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# MONITORING REPORTS

DATE:
2003-2002

### JANUARY 2003 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY

**BJ SERVICES COMPANY, U.S.A.** 

MAY 9, 2003

### JANUARY 2003 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: 12832.018

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May 9, 2003

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### 1.0 INTRODUCTION

Brown and Caldwell conducted a 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 in January 2003. This report presents a description of the groundwater sampling field activities, a summary and evaluation of the analytical results, and an evaluation of remedial technologies applied at the facility. A groundwater potentiometric surface map and a hydrocarbon distribution map are included.

A layout of the facility is shown in Figure 1. The facility formerly operated an on-site fueling system. Subsurface impact near the former diesel fueling system was detected by the New Mexico Oil Conservation Division (NMOCD) during an on-site inspection on February 7, 1991. The fueling system was taken out of operation in July 1995. 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.

A biosparging system was activated in November 1995 and expanded in March/April 1997 and February/March 1998 to remediate soil and groundwater at the former fuel island area of the facility. The biosparging system was deactivated on November 1, 2000 after achieving cleanup goals for groundwater. The confirmation soil sampling program specified in the NMOCD-approved Remedial Action Plan (RAP) for the facility was conducted in July 2001. The results of the confirmation soil sampling program were presented to NMOCD in the report for the June 2001 groundwater sampling event. In accordance with the RAP for the facility, four additional groundwater sampling events were conducted following the confirmation soil sampling event. Hydrocarbon concentrations in groundwater samples from applicable monitor wells remained below the target concentrations specified in the RAP during each of these sampling events, so a request to decommission the biosparging system was submitted to NMOCD in the June 2002 Groundwater Sampling and Biosparging System Closure Report for the facility.

BJ Services removed three field waste tanks from the facility on March 6-7, 1997. The ongoing groundwater monitoring program was expanded 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.

Table 1 presents a site chronology detailing the history of investigations into and the remediation of soil and groundwater impacts in the areas of the former fueling system and the former field waste tanks at the facility.

### 2.0 FIELD ACTIVITIES AND RESULTS

Brown and Caldwell purged and sampled six monitor wells (MW-5, MW-10, MW-11A, MW-12D, MW-14, and MW-15) at the facility on January 9, 2003 to determine the concentrations of dissolved-phase hydrocarbons and/or chloride in groundwater and to evaluate general groundwater quality in the area of the facility. The monitor well locations are shown in Figure 1. In the March 2002 Groundwater Sampling Report for the facility, Brown and Caldwell recommended installation of a new monitor well (MW-16) to replace monitor well OW-4, which has gone dry. Brown and Caldwell plans to install monitor well MW-16 in March 2003 now that this activity has been approved by the NMOCD and access privileges have been granted by the off-site landowner.

The following subsections describe the field activities conducted by Brown and Caldwell during the January 2003 event and present the results from the associated groundwater analyses.

### 2.1 Groundwater Sampling Activities

Groundwater level measurements were obtained from all accessible monitor wells at the facility on January 9, 2003 prior to purging and sampling the subset of wells listed above. Groundwater levels were measured to the nearest 0.01 foot with a water-level indicator. Current and historical groundwater elevation data for each well are presented in Table 2. The groundwater elevation data indicate that the groundwater flow direction is to the east/northeast, with an overall hydraulic gradient of approximately 0.007 foot/foot. The groundwater elevation data presented in Table 2 indicate that groundwater levels have continued to decline in monitor wells at the facility since late 1995. A groundwater elevation map for January 9, 2003 is presented in Figure 2.

Monitor wells MW-5, MW-10, MW-11A, MW-14 and MW-15 were purged and sampled with previously unused disposable bailers and clean, previously unused nylon string. Three well volumes were purged from monitor wells MW-5, MW-11A, and MW-15. Monitor wells MW-10 and MW-14 were purged dry at 0.5 gallons and 1.5 gallons, respectively. A submersible pump fitted with disposable polyethylene tubing was used to purge monitor well MW-12D until

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groundwater stabilization occurred, with stabilization defined as variation of less than 0.5°C for temperature, less than 0.1 unit for pH, and less than 10% for specific conductivity between three consecutive measurements of groundwater during the purging process. The wells were sampled in general order of least impacted to most impacted (based on analytical results from the September 2002 and preceding sampling events) to further mitigate the potential for cross-contamination between the wells.

Field parameter measurements for pH, specific conductivity, oxidation-reduction (redox) potential, dissolved oxygen content, and temperature were collected from wells containing an adequate volume of water during and upon completion of well purging. Ferrous iron and dissolved oxygen were measured in monitor wells MW-5, MW-11A, and MW-12D upon conclusion of purging activities; because it was purged dry, these field parameters were not measured for monitor well MW-10. Field parameter readings were recorded on the groundwater sampling forms included in Appendix A and the final values for each well sampled during the January 2003 event are summarized in Table 3.

With the exception of monitor well MW-12D, groundwater samples were collected by pouring recovered water from a bailer. For monitor well MW-12D, the groundwater sample was collected directly from the discharge line of the down-hole pump. Using these methods, each sample was transferred to laboratory-prepared, clean glass and/or plastic containers, sealed with Teflon<sup>®</sup>-lined lids, labeled, and placed on ice in an insulated cooler for delivery to Southern Petroleum Laboratory in Houston, Texas for analysis using standard chain-of-custody procedures.

Field measurement equipment was decontaminated prior to and following each use. Decontamination procedures consisted of washing with distilled water and a non-phosphate detergent, then rinsing with distilled water. The submersible pump used to sample monitor well MW-12D was decontaminated first by pumping distilled water with a non-phosphate detergent through it and then by rinsing it with distilled water using containers at the surface. Purge and decontamination waters were discharged to an on-site water reclamation system at the BJ Services facility.

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### 2.2 Results of Groundwater Analyses

Groundwater samples from monitor wells MW-5, MW-10, MW-11A, MW-14 and MW-15 were analyzed for chloride content using Method E325.3. In addition, samples from monitor wells MW-5, MW-10, MW-11A, and MW-12D were analyzed for gasoline- and diesel-range total petroleum hydrocarbons (TPH-G and TPH-D) by EPA Method SW-8015B and for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method SW-8021B. Analyses of groundwater from these four wells for nitrate and sulfate (Method E300.0), dissolved methane (Method RSK 147), and alkalinity (Method E310.1) were performed to evaluate the potential for natural attenuation of hydrocarbons at the facility. The laboratory analytical report and chain-of-custody documentation for the groundwater samples collected during the January 2003 sampling event are provided in Appendix B.

Current and cumulative analytical results for BTEX constituents, TPH-D, and TPH-G are presented in Table 4. Figure 3 presents a hydrocarbon distribution map for the January 2003 sampling event. With the exception of the detection of benzene in monitor well MW-11A at 0.012 milligrams per liter (mg/L), all BTEX concentrations are less than the applicable New Mexico Water Quality Control Commission (NMWQCC) standards. The NMWQCC standard for benzene is 0.010 mg/L.

Table 5 presents current and cumulative results for chloride analyses performed on groundwater samples collected at the facility. Choloride concentrations in monitor wells MW-5, MW-12D and MW-15 remained less than the NMWQCC chloride standard of 250 mg/L in January 2003. The chloride concentration of 179 mg/L in downgradient monitor well MW-14 is also less than this standard.

The current and historical results for nitrate, sulfate, and dissolved methane analyses performed on groundwater samples from monitor wells MW-5, MW-10, MW-11A, MW-12, and MW-12D to assist in the evaluation of natural attenuation processes at the BJ Services facility are presented in Table 6. Groundwater alkalinity may also be indicative of natural attenuation processes.

Groundwater alkalinity values measured in the four wells of interest during the January 2003 sampling event are as follows:

- MW-5 (upgradient, background well): 222 mg/L;
- MW-10: 408 mg/L;
- MW-11A: 356 mg/L; and
- MW-12D: 225 mg/L.

### 3.0 EVALUATION OF REMEDIAL TECHNOLOGIES

The following subsections present evaluations of the remedial technologies applied at the former fueling system and former field waste tanks areas of the BJ Services facility in Hobbs, New Mexico.

### 3.1 Biosparging System at the Former Fueling System Area

Brown and Caldwell recommended installation of a biosparging system at the former fueling system area of the facility in the Remedial Action Plan (RAP) submitted to the NMOCD in May 1994. The NMOCD approved the RAP on August 11, 1994. The biosparging system was installed in August 1995, with expansions completed in April 1997 and March 1998. Operation of the biosparging system resulted in substantial decreases in hydrocarbon concentrations in applicable former fueling system area monitor wells. In accordance with the RAP, confirmation soil sampling activities were conducted at the former fueling system area in July 2001 to verify the effectiveness of the biosparging system in remediating vadose zone soils. The analytical results for these soil samples, as discussed in the report for the June 2001 groundwater sampling event, indicated that remediation goals for soil in this area had been achieved.

Following the confirmation soil sampling activities, hydrocarbon concentrations in groundwater remained below target cleanup goals for four successive quarters. In accordance with the RAP for the facility, a request to decommission the biosparging system was submitted to the NMOCD in the June 2002 Groundwater Sampling and Biosparging System Closure Report.

### 3.2 Natural Attenuation at the Former Field Waste Tanks Area

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

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Plume behavior is the primary evidence of natural attenuation. 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. 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 these tanks. Sporadic increases in total BTEX concentrations between quarterly sampling events have been observed in monitor wells in this area since March 1997, however. These increases may be attributed to sporadic loading rates from the vadose zone in excess of the rate of natural attenuation in the area. The following subsections present primary and secondary evidence of natural attenuation of hydrocarbons in groundwater at the former field waste tanks area of the facility.

### 3.2.1 Primary Evidence

The benzene concentration in monitor well MW-10 has decreased from a maximum of 1.3 mg/L in August 1995 (prior to removal of the field waste tanks) to less than the NMWQCC standard of 0.01 mg/L for BTEX in the eight applicable groundwater sampling events between December 2000 and January 2003. Concentrations of toluene, ethylbenzene, and xylenes in monitor well MW-10 have undergone similar decreases over this time period. BTEX constituent concentrations have been less than 0.001 mg/L for the previous four successive quarters.

Benzene concentrations at the monitor well MW-11/11A location have generally decreased from a maximum of 0.970 mg/L in December 1996 (prior to removal of the field waste tanks). During the period from June 2001 through September 2002, benzene concentrations in six successive sampling P:\Wp\BJSERV\12832\103r.doc

events were less than the applicable NMWQCC standard of 0.01 mg/L. However, the January 2003 benzene concentration of 0.012 mg/L in monitor well MW-11A slightly exceeds the NMWQCC standard for benzene.

Concentrations of each BTEX constituent at the monitor well MW-12/12D location have been below analytical detection limits for the past six sampling events.

### 3.2.2 Secondary Evidence

The following lines of geochemical evidence can also be used to 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 as an electron acceptor during intrinsic bioremediation. Dissolved oxygen concentrations should therefore be depressed in areas where intrinsic bioremediation is occurring.

Groundwater samples were collected primarily using bailers during the January 2003 sampling event due to low water levels in the wells. Measured dissolved oxygen concentrations in most wells at the facility were therefore artificially elevated. The use of bailers may cause groundwater samples to become oxygenated, thus precluding a meaningful comparison of dissolved oxygen data.

Historic evidence submitted to the NMOCD in previous quarterly groundwater monitoring reports for the facility when down-hole pumps were utilized has indicated that dissolved oxygen concentrations were typically depressed in hydrocarbon-impacted monitor wells relative to non-impacted wells at the facility (see the June 2001 Groundwater Sampling Report for BJ Services Hobbs, New Mexico Facility, for example).

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 was detected at a concentration of 2.1 mg/L in background monitor well MW-5 during the January 2003 sampling event. Although there was minimal to no hydrocarbon impact at former field waste tanks area wells MW-10, MW-11A, and MW-12D in January 2003 (see Table 4), nitrate concentrations were below analytical detection limits in each of

these wells. The non-detectable nitrate concentrations observed during this sampling event at former field waste tanks area wells MW-10, MW-11A, and MW-12D relative to the background nitrate concentration at the facility is likely due to residual effects from hydrocarbons.

3. When dissolved oxygen and nitrate are depleted, anaerobic microbes that utilize other electron acceptors may 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 0.0 mg/L in background monitor well MW-5 during the January 2003 sampling event, but respective ferrous iron concentrations of 0.5 mg/L and 0.75 mg/L were measured in former field waste tanks area monitor wells MW-11A and MW-12D. The elevated ferrous iron concentrations in monitor wells MW-11A and MW-12D suggest that ferric iron has been used as an electron acceptor during natural attenuation of hydrocarbons at the former field waste tanks area of the facility.

4. Microbes that utilize sulfate may become active when dissolved oxygen, nitrate, and ferric iron are depleted. Sulfate concentrations should therefore decrease in areas where intrinsic bioremediation is occurring through the use of sulfate as an electron acceptor.

In January 2003, sulfate concentrations in the former field waste tanks area monitor wells MW-10, MW-11A, and MW-12D ranged from 150 mg/L to 290 mg/L whereas the concentration in background monitor well MW-5 was 97 mg/L. The fact that sulfate concentrations in the former source area monitor wells are greater than the sulfate concentration in the background monitor well suggests that sulfate is not being utilized as an electron acceptor in the former field waste tanks area.

5. Methane is a reaction product generated during utilization of carbon dioxide as an electron acceptor, so its concentration may increase in areas where concentrations of electron acceptors such as dissolved oxygen, nitrate, and ferric iron have diminished.

Dissolved methane was detected in background monitor well MW-5 at a concentration of 0.004 mg/L during the January 2003 groundwater sampling event. In the former field waste tanks area monitor wells MW-10, MW-11A, and MW-12D, dissolved methane ranged from 0.0024 mg/L to 0.0063 mg/L. The nominal differences in dissolved methane concentrations in these wells suggest that utilization of carbon dioxide as an electron acceptor is not presently occurring at the former field waste tanks area of the facility.

6. Redox potential is a measure of chemical energy in groundwater. The redox potential of groundwater from background monitor well MW-5 was measured at -158.1 mV in January 2003. Respective redox potentials of -172.8 mV, -165.1 mV, and -159.9 mV were measured in the former field waste tanks area monitor wells MW-10, MW-11A, and MW-12D in January 2003. These wells cannot be differentiated in terms of redox potential based

 on the similarity of the values, so that this parameter does not provide evidence of natural attenuation of hydrocarbons at the former field waste tanks area.

7. Alkalinity is expected to increase during natural attenuation processes as a result of the leaching of carbonates from mineral substrates by microbially-produced organic acids.

Analytical method E310.1 was used to measure total alkalinity in January 2003. The alkalinity of groundwater from background monitor well MW-5 was 222 mg/L. A comparable alkalinity of 225 mg/L was measured in the deepest monitor well at the former field waste tanks area, MW-12D. Elevated alkalinities of 408 mg/L and 356 mg/L were measured in the shallower former field waste tanks area monitor wells MW-10 and MW-11A, respectively. Based on the elevated total alkalinity of groundwater in monitor wells MW-10 and MW-11A, it can be inferred that natural attenuation of hydrocarbons is occurring in the vicinity of these shallower wells at the former field waste tanks area.

In conclusion, current nitrate and historic dissolved oxygen data suggest that these electron acceptors are being utilized during intrinsic bioremediation processes in the vicinity of the former field waste tanks area of the facility. Data for ferrous iron may also indicate the utilization of ferric iron as an electron acceptor in this area of the facility. Current alkalinity data provide further evidence that natural attenuation of hydrocarbons is occurring in this area.

It is recommended that monitoring for natural attenuation evaluation parameters continue in the former field waste tank area monitor wells MW-10, MW-11A, and MW-12D and in the background well, MW-5. Redox potential, dissolved oxygen content, ferrous iron content, and alkalinity serve as good indicators of the occurrence of intrinsic bioremediation of hydrocarbons, so it is also recommended that field testing for these parameters be continued in all wells to be sampled during upcoming groundwater monitoring events.

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### 4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the January 2003 groundwater sampling event conducted at the BJ Services Hobbs, New Mexico facility.

### 4.1 Conclusions

- January 2003 benzene concentrations in the former field waste tanks area monitor wells MW-10 and MW-12D are less than the NMWQCC standard of 0.01 mg/L for benzene; however, monitor well MW-11A recorded a benzene concentration of 0.012 mg/L, which is slightly higher than the NMWQCC standard for benzene. Based on generally decreasing hydrocarbon concentrations in these monitor wells over time and as substantiated by geochemical data, natural attenuation processes appear to be occurring in the vicinity of the former field waste tanks which were removed in March 1997.
- The chloride concentration measured in downgradient monitor well MW-14 during the January 2003 groundwater sampling event is less than the NMWQCC standard of 250 mg/L.

### 4.2 Recommendations

- Continue the quarterly monitoring program for former field waste tank area monitor wells MW-10, MW-11A, and MW-12D. Continue monitoring for natural attenuation parameters in these wells and the background monitor well MW-5, including field-testing for natural attenuation indicator parameters.
- Based on the recent approval from the NMOCD and the acquisition of access privileges, complete installation and sampling of an off-site monitor well (MW-16) to further define the downgradient extent of chloride impact to groundwater in the area of the facility.
- Upon approval from the NMOCD, decommission the biosparging system at the former fuel island area.

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### DISTRIBUTION

January 2003 Groundwater Sampling Report BJ Services Company, U.S.A. Hobbs, New Mexico

May 9, 2003

Final Distribution as follows:

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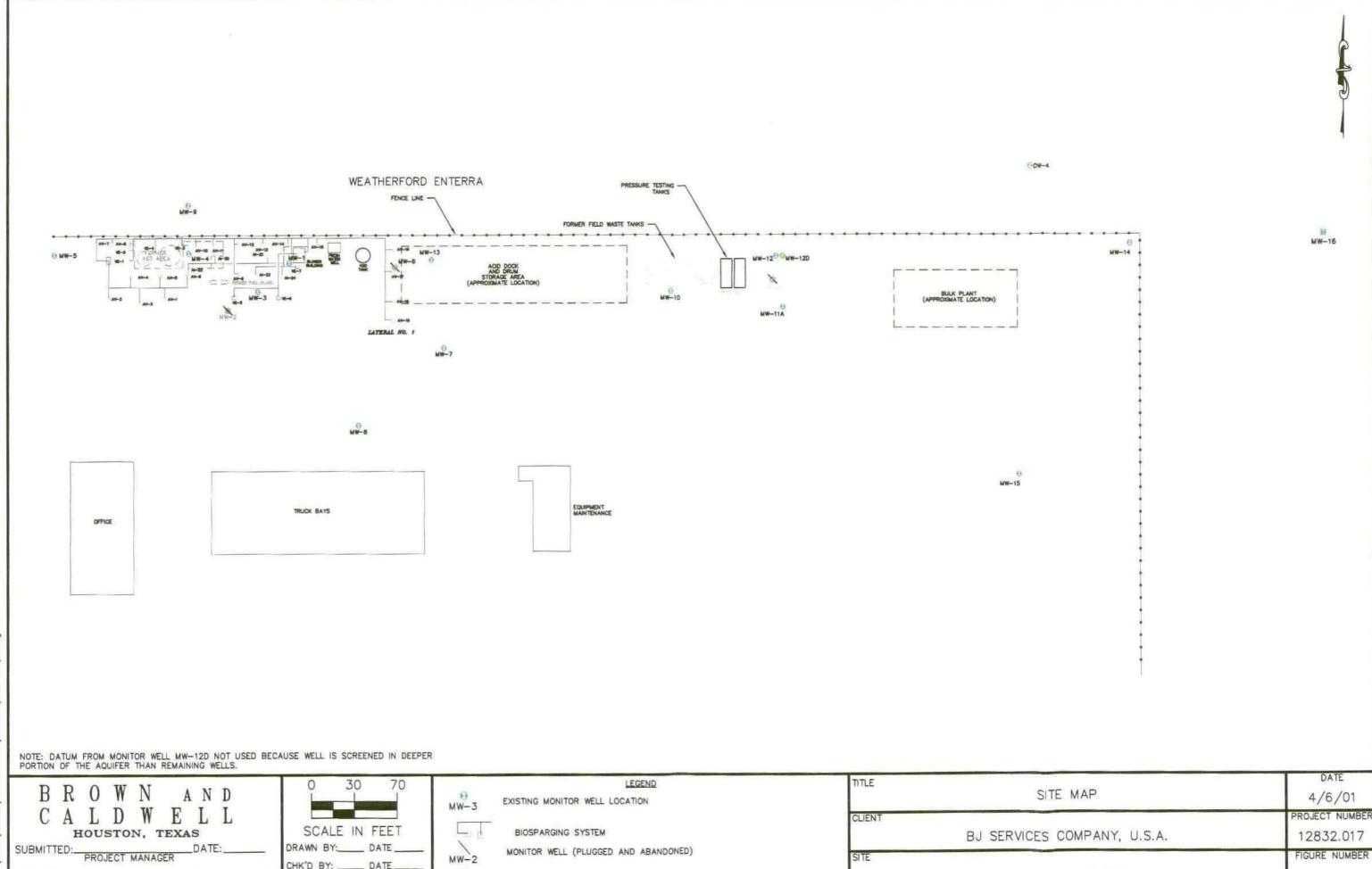
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Lynn Wright

Principal Geologist

<sup>&</sup>quot;Use or disclosure of data contained on this sheet is subject to the restriction specified at the beginning of this document."

**FIGURES** 



MONITOR WELL (PLUGGED AND ABANDONED)

PROPOSED WELL LOCATION

FIGURE NUMBER

HOBBS, NEW MEXICO

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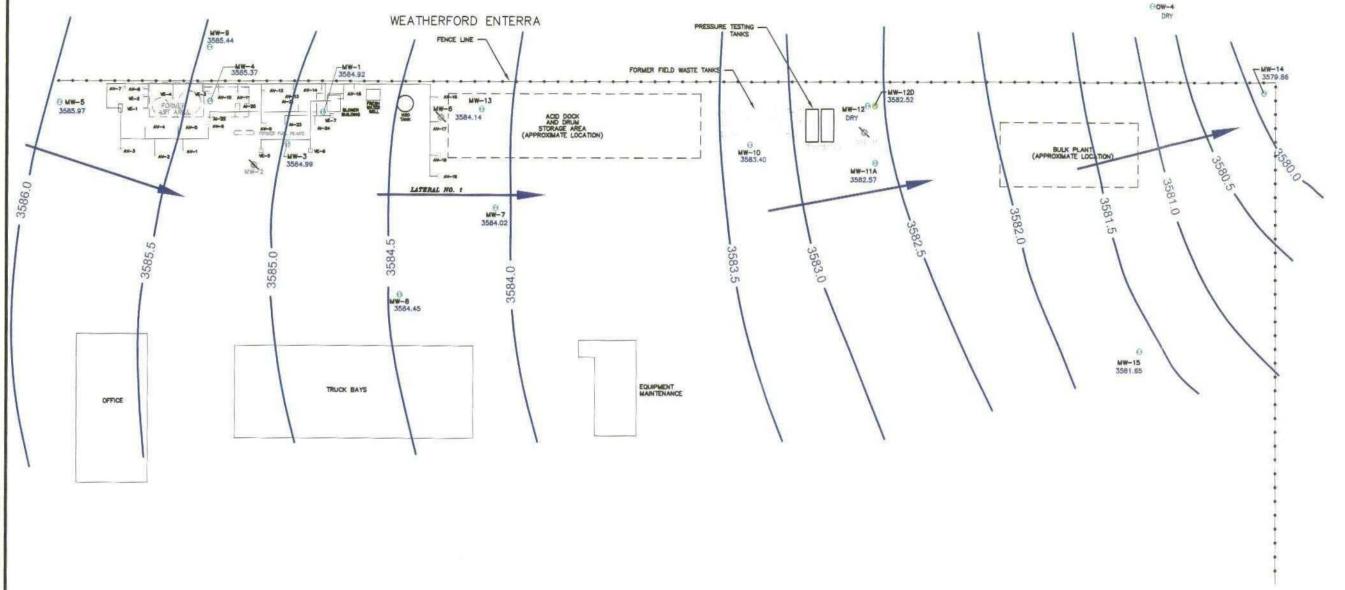
APPROVED: \_\_\_\_DATE:

DRAWN BY:\_

APPROVED:\_

\_ DATE\_

MW-16 FUTURE WELL



B R O W N A N D C A L D W E L L HOUSTON, TEXAS

SUBMITTED: PROJECT MANAGER APPROVED: BROWN AND CALDWELL

70 SCALE IN FEET DRAWN BY: CLK DATE 2 APPROVED:\_\_\_ \_\_ DATE\_

MW-3

EXISTING MONITOR WELL LOCATION

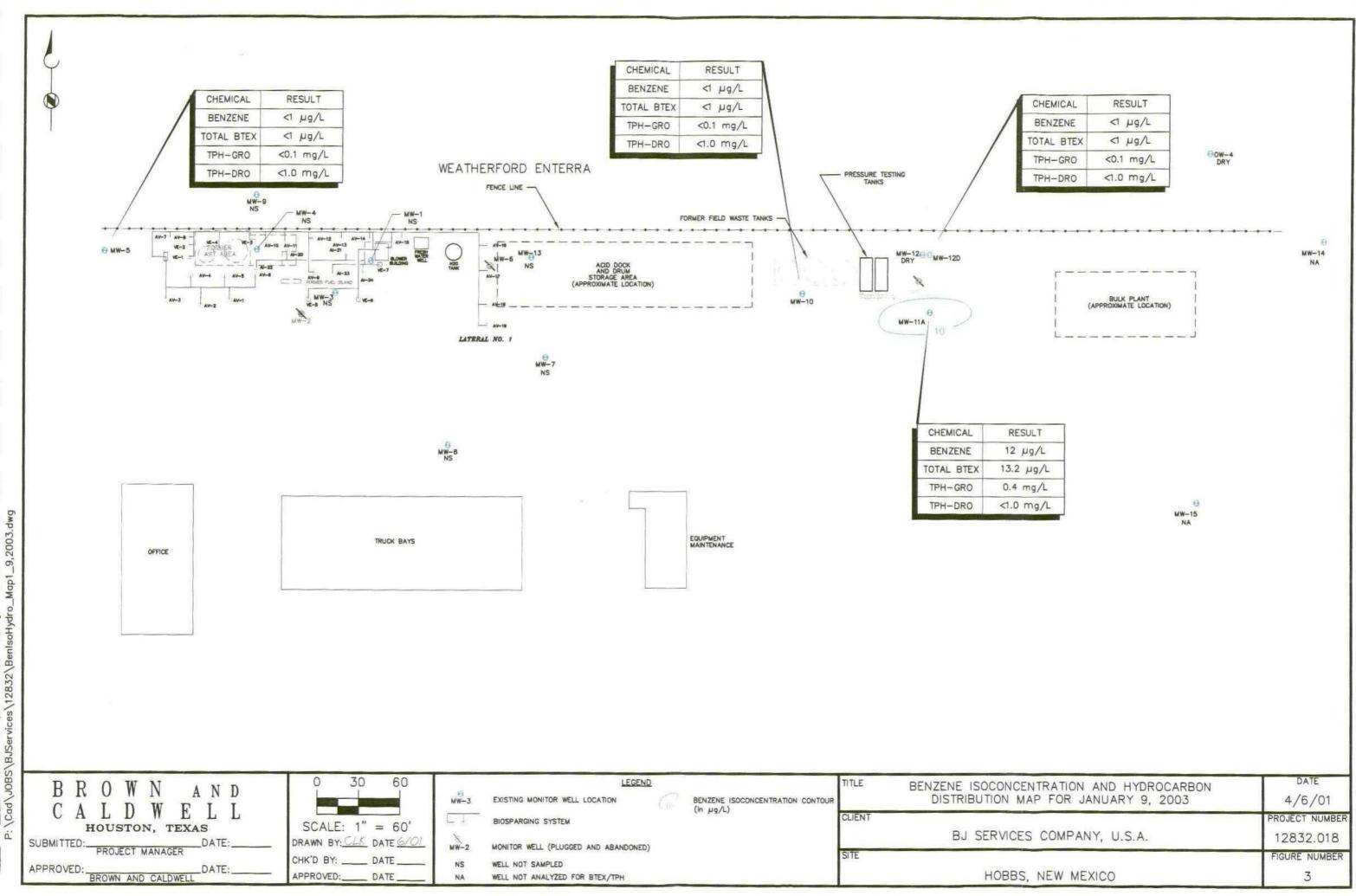
BIOSPARGING SYSTEM WW-2 AV-10 MONITOR WELL (PLUGGED AND ABANDONED) PROPOSED WELL LOCATION

GROUNDWATER FLOW DIRECTION

GROUNDWATER ELEVATION CONTOUR

TITLE	GROUNDWATER ELEVATION MAP FOR JANUARY 9, 2003	DATE 4/6/01
CLIEN.	BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER 12832.017
SITE	HOBBS, NEW MEXICO	FIGURE NUMBER

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**TABLES** 

Date	Activity				
February 7, 1991	The New Mexico Oil Conservation Division (NMOCD) conducted an on-site inspection, including sampling of the on-site fresh water well.				
August 6, 1991	The NMOCD 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 NMOCD.				
November 15, 1991	The NMOCD approved the Technical Work Plan submitted by RSA.				
December 16, 1991	RSA sampled the fresh water well. The analytical results were submitted to the NMOCD.				
February 21, 1992	Western sampled the fresh water well. The analytical results were submitted to the NMOCD.				
July 29 -	Brown and Caldwell conducted a soil and groundwater investigation				
August 10, 1992	according to the approved Technical Work Plan. The investigation included drilling and sampling nine soil borings, sampling six handaugured soil borings, installation and sampling of five monitor wells, and sampling of the fresh water well.				
October 12, 1992	Brown and Caldwell submitted a Soil and Groundwater Investigation Report to the NMOCD.				
December 2, 1992	The NMOCD requested the installation and sampling of four additional monitor wells, including a monitor well on an adjacent property.				
April 13, 1993	Brown and Caldwell conducted a vapor extraction pilot test on the existing monitor wells.				
April 15, 1993	Brown and Caldwell installed off-site monitor well MW-9.				
April 22, 1993	Brown and Caldwell sampled off-site monitor well MW-9.				
May 27, 1993	Brown and Caldwell submitted a letter report documenting the installation and sampling of off-site monitor well MW-9 to the NMOCD.				
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.				

Date	Activity
June 21, 1993	ENSR Consulting and Engineering (ENSR), the environmental consultant for the adjacent property owner on which off-site well MW-9 is located, submitted a request to sample monitor well MW-9.
July 15, 1993	ENSR split a groundwater sample collected from monitor well MW-9 with Brown and Caldwell.
July 30, 1993	USTank Management, Inc. submitted a 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 monitor wells. Brown and Caldwell sampled each of the existing and newly installed monitor wells.
January 26, 1994	Brown and Caldwell performed a groundwater monitoring event; the existing monitor wells and the fresh water well were purged and sampled. The groundwater samples were analyzed for BTEX.
May 6, 1994	A Remedial Action Plan (RAP) was submitted to the NMOCD.
August 11, 1994	The RAP was approved by the NMOCD.
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 the 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) constructed the initial design of the biosparging system.
September 19, 1995	Operation of the extraction portion of the biosparging system commenced.
November 13, 1995	Operation of the injection portion of the biosparging system commenced.
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.

Date	Activity
May 31, 1996	Brown and Caldwell conducted the May 1996 groundwater sampling event.
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 tanks 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 was installed.
April 1997	Vapor extraction well VE-4 was 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 was 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.

Date	Activity
December 9-10, 1998	Brown and Caldwell conducted the December 1998 groundwater sampling event.
January 21, 1999	The 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 by the NMOCD.
May 19, 1999	The 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 injection 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.
November 1, 2000	Brown and Caldwell deactivated the biosparging system.
December 7, 2000	Brown and Caldwell conducted the December 2000 groundwater sampling event.

Date	Activity
January 2001	Brown and Caldwell installed and sampled monitor wells MW-14 and MW-15.
March 8-9, 2001	Brown and Caldwell conducted the March 2001 groundwater sampling event.
June 21-22, 2001	Brown and Caldwell conducted the June 2001 groundwater sampling event.
July 23, 2001	Brown and Caldwell collected soil samples from four soil borings installed at the former fueling system area of the facility to confirm the effectiveness of the biosparging system in remediating hydrocarbon impact to soil, as specified in the NMOCD-approved RAP.
September 10, 2001	Brown and Caldwell conducted the September 2001 groundwater sampling event.
December 6, 2001	Brown and Caldwell conducted the December 2001 groundwater sampling event.
February 26, 2002	Brown and Caldwell repaired the crushed well completion on monitor well MW-10.
February 28, 2002	NMOCD requested an evaluation of chloride content of groundwater at the facility.
March 11-12, 2002	Brown and Caldwell conducted the March 2002 groundwater sampling event. Groundwater samples from all water-producing wells at the facility were analyzed for chloride content.
May 21, 2002	Brown and Caldwell submitted the report for the March 2002 groundwater sampling event, including an evaluation of chloride content of groundwater at the facility and a recommendation for installation of a downgradient off-site well (MW-16) to replace off-site well OW-4, which has gone dry.
June 17-18, 2002	Brown and Caldwell conducted the June 2002 groundwater sampling event.
September 16, 2002	Brown and Caldwell conducted the September 2002 groundwater sampling event.
November 11, 2002	Brown and Caldwell submitted the June 2002 Groundwater Sampling Report and Biosparging System Closure Report.
January 9, 2003	Brown and Caldwell conducted the January 2003 groundwater sampling event.

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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	8/10/1992	53.22	0.00	3,594.31	(1)
	1	2/9/1993	53.03	0.00	3,594.50	1
		8/18/1993	53.10	0.00	3,594.43	
	·	1/26/1994	53.31	0.00	3,594.22	
		5/3/1995	54.64	0.20	3,593.05	(2)
	ł	7/31/1995	54.14 53.69	0.00	3,593.39	
		11/14/1995 2/23/1996	53.09 54.32	0.00	3,593.84 3,593.21	
		5/31/1996	54.14	0.00	3,593.21	
		8/23/1996	56.17	0.00	3,591.36	
		12/2/1996	55.27	0.00	3,592.26	
		3/12/1997	55.70	0.27	3,592.05	
		6/12/1997	55.08	0.02	3,592.47	
		9/12/1997	55.64	0.51	3,592.31	
	ľ	12/10/1997	55.46	0.00	3,592.07	PSH Sheen
		3/24/1998	55.81	0.00	3,591.72	PSH Sheen
		6/23/1998	56.38	0.06	3,591.20	
		9/30/1998	56.82	0.00	3,590.71	PSH Sheen
		12/9/1998	57.05	0.00	3,590.48	
		3/10/1999	57.45	0.00	3,590.08	
		6/10/1999	58.02	0.00	3,589.51	
		7/2/1999 9/14/1999	57.90 58.14	0.00 0.00	3,589.63	
		12/9/1999	38.14	0.00	3,589.39	(3)
		3/9/2000 06/00	- 58.99	0.00	3,588.54	(3)
		09/00	-	-	<u>-</u>	1
		12/7/00	-	- 1	•	
		3/8/2001	60.35	0.00	3,587.18	•
		6/21/01	60.99	0.00	3,586.54	
		9/10/01	61.17	0.00	3,586.36	
		12/6/2001		not measured		
		03/11/02	62.11	0.00	3,585.42	<u> </u>
		6/17/02	62.53	0.00	3,585.00	
	1	9/16/2002	62.43	0.00	3,585.10	
MW-2	3,644.84	1/9/2003 8/10/1992	62.61 52.82	0.00	3,584.92 3,592.02	(1)
IVI VV -2	3,044.84	2/9/1993	49.60	0.00	3,595.24	(1)
		8/18/1993	49.71	0.00	3,595.13	
		1/26/1994	49.97	0.00	3,594.87	ł
		5/3/1995	-	-	-	(4),(5)
MW-3	3,645.00	8/10/1992	52.99	0.00	3,592.01	(1)
		2/9/1993	52.72	0.00	3,592.28	
		8/18/1993	52.82	0.00	3,592.18	
		1/26/1994	53.05	0.00	3,591.95	
		5/3/1995	54.31	0.00	3,590.69	
		7/31/1995	51.24	0.00	3,593.76	
		11/14/1995 2/23/1996	51.10 51.68	0.00	3,593.90	
		5/31/1996 5/31/1996	51.68 51.45	0.00 0.00	3,593.32 3,593.55	
		8/23/1996	51.43 51.55	0.00	3,593.45	
		12/2/1996	52.23	0.00	3,592.77	1
		3/12/1997	52.67	0.00	3,592.33	
		6/12/1997	52.68	0.00	3,592.32	[
		9/11/1997	52.71	0.00	3,592.29	
		12/10/1997	52.89	0.00	3,592.11	
		3/23/1998	53.22	0.00	3,591.78	
	<u> </u>	6/23/1998	53.66	0.00	3,591.34	
		9/30/1998	54.06	0.00	3,590.94	1
		12/9/1998	54.36	0.00	3,590.64	
	1					
	t	3/10/1999	54.72	0.00	3,590.28	
		3/10/1999 6/10/1999	54.72 55.17	0.00	3,589.83	
		3/10/1999 6/10/1999 7/2/1999	54.72 55.17 55.15	0.00 0.00	3,589.83 3,589.85	
		3/10/1999 6/10/1999 7/2/1999 9/14/1999	54.72 55.17 55.15 55.42	0.00 0.00 0.00	3,589.83 3,589.85 3,589.58	
		3/10/1999 6/10/1999 7/2/1999 9/14/1999 12/9/1999	54.72 55.17 55.15 55.42 55.78	0.00 0.00 0.00 0.00	3,589.83 3,589.85 3,589.58 3,589.22	
		3/10/1999 6/10/1999 7/2/1999 9/14/1999	54.72 55.17 55.15 55.42	0.00 0.00 0.00	3,589.83 3,589.85 3,589.58	

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	3,645.00	12/7/2000	57.15	0.00	3,587.85	
cont.		3/8/2001	57.69	0.00	3,587.31	
		6/21/01	58.34	0.00	3,586.66	
		9/10/01	58.54	0.00	3,586.46	
		12/6/2001	59.04 59.50	0.00	3,585.96	
		3/11/2002 6/17/02	59.83	0.00 0.00	3,585.50 3,585.17	
		9/16/2002	59.80	0.00	3,585.20	
		1/9/2003	60.01	0.00	3,584.99	
MW-4	3,645.28	8/10/1992	50.55	0.00	3,594.73	(1)
	]	2/9/1993	50.26	0.00	3,595.02	(-)
	\	8/18/1993	50.38	0.00	3,594.90	
		1/26/1994	50.90	0.30	3,594.63	
		5/3/1995	51.51	0.45	3,594.14	
		7/31/1995	51.74	0.26	3,593.75	
		11/14/1995	51.03	0.00	3,594.25	
		2/23/1996	51.65	0.01	3,593.64	
		5/31/1996	51.48	0.00	3,593.80	
		8/23/1996	53.49 53.33	0.00	3,591.79	
		12/2/1996 3/12/1997	52.32 52.74	0.00	3,592.96 3,592.58	
		6/12/1997 6/12/1997	52.74 53.08	0.05 0.44	3,592.58 3,592.56	
		9/12/1997	52.60	0.44	3,592.80	
		12/10/1997	52.89	0.00	3,592.39	PSH Sheen
		3/24/1998	53.20	0.25	3,592.29	TOTA BILLOT
		6/23/1998	53.82	0.22	3,591.64	
	1.	9/30/1998	53.96	0.00	3,591.32	200 ml PSH
	¥	12/9/1998	54.27	0.00	3,591.01	
		3/10/1999	54.69	0.04	3,590.62	ļ
		6/10/1999	55.07	0.00	3,590.21	
		7/2/1999	55.10	0.00	3,590.18	
		9/14/1999	55.33	0.00	3,589.95	
		12/9/1999	55.79	0.00	3,589.49	
		3/10/2000 6/8/2000	56.12 56.67	0.00 0.00	3,589.16	
		9/13/2000	56.65	0.00	3,588.61 3,588.63	<u> </u>
		12/7/2000	57.05	0.00	3,588.23	
		3/8/2001	57.72	0.00	3,587.56	
		6/21/01	58.18	0.00	3,587.10	
		9/10/01	58.54	0.00	3,586.74	
		12/6/2001	58.88	0.00	3,586.40	
	i	3/11/2002	59.41	0.00	3,585.87	
		6/17/02	59.67	0.00	3,585.61	
		9/16/2002	59.71	0.00	3,585.57	
		1/9/2003	59.91	0.00	3,585.37	
MW-5	3,647.72	8/10/1992	52.38	0.00	3,595.34	(1)
		2/9/1993	52.06	0.00	3,595.66	1
		8/18/1993	52.16 52.50	0.00	3,595.56 3,595.33	[
		1/26/1994 5/3/1995	52.50 53.57	0.00 0.00	3,595.22 3,594.15	1
		7/31/1995 7/31/1995	53.57 53.27	0.00	3,594.15 3,594.45	
		11/14/1995	52.83	0.00	3,594.45 3,594.89	1
		2/23/1996	53.57	0.00	3,594.15	ļ.
		5/31/1996	53.16	0.00	3,594.56	
		8/23/1996	53.41	0.00	3,594.31	
		12/2/1996	53.98	0.00	3,593.74	
		3/12/1997	54.44	0.00	3,593.28	
		6/12/1997	54.48	0.00	3,593.24	
		9/12/1997	54.29	0.00	3,593.43	
		12/10/1997	54.66	0.00	3,593.06	
		3/23/1998	55.05	0.00	3,592.67	
		6/23/1998	55.44	0.00	3,592.28	
		9/30/1998	55.65	0.00	3,592.07	
		12/9/1998	56.00	0.00	3,591.72	
	·	3/9/1999	56.45	0.00	3,591.27	
		6/10/1999 7/2/1999	56.91 56.93	0.00	3,590.81 3,590.79	
		11211999	.30.9.3	1 0.00	1 1190.79	1

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-5	3,647.72	12/9/1999	57.41	0.00	3,590.31	
cont.		3/9/2000	57.92	0.00	3,589.80	
	]	6/8/2000	58.32	0.00	3,589.40	
		9/13/2000	58.36	0.00	3,589.36	
	1	12/7/2000	58.71	0.00	3,589.01	
		3/8/2001	59.36	0.00	3,588.36	
	1	6/21/01	59.94	0.00	3,587.78	
	J I	9/10/01	59.85	0.00	3,587.87	
	1	12/6/2001	60.56	0.00	3,587.16	
		3/11/02	61.12	0.00	3,586.60	
	(	6/17/02	61.43	0.00	3,586.29	
		9/16/2002	61.52	0.00	3,586.20	
	J I	1/9/2003	61.75	0.00	3,585.97	
MW-6	3,644.74	2/9/1993	50.58	0.00	3,594.16	(1)
141 44 0	] 3,0	8/18/1993	50.78	0.00	3,593.96	(.)
		1/26/1994	51.00	0.00	3,593.74	
		5/3/1995	52.63	0.00	3,592.11	
		7/31/1995	51.90	0.00	3,592.84	
	1	11/14/1995	51.19	0.00	3,593.55	
		2/23/1996	52.10	0.00	3,592.64	
	1		52.10 51.76	0.00		ļ
		5/31/1996		0.00	3,592.98	
		8/23/1996	51.63		3,593.11	
	į l	12/2/1996	52.85	0.00	3,591.89	
		3/12/1997	53.55	0.00	3,591.19	
	]	6/12/1997	52.08	0.00	3,592.66	
		9/11/1997	53.72	0.00	3,591.02	
		12/10/1997	53.27	0.00	3,591.47	
		3/23/1998	53.56	0.00	3,591.18	1
	1	6/23/1998	52.88	0.00	3,591.86	
		9/30/1998	54.89	0.00	3,589.85	
		12/9/1998	54.57	0.00	3,590.17	
	•	3/10/1999	55.10	0.00	3,589.64	
		7/2/1999				(5),(6)
MW-7	3,644.55	2/9/1993	50.53	0.00	3,594.02	(1)
		8/18/1993	50.74	0.00	3,593.81	
		1/26/1994	51.01	0.00	3,593.54	
		5/3/1995	52.25	0.00	3,592.30	
	1	7/31/1995	51.92	0.00	3,592.63	1
		11/14/1995	51.48	0.00	3,593.07	
		2/23/1996	52.15	0.00	3,592.40	
	Î I	5/31/1996	51.78	0.00	3,592.77	
		8/23/1996	52.02	0.00	3,592.53	
	,	12/2/1996	52.52	0.00	3,592.03	
		3/12/1997	52.99	0.00	3,591.56	1
		6/12/1997	53.08	0.00	3,591.47	1
	(	9/11/1997	53.00	0.00	3,591.55	1
		12/10/1997	53.28	0.00	3,591.27	
	Į l	3/23/1998	53.59	0.00	3,590.96	Į.
		6/23/1998	54.20	0.00	3,590.35	
		9/30/1998	54.54	0.00	3,590.01	
	{	12/9/1998	54.74	0.00	3,589.81	ľ
	1	3/9/1999	55.15	0.00	3,589.40	
	J I	6/10/1999	55.66	0.00	3,588.89	ļ
		7/2/1999	55.73	0.00	3,588.82	1
	]	9/13/1999	55.94	0.00	3,588.61	
	[	12/9/1999	56.38	0.00	3,588.17	}
		3/9/2000	56.74	0.00	3,587.81	1
		6/8/2000	57.17	0.00	3,587.38	
	1	9/13/2000	57.40	0.00	3,587.15	
		12/7/2000	57.77	0.00	3,586.78	1
	}			0.00		ļ
	1	3/8/2001	58.29		3,586.26	
	]	6/21/01	58.91	0.00	3,585.64	
	1	9/10/01	59.25 50.75	0.00	3,585.30	1
	1	12/6/2001	59.75	0.00	3,584.80	1
	J 1	3/11/2002	60.03	0.00	3,584.52	
	[	6/17/02	60.39	0.00	3,584.16	
		9/16/2002	60.39	0.00	3,584.16	
		1/9/2003	60.53	0.00	3,584.02	1

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-8	3,644.87	2/9/1993	50.48	0.00	3,594.39	(1)
	,	8/18/1993	50.67	0.00	3,594.20	(-)
		1/26/1994	50.96	0.00	3,593.91	
	1	5/3/1995	52.15	0.00	3,592.72	
		7/31/1995	51.77	0.00	3,593.10	
	l	11/14/1995	51.37	0.00	3,593.50	
		2/23/1996	52.17	0.00	3,592.70	
		5/31/1996	51.55	0.00	3,593.32	
		8/23/1996	51.92	0.00	3,592.95	
		12/2/1996	52.43	0.00	3,592.44	
		3/12/1997	52.93	0.00	3,591.94	
		6/12/1997	53.96	0.00	3,590.91	
		9/11/1997	52.73	0.00	3,592.14	
	1	12/10/1997	53.15	0.00	3,591.72	
		3/23/1998	53.51	0.00	3,591.36	
	[	6/23/1998	54.01	0.00	3,590.86	
		9/30/1998	54.35	0.00	3,590.52	
	1	12/9/1998	54.60	0.00	3,590.27	
	1	3/9/1999	55.00	0.00	3,589.87	1
		6/10/1999	55.56	0.00	3,589.31	
		7/2/1999	55.57	0.00	3,589.30	
		9/13/1999	55.72	0.00	3,589.15	
	1	12/9/1999	-	-	-,	(3)
		3/9/2000	56.52	0.00	3,588.35	(3)
		06/00	30.32	0.00	3,300.33	
	1	09/00	_	l - 1	-	ļ
	•	12/00	<u>-</u>	- [	-	
	f.	3/8/2001	58.11	0.00	3,586.76	
	11					<b>}</b>
	}	6/21/01	58.72	0.00	3,586.15	}
		9/10/01	58.94	0.00	3,585.93	
		12/6/2001		not measured		
		3/11/2002	59.94	0.00	3,584.93	
	(	6/17/02	60.22	0.00	3,584.65	
		9/16/2002	60.24	0.00	3,584.63	i
		1/9/2003	60.42	0.00	3,584.45	
MW-9	3,644.78	4/22/1993	49.73	0.00	3,595.05	(1)
		7/15/1993	49.65	0.00	3,595.13	
		8/18/1993	49.85	0.00	3,594.93	
		1/26/1994	50.02	0.00	3,594.76	ì
	i i	5/3/1995	51.35	0.00	3,593.43	ł
	]	7/31/1995	50.97	0.00	3,593.81	
		11/14/1995	50.43	0.00	3,594.35	
	J l	2/23/1996	51.12	0.00	3,593.66	J
		5/31/1996	50.89	0.00	3,593.89	
		8/23/1996	50.98	0.00	3,593.80	1
		12/2/1996	51.58	0.00	3,593.20	1
		3/12/1997	52.21	0.00	3,592.61	1
	Į l	6/12/1997	52.10	0.00	3,592.68	PSH Sheen
		9/12/1997				
	1		51.95	0.00	3,592.83	PSH Sheen
	[	12/10/1997	52.37	0.00	3,592.41	PSH Sheen
		3/23/1998	52.68	0.00	3,592.10	PSH Sheen
		6/23/1998	53.08	0.00	3,591.70	PSH Sheen
	]	9/30/1998	53.39	0.01	3,591.40	PSH Sheen
	]	12/9/1998	53.68	0.00	3,591.10	
		3/10/1999	54.15	0.00	3,590.63	
		6/10/1999	54.68	0.00	3,590.10	1
	1	7/2/1999	54.71	0.00	3,590.07	1
	1	9/13/1999	54.71	0.00	3,590.07	1
	'	12/9/1999			•	(3)
		3/9/2000	55.69	0.00	3,589.09	"
	[	06/00	-		-,,	
	]	09/00	_	] [	-	1
		12/00	-		-	1
	}		- 57.03	0.00	2 507 75	ļ
	j	3/8/2001	57.03	0.00	3,587.75	
		6/21/01	57.91 57.95	0.00	3,586.87	]
	1	9/10/01	57.95	0.00	3,586.83	
	t i	12/6/2001		not measured		1

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-9	3,644.78	3/11/2002	58.96	0.00	3,585.82	
cont.	İ	6/17/02	59.14	0.00	3,585.64	
		9/16/2002	50.24	not measured	2505 44	
MW-10	3,644.47	1/9/2003 8/18/1993	59.34 51.54	0.00	3585.44 3,592.93	(1)
IVI VV - I U	3,044.47	1/26/1994	51.90	0.00	3,592.57	(1)
		5/3/1995	52.97	0.00	3,591.50	
	1	7/31/1995	52.87	0.00	3,591.60	
		11/14/1995	52.51	0.00	3,591.96	
	j	2/23/1996	53.05	0.00	3,591.42	
		5/31/1996	52.79	0.00	3,591.68	
	1	8/23/1996	53.03	0.00	3,591.44	
	1	12/2/1996	53.41	0.00	3,591.06	
		3/12/1997	54.21	0.00	3,590.26	
	1	6/12/1997	53.99	0.00	3,590.48	l
		9/12/1997	53.94	0.00	3,590.53	
	j	12/10/1997 3/23/1998	54.12 54.51	0.00	3,590.35 3,589.96	
		6/23/1998	55.12	0.00	3,589.35	
		9/30/1998	55.61	0.00	3,588.86	
	ĺ	12/9/1998	55.80	0.00	3,588.67	
		3/9/1999	56.09	0.00	3,588.38	
	-	6/10/1999	56.60	0.00	3,587.87	
		7/2/1999	56.64	0.00	3,587.83	
	J	9/14/1999	56.91	0.00	3,587.56	
		12/9/1999	57.37	0.00	3,587.10	
		3/10/2000	57.71	0.00	3,586.76	
	İ	6/8/2000	58.08	0.00	3,586.39	
	1	9/13/2000	58.44	0.00	3,586.03	
	}	12/7/2000	58.89	0.00	3,585.58	
		3/9/2001 6/21/01	59.31 59.89	0.00	3,585.16 3,584.58	
	)	9/10/01	61.34	0.00	3,583.13	
		12/6/2001	60.65	0.00	3,583.82	
		3/11/2002	60.69	0.00	3,583.78	
		6/17/02	60.98	0.00	3,583.49	i
		9/16/2002	61.00	0.00	3,583.47	
	1	1/9/2003	61.07	0.00	3,583.40	}
MW-11	3,643.78	8/18/1993	51.92	0.00	3,591.86	(1)
	]	1/26/1994	52.32	0.00	3,591.46	ļ
		5/3/1995	53.38	0.00	3,590.40	
		7/31/1995	53.35	0.00	3,590.43	
	·	11/14/1995	52.96 52.50	0.00	3,590.82	<b>6</b>
		2/23/1996 5/31/1996	53.50 53.25	0.00	3,590.28 3,590.53	
	1	8/23/1996	53.49	0.00	3,590.29	
		12/2/1996	53.79	0.00	3,589.99	
		3/12/1997	53.81	0.00	3,589.97	1
		6/12/1997	53.96	0.00	3,589.82	
		9/12/1997	52.93	0.00	3,590.85	1
		12/10/1997				(5),(6)
MW-11A	3,644.24	3/23/1998	54.79	0.00	3,589.45	(7)
		6/23/1998	55.43	0.00	3,588.81	1
		9/30/1998	55.96	0.00	3,588.28	1
		12/9/1998	56.13	0.00	3,588.11	}
		3/10/1999	56.43 56.04	0.00	3,587.81	
	J	6/10/1999 7/2/1999	56.94 57.01	0.00 0.00	3,587.30 3,587.23	1
		9/14/1999	57.36	0.00	3,586.88	
		12/9/1999	57.72	0.00	3,586.52	
	{	3/9/2000	58.01	0.00	3,586.23	1
		6/8/2000	58.40	0.00	3,585.84	
		9/13/2000	58.84	0.00	3,585.40	1
		12/7/2000	59.29	0.00	3,584.95	
		3/8/2001	59.72	0.00	3,584.52	1
		6/21/01	60.28	0.00	3,583.96	
		9/10/01	60.69	0.00	3,583.55	
	1	12/6/2001	60.88	0.00	3,583.36	1

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-11A	3,644.24	3/11/2002	61.42	0.00	3,582.82	
cont.		6/17/02	61.55	0.00	3,582.69	
		9/16/2002	61.59	0.00	3,582.65	
		1/9/2003	61.67	0.00	3,582.57	
MW-12	3,644.29	3/23/1998	54.72	0.00	3,589.57	(7)
	[	6/23/1998	55.48	0.00	3,588.81	
		9/30/1998	56.02	0.00	3,588.27	
	ľ	12/9/1998	56.17	0.00	3,588.12	
		3/10/1999	56.45	0.00	3,587.84	
	1	6/10/1999	56.97	0.00	3,587.32	
	<u>'</u>	7/2/1999	56.99	0.00	3,587.30	
	}	9/14/1999	57.41	0.00	3,586.88	
		12/9/1999	57.76	0.00 0.00	3,586.53	
	1	3/10/2000 6/8/2000	58.08 58.42	0.00	3,586.21 3,585.87	1
	!	9/13/2000	58.85	0.00	3,585.44	
	}	12/7/2000	59.31	0.00	3,584.98	
	ļ		59.76	0.00		
	]	3/8/2001 6/21/01	60.29	0.00	3,584.53 3,584.00	
		9/10/01	60.79	0.00	3,583.50	
	1	12/6/2001		g this and subsequent monitor		I
MW-12D	3,644.38	7/2/1999	57.13	0.00	3,587.25	(8)
101 00 - 12.0	3,044.56	9/14/1999	57.74	0.00	3,586.64	(0)
		12/9/1999	57.86	0.00	3,586.52	
		3/9/2000	58.24	0.00	3,586.14	
		6/8/2000	58.56	0.00	3,585.82	
	1.	09/00	-	-	-	
	<i>t</i> :	12/00	<del>-</del>	-	_	
		3/8/2001	-	-	_	
		6/21/01	-	_	-	
		9/10/01	-	-	-	
		12/6/2001	61.30	0.00	3,583.08	
		3/11/2002	61.61	0.00	3,582.77	
		6/17/02	61.71	0.00	3,582.67	
		9/16/2002	61.75	0.00	3,582.63	
		1/9/2003	61.86	0.00	3,582.52	
MW-13	3,645.52	7/2/1999	56.60	0.00	3,588.92	(9)
		9/14/1999	56.92	- 0.00	3,588.60	j
		12/9/1999	57.28	0.00	3,588.24	ļ
		3/10/2000	57.68	0.00	3,587.84	
		6/8/2000	58.04	0.00	3,587.48	
		9/13/2000	58.29	0.00	3,587.23	İ
	[	12/7/2000	58.68	0.00	3,586.84	ĺ
		3/8/2001	59.19	0.00	3,586.33	
		6/21/01	59.80	0.00 0.00	3,585.72	Í
		9/10/01 12/6/2001	60.03 60.59	0.00	3,585.49 3,584.93	
		3/11/2002	60.94	0.00	3,584.58	1
		6/17/02	61.28	0.00	3,584.24	
		9/16/2002	61.23	0.00	3,584.29	l
		1/9/2003	61.38	0.00	3,584.14	]
MW-14	3,642.45	3/8/2001	61.07	0.00	3,581.38	<del> </del>
		6/21/01	61.71	0.00	3,580.74	
		9/10/01	62.31	0.00	3,580.14	
		12/6/2001	62.80	0.00	3,579.65	
	]	3/11/2002	62.70	0.00	3,579.75	l
		6/17/02	62.65	0.00	3,579.80	1
		9/16/2002	62.55	0.00	3,579.90	1
		1/9/2003	62.59	0.00	3,579.86	1
MW-15	3,643.24	3/8/2001	59.79	0.00	3,583.45	1
		6/21/01	60.49	0.00	3,582.75	1
		9/10/01	61.02	0.00	3,582.22	
		12/6/2001	61.47	0.00	3,581.77	ľ
		3/11/2002	61.65	0.00	3,581.59	
	į i	6/17/02	61.68	0.00	3,581.56	
		9/16/2002	61.47	0.00	3,581.77	
	]	1/9/2003	61.59	0.00	3,581.65	1

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
OW-4	3,644.06	7/2/1999	58.18	0.00	3,585.88	(8)
	• •	9/14/1999	58.63	0.00	3,585.43	
į		12/9/1999	58.92	0.00	3,585.14	
		3/9/2000	59.19	0.00	3,584.87	
	· ·	6/8/2000	59.56	0.00	3,584.50	
		9/13/2000	60.16	0.00	3,583.90	
		12/7/2000	61.15	0.00	3,582.91	
		3/8/2001	61.43	0.00	3,582.63	(10)
		6/21/01	61.48	0.00	3,582.58	
1		9/10/01	61.53	0.00	3,582.53	
		12/6/2001	well dry durit	ng this and subsequent monito	ring events	

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

<sup>(2) -</sup> For wells having measurable thickness of free product, the groundwater elevation was calculated as follows:

Groundwater Elevation = (TOC elevation)-(depth to groundwater)+[(free product thickness)x(SG of free product)]

Note: The specific gravity (SG) of the free product is 0.82.

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

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

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

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

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

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

<sup>&</sup>lt;sup>(9)</sup>- TOC elevation for MW-13 estimated relative to TOC elevation for MW-7.

<sup>(10)-</sup>Well dry (measured depth to water is below base of screen); true groundwater elevation is less than listed groundwater elevation.

# Table 3 January 9, 2003 Field Screening Results for Groundwater Samples Hobbs, New Mexico Facility BJ Services Company, U.S.A.

Monitor Well	Cumulative Gallons Removed	pН	Temperature (°C)	Conductivity (umhos/cm)	Redox (mV)	Dissolved Oxygen (meter) (mg/L)	Dissolved Oxygen (Hach kit) (mg/L)	Ferrous Iron (mg/L)
MW-5	2.0	7.19	18.50	1066	-158.1	6.11	3.75	0.0
MW-10	0.5*	7.09	18.94	4715	-172.8	6.49	NM	NM
MW-11A	1.1	6.68	18.87	9992	-165.1	4.24	4.0	0.5
MW-12D	1.25	6.85	18.91	1079	-159.9	1.54	0.0	0.75
MW-14	1.5*	7.11	17.93	1706	-154.6	7.42	NM	NM
MW-15	2.75	6.99	18.55	1539	-151.0	6.65	NM	NM

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

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.

Monitor wells MW-12 and OW-4 were dry.

NM = Not Measured

\* Well was purged dry using bailing techniques.

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

- No. 14		61-	n	Toluene	Ethylbenzene	V-l	TPH-D	TPH-G
Monitor	Sample	Sample	Benzene			Xylenes	milligrams pe	
Well	Date	Туре	5550.0		s per liter, ug/L	2220.0		
MW-1	8/10/92	Regular	5550.0	12090.0	2160.0	7370.0	NA NA	NA
	2/9/93	Regular	2100.0	6500.0	1300.0	7400.0	NA NA	NA
	8/19/93	Regular	3200.0	7300.0	1200.0	3700.0	NA NA	NA
	1/27/94	Regular	1930.0	4580.0	672.0	2390.0	NA 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
	9/30/1998	Regular	3.2	90.0	280.0	970.0	2.5	3.6
	12/10/1998	Regular	< 1.0	1.5	17.0	110.0	1.4	0.31
	3/10/1999	Regular	< 1.0	< 1.0	8.2	110.0	0.62	0.85
	3/10/1999	Duplicate	< 1.0	< 1.0	7.9	110.0	0.66	0.84
	6/10/1999	Regular	< 1.0	1.1	< 1.0	28.0	0.53	0.55
	6/10/1999	Duplicate	< 1.0	1.8	< 1.0	41.0	0.69	0.76
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	-	NS	NS	NS	NS	NS	NS
	3/9/2000	Regular	< 1	< 1	< 1	9.1	14	1.3
	6/8/2000	-	NS	NS	NS	NS	NS	NS
	9/13/2000	-	NS	NS	NS	NS	NS	NS
	12/7/2000	-	NS	NS	NS	NS	NS	NS
	3/8/2001	Regular	2.0	< 1	< 1	< 1	0.49	0.58
	6/21/2001	-	NS	NS	NS	NS	NS	NS
	9/10/2001	-	NS	NS	NS	NS	NS	NS
	12/6/2001	- D1	NS	NS	NS	NS	NS < 0.2	NS < 0.1
	3/12/2002 6/18/2002	Regular	< 1 NS	< 1 NS	< 1 NS	< 1 NS	NS	NS
	9/16/2002	_	NS NS	NS NS	NS	NS	NS NS	NS NS
	1/9/2002	<u>-</u>	NS NS	NS NS	NS	NS NS	NS NS	NS NS
MW-2 1	8/10/92	Regular	14.9	< 4	< 4	< 4	NA NA	NA NA
111 11 2	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	100.0	12.0	3.0	13.0	NA NA	NA NA
	1/27/94	Regular	< 1	1.2	2.0	2.5	NA NA	NA NA
MW-3	8/10/92	Regular	304.9	2099.0	6760.0	1586.0	NA NA	NA NA
C_ A4 1A1	2/9/93	Regular	130.0	< 10	< 10	190.0	NA NA	NA NA
	8/19/93	Regular	560.0	3100.0	630.0	1900.0	NA NA	NA NA
	1/27/94	Regular	1070.0	5380.0	510.0	3120.0	NA NA	NA NA
	5/4/95	Regular	770.0	3300.0	470.0	1800.0	NA NA	NA NA
	3/4/95 8/1/95		490.0	2900.0	890.0	1600.0	NA NA	14
		Regular	i .	1	180.0	440.0	NA NA	2.9
	11/15/95	Regular	250.0	1000.0		1	F .	4
	2/23/96	Regular	120.0	810.0	170.0	560.0	NA NA	l
	5/31/96	Regular	670.0	3900.0	1200.0	2300.0	NA NA	15 12
	8/23/96	Regular	330.0	2200.0	590.0	1500.0	NA	14

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	ТРН-D	TPH-G
Well	Date	Туре		<u> </u>	ns per liter, ug/L		milligrams pe	
MW-3	12/2/96	Regular	220.0	1800.0	670.0	1000.0	0.89	7.4
141 44 -2	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
	1	i	!	1		450.0	0.59	5.3
	12/10/97	Regular	240.0	740.0	500.0			3.9
	3/24/98	Regular	140.0	630.0	360.0	310.0	0.56	
	6/23/98	Regular	100.0	720.0	350.0	490.0	0.40	4.9
	9/30/1998	Regular	42.0	470.0	450.0	530.0	1.0	3.8
	12/10/1998	Regular	13.0	220.0	160.0	290.0	1.3	0.43
	3/10/1999	Regular	3.2	7.4	42.0	32.0	0.2	0.44
	6/10/1999	Regular	1.7	3.1	<1.0	36.0	< 0.20	0.18
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/9/2000	Regular	< 1	< 1	< 1	< 1	0.32	< 0.1
	6/8/2000	Regular	< 1	<1	< 1	< 1	< 0.22	< 0.1
	9/13/2000	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1 < 0.1
	12/7/2000 3/8/2001	Regular Regular	< 1 < 1	<1 <1	< 1 < 1	< 1 < 1	< 0.25 0.42	< 0.1
	6/21/2001	Regular	< 1	<1	<1	<1	< 0.22	< 0.1
	9/10/2001	Regular	< 1	<1	<1	<1	< 0.2	< 0.1
	12/6/2001	Regular	< 1	<1	<1	< 1	< 0.2	< 0.1
	3/12/2002	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/18/2002	Regular	<1	<1	<1	<1	<0.2	<0.1
	9/16/2002	-	NS	NS	NS	NS	NS	NS
	1/9/2003	-	NS	NS	NS	NS	NS	NS
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
	9/30/1998	Regular	80.0	180.0	370.0	840.0	2.0	3.9
	12/10/1998	Regular	28.0	70.0	210.0	960.0	9.3	4.3
	12/10/1998	Duplicate	26.0	62.0	180.0	830.0	3.9	4.3
	3/10/1999	Regular	8.0	20.0	250.0	1400.0	13.0	13
	6/10/1999	Regular	<1.0	<1.0	12.0	12.0	0.44	0.63
	9/14/1999	Regular	< 1.0	< 1.0	3.3	13.1	0.35	0.17
	12/9/1999	Regular	< 1	2.5	2.3	20.1	2	0.53
	3/10/2000	Regular	<1	< 1	< 1	3.6	2.6	0.15
	6/8/2000	Regular	<1	<1	< 1	< 1	0.44	0.23

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	ТРН-С
Well	Date	Туре	Denzene	L	ns per liter, ug/L	Aylenes	milligrams po	
MW-4	9/13/2000		- 1			1		
IVI VV -4		Regular	<1 <1	<1	< 1	<1	0.61	< 0.1
	12/7/2000	Regular	l .	<1	1.3	<1	0.53	0.16
	3/8/2001	Regular	<1	<1	< 1	< 1	0.43	0.16
	6/21/2001	Regular	<1	<1	< 1	<1	< 0.25	< 0.1
	9/10/2001	Regular	< 1	<1	< 1	< 1	< 0.2	< 0.1
	12/6/2001	Regular	<1	< 1	< 1	< 1	0.6	< 1
	3/12/2002	Regular	<1	<1	< 1	< 1	< 0.2	< 0.1
	6/18/2002	Regular	<1	<1	<1	<1	<0.2	<0.1
	9/16/2002	-	NS	NS	NS	NS	NS	NS
	1/9/2003	<del>-</del>	NS	NS	NS	NS	NS	NS
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
	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/30/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/9/1999	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	6/10/1999	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	9/14/1999	Regular	<1.0	<1.0	<1.0	<2.0	< 0.20	< 0.10
	12/9/1999	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/9/2000	Regular	< 1	< 1	< 1	< 1	0.55	< 0.1
	6/8/2000	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/13/2000	Regular	<1	< 1	< 1	< 1	< 0.2	< 0.1
	12/7/2000	Regular	< 1	< 1	< 1	< 1	< 0.25	< 0.1
	3/8/2001	Regular	< 1	< 1	< 1	< 1	0.56	< 0.1
	6/21/2001	Regular	< 1	< 1	< 1	< 1	0.26	< 0.1
	9/10/2001	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	12/6/2001	Regular	< 1	< 1	< 1	< 1	0.49	< 0.1
	3/12/2002	Regular	< 1	< 1	< 1	< 1	< 0.24	< 0.1
	6/18/2002	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	9/16/2002	Regular	< 0.074	< 0.11	< 0.068	< 0.082	0.3 J	< 0.05
	1/9/2003	Regular	< 1	< 1	< 1	< 1	< 1.0	< 0.1
MW-6 1	8/10/92	Regular	NS	NS	NS	NS	NA NA	NS
	2/9/93	Regular	7000.0	19000.0	3100.0	7200.0	NA	NA NA
	8/19/93	Regular	8100.0	19000.0	3500.0	6400.0	NA NA	NA NA
	1/27/94	Regular	7960.0	20200.0	3830.0	6150.0	NA	NA NA
	5/4/95	Regular	11000.0	17000.0	2900.0	6000.0	NA NA	NA NA

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	ТРН-G
Well	Date	Туре		microgran	ns per liter, ug/L		milligrams pe	r liter, mg/L
MW-6	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	_	3.0	4.2	1.2	3.9	1.7	0.14
	3/23/98	Regular	3.6	4.2 < 1	4.0	<1	< 0.2	< 0.1
	ł I	Regular			15.0	7.2	1	0.51
	6/23/98	Regular	170.0	4.1		1 1	1.2	3.3
	9/30/1998	Regular	1000.0	420.0	140.0	270.0	4.0	
	12/10/1998	Regular	7.6	6.6	1.7	5.8	2.0	< 0.1
	3/10/1999	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
	9/30/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/9/1999	Regular	<1.0	<1.0	<1.0	<1.0	4.7	< 0.1
	6/10/1999	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	Regular	< 5	< 5	< 5	< 5	1.8	< 0.5
	3/9/2000	Regular	<1	<1	< 1	< 1	0.66	< 0.1
	6/8/2000	Regular	<1	<1	< 1	<1	< 0.21	< 0.1
	9/13/2000	Regular	<1	<1	<1	<1	< 0.21	< 0.1
		·=		ł .	< 1	<1		< 0.1
	12/7/2000	Regular	<1	< 1		I .	< 0.29	< 0.1
	3/8/2001	Regular	< 1	<1	< 1	< 1	1.2	
	6/21/2001	Regular	3.1 .	<1	< 1	< 1	< 0.22	< 0.1
	9/10/2001 12/6/2001	Regular Regular	< 1 < 1	< 1 < 1	<1 <1	< 1 < 1	< 0.33 1.3	< 0.1 < 0.1

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		·	ns per liter, ug/L		milligrams pe	
MW-7	3/12/2002	Regular	< 1	< 1	< 1	< 1	NA	< 0.1
141 44 - 7	6/18/2002	Regular	< 1	<1	< 1	<1	< 0.2	< 0.1
	9/16/2002	- Regular	NS	NS	NS	NS	NS	NS
	1/9/2003	_	NS NS	NS NS	NS	NS	NS	NS
MW-8		Popula-			NS	NS NS	NA NA	NS NS
M W-8	8/10/92	Regular	NS	NS				
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA 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
	9/30/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/9/1999	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	6/10/1999	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	-	NS	NS	NS	NS	NS	NS
	3/9/2000	Regular	< 1	< 1	<1	<1	0.55	< 0.1
	6/8/2000	-	NS	NS	NS	NS	NS	NS
	9/13/2000	_	NS	NS	NS	NS	NS	NS
	12/7/2000	-	NS	NS	NS	NS	NS	NS
	3/8/2001	Regular	< 1	< 1	< 1	< 1	1.6	< 0.1
	6/21/2001	-	NS	NS	NS	NS	NS	NS
	9/10/2001	-	NS	NS	NS	NS	NS	NS
	12/6/2001	-	NS	NS	NS	NS	NS	NS
	3/12/2002	Regular	< 1	< 1	< 1	< 1	0.38	< 0.1
	6/18/2002	-	NS	NS	NS	NS	NS	NS
	9/16/2002	-	NS	NS	NS	NS	NS	NS
	1/9/2003	- ,	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

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	ТРН-G
Well	Date	Туре	Benzene		ns per liter, ug/L	Aylenes	milligrams pe	
					•	2.50		
MW-9	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
	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
	9/30/1998	Regular	1.1	5.5	21.0	59.0	0.27	0.27
	12/10/1998	Regular	< 1.0	1.9	17.0	79.0	5.1	0.25
	3/10/1999	Regular	< 1.0	< 1.0	5.7	68.0	< 0.2	0.22
	6/10/1999	Regular	< 1.0	1.8	1.8	71.0	< 0.20	0.43
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	<0.10
	12/9/1999	-	NS	NS	NS	NS	NS	NS
	3/9/2000	Regular	< 1	< 1	< 1	64.0	0.66	1.3
	6/8/2000	-	NS	NS	NS	NS	NS	NS
	9/13/2000	-	NS	NS	NS	NS	NS	NS
	12/7/2000	-	NS	NS	NS	NS	NS	NS
	3/8/2001	Regular	< 1	< 1	< 1	< 1	1.4	< 0.1
-	6/21/2001	-	NS	NS	NS	NS	NS	NS
	9/10/2001	-	NS	NS	NS	NS	NS	NS
	12/6/2001	] -	NS	NS	NS	NS	NS	NS
	3/12/2002	Regular	1	< 1	< 1	< 1	0.37	< 0.1
	6/18/2002		NS	NS	NS	NS	NS	NS
	9/16/2002	-	NS	NS	NS	NS	NS	NS
	1/9/2003	-	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
	9/30/1998	Regular	84.0	3.2	30.0	2.2	1.4	0.36
	12/10/1998	Regular	29.0	1.0	7.0	1.0	0.86	0.18
	3/9/1999	Regular	28.0	<5.0	5.8	<5.0	0.92	<0.5
	6/10/1999	Regular	17.0	<1.0	<1.0	<1.0	0.30	0.16

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	ТРН-G
Well	Date	Туре	Delizene		ns per liter, ug/L	Aylenes	milligrams po	
MW-10	9/14/1999	Regular	10.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
1111110	12/9/1999	Regular	23.0	< 1	< 1	1.2	0.44	0.16
	3/10/2000	Regular	300.0	4.3	6.6	43.2	1.2	0.85
	6/8/2000	Regular	78.0	1.7	7.2	9.0	0.67	0.74
	9/13/2000	Regular	23.0	1.5	1.1	2.9	1.6	0.41
	12/7/2000	Regular	7.2	< 1	< 1	< 1	1.5	0.15
l	3/8/2001	Regular	3.4	1.1	< 1	<1	3.4	0.2
	6/22/2001	Regular	< 1	< 1	< 1	<1	1.2	<0.1
	9/10/01 and							
	9/18/01	Regular	2	< 1	< 1	<1	2.3	<0.1
	12/6/2001	Regular			1	No Valid Data		
	3/12/2002	Regular	< 1	< 1	< 1	<1	3.2	< 0.1
	6/18/2002	Regular	< 1	< 1	< 1	< 1	1.2	< 0.1
	9/16/2002	Regular	< 0.074	< 0.11	0.1	<0.082	3 J	< 0.05
	1/9/2003	Regular	< 1	< 1	< 1	< 1	< 1.0	< 0.1
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	44.0	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
	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
	9/30/1998	Regular	9.3	3.7	2.2	7.0	<0.20	0.1
	12/10/1998	Regular	1.7	<1.0	<1.0	<1.0	< 0.20	<0.1
	3/10/1999	Regular	<5	< 5	< 5	< 5	0.3	<0.5
	6/10/1999	Regular	<1.0	< 1.0	< 1.0	< 1.0	<0.20	<0.10
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
ļ	12/9/1999	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/9/2000	Regular	1.2	< 1	< 1	< 1	0.43	< 0.1
	6/8/2000	Regular	3.6	< 1	< 1	< 1	0.37	< 0.1
	9/13/2000	Regular	1.4	< 1	< 1	< 1	0.36	< 0.1
,	12/7/00	Regular	26	< ]	< 1	3.3	0.3	0.12
	3/8/01	Regular	12	< 5	< 5	< 5	2.2	< 0.5
	6/22/2001	Regular	1.5	< 1	< 1	< 1	1	< 0.1
	9/10/2001	Regular	7.9	< 1	< 1	< 1	1.1	< 0.1
	12/6/2001	Regular	<1	< 1	< 1	< 1	1	< 0.1
	3/12/2002	Regular	1.8	< 1	< 1	1	1.6	< 0.1
	6/18/2002	Regular	2.9	< 0.1	1.3	< 1	0.91	<0.1
	9/16/2002	Regular	9	< 0.11	41	< 0.082	1 J	0.2
	1/9/2003	Regular	12	< 1	< 1	1.2	< 1.0	0.4

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	ТРН-G
Well	Date	Type			ns per liter, ug/L		milligrams pe	
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
	9/30/1998	Regular	260.0	3.0	1.2	7.9	<0.20	0.62
ľ	12/10/1998	Regular	160.0	< 1.0	< 1.0	1.2	0.21	0.36
	3/10/1999	Regular	160.0	1.1	< 1.0	2.9	0.38	0.45
	6/10/1999	Regular	49.0	1.4	< 1.0	< 1.0	0.22	0.13
	9/14/1999	Regular	75.0	< 1.0	< 1.0	< 2.0	<0.20	0.23
	12/9/1999	Regular	64.0	< 1	< 1	< 1	< 0.2	0.21
	3/10/2000	Regular	93.0	< 1	< 1	< 1	< 0.2	0.21
	3/10/2000	Duplicate	99.0	< 1	< 1	< 1	0.22	0.22
	6/8/2000	Regular	62.0	< 1	< 1	< 1	< 0.2	< 0.1
ľ	9/13/2000	Regular	34.0	< 1	< 1	< 1	0.23	< 0.1
	12/7/2000	Regular	27	< 1	2.9	1.9	<0.25	< 0.1
	3/8/2001	Regular	14	< 1	< 1	< 1	2.1	0.1
	6/22/2001	Regular	12	<1	< 1	<1	0.51	0.11
	9/10/2001				Sampled) During This	1		-
MW-12D	7/2/1999	Regular	< 5	< 5	< 5	< 5	<0.20	<0.10
į	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
İ	12/9/1999	Regular	<1	< 1	< 1	<1	< 0.2	< 0.1
ſ	3/9/2000	Regular	< 1	<1	< 1	< 1	0.24	< 0.1
	6/8/2000	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/13/2000	-	NS	NS	NS	NS	NS	NS
	12/7/2000	_	NS	NS	NS	NS	NS	NS
	3/8/2001	_	NS	NS	NS	NS	NS	NS
	6/22/2001	_	NS	NS	NS	NS	NS	NS
	9/18/2001	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	12/6/2001	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	3/12/2002	Regular	< 1	< 1	< 1	<1	0.44	< 0.1
	6/18/2002	Regular	< 1	<1	<1	<1	< 0.2	< 0.1
	9/16/2002	Regular	< 0.074	< 0.11	< 0.068	< 0.082	0.2 J	< 0.05
	1/9/2003	Regular	< 1	< 1	< 1	< 1	< 1.0	< 0.1
MW-13	7/2/1999	Regular	1500.0	23.0	750.0	58.0	2.2	5.1
	9/14/1999	Regular	860.0	16.0	450.0	34.4	2.1	3.1
	12/9/1999	Regular	430.0	16.0	410.0	40.9	0.46	3.2
j	3/10/2000	Regular	88.0	2.8	200.0	1.3	1.9	0.99
	6/8/2000	Regular	6.0	< 1	63.0	3.3	1.1	0.91
	9/13/2000	Regular	<1.0	<1.0	3.4	<1.0	0.44	0.12
	12/7/2000	Regular	<1.0	<1.0	<1	<1	0.43	< 0.1
	3/8/2001	Regular	<1	<1	1.2	<1	2	< 0.1
	6/22/2001	Regular	< 1	<1	< 1	<1	0.31	< 0.1
	9/10/2001	Regular	< 1	<1	<1	<1	0.3	< 0.1
	12/6/2001	Regular	<1	<1	< 1	<1	< 0.2	< 0.1
	3/12/2001	Regular	<1	<1	< 1	<1	0.84	< 0.1
	6/18/2002	Regular	<1	<1	<1	<1	0.3	<0.1
	9/16/2002	veanini		NS	NS	NS	NS	NS
		-	NS NS	NS NS	NS NS	NS NS	NS NS	NS NS
MW-14	1/9/2003	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
IVI VV - 14	1/14/2001 9/16/2002	Regular	NA	NA	NA	NA	NA	NA
	1/9/2003	Regular	NA NA	NA NA	NA NA	NA NA	NA NA	NA NA

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type		microgran	ns per liter, ug/L		milligrams p	er liter, mg/L
MW-15	1/14/2001	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/16/2002	Regular	NA	NA	NA	NA	NA	NA
	1/9/2003	Regular	NA	NA	NA	NA	NA	NA
OW-4	6/10/1999	Regular	<1.0	<1.0	<1.0	4.4	< 0.2	< 0.10
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.2	< 0.1
	3/9/2000	Regular	< 1.0	< 1.0	< 1.0	< 1.0	0.25	< 0.1
	6/8/2000	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.21	< 0.1
	9/13/2000	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.2	< 0.1
	12/7/2000		,	Well Dry (Not S	Sampled) During This	and Subsequent	Monitoring Events	

<sup>&</sup>lt;sup>1</sup> Well plugged and abandoned 7/1/99

NA = Not Analyzed

NS = Not Sampled

NS-D = Not Sampled because well was dry

NSP = Not Sampled due to Phase-Separated Hydrocarbons

Cumulative Results<sup>(1)</sup> for Chloride<sup>(2)</sup> Analyses Hobbs, New Mexico Facility BJ Services Company, U.S.A. Table 5

		1	- F			Monito	Monitor Wells <sup>(3)</sup>		,			,		
MW-6   MW-7	9	Ä.		MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
380 310		310	┝━┥	350	110	2200	3400	NP	ďN	NP	NP	NP	٨b	NS
210 250	4	250	-	360	140	2000	2900	NP	Ž	NP	NP	Š	NP	SN
183 223		223		364	164	2390	NS	940	1200	ď	₽N.	Ν	NP	NS
411 238	_	238		274	123	1160	NS	834	314	NP	NP	NP	ΝP	NS
NP NA		NA		NA	NA	NA	ď	NA	NA	195	496	ВN	NP	266
NP 224		224		241	131	474	NP	1290	327	117	276	NP	NP	258
NP NS		SN		NS	SN	NS	ďN	NS	NS	NS	NS	368	219	NS
NP 224		224		250	127	879	ΝΡ	1720	586	NS	276	327	NA	NS-D
NP NA		Ϋ́	-	NA	NA	ΝA	ď	NA	NA	NS	NA	222	222	NS-D
NP NA		N A		NA	NA	NA	È	NA	NS-D	NA	NA	245	228	NS-D
NP NA		X		ΝA	NA	NA	Ž	NA	NS-D	78.8	NA	NA	NA	NS-D
NP NA		NA		NA	NA	NA	ď	NA	NS-D	NA	NA	276	215	US-D
NP 188		188		241	110	861	ď	1230	NS-D	75.8	207	284	224	NS-D
NP NA		Ϋ́		NS	SN	NA	ďZ	NA	NS-D	NA	145	258	233	NS-D
NP NS		NS		NS	NS	1030	ď	1550	NS-D	98	NS	293	246	NS-D
NP NS		SN		SN	NS	525	NP	3150	NS-D	94.6	NS	179	228	NS-D

 $^{(1)}$  - in mg/L.

(2) - NMWQCC standard for chloride is 250 mg/L.

(3) - MW-2 not operative after May 3, 1995; P&A'd 7/1/99.

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

MW-11 P&A'd 7/1/99.

MW-11A installed February 1998.

MW-12 installed February 1998.

MW-12D installed June 1999.

MW-13 installed June 1999.

MW-14 installed January 2001.

MW-15 installed January 2001.

NP = not present at time of sampling event.

NS = not sampled during applicable sampling event.

NA = not analyzed for chloride during applicable sampling event.

NS-D = not sampled because well was dry during applicable sampling event.

Table 6 Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, and MW-12D

#### Hobbs, New Mexico

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

Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	Dissolved Methane (mg/L)
	3/23/1998	3.87	190	< 0.0012
	3/9/1999	< 0.1	195	< 0.0012
	6/10/1999	4.73	209	< 0.0012
1	9/14/1999	4.3	210	< 0.0012
	12/9/1999	4.2	210	< 0.0012
	3/9/2000	5.3	260	< 0.0012
·	6/8/2000	4.7	240	< 0.0012
	9/13/2000	3.93	200	< 0.0012
MW-5	12/7/2000	3.27	160	< 0.0012
	3/8/2001	3.24	180	< 0.0012
	6/21/2001	2.74	150	0.0017
	9/10/2001	NA <sup>(2)</sup>	130	< 0.0012
	12/6/2001	2.38	120	< 0.0012
	3/12/2002	2.98	120	< 0.0012
	6/18/2002	2.56	110	0.002
	9/16/2002	2.4	105	0.002
	1/9/2003	2.1	97	0.004
	3/23/1998	0.07	320	0.91
	6/23/1998	< 0.1	325	0.55
	9/30/1998	< 0.1	204	0.81
	12/10/1998	< 0.1	180	0.091
	3/9/1999	< 0.1	142 223 <sup>(3)</sup>	0.035
	9/14/1999	< 0.10	160	0.0049
	12/9/1999	0.49	170	0.0039
	3/10/2000	0.1	160	0.0056
MW-10	6/8/2000	< 0.1	150	0.031
	9/13/2000	< 0.1	160	0.031
	12/7/2000	< 0.1	190	0.17
	3/8/2001	< 0.1	270	< 0.0012
	6/22/2001	< 0.1	270	0.044
	9/10/2001	NA NA	NA	NA
	3/12/2002	< 0.1	230	NA 0.00 <b>7</b>
	6/18/2002	< 0.1	240	0.007
	9/16/2002	< 0.03	318	0.006
	1/9/2003	< 0.1	280	0.0024

Table 6
Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, and MW-12D

#### Hobbs, New Mexico

BJ Services Company, U.S.A.

Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	Dissolved Methane (mg/L)
	3/23/1998	< 0.05	190	0.14
	6/23/1998	< 0.1	225	0.11
	9/30/1998	0.4	196	0.043
	12/10/1998	0.7	188	0.033
	2/10/1000	< 0.1	164	0.004
	3/10/1999	< 0.1 <sup>(4)</sup>	227 <sup>(3)</sup>	0.094
	6/10/1999	< 0.1	181	0.0036
	9/13/1999	0.22	250	< 0.0012
	12/9/1999	< 0.1	290	0.0079
	3/9/2000	0.11	270	0.037
MW-11A	6/8/2000	< 0.1	240	0.0069
1	9/13/2000	< 0.1	320	< 0.0012
	12/7/2000	< 0.1	260	0.0096
	3/8/2001	< 0.1	330	0.0028
	6/22/2001	< 0.1	180	0.0074
	9/10/2001	NA	280	< 0.0012
	12/6/2001	< 0.1	240	0.0041
	3/12/2002	< 0.1	350	0.0044
	6/18/2002	< 0.1	560	0.0028
	9/16/2002	0.3	383	< 0.0012
	1/9/2003	< 0.5	290	0.0063
	3/23/1998	< 0.05	240	< 0.0012
	6/23/1998	< 0.1	240	< 0.0012
	9/30/1998	< 0.1	168	< 0.0012
	12/10/1998	< 0.1	202	< 0.0012
	2/10/1000	< 0.1	137	< 0.0012
	3/10/1999	< 0.1 <sup>(4)</sup>	193 <sup>(3)</sup>	< 0.0012
MW-12	6/10/1999	< 0.1	217	< 0.0012
1V1 VV ~ I Z	9/14/1999	< 0.10	230	< 0.0012
	12/9/1999	< 0.1	180	< 0.0012
	3/10/2000	< 0.1	210	< 0.0012
	6/8/2000	< 0.1	220	< 0.0012
	9/13/2000	< 0.1	240	< 0.0012
	12/7/2000	< 0.1	260	< 0.0012
	3/8/2001	< 0.1	300	< 0.0012

# Table 6 Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, and MW-12D

#### Hobbs, New Mexico

BJ Services Company, U.S.A.

Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	Dissolved Methane (mg/L)
MW-12	6/22/2001	< 0.1	360	0.0021
IVI VV -12	9/10/2001	Well Dry (Not Sample	d) During This and Subsequ	ent Monitoring Events
	9/18/2001	NA	190	< 0.0012
	12/6/2001	< 0.1	200	< 0.0012
MW-12D	3/12/2002	< 0.1	200	< 0.0012
W1W-12D	6/18/2002	< 0.1	180	0.0012
	9/16/2002	0.06	172	< 0.0012
	1/9/2003	< 0.1	150	0.005

<sup>(1) -</sup> By EPA Method 300, except as noted

mg/L = milligrams per liter

<sup>(2) -</sup> NA indicates not analyzed

<sup>(3) -</sup> By EPA Method 375.4

<sup>(4) -</sup> By EPA Method 353.3

<sup>(5) -</sup> NS-D indicates not sampled (well dry)

**APPENDICES** 

## APPENDIX A

**Groundwater Sampling Forms** 

# **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-5

1 PRO	ECT INFO	RMAT	ION			-			
	lumber: 1282			SIQ.		Date: \	9/03	-	Time:_1358_
	BU Servi		i ask inuitii	ber. <u> </u>				1. A More	
_	ocation: Hob		<u> </u>						N, clear
			JN 1			vvcdalerv	720111 101	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
2. WELL	. DATA			r ·			·	- <del></del>	
Casing D	iameter:	inch	es — ·	Type: $\mathcal{L}_{\mathcal{P}}$	· · · · · · · · · · · · · · · · · · ·		eel 🔾 Teflon®		
i	Diameter:	inch		Type: S P			eel 🔾 Teflon®		Menus
	oth of Well: 64			- · · · · · \	• • • • • • • • • • • • • • • • • • • •		Top of Protect		ther. Musured
Depth to	Static Water:	21.13 fo	eet		op of Well Casi		Top of Protect		
	Product:	feet		J			Top of Protect		ther:
Length o	f Water Column:	<u>: 2.15</u>	feet	Well Volume	: <u> ()-44</u>	gal	Screened Inte Note: 2-inc	erval (from <del>03)</del> ; th well = 0(15) gab	4-inch well = 0,667 gal/R
3. PURC	SE DATA	011							
Purge Me	ethod: Baile	r, Size	□ Bladde	er Pump 🖸 2 Itic Pump 🚨 I	" Submers <mark>ible F</mark> nertial Lift Pum <sub>l</sub>		ubmersible Pun	np 	Equipment Model(s)
1	: Pump/Baile	C) Stainle	ss 🗆 PVC	☐ Teflon®	0. 🔀 Other: <u>                                    </u>	lastic		illa	
l					☐ Field Clear			1. 951	600/610D
Materials Rope Tubing Polyethylene Polypropylene Teffon® Cother: Ninwow  Dedicated Prepared Off-Site Field Cleaned Colsposable 2.									
Was well purged dry?   Yes No Pumping Rate: 124 hand gal/min 3.									
Time Cum. Gallons Removed PH Temp Spec. ORP Dissolved Oxygen Turbidity Other: Comments									
1410 1/2 7.17 18.56 1074 -161.2 5.58									
1414 1 7.16. 18.54 1061159.8. 5.50									
1418 1 1/2 7.20 18.49 1062 -158.9 5.60									
1420	2	7.19	18.50	1066	-158.1	6.11	_		
		<u> </u>	-						
<u> </u>									
				}	<u> </u>				
4. SAMF	LING DAT	Ā,,,						Geoc	hemical Analyses
Method(s	Bailer, Siz		⊒ Bladder Pા nertial Lift Pu		bmersible Pum	p 🖸 4" Subn	nersible Pump	Ferro	us Iron: 0.0 mg/L
NA stasiala			nentalitri ess □ PVC	•	Other.	Plastic			275
Materials	: Pump/Bailer		•		Field Clea			DO:	<u> 7. 13</u> mg/L
Materials	: Tubing/Rope			Polypropylene epared Off-Site	⊔ ≀effon® □ Field Cle	aned A Dis	posable	Nitrat	e: mg/L
Depth to	Water at Time o	of Sampling	not rec	orded.	Field Filtere	d? 🗅 Yes	X No	Sulfa	te: mg/L
Sample I	D: <u>MW-5</u>	<del></del>	Sample Ti	1:10	1	# of Contain	ners:_ <u> </u>		
Duplicate	Sample Collect	ted?	□ Yes 💢	No ID:		•	· · · · · · · · · · · · · · · · · · ·	Alkal	inity: mg/L
5. COM	MENTS PU	WAL 8	innude	s mer	c muss	ured i	anzorox.	each 1/2	e gullon
based	an size	of c	olliot	on ves	sel us	ed du	ring b	each 1/2 miling.	0
Note: Include o	ell yolk	MUS well conditi	on, odor, pre	sence of NAP	or other item	s not on the field	UMPU Id data sheet.	ng,	
							<del></del>		1 .

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

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

# **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-10

A DECLECT INCODMATION	
1. PROJECT INFORMATION	01-08-03
Project Number: 1852 Task Number 18	Date: 01-09-03 Time: 1141
Client: BJ Services	Personnel: A Morth, 5Dalton
Project Location: Hobbs, NM	Weather: Sunny, Dwind, U3F
2. WELL DATA	
Casing Diameter: inches Type: Type: Di PVC 🗆 Stain	less □ Galv. Steel □ Teflon® □ Other:
Screen Diameter: inches Type: 5(PVC D Stain	less Galv. Steel Teflon® Other:
Total Depth of Well: <u>63.51</u> feet From: 🗘 Top of Well Ca	sing (TOC)
Depth to Static Water: 6 From: 50 Top of Well Ca	sing (TOC)
Departor rodadu.	asing (TOC)
Length of Water Column: 244 feet Well Volume: 0.39	gal Screened Interval (from GS):  Note:(24nch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft
3. PURGE DATA	
Purge Method: ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pu	
Materiale: Pump Railer	Plustic
	saned Disposable 1. USI 600/6/01
Materials Rope/Tubing Dedicated Polypropylene Deficited Prepared Off-Site Deficited C	leaned Disposable 2. Huch Tlot Kit
Was well purged dry? ★ Yes □ No Pumping Rate:	hand gal/min 3.
Time Cum. Gallons PH Temp Spec. ORP	Dissolved Oxygen Other: Comments
1150 0.5 7.09 1894 4715 - 172.8	6-49 - aran color w odor
Pursed dry after builing 0.5	
1000	The second of the second
4. SAMPLING DATA	<u>Geochemical Analyses</u>
Method(s): ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:	mp 🖸 4" Submersible Pump Ferrous Iron: mg/L
Materials: Pump/Bailer Stainless PVC Teflon® Other.	
Dedicated di Prepared Ort-Site di Field Ci	eaned Disposable DO:mg/L
Materials: Tubing Rope     Polyetnylene	
	red? ☐ Yes 🔼 No Sulfate: mg/L
Sample ID: MW-10 Sample Time: 1444	# of Containers:
Duplicate Sample Collected?   Yes 10 No ID:	Alkalinity: mg/L
5. COMMENTS pure samples were measured approx	ox. ench 1/2 gullon per size of collection ussel used
during bailing. alochemical analysis were no	rox. ench to gullon per size of collection vissel word of performed on lack of water in well. mpled to dry, Only 8 containers were filled for manner on the field dates sheet.
Well was proved dry after barling D. Sand. Su	moled to dry. Only & sontainers were tilled for
Note: Include comments such as well condition, odor, presence of NAPL or other ite	ms not on the field data sheet. Analysis on with of w
	Larah Dartin
FORM GW-1 (Rev 6/8/99 - wah)	Signature

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

WELL ID: MW-11A

	JECT INFO			0:1			<b>α</b> 2		1001
Project N	Number: 1245	50	Task Num	ber: <u>018</u>	-	Date: 1-9	<del>-03</del>		Time:  20
	3) Segar	4 /1	2.0			Personnel:	s buller	1, Amor	300
Project L	ocation: Ho	18105 T	<u>u</u>			Weather: 8	unny,	N'ura, l	25°F
2. WELL	DATA					<del></del>			
Casing [	Diameter: 2	inch	es	Type: 🙀 P\	/C 🔾 Stainle	ss 🔾 Galv. St	eel 🗆 Teflon®	Cl Other:	
	Diameter: 2	inct		Type: EXP	/C D Stainle	ss 🗆 Galv. St	eel 🗆 Teflon®		
Total De	pth of Well: <u>63</u>	.82 fee	t	From: 🕫 T	op of Well Casi	ing (TOC)	Top of Protect	ive Casing 🔎 O	ther: HIStorical
	Static Water: <u>(</u>			From: 🕏 T	op of Well Casi	ing (TOC)	Top of Protect	tive Casing 🔲 O	ther:
	Product:	feet		From: 🗅 T	op of Well Cas	ing (TOC)	Top of Protec	tive Casing 🔲 O	ther:
Length o	of Water Column	: 2.15	feet	Well Volume	: <u>034</u>	gal		erval (from GS):_ th well = (2.167) gal/	
	GE DATA		i.						
Purge M	lethod: Baile	r, Size: 🗸	Bladd		" Submersible i nertial Lift Pum		iubmersible Pur	пр	Farriage 14 and 14 a
	_	☐ Stainle	ss DPV0	☐ Teflon®	Other:	Plastic		 	Equipment Model(s)
l	s: Pump/kailer			pared Off-Site	☐ Field Clear			1. <u>USI</u>	600/6100
Materials: Rope/Tubing   Polyethylene   Polypropylene   Teflon® & Other: NWW   Prepared Off-Site   Field Cleaned   Polypropylene   2. How Tut Ut									
Was well purged dry?    Yes No Pumping Rate									
Time Cum. Gallons Removed pH Temp Spec. Cond. ORP Dissolved Oxygen Turbidity Other: Comments									
1208 0.5 6.79 18.83 9265 167.8 5.12									
1213 1.1 6.68 18.87 9992 -165.1 4.24									
	, ,		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	. , ,,,,,,					
								<u> </u>	
			,						
				<u></u>					
	NINO DAT					<u> </u>			
4. SAMF	PLING DAT	7 K	7 Diada D.		ible Dure	- D4" C	ibl- Direc	Geoc	hemical Analyses
Method(:	s): Bailer, Siz Peristaltic	Pump 🗆 i		ımp ⊡ Other:		7 4 Subn	nersible Pump	Ferro	us Iron: mg/L
Materials	s: Pump(Bailer	☐ Stainle		☐ Teflon® ared Off-Site	Other:	ned (A) Dispo	osable	DO:	14808 4m/L
Materials	s: Tubing/Rope	☐ Polyet	hylene 🔲 l	Polypropylene	☐ Teflon®	Other: N	Mon		
				pared Off-Site		<b>/</b> \	posable	Nitrat	e: mg/L
Depth to	Water at Time o	ग Sampling A		10 1	Field Filtere	d? 🗆 Yes	10	Sulfa	te: mg/L
	D: <u>MW - 11</u>		Sample Ti		<u> </u>	. # of Contain	iers: <u>10</u>	Alkali	inity: mg/L
Duplicate	e Sample Collect		Yes V			<u> </u>			
	MENTS W.	ell wi	NO DU	impled	after	3 me	le volu	mes wer	e pursed on builing
Purze S	amples her	e coll	ected o	approx	. each (	0.5 Sul	. bused	on the s	ize of the
Colle	tion vess	w u	ced a	wine	bailina				
Note: Include o	comments such as	well condition	on, odor, pre	sence of NAPL	, or other item	not on the fiel	1	7	
F0D1: 011	•	<b>.</b> 1					Sans	M PB	alton
FORM GW-	1 (Rev 6/8/99 - wai	n)					Signature		

# **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-12D

1. PROJECT INFORMATION												
Project Number: <u>0832</u> Task Number: <u>018</u> Date: <u>01-09-03</u> Time: 1030												
Client:	client: B) Services Personnel: AMOVEL SDUCTON											
Project L	Project Location: Hebbe, NM Weather: Swnny, Nunua, 58°F											
2. WELL	2. WELL DATA											
Casing [	Casing Diameter: inches											
		inch		Type: DYPVC   Stainless   Galv. Steel   Teflon®   Other:								
	pth of Well:			From: Top of Well Casing (TOC) Top of Protective Casing Cother: Thi Stout Cal								
	Static Water:		eet	From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:								
	Product:	feet _ つく <b>つ</b> (	)									
Length o	Length of Water Column: 25.72 feet Well Volume: 4.12 gal Screened Interval (from GS):											
3. PUR	SE DATA											
Purge M	□ Bailer, Size: □ □ Bladder Pump □ 2" Submersible Pump □ 4" Submersible Pump  Purge Method: □ Centrifugal Pump □ Peristaltic Pump □ Inertial Lift Pump □ Other:											
Materials	s Pump/Bailer	Stainle	ess DPV0	☐ Teflon® pared Off-Site	Other:	ed 🛭 Dispo	sable	1. UST	600/610D			
Materials	s: Rope/Jubing	🛍 Polvet	hviene 🗆	Polypropylene	☐ Teflon® □	Other:		1. Jun	/ .			
	Was well purged dry?   Yes   No   Pumping Rate: 0.083   gal/min   3. Fult 2   Pump											
Time	Cum. Gallons	pН	Temp	Spec.	ORP	Dissolved	Turbidity	Other: DTW (4)				
1054	Removed			Cond.		Oxygen		62.09				
<del></del>	0.25	6.98	18:70	1103	-145.1	3,61		62.22	1000 Color			
1057		<del>                                     </del>	18.13	1048	-151.5	1.83		62.22	gray color			
1100	0.50	6.85	18.45		-15S.S	1.05						
1103	0.75	6.84		1077		1,37		62.15	7.			
1106	1.0	6.85	· · · ·		-157.4			62.13				
1109	1.25	6.85	18.91	1079	-159.9	1.54		62:11				
4. SAM	PLING DAT	Α		4				Geoc	hemical Analyses			
Method(	Method(s): Baller, Size: Bladder Pump 2" Submersible Pump 4" Submersible Pump Ferrous Iron: 0.75 mg/L											
Materials	Materials Runn/Railor Stainless DPVC DTeflon® DOther:											
ł	Materials Tubica (Rone Polyethylene Polypropylene D Teflon® D Other:											
Doubt to Water at Time of Sampling: QQ 1 4 . Field Filtered 2 D Yes DY No.												
Sample	Sample ID: MW-12D Sample Time: 1109 # of Containers: 10											
Duplicate Sample Collected?												
5. COMMENTS												
Note: Inches	Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.											
ivote: include	comments such as	wen contaill	on, odor, pre	SEILE UI IVAPL	, or other items	not on the flet	o oara sneer.		···			

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

Lenan Dalto Signature

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-14

1 PRO	ECT INFO	RMAT	ION								
	lumber: 128			<sub>ber</sub> 018	i	Date:_ -C	7-03		Time: 1241		
Client:		vices	othices	alton, AMout							
Project L	ocation:	2015,	NM		·	Weather: <u>S</u> 12	mmy	65F Nu	nd		
2. WELL	DATA						<u>Y</u>	<u> </u>			
Casing D	Diameter: 2	inch	es	Type: Þ P∨	C ☐ Stainles	s 🖸 Galv. Ste	el 🗆 Teflon®	Other:			
Screen Diameter: inches Type: 0 PVC - Stainless - Galv. Steel - Teflon® - Other:											
Total Depth of Well: 6.31 feet From: A Top of Well Casing (TOC) Top of Protective Casing Other: HISTORICAL											
Depth to Static Water: 62,54 feet From: 9C Top of Well Casing (TOC) Top of Protective Casing Other:											
Depth to Product: feet											
Length o	f Water Column	: 6.10	feet	Well Volume	: 1, UD_	gal	Screened Int Note: 2-in	erval (from GS); ch well = 0.167 gal	77. 4-inch well = 0.667 gel/ft		
3. PURC	SE DAŢA										
Purge M	ethod: Baile	r, Size: <mark>O</mark> rifugal Pump	□ Bladde □ Perista		Submersible F ertial Lift Pump		ubmersible Pu	mp	Equipment Model(s)		
Materials	: Pump/pailer)	☐ Stainle	ess D PVC	•	Other:	Plastic		<u> </u>	T 600/6100		
	$\sim$	☐ Polyet	hylene 🗀 l	Polypropylene	☐ Teflon® §	Other: N	Non	1. <u>US</u>	T 000/0/00		
Materials, Roper Lubing Dedicated Prepared Off-Site Field Cleaned Dispesable 2.											
vvas wei	Cum. Gallons	y Yes	□ No	Pumpin Spec.	g Rate:VV	Dissolved	min	3. Other:			
Time	Removed	pН	Temp	Cond.	ORP	Oxygen	Turbidity	Other.	Comments		
1249	1/2	7.18	18.21	1735	-157	7.25			clear		
1254	1	7.08	18.21	1770	-156.4	7.09					
1302	11/2	7.11	17.93	1706	-154,6	7.42					
	Puraed	drin	at 1		lous, 1	Nait.	for re	charge.	to sumple.		
	T WAS DEED	J		0.		0000		8	300110		
4. SAMF	PLING DAT	- L	D Dieddaa D			- 5.410-1-		Geod	chemical Analyses		
Method(s): Bailer, Size: 2 □ Bladder Pump □ 2" Submersible Pump □ 4" Submersible Pump  Method(s): Peristaltic Pump □ Inertial Lift Pump □ Other:											
Materials	: Pump/Baile		ss DPVC		Other:	Plastic ned Schisp	osable	DO:	mg/L		
Materials Tubing Cond  Polyethylene  Polypropylene  Teflon®  Other:											
Depth to Water at Time of Sampling: Not Y COVALA Field Filtered?   Yes X No											
Sample I	D: MW-14	Ł	Sample Ti	! 1-		# of Contain	` ` `	Sulfa	ate: mg/L		
Duplicate Sample Collected?   Yes No ID: mg/L											
5 COMI	MENTS PL	1.600.0	0 0 00 -1	60 4000	0 0-101	is al a	70x21 1	Mal = 0 50	and loss based or		
Stre 1	f colland	vige	zamyou to so t	LO WELL	diasi	no bu	MILKELL Lina	MCM U.3	Durald dry all		
מולוומ	LISCAL	MIMIL	for	rooman	so to	SOLD OF	NA ~~	whi www	gallon based on purged dry aft		
1/2/2/LV3.1.V	~~~ ~~~ XVV	* XXX (L.	\ Y	1_00.000	ا يار. بدرد		المراجع المناطق	**************************************			

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

Smah Houte

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

WELL ID: MW-15

1. PROJECT INFORMATION												
Project Number: 12832 Task Number: 018 Date: 1-9-03 Time: 1315												
Client: B) Services Personnel: S. Dulton, AMOUT												
Project L	Project Location: Hobbs, NM Weather: Sunny, windly, 65°F											
2. WELL DATA												
Casing Diameter: inches Type: ^5(PVC   Stainless   Galv. Steel   Teflon®   Other:												
		)_ inch										
	Diameter: ==			Type: D PVC Stainless Galv. Steel Teflon® Other:  From: Top of Well Casing (TOC) Top of Protective Casing Cher: HISTONICAL								
I otal De	pth of Well: <u>67</u> Static Water <u>.</u> 6	. <u>01</u> fee	eet	V								
		feet		From: \( \text{Top of Well Casing (TOC)} \) \( \text{Top of Protective Casing} \) \( \text{Other:} \) \( \text{Prom:} \) \( \text{Top of Well Casing (TOC)} \) \( \text{Top of Protective Casing} \) \( \text{Other:} \)								
	of Water Column			Well Volume: 0.87 gal Screened Interval (from GS): 52-67								
Cenguro	TVALET COLUMN		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	TTCII TOIGING	·	94		ch well = 0.167 gaV				
3. PURO	GE DATA	رار ا		<del></del>								
Purge Method: Bailer, Size. □ Bladder Pump □ 2" Submersible Pump □ 4" Submersible Pump												
Materials	s: Pump(Bailer	☐ Stainle	ess 🖵 PVC	☐ Teflon®	Other: V	ustic			Equipment Model(s)			
l	$\sim$				☐ Field Clean			1. <u>US</u>	I 600/610D			
Materials Rope/Tubing  Polyethylene  Polypropylene  Teflon® Other:  My Other:  2												
Was wel	I purged dry?	☐ Yes	X №	Pumpin	g Rate: bv	hand gall	min	3				
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments			
1320	05	7.01	18.58	1540	-157.2	6,91		(				
1326	1.25	7.07	18.59	1542	-154.9	6.75	_					
1331	175	695	18.55	1535	-1547	6.84	_	_				
1335	2.25	6.98	18.50	1540	-153.0	6.78		_				
1342	2,75	6.99	18.55	1539	-151.0	6.65						
1392	07.0	0.11	10.32	1301	171.0	W. W.						
								ţ				
4. SAMF	LING DAT	A <sub>4</sub>						Geoc	hemical Analyses			
Method(s	S): Bailer, Siz				omersible Pum	D 4" Subm	nersible Pump	Ferro	us Iron: mg/L			
Adoptions Pump Railed												
	Materials: Fullip Ballet  Dedicated Departed Off-Site Deficience Disposable  DO:mg/L											
Materials. Tubility Dedicated Prepared Off-Site Field Cleaned Disposable Nitrate:mg/L												
Depth to Water at Time of Sampling Not Vice Veld Field Filtered?    Sample ID: MW15 Sample Time: 1342 # of Containers:   Sample ID: MW15 S												
			Sample Ti		ia	# of Contain	ers: \	. Alkal	inity: mg/L			
Duplicate	e Sample Collect	ed? (	☐ Yes 🕅	No ID:								
5. COMI	MENTS Pu	vige Sa	mples	were m	easure	d appro	x. lach	0.5 Sall	n bused on size			
5. COMMENTS things samples were measured approx, each 0.5 gallon bused on size of collection vessel noted during bailing.												
Note: Include	Three well volumes well oward over to sampling.  Note: Include comments such as well condition, odor, presence of NAPID, or other items ribt on the field data sheet.											
The state comments seem so were consider, seed, presence of term to, or only nems that on the new date sheet.												
FORM GW-	1 (Rev 6/8/99 - wa	h)					-Signature	andle	MON			



## APPENDIX B

Laboratory Analytical Report



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

#### **Brown & Caldwell**

### Certificate of Analysis Number:

#### 03010287

Report To:

Brown & Caldwell

Rick Rexroad 1415 Louisiana

Suite 2509

Houston

ΤX

77002-

ph: (713) 759-0999

fax:

**Project Name:** 

BJ Hobbs/12832-018

Site:

Hobbs,NM

Site Address:

PO Number:

State:

New Mexico

State Cert. No.:

Date Reported:

2/24/03

This Report Contains A Total Of 21 Pages

**Excluding This Page** 

And

Chain Of Custody



#### **HOUSTON LABORATORY**

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

# Case Narrative for: Brown & Caldwell

#### Certificate of Analysis Number:

#### 03010287

Report To:

Brown & Caldwell

Rick Rexroad

1415 Louisiana Suite 2509

Houston

ΤX

77002-

ph: (713) 759-0999

fax:

Project Name:

BJ Hobbs/12832-018

Site:

Hobbs,NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported:

2/24/03

Matrix spike (MS) and matrix spike duplicate (MSD) samples are chosen and tested at random from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. Since the MS and MSD are chosen at random from an analytical batch, the sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The Laboratory Control Sample (LCS) and the Method Blank (MB) are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

Any other 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.

Amallest Sonia West

Senior Project Manager

2/24/03

Date



#### **HOUSTON LABORATORY**

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

#### **Brown & Caldwell**

#### **Certificate of Analysis Number:**

#### 03010287

eport To:

**Brown & Caldwell** 

Rick Rexroad

1415 Louisiana

**Suite 2509** 

Houston

ΤX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

Project Name:

BJ Hobbs/12832-018

Site:

Hobbs,NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported:

2/24/03

Client Sample	ID Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD	
	00040007 04	14/	4/0/00 0.04.00 DM	4/40/02 0:20:00 AM	402700		
V-5 N-10	03010287-01	Water	1/9/03 2:21:00 PM 1/9/03 2:44:00 PM	1/10/03 9:30:00 AM 1/10/03 9:30:00 AM	163702 163702	14	
MW-11A	03010287-02	Water	1/9/03 2:44:00 PM	1/10/03 9:30:00 AM	163702	<del>-   -   -</del>	
₩V-12D	03010287-03	Water	1/9/03 12:14:00 PM	1/10/03 9:30:00 AM	163703		
W-14	03010287-05	Water	1/9/03 3:13:00 PM	1/10/03 9:30:00 AM	163703	ᆉ	
/W-15	03010287-06	Water	1/9/03 1:42:00 PM	1/10/03 9:30:00 AM	163703	一声	
rip Blank	03010287-07	Water	1/9/03	1/10/03 9:30:00 AM	163703	一一	

Amellest pnia West

2/24/03

Date

Senior Project Manager

Joel Grice Laboratory Director

Ted Yen
Quality Assurance Officer



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

Client Sample ID MW-5 Collected: 01/09/2003 14:21 SPL Sample ID: 03010287-01

Cheff Sample ID W	74-0			Colle	cieu. c	7170372003 14.21	SEL Sample II	<b>D</b> . 030	10207-01
				Site	Hol	bbs,NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq.#
ALKALINITY (AS CA	CO3), TOTAL				MCL	E310.1	Units: m	g/L	
Alkalinity, Total (As Ca		222		2		1	01/21/03 12:00		1472820
CHLORIDE, TOTAL					MCL	E325.3	Units: m	g/L	
Chloride		123		2		2	01/16/03 11:00		1471693
DIESEL RANGE ORG	GANICS				MCL	SW8015B	Units: นดู	g/mL	
Diesel Range Organic	s	ND		1.0		1	01/15/03 15:03	AR	1464982
Surr: n-Pentacosan	е	68.4	%	18-120		1	01/15/03 15:03	AR	1464982
Prep Method	Prep Date			Prep Initials					
SW3510C	01/12/2003 18	:23		KL					
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: m	a/L		
Gasoline Range Organ		ND		0.1		1	01/16/03 18:09	DL	1466429
Surr: 1,4-Difluorobe	nzene	101	%	74-121		1	01/16/03 18:09	DL	1466429
Surr: 4-Bromofluoro	benzene	68.3	%	55-150		1	01/16/03 18:09	DL	1466429
HEADSPACE GAS A	NALYSIS				MCL	RSK147	Units: mg/L		
Ethane		ND		0.0025		1	01/20/03 13:30	ER	1470095
Ethylene		ND		0.0032		1	01/20/03 13:30	ER	1470095
Methane		0.004		0.0012		1	01/20/03 13:30	ER	1470095
ION CHROMATOGRA	APHY				MCL	E300.0	Units: m	g/L	
Nitrogen, Nitrate (As N	)	2.1		0.1		1	01/10/03 15:34	CV	1469063
Sulfate		97		4		20	01/18/03 22:14	CV	1468700
PURGEABLE AROM	ATICS				MCL	SW8021B	Units: uç	g/L	-
Benzene		ND		1		1	01/16/03 18:09	DL	1466380
Ethylbenzene		ND		1		1	01/16/03 18:09	DL	1466380
Toluene		ND		1		1	01/16/03 18:09	DL	1466380
Xylenes,Total		ND		1		1	01/16/03 18:09	DL	1466380
Surr: 4-Bromofluoro	benzene	94.5	%	56-158		1	01/16/03 18:09	DL	1466380

Qualifiers:

Surr: 1,4-Difluorobenzene

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

98.2

%

46-160

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

DL

01/16/03 18:09

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

1466380



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

SPL Sample ID: Client Sample ID MW-10 Collected: 01/09/2003 14:44 03010287-02

Site:	Hobbs.	NI BA
Site:	HODDES,	NIV

			Site	: Hol	bbs,NM			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY (AS CA	CO3), TOTAL			MCL	E310.1	Units: m	g/L	
Alkalinity, Total (As Ca	CO3) 408		2		1	01/21/03 12:00	RA	1472821
CHLORIDE, TOTAL				MCL	E325.3	Units: m	g/ <b>L</b>	
Chloride	525		10		10	01/16/03 11:00	RA	1471694
DIESEL RANGE ORG	SANICS			MCL	SW8015B	Units: ug	ı/mL	
Diesel Range Organics	ND.		1.0		1	01/15/03 15:41	AR	1464983
Surr: n-Pentacosane	69.2	%	18-120		1	01/15/03 15:41	AR	1464983
Prep Method	Prep Date		Prep Initials					
SW3510C	01/12/2003 18:23		KL					
GASOLINE RANGE C	RGANICS			MCL	SW8015B	Units: m	g/L	
Gasoline Range Organ			0.1		1	01/16/03 18:35	DL	1466430
Surr: 1,4-Difluorober	nzene 107	%	74-121		1	01/16/03 18:35	DL	1466430
Surr: 4-Bromofluorol	penzene 94.3	%	55-150		1	01/16/03 18:35	DL	1466430
HEADSPACE GAS A	NALYSIS			MCL	RSK147	Units: m	g/L	
Ethane	ND		0.0025		1	01/20/03 13:41	ER	1470096
Ethylene	ND		0.0032		1	01/20/03 13:41	ER	1470096
Methane	0.0024		0.0012		1	01/20/03 13:41	ER	1470096
ION CHROMATOGRA	NPHY			MCL	E300.0	Units: m	g/L	
Nitrogen, Nitrate (As N)	ND		0.1		1	01/10/03 16:11	CV	1469066
Sulfate	280		10		50	01/18/03 22:52	CV	1468704
PURGEABLE AROMA	ATICS			MCL	SW8021B	Units: ug	ı/L	
Benzene	ND		1		1	01/16/03 18:35	DL	1466381
Ethylbenzene	ND		1		1	01/16/03 18:35	DL	1466381
Toluene	ND		1		1	01/16/03 18:35	DL	1466381
Xylenes,Total	ND		1		1	01/16/03 18:35	DL	1466381
Surr: 4-Bromofluorot	penzene 99.1	%	56-158		1	01/16/03 18:35	DL	1466381
Surr: 1,4-Difluorober	izene 102	%	46-160		1	01/16/03 18:35	DL	1466381

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



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

Client Sample ID MW-11A Collected: 01/09/2003 12:14 SPL Sample ID: 03010287-03

Client Sample ID MVV-11A			Collected: 01/09/2003 12:14				3FL Sample ID: 03010207-03			
				Site	Hol	obs,NM				
Analyses/Method		Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
ALKALINITY (AS CA	CO3), TOTAL				MCL	E3	310.1	Units: m	g/L	
Alkalinity, Total (As Ca	CO3)	356		2		1		01/21/03 12:00	RA	1472822
CHLORIDE, TOTAL					MCL	E3	325.3	Units: m	g/L	
Chloride		3150		50		50		01/16/03 11:00		1471695
DIESEL RANGE ORG	SANICS				MCL	SW80	)15B	Units: uç	g/mL	
Diesel Range Organics		ND		1.0		1		01/15/03 16:18	T	1464984
Surr: n-Pentacosane	e	53.2	%	18-120		1		01/15/03 16:18	AR	1464984
Prep Method	Prep Date		<del></del>	Prep Initials						
SW3510C	01/12/2003 18	:23		KL						
GASOLINE RANGE ORGANICS				MCL	SW80	)15B	Units: m	g/L		
Gasoline Range Organ	nics	0.4		0.1		1		01/16/03 19:02	DL	1466431
Surr: 1,4-Difluorober	nzene	143 MI	%	74-121		1 *		01/16/03 19:02	DL	1466431
Surr: 4-Bromofluoro	benzene	100	%	55-150		1		01/16/03 19:02	DL	1466431
HEADSPACE GAS A	NALYSIS				MCL	RSI	K147	Units: m	g/L	
Ethane		ND		0.0025		1		01/20/03 13:57	ER	1470097
Ethylene		ND		0.0032		1		01/20/03 13:57	ER	1470097
Methane		0.0063		0.0012		1		01/20/03 13:57	ER	1470097
ION CHROMATOGRA	APHY				MCL	E3	300.0	Units: m	g/L	
Nitrogen, Nitrate (As N)	)	ND		0.5		5		01/13/03 20:23	CV	1462785
Sulfate		290		10		50		01/18/03 23:05	CV	1468705
PURGEABLE AROMA	ATICS				MCL	SW80	)21B	Units: uç	g/L	
Benzene		12		1		1		01/16/03 19:02	DL	1466382
Ethylbenzene		ND		1		1		01/16/03 19:02	DL	1466382
Toluene		ND		1		1		01/16/03 19:02	DL	1466382
Xylenes,Total		1.2		1		1		01/16/03 19:02	DL	1466382
Surr: 4-Bromofluorol	benzene	100	%	56-158		1		01/16/03 19:02	DL	1466382
Surr: 1,4-Difluorober	nzene	110	%	46-160		1		01/16/03 19:02	DL	1466382

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



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

Client Sample ID MW-12D Collected: 01/09/2003 11:09 SPL Sample ID: 03010287-04

Client Sample ID W	VV-12U			Cone	ctea: c	71/09/2003 11.09	SPL Sample II	U: U3U1	0207-04
				Site	: Hol	obs,NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY (AS CA	CO3), TOTAL				MCL	E310.1	Units: m	g/L	
Alkalinity, Total (As C	aCO3)	225		2		1	01/21/03 12:00	RA	1472823
CHLORIDE, TOTAL					MCL	E325.3	Units: m	g/L	
Chloride		94.6		1		1	01/16/03 11:00	RA	1471696
DIESEL RANGE OR	GANICS				MCL	SW8015B	Units: ug	g/mL	
Diesel Range Organio	es	ND		1.0		1	01/15/03 16:56	AR	1464985
Surr: n-Pentacosan	ne	52.0	%	18-120		1	01/15/03 16:56	AR	1464985
Prep Method	Prep Date			Prep Initials					
SW3510C	01/12/2003 18	:23		KL					
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: m	g/L		
Gasoline Range Orga	nics	ND	-	0.1		1	01/16/03 19:29	DL	1466432
Surr: 1,4-Difluorobe	enzene	102	%	74-121		1	01/16/03 19:29	DL	1466432
Surr: 4-Bromofluoro	obenzene	74.7	%	55-150		1	01/16/03 19:29	DL	1466432
HEADSPACE GAS A	NALYSIS				MCL	RSK147	Units: m	g/L	
Ethane		ND		0.0025		1	01/20/03 14:09	ER	1470098
Ethylene		ND		0.0032		1	01/20/03 14:09	ER	1470098
Methane		0.005		0.0012		1	01/20/03 14:09	ER	1470098
ION CHROMATOGR	APHY				MCL	E300.0	Units: m	g/L	
Nitrogen, Nitrate (As N	)	ND		0.1		1	01/10/03 16:37	CV	1469068
Sulfate		150		10		50	01/18/03 23:18	CV	1468706
PURGEABLE AROM	IATICS				MCL	SW8021B	Units: ug	g/L	
Benzene		ND		1	-	1	01/16/03 19:29	DL	1466385
Ethylbenzene		ND		1		1	01/16/03 19:29	DL	1466385
Toluene		ND		1		1	01/16/03 19:29	DL	1466385
Xylenes, Total		ND		1		1	01/16/03 19:29	DL	1466385
Surr: 4-Bromofluoro	benzene	98.6	%	56-158		1	01/16/03 19:29	DL	1466385
Surr: 1,4-Difluorobe	enzene	99.8	%	46-160		1	01/16/03 19:29	DL	1466385

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



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

Client Sample ID MW-14

Collected: 01/09/2003 15:13

SPL Sample ID:

03010287-05

Site: Hobbs,NM

Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed Ana	lyst Seq.#
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/L	
Chloride	179	2		2	01/16/03 11:00 RA	1471697

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



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

Client Sample ID MW-15

Collected: 01/09/2003 13:42

SPL Sample ID:

03010287-06

Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/	/L	
Chloride	228	5		5	01/16/03 11:00 F	₹A	1471698

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



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

Client Sample ID Trip Blank

Collected: 01/09/2003 0:00

SPL Sample ID:

03010287-07

Site:	Hobbs,NM
Oite.	110003,1111

Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
PURGEABLE AROMATICS				MCL	SW8	021B	Units: uç	g/L	
Benzene	ND		1		1		01/17/03 17:49	DL	1469661
Ethylbenzene	ND		1		1		01/17/03 17:49	DL	1469661
Toluene	ND		1		1		01/17/03 17:49	DL	1469661
Xylenes,Total	ND		1		1		01/17/03 17:49	DL	1469661
Surr: 4-Bromofluorobenzene	96.6	%	56-158		1		01/17/03 17:49	DL	1469661
Surr: 1,4-Difluorobenzene	99.7	%	46-160		1		01/17/03 17:49	DL	1469661

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

J - Estimated Value between MDL and PQL

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

## **Quality Control Documentation**



**HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE

> HOUSTON, TX 77054 (713) 660-0901

#### Brown & Caldwell BJ Hobbs/12832-018

palysis: ethod:

**Diesel Range Organics** 

SW8015B

WorkOrder:

03010287

Lab Batch ID:

24830

Method Blank

HP\_V\_030115A-1464979

ug/mL

Lab Sample ID

Client Sample ID

halysis Date:

inID:

01/15/2003 13:09

Analyst: AR

03010287-01B

Samples in Analytical Batch:

MW-5

Preparation Date:

01/12/2003 18:23

Prep By: KL

Units:

Method SW3510C

03010287-02B 03010287-03B MW-10

MW-11A

03010287-04B

MW-12D

Analyte	Result	Rep Limit
Diesel Range Organics	ND	1.0
Surr: n-Pentacosane	73.4	18-120

#### Laboratory Control Sample (LCS)

RunID:

HP\_V\_030115A-1464978

ug/mL

Units:

Analysis Date: Preparation Date: 01/12/2003 18:23

01/15/2003 12:31

Analyst: AR

Prep By: KL

Method SW3510C

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	1.76	70	21	175

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

Sample Spiked:

03010287-01

RunID:

HP\_V\_030115A-1464986

Units:

ug/mL AR

Analysis Date:

01/15/2003 17:34

Analyst:

Preparation Date:

01/12/2003 18:23

Prep By: KL

Method SW3510C

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
iesel Range Organics	ND	5	3.4	67.3	5	3.81	75.5	11.6	39	13	130

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

N/C - Not Calculated - Sample concentration is greater than 4 times the amount of spike added. Control limits do not apply.

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.

2/24/03 4:21:37 PM



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

#### **Brown & Caldwell** BJ Hobbs/12832-018

alysis:

Headspace Gas Analysis

thod:

**RSK147** 

WorkOrder:

Samples in Analytical Batch:

03010287

Lab Batch ID:

R75619

**Method Blank** 

Analyst:

InID: alysis Date:

01/20/2003 12:49

VARC\_030120B-1470094 Units:

mg/L ER

Lab Sample ID

Client Sample ID

03010287-01E

MW-5 MW-10

03010287-02E 03010287-03E

03010287-04E

MW-11A MW-12D

	Analyte	Resul	Result				
Ethane		N	ID	0.0025			
Ethylene		N	ID	0.0032			
Methane		N N	īD	0.0012			

#### Sample Duplicate

Original Sample:

03010287-04

VARC\_030120B-1470098

Units:

mg/L

Analysis Date:

RunID:

01/20/2003 14:09

Analyst: ER

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	0.005	0.00469	7	50
Propane	ND	ND	0	50
Propylene	ND	ND	0	50

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

N/C - Not Calculated - Sample concentration is greater than 4 times the amount of spike added. Control limits do not apply.

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.



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

#### **Brown & Caldwell** BJ Hobbs/12832-018

malysis:

ınlD:

nalysis Date:

**Purgeable Aromatics** 

ethod:

SW8021B

WorkOrder:

03010287

Lab Batch ID:

R75410

Method Blank

HP\_J\_030116A-1465896 Units:

01/16/2003 14:18

ug/L DL

Analyst:

Lab Sample ID 03010287-01A

Client Sample ID

03010287-02A

Samples in Analytical Batch:

MW-5 MW-10

03010287-03A

MW-11A

03010287-04A

MW-12D

03010287-07A

Trip 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	99.9	46-160
Surr: 4-Bromofluorobenzene	88.9	56-158

#### **Laboratory Control Sample (LCS)**

RunID:

HP\_J\_030116A-1465895

Units: ug/L

Analysis Date:

01/16/2003 13:25

Analyst: DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	47	94	70	130
Ethylbenzene	50	51.3	103	70	130
Toluene	50	50.9	102	70	130
Xylenes,Total	150	155.6	104	70	130

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

Sample Spiked:

03010458-02

RuniD:

HP\_J\_030116A-1466396

Units:

ug/L

Analysis Date:

01/16/2003 21:16

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
enzene	ND	20	19.4	93.9	20	20.9	102	7.90	21	32	164
thylbenzene	ND	20	22.1	111	20	23.3	117	5.45	19	52	142
Toluene	ND	20	19.3	93.6	20	20.6	100	6.65	20	38	159
ylenes,Total	1.90	60	67.8	110	60	68.3	111	0.756	18	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

N/C - Not Calculated - Sample concentration is greater than 4 times the amount of spike added. Control limits do not apply.

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.



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

### Brown & Caldwell BJ Hobbs/12832-018

Analysis:

RunID:

nalysis Date:

Gasoline Range Organics

SW8015B

WorkOrder:

Samples in Analytical Batch:

03010287

Lab Batch ID:

R75434

Method Blank

Units:

Analyst:

HP\_J\_030116B-1466428

01/16/2003 14:18

mg/L

DL

Lab Sample ID

Client Sample ID

03010287-01A 03010287-02A MW-5

03010287-03A

MW-10

03010287-04A

MW-11A MW-12D

Analyte	Result	Rep Limit
Gasoline Range Organics	ND ND	0.10
Surr: 1,4-Difluorobenzene	101.0	74-121
Surr: 4-Bromofluorobenzene	73.0	55-150

#### Laboratory Control Sample (LCS)

RunID:

HP\_J\_030116B-1467298

Units:

mg/L

Analysis Date:

01/17/2003 13:49

Analyst: DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	1.25	125	70	130

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

Sample Spiked:

03010458-03

RunID:

HP\_J\_030116B-1466434

Units:

mg/L

Analysis Date:

01/16/2003 22:09

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	0.526	0.9	1.49	107	0.9	1.4	97.6	9.60	36	36	160

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

N/C - Not Calculated - Sample concentration is greater than 4 times the amount of spike added. Control limits do not apply.

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.

2/24/03 4:21:40 PM



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

## Brown & Caldwell BJ Hobbs/12832-018

Analysis:

unID:

Ion Chromatography

ethod: E300.0

J HODDS/12632-016

WorkOrder:

03010287

Lab Batch ID:

R75261

Method Blank

IC1\_030113A-1462776

Units: mg/L

CV

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

alysis Date:

01/13/2003 18:42

Analyst:

03010287-03C

MW-11A

 Analyte
 Result
 Rep Limit

 Nitrogen, Nitrate (As N)
 ND
 0.10

#### **Laboratory Control Sample (LCS)**

RunID:

IC1\_030113A-1462777

Units: mg/L

Analysis Date:

01/13/2003 18:54

Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	10	100	85	115

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

Sample Spiked:

03010287-03

RunID:

IC1\_030113A-1462786

Units:

mg/L

Analysis Date:

01/13/2003 20:36

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
itrogen,Nitrate (As N)	ND	50	48.3	96.7	50	45.7	91.5	5.54	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

N/C - Not Calculated - Sample concentration is greater than 4 times the amount of spike added. Control limits do not apply.

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.

2/24/03 4:21:41 PM



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

#### **Brown & Caldwell** BJ Hobbs/12832-018

palysis:

ınID:

alysis Date:

ethod:

Ion Chromatography

E300.0

WorkOrder:

03010287

Lab Batch ID:

R75533B

Method Blank

IC1\_030118A-1468688

Units:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

01/18/2003 20:21

CV Analyst:

03010287-01C

MW-5

03010287-02C

MW-10

03010287-03C

MW-11A

03010287-04C

MW-12D

Analyte Result Rep Limit ND 0.20 Sulfate

#### Laboratory Control Sample (LCS)

RunID:

IC1\_030118A-1468689

Units:

mg/L

Analysis Date:

01/18/2003 20:33

Analyst: CV

Spike Percent Analyte Result Lower Upper Added Recovery Limit Limit Sulfate 10 9.79 98 85 115

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

Sample Spiked:

03010287-01

RunID:

IC1\_030118A-1468701

Units:

mg/L

Analysis Date:

01/18/2003 22:27

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
ulfate	97.5	200	296	99.1	200	293	97.7	1.48	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

N/C - Not Calculated - Sample concentration is greater than 4 times the amount of spike added. Control limits do not apply.

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.

2/24/03 4:21:42 PM



**HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

#### **Brown & Caldwell** BJ Hobbs/12832-018

\nalysis:

RunID:

Ion Chromatography

ethod: E300.0 WorkOrder:

03010287

Lab Batch ID:

R75564

**Method Blank** 

Units: mg/L

Lab Sample ID

Client Sample ID

alysis Date:

IC1\_030110A-1469059

03010287-01C

MW-5

01/10/2003 14:43

Analyst:

03010287-02C

Samples in Analytical Batch:

MW-10

03010287-04C

MW-12D

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

#### Laboratory Control Sample (LCS)

RunID:

IC1 030110A-1469060

Units: mg/L

Analysis Date:

01/10/2003 14:56

Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen,Nitrate (As N)	10	9.65	96	80	120

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

Sample Spiked:

03010287-01

RunID:

IC1 030110A-1469064

Units:

mg/L

Analysis Date:

01/10/2003 15:46

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
itrogen,Nitrate (As N)	2.12	10	11.1	89.3	10	10.6	84.9	5.07	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

N/C - Not Calculated - Sample concentration is greater than 4 times the amount of spike added. Control limits do not apply.

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.

2/24/03 4:21:44 PM



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

## Brown & Caldwell BJ Hobbs/12832-018

nalysis: ethod:

Chloride, Total

E325.3

WorkOrder:

03010287

Lab Batch ID:

R75695

Method Blank

unID: halysis Date:

WET\_030116W-1471688 01/16/2003 11:00

Units: Analyst: mg/L RA

**Lab Sample ID** 03010287-01D

Client Sample ID MW-5

03010287-02C

MW-10

03010287-03D

MW-11A MW-12D

(

03010287-04D 03010287-05A

Samples in Analytical Batch:

MW-14

03010287-06A

MW-15

 Analyte
 Result
 Rep Limit

 Chloride
 ND
 1.0

Laboratory Control Sample (LCS)

RunID:

WET\_030116W-1471702

Units: mg/L

Analysis Date:

01/16/2003 11:00

Analyst: RA

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Chloride	100	98.07	98	90	110

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

Sample Spiked:

03010287-06

RunID:

WET\_030116W-1471699

Units:

mg/L

Analysis Date:

01/16/2003 11:00

Analyst: RA

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
hloride	227.7	250	499.1	108.6	1	499.1	108.6	0	20	85	115

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

N/C - Not Calculated - Sample concentration is greater than 4 times the amount of spike added. Control limits do not apply.

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.

2/24/03 4:21:45 PM



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

#### **Brown & Caldwell** BJ Hobbs/12832-018

nalysis: ethod:

Alkalinity (as CaCO3), Total

E310.1

WorkOrder: Lab Batch ID: 03010287

R75775

Method Blank

unID:

nalysis Date:

WET\_030121J-1472817

Units:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

01/21/2003 12:00

Analyst: RA 03010287-01C

MW-5

03010287-02C

MW-10

03010287-03C

MW-11A

03010287-04C

MW-12D

Result Rep Limit Analyte Alkalinity, Total (As CaCO3) ND 2.0

**Laboratory Control Sample (LCS)** 

RunID:

WET\_030121J-1472819

Units: mg/L

Analysis Date:

01/21/2003 12:00

Analyst: RA

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit	
Alkalinity, Total (As CaCO3)	98.9	97.44	99	90	110	

#### Sample Duplicate

Original Sample:

03010287-04

RunID:

WET\_030121J-1472823

Units:

mg/L

Analysis Date:

01/21/2003 12:00

Analyst:

RA

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Total (As CaCO3)	225	224.3	0	20

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

N/C - Not Calculated - Sample concentration is greater than 4 times the amount of spike added. Control limits do not apply.

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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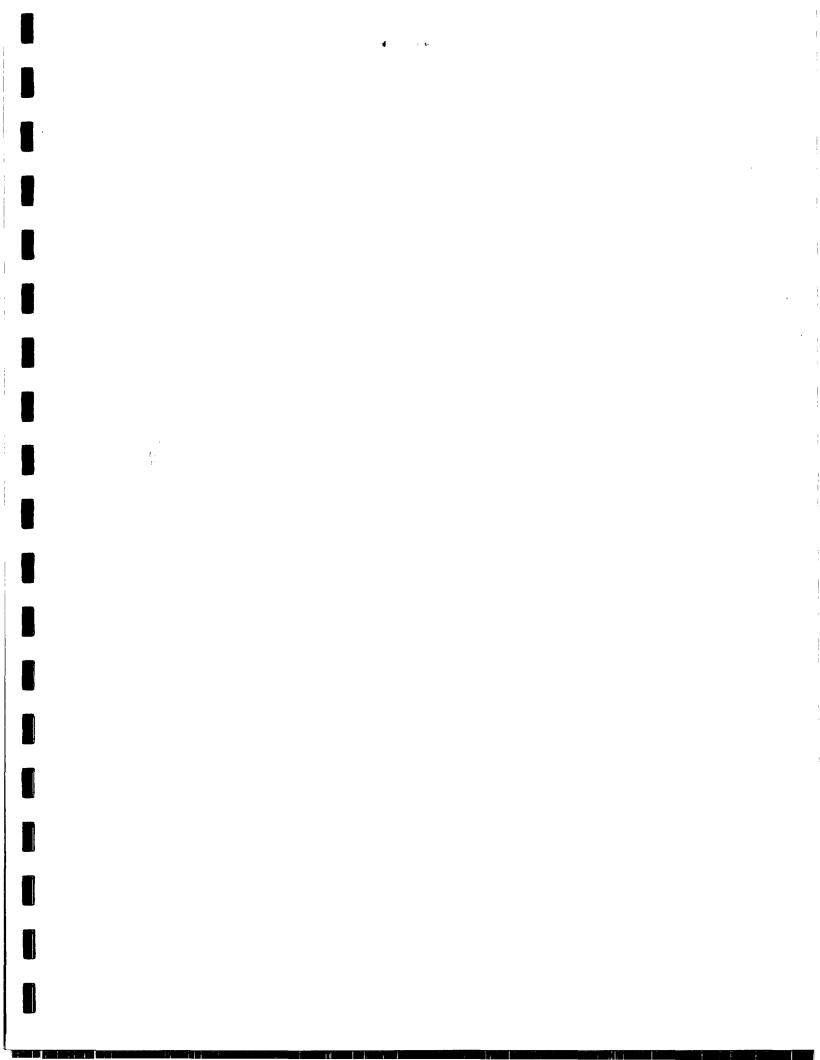
# Sample Receipt Checklist And Chain of Custody



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

#### Sample Receipt Checklist

Workorder: 03010287  Date and Time Received: 1/10/03 9:30:00 AM  Temperature: 3		Receive Carrier Chilled	name: F	IB edEx Vater Ice
1. Shipping container/cooler in good condition?	Yes 🗹	No 🗆	Not Present	
2. Custody seals intact on shippping container/cooler?	Yes 🗹	No 🗆	Not Present	t 🗆
3. Custody seals intact on sample bottles?	Yes 🗌	No 🗆	Not Presen	t 🗹
4. Chain of custody present?	Yes 🗹	No 🗆		
5. Chain of custody signed when relinquished and received?	Yes 🗹	No 🗌		
6. Chain of custody agrees with sample labels?	Yes 🗹	No 🗆		
7. Samples in proper container/bottle?	Yes 🗹	No 🗆		
8. Sample containers intact?	Yes 🗹	No 🗆		
9. Sufficient sample volume for indicated test?	Yes 🗹	No 🗌		
10. All samples received within holding time?	Yes 🗹	No 🗌		
11. Container/Temp Blank temperature in compliance?	Yes 🗹	No 🗆		
12. Water - VOA vials have zero headspace?	Yes 🗹	No 🗆	Not Applica	able
13. Water - pH acceptable upon receipt?	Yes 🗹	No 🗆	Not Applica	able
SPL Representative:  Client Name Contacted:  Non Conformance Issues:	Contact Date &	Time:		
Client Instructions:				



>		

SEPTEMBER 2002 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

MAY 9, 2003

## SEPTEMBER 2002 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: 12832.017

Richard L. Rexroad, P.G.

Project Manager

May 9, 2003

**Brown and Caldwell** 

1415 Louisiana, Suite 2500

Houston, Texas 77002 - (713) 759-0999

<sup>&</sup>quot;This is a draft report and is not intended to be a final representation of the work done or recommendations made by Brown and Caldwell. It should not be relied upon; consult the final report."
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#### 1.0 INTRODUCTION

Brown and Caldwell conducted a 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 in September 2002. This report presents a description of the groundwater sampling field activities, a summary and evaluation of the analytical results, and an evaluation of remedial technologies applied at the facility. A groundwater potentiometric surface map and a hydrocarbon distribution map are included.

A layout of the facility is shown in Figure 1. The facility formerly operated an on-site fueling system. Subsurface impact near the former diesel fueling system was detected by the New Mexico Oil Conservation Division (NMOCD) during an on-site inspection on February 7, 1991. The fueling system was taken out of operation in July 1995. 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.

A biosparging system was activated in November 1995 and expanded in March/April 1997 and February/March 1998 to remediate soil and groundwater at the former fuel island area of the facility. The biosparging system was deactivated on November 1, 2000 after achieving cleanup goals for groundwater. The confirmation soil sampling program specified in the NMOCD-approved Remedial Action Plan (RAP) for the facility was conducted in July 2001. The results of the confirmation soil sampling program were presented to NMOCD in the report for the June 2001 groundwater sampling event. In accordance with the RAP for the facility, four additional groundwater sampling events were conducted following the confirmation soil sampling event. Hydrocarbon concentrations in groundwater samples from applicable monitor wells remained below the target concentrations specified in the RAP during each of these sampling events, so a request to decommission the biosparging system was submitted to NMOCD in the June 2002 Groundwater Sampling and Biosparging System Closure Report for the facility.

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BJ Services removed three field waste tanks at the facility on March 6-7, 1997. The ongoing groundwater monitoring program was expanded 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 site chronology detailing the history of investigations into and remediation of soil and groundwater impacts in the former fueling system and the former field waste tanks areas of the facility is presented in Table 1.

#### 2.0 FIELD ACTIVITIES AND RESULTS

Brown and Caldwell purged and sampled 6 monitor wells (MW-5, MW-10, MW-11A, MW-12D, MW-14, and MW-15) at the facility on September 16, 2002 to determine concentrations of dissolved-phase hydrocarbons and chlorides in groundwater and to evaluate general groundwater quality in the area of the facility. Monitor well locations are shown in Figure 1. The following subsections describe the field activities conducted by Brown and Caldwell during the September 2002 event and present the results of the associated groundwater analyses.

#### 2.1 Groundwater Sampling Activities

Groundwater level measurements were obtained from all monitor wells at the facility on September 16, 2002, prior to purging and sampling the wells listed above. Groundwater levels were measured to the nearest 0.01 foot with an oil/water interface probe. Current and historic groundwater elevation data are presented in Table 2. The groundwater elevation data indicate that the groundwater flow direction is to the east/northeast, with an overall hydraulic gradient of approximately 0.007 foot/foot. A groundwater elevation map for September 16, 2002 is presented in Figure 2. The groundwater elevation data presented in Table 2 indicate that groundwater levels have continued to decline in monitor wells at the facility since late 1995.

In the March 2002 Groundwater Sampling Report for the facility, Brown and Caldwell recommended installation of a new monitor well, MW-16, to replace monitor well OW-4. Brown and Caldwell will proceed with this well installation activity upon approval by NMOCD and acquisition of access privileges from the off-site landowner.

Monitor wells MW-5, MW-10, MW-11A, MW-14 and MW-15 were purged and sampled with previously unused disposable bailers and clean, previously unused nylon string. A submersible pump was used to purge monitor well MW-12D until groundwater stabilization occurred, with stabilization defined as variation of less than 0.1° Celsius, less than 0.1 pH unit, less than 1% specific conductivity, and less than 15 millivolts (mV) Eh between consecutive measurements of groundwater

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during the purging process. Three well volumes were purged from monitor wells MW-5, MW-11A, MW-14 and MW-15. Monitor well MW-10 was purged dry. The wells were sampled in general order of least impacted to most impacted (based on analytical results from the June 2002 and preceding sampling events) to further mitigate the potential for cross-contamination of wells.

Field parameter measurements for pH, conductivity, oxidation-reduction (redox) potential, dissolved oxygen, and temperatures were collected from wells containing an adequate volume of water during and upon completion of well purging. Ferrous iron and dissolved oxygen were measured in selected wells upon conclusion of purging activities. Field parameter readings were recorded on the groundwater sampling forms included in Appendix A. Field readings for the September 2002 sampling event are summarized in Table 3.

With the exception of monitor well MW-12D, groundwater samples were collected by pouring recovered water from a bailer. The groundwater sample from monitor well MW-12D was collected directly from the discharge line of the down-hole pump. Each sample was then transferred to laboratory-prepared, clean glass and/or plastic containers, sealed with Teflon®-lined lids, labeled, and placed on ice in an insulated cooler for delivery to Southern Petroleum Laboratory in Houston, Texas for analysis under standard chain-of-custody control.

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. The submersible pump used to sample monitor well MW-12D was decontaminated by pumping clean tap water through the pump and tubing in a container at the surface. Purge water was discharged to an on-site water reclamation system for re-use by BJ Services.

#### 2.2 Results of Groundwater Analyses

Groundwater samples from monitor wells MW-5, MW-10, MW-11A, MW-14 and MW-15 were analyzed for Method 325.3 chloride content. Groundwater samples from monitor wells MW-5, P:\Wp\BJSERV\12832\101r.doc

MW-10, and MW-11A were also analyzed for gasoline- and diesel-range total petroleum hydrocarbons (TPH-G and TPH-D) by EPA Method 8015B and for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8021. Analyses of groundwater from selected wells for nitrate and sulfate (Method E300) and methane (Method RSK 147) were performed to evaluate the potential for natural attenuation of hydrocarbons at the facility. The laboratory analytical report and chain-of-custody documentation for the groundwater samples collected during the September 2002 sampling event are provided in Appendix B.

Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 4. Figure 3 presents a hydrocarbon distribution map for the September 2002 sampling event. All BTEX concentrations are less than the applicable New Mexico Water Quality Control Commission (NMWQCC) standards.

Table 5 presents current and historic results for chloride analyses performed on groundwater samples collected at the facility. The chloride concentration in monitor wells MW-10 (1030 mg/L), MW-11A (1550 mg/L) and downgradient monitor well MW-14 (293 mg/L) exceed the NMWQCC chloride standard of 250 mg/L. The chloride concentration in monitor wells MW-5, MW-12D and MW-15 remained below 250 mg/L in September 2002.

The current and historic results for nitrate, sulfate, and dissolved methane analyses performed on groundwater samples from monitor wells MW-5, MW-10, MW-11A, MW-12, and MW-12D to assist in evaluation of natural attenuation processes at the facility are presented in Table 6.

#### 3.0 EVALUATION OF REMEDIAL TECHNOLOGIES

The following subsections present evaluations of the remedial technologies applied at the former fueling system and former field waste tanks areas of the BJ Services facility at Hobbs, New Mexico.

#### 3.1 Biosparging System at the Former Fueling System Area

Brown and Caldwell recommended installation of a biosparging system at the former fueling system area of the facility in the RAP submitted to the NMOCD in May 1994. The NMOCD approved the RAP on August 11, 1994. The biosparging system was installed in August 1995 and expanded in April 1997 and February 1998. Operation of the biosparging system resulted in substantial decreases in hydrocarbon concentrations in applicable former fueling system area monitor wells. In accordance with the RAP, confirmation soil sampling activities were conducted at the former fueling system area in July 2001 to verify the effectiveness of the biosparging system in remediating vadose zone soils in this area. The analytical results for these soil samples, as discussed in the report for the June 2001 groundwater sampling event, indicated that remediation goals for soil in this area had been achieved.

After completing the confirmation soil sampling activities, hydrocarbon concentrations in groundwater remained below target cleanup goals for four successive quarters. In accordance with the RAP for the facility, a request to decommission the biosparging system was submitted to NMOCD in the June 2002 Groundwater Sampling and Biosparging System Closure Report.

#### 3.2 Natural Attenuation at the Former Field Waste Tanks Area

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

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Plume behavior is the primary evidence of natural attenuation. 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. 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. Sporadic increases in total BTEX concentrations between quarterly sampling events have been observed in monitor wells in this area since March 1997, however. These increases may be attributed to sporadic loading rates from the vadose zone in excess of the natural attenuation rate of the area. The following subsections present primary and secondary evidence of natural attenuation of hydrocarbons in groundwater at the former field waste tanks area of the facility.

### 3.2.1 Primary Evidence

The benzene concentration in monitor well MW-10 has decreased from a maximum of 1.3 mg/L in August 1995 (prior to removal of the field waste tanks) to less than the NMWQCC standard of 0.01 mg/L in the seven applicable groundwater sampling events from December 2000 through September 2002. Concentrations of toluene, ethylbenzene, and xylenes in monitor well MW-10 have undergone similar decreases over this time period.

Benzene concentrations at the monitor well MW-11/11A location have decreased from a maximum of 0.970 mg/L in December 1996 (prior to removal of the field waste tanks) to less than the NMWQCC standard of 0.01 mg/L in the last six groundwater sampling events.

Concentrations of BTEX constituents at the monitor well MW-12/12D location have displayed decreases similar to those observed at the monitor well MW-11/11A location since September 1998.

#### 3.2.2 Secondary Evidence

The following lines of geochemical evidence can also be used to 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.

Groundwater samples were collected primarily using bailers during the September 2002 sampling event due to low water levels in the wells. Dissolved oxygen concentrations in most wells at the facility were elevated in September 2002 relative to previous sampling events in which groundwater samples were collected using a downhole pump. Use of bailers in groundwater sampling causes groundwater samples to be oxygenated, precluding meaningful comparison of dissolved oxygen data from wells at impacted areas to corresponding data from wells in non-impacted areas.

Historic evidence submitted to the NMOCD in previous quarterly groundwater monitoring reports for the facility has indicated that dissolved oxygen concentrations have typically been depressed in hydrocarbon-impacted monitor wells relative to non-impacted wells at the facility (see the June 2001 Groundwater Sampling Report for BJ Services Hobbs, New Mexico Facility, for example).

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 was detected at a concentration of 2.4 mg/L in background monitor well MW-5 during the September 2002 sampling event. Although there was minimal to no hydrocarbon impact at former field waste tanks area wells MW-10, MW-11A, and MW-12D in September 2002, the maximum nitrate concentration detected in these wells was 0.3 mg/L. The decreased nitrate concentrations observed in September 2002 at former field waste tanks area wells MW-10, MW-11A, and MW-12D relative to the background nitrate concentration at the facility is likely due to residual effects of hydrocarbons.

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 concentrations measured in former field waste tanks area monitor wells in September 2002 are inconclusive regarding use of ferric iron as an electron acceptor.

4. Microbes that utilize sulfate become active when dissolved oxygen, nitrate, and ferric iron are depleted. Sulfate concentrations should therefore decrease in areas where intrinsic bioremediation is occurring through use of sulfate as an electron acceptor.

September 2002 sulfate concentrations in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12D ranged from 172 mg/L to 383 mg/L. The September 2002 sulfate concentration in background monitor well MW-5 is 105 mg/L. The fact that sulfate concentrations in former source area monitor wells are greater than the sulfate concentration in the background well suggests that sulfate is not being utilized as an electron acceptor in the former field waste tanks area.

5. Methane is a reaction product generated during utilization of carbon dioxide as an electron acceptor, and its concentration should therefore increase in areas where concentrations of electron acceptors such as dissolved oxygen, nitrate, and ferric iron have diminished.

Methane was detected in background monitor well MW-5 at a concentration of 0.002 mg/L during the September 2002 groundwater sampling event. Methane was detected in former field waste tanks area monitor well MW-10 at a concentration of 0.006 mg/L in September 2002, but was not detected in monitor wells MW-11A and MW-12D. The minimal differences in methane concentrations in these wells suggest that utilization of carbon dioxide as an electron acceptor is no longer occurring at the former field waste tanks area of the facility.

- 6. Redox potential is a measure of chemical energy in groundwater. The redox potential of groundwater from background well MW-5 was measured at 370.9 mV in September 2002. Respective redox potentials of -102.0 mV, -62.2 mV, and -114.0 mV were measured in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12D in September 2002. The negative redox values in the former field waste tanks area monitor wells as compared to the positive redox value in the background well at the facility provides additional evidence that natural attenuation of hydrocarbons is occurring in the area of the former field waste tanks.
- 7. Alkalinity is expected to increase during natural attenuation processes, due to the leaching of carbonates from mineral substrates by microbially produced organic acids.

Laboratory method M2320B was used to measure bicarbonate alkalinity in September 2002.

The alkalinity bicarbonate of groundwater from background monitor well MW-5 was 249

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mg/L. A comparable bicarbonate alkalinity of 262 mg/L was measured in the deep monitor well at the former field waste tanks area, MW-12D. Elevated bicarbonate alkalinities of 844 mg/L and 364 mg/L were measured the shallower former field waste tanks area monitor wells MW-10 and MW-11A, respectively. Based on the elevated bicarbonate alkalinity of groundwater in monitor wells MW-10 and MW-11A, it can be inferred that natural attenuation of hydrocarbons is occurring in the vicinity of these wells at the former field waste tanks area.

In conclusion, current nitrate data and historic dissolved oxygen data suggest that dissolved oxygen and nitrate act as electron acceptors during intrinsic bioremediation processes at former field waste tanks area of the facility. Current redox and alkalinity data provide further evidence that natural attenuation of hydrocarbons is occurring in this area.

It is recommended that monitoring for natural attenuation evaluation parameters continue in former field waste tank area monitor wells MW-10, MW-11A, and MW-12D and the background well, MW-5. Redox potential, 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 continued in all wells to be sampled during upcoming groundwater monitoring events.

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### 4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the September 2002 groundwater sampling event conducted at the BJ Services Hobbs, New Mexico facility.

#### 4.1 Conclusions

- September 2002 benzene concentrations in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12D are less than the NMWQCC standard of 0.01 mg/L for benzene. Natural attenuation processes appear to be occurring in the vicinity of the former field waste tanks removed in March 1997, based on generally decreasing hydrocarbon concentrations in local monitor wells over time and as substantiated by geochemical data.
- The chloride concentrations recorded in monitor wells MW-10, MW-11A and MW-14 during the September 2002 groundwater sampling event exceed the NMWQCC standard of 250 mg/L.

#### 4.2 Recommendations

- Continue the quarterly monitoring program for former field waste tank area monitor wells MW-10, MW-11A, and MW-12D. Continue monitoring for natural attenuation parameters in these wells and the background monitor well MW-5, including field-testing for natural attenuation indicator parameters until compliance with NMWQCC standards is demonstrated.
- Upon NMOCD approval and acquisition of access rights, complete installation and sampling of an off-site well to define the downgradient extent of chloride impact to groundwater in the area of the facility.
- Upon NMOCD approval, decommission the biosparging system at the former fuel island area.

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#### **DISTRIBUTION**

September 2002 Groundwater Sampling Report BJ Services Company, U.S.A. Hobbs, New Mexico

May 9, 2003

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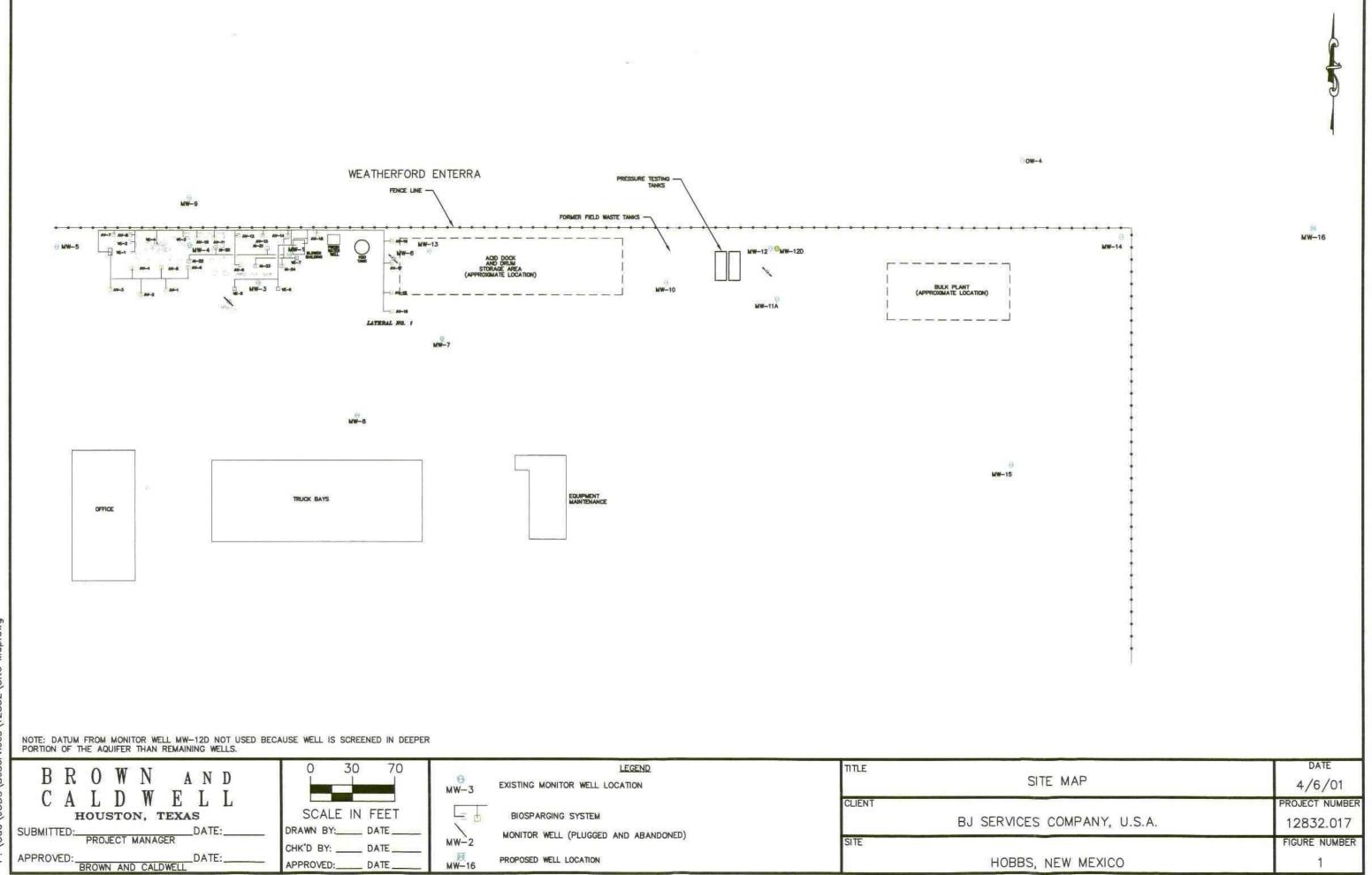
Lynn Wright

Principal Geologist

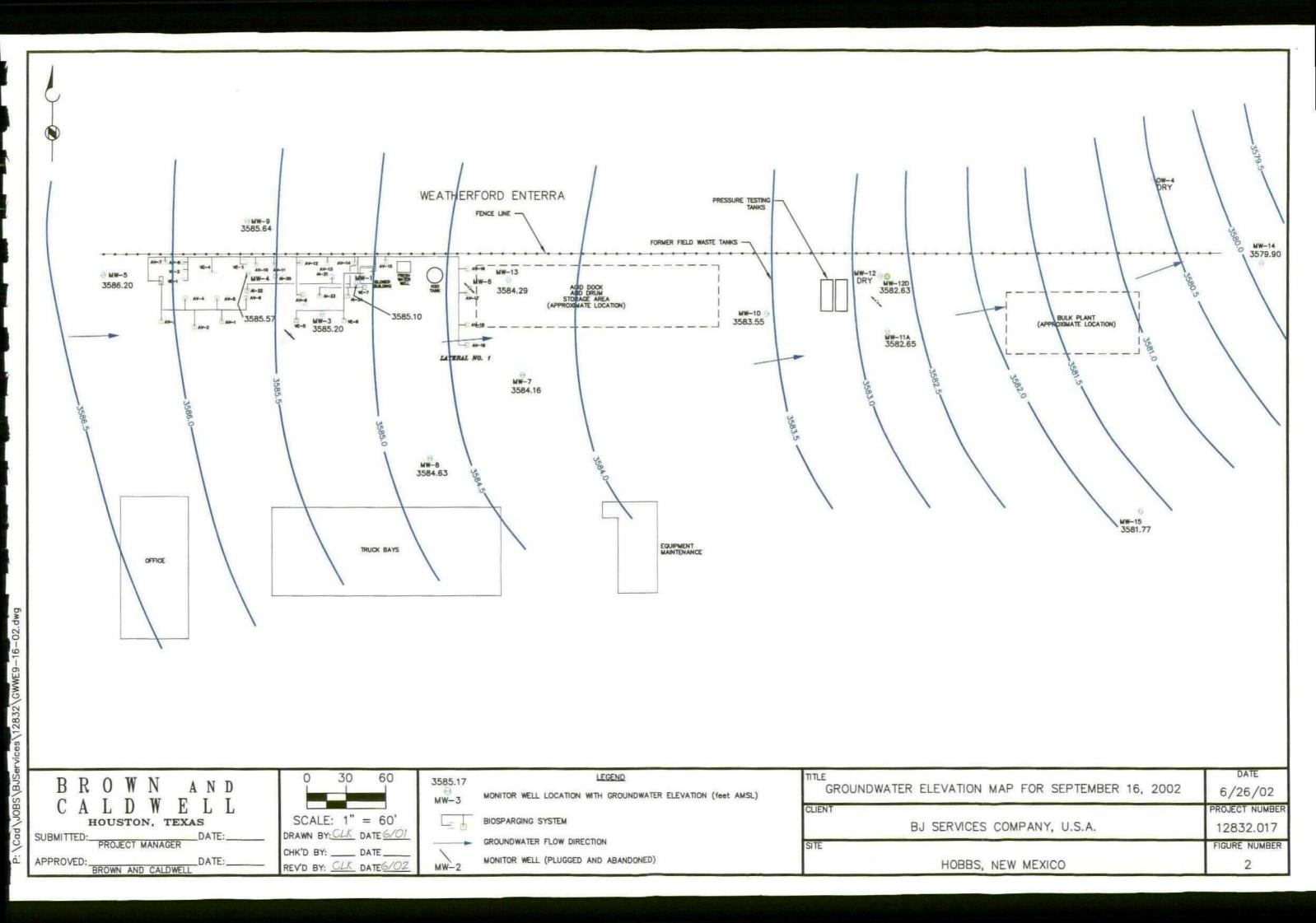
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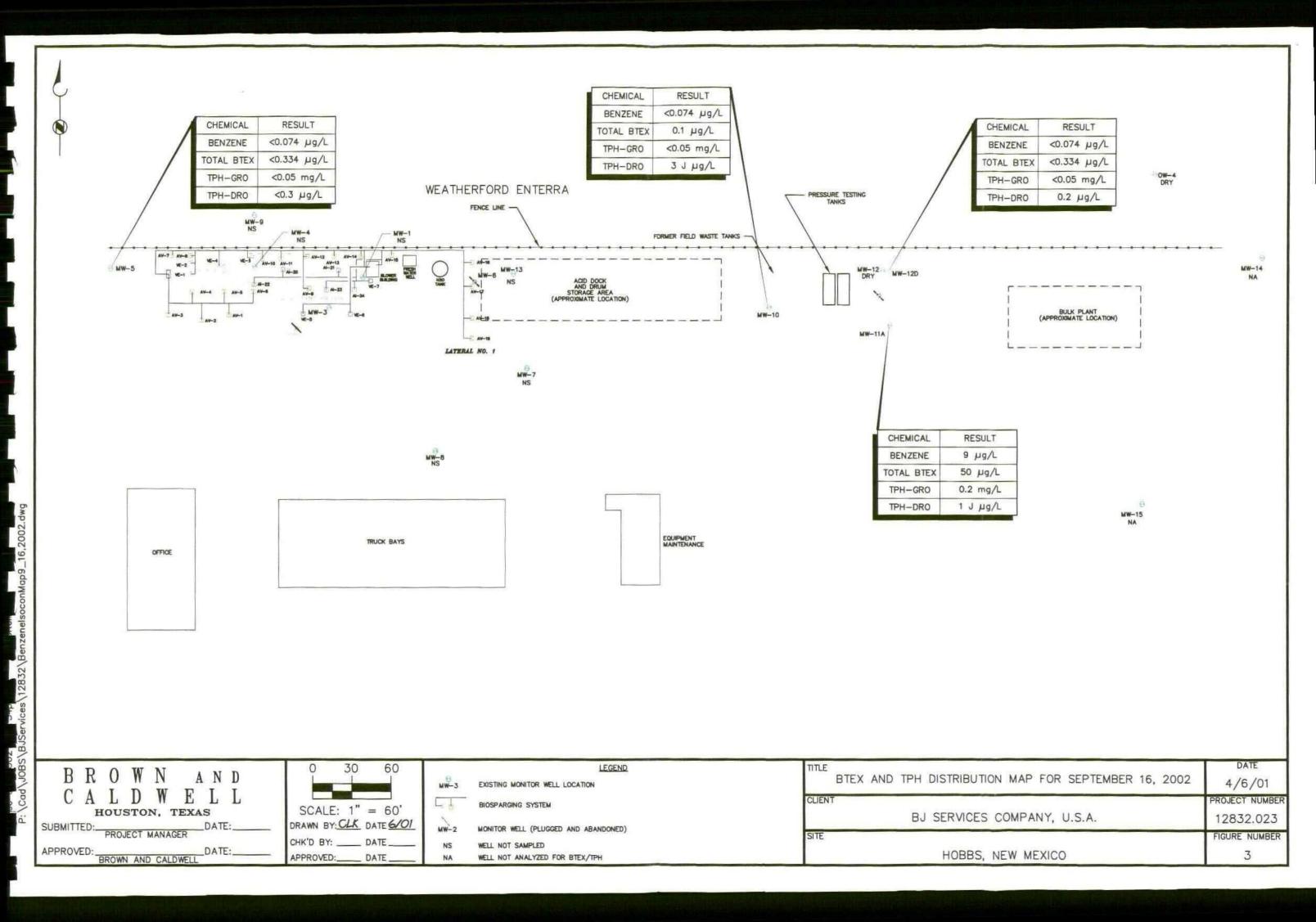
<sup>&</sup>quot;Use or disclosure of data contained on this sheet is subject to the restriction specified at the beginning of this document."

**FIGURES** 



\Cad\JOBS\BJServices\12832\Site Map.dwg





**TABLES** 

Date	Activity
February 7, 1991	The New Mexico Oil Conservation Division (NMOCD) conducted an on-site inspection, including sampling of the on-site fresh water well.
August 6, 1991	The NMOCD 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 NMOCD.
November 15, 1991	The NMOCD approved the Technical Work Plan submitted by RSA.
December 16, 1991	RSA sampled the fresh water well. The analytical results were submitted to the NMOCD.
February 21, 1992	Western sampled the fresh water well. The analytical results were submitted to the NMOCD.
July 29 -	Brown and Caldwell conducted a soil and groundwater investigation
August 10, 1992	according to the approved Technical Work Plan. The investigation included drilling and sampling nine soil borings, sampling six handaugured soil borings, installation and sampling of five monitor wells, and sampling of the fresh water well.
October 12, 1992	Brown and Caldwell submitted a Soil and Groundwater Investigation Report to the NMOCD.
December 2, 1992	The NMOCD requested the installation and sampling of four additional monitor wells, including a monitor well on an adjacent property.
April 13, 1993	Brown and Caldwell conducted a vapor extraction pilot test on the existing monitor wells.
April 15, 1993	Brown and Caldwell installed off-site monitor well MW-9.
April 22, 1993	Brown and Caldwell sampled off-site monitor well MW-9.
May 27, 1993	Brown and Caldwell submitted a letter report documenting the installation and sampling of off-site monitor well MW-9 to the NMOCD.
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.

Date	Activity
June 21, 1993	ENSR Consulting and Engineering (ENSR), the environmental consultant for the adjacent property owner on which off-site well MW-9 is located, submitted a request to sample monitor well MW-9.
July 15, 1993	ENSR split a groundwater sample collected from monitor well MW-9 with Brown and Caldwell.
July 30, 1993	USTank Management, Inc. submitted a 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 monitor wells. Brown and Caldwell sampled each of the existing and newly installed monitor wells.
January 26, 1994	Brown and Caldwell performed a groundwater monitoring event; the existing monitor wells and the fresh water well were purged and sampled. The groundwater samples were analyzed for BTEX.
May 6, 1994	A Remedial Action Plan (RAP) was submitted to the NMOCD.
August 11, 1994	The RAP was approved by the NMOCD.
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 the 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) constructed the initial design of the biosparging system.
September 19, 1995	Operation of the extraction portion of the biosparging system commenced.
November 13, 1995	Operation of the injection portion of the biosparging system commenced.
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.

Date	Activity
May 31, 1996	Brown and Caldwell conducted the May 1996 groundwater sampling event.
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 tanks 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 was installed.
April 1997	Vapor extraction well VE-4 was 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 was 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.

Date	Activity
December 9-10, 1998	Brown and Caldwell conducted the December 1998 groundwater sampling event.
January 21, 1999	The 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 by the NMOCD.
May 19, 1999	The NMOCD approved the groundwater delineation work plan.
June10, 1999	Brown and Caldwell performed sampling of existing monitor wells for the June /July 1999 groundwater sampling event.
July 2, 1999	Brown and Caldwell completed plugging and abandonment of monitor wells MW-2, MW-6, and MW-11; installed and developed monitor wells MW-12D and MW-13; and sampled monitor wells MW-12D and MW-13 to complete the June/July 1999 groundwater sampling event.
July 14, 1999	Brown and Caldwell redirected air discharge from the shallow injection 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.
November 1, 2000	Brown and Caldwell deactivated the biosparging system.
December 7, 2000	Brown and Caldwell conducted the December 2000 groundwater sampling event.

Date	Activity
January 2001	Brown and Caldwell installed and sampled monitor wells MW-14 and MW-15.
March 8-9, 2001	Brown and Caldwell conducted the March 2001 groundwater sampling event.
June 21-22, 2001	Brown and Caldwell conducted the June 2001 groundwater sampling event.
July 23, 2001	Brown and Caldwell collected soil samples from four soil borings installed at the former fueling system area of the facility to confirm the effectiveness of the biosparging system in remediating hydrocarbon impact to soil, as specified in the NMOCD-approved RAP.
September 10, 2001	Brown and Caldwell conducted the September 2001 groundwater sampling event.
December 6, 2001	Brown and Caldwell conducted the December 2001 groundwater sampling event.
February 26, 2002	Brown and Caldwell repaired the crushed well completion on monitor well MW-10.
February 28, 2002	NMOCD requested an evaluation of chloride content of groundwater at the facility.
March 11-12, 2002	Brown and Caldwell conducted the March 2002 groundwater sampling event. Groundwater samples from all water-producing wells at the facility were analyzed for chloride content.
May 21, 2002	Brown and Caldwell submitted the report for the March 2002 groundwater sampling event, including an evaluation of chloride content of groundwater at the facility and a recommendation for installation of a downgradient off-site well (MW-16) to replace off-site well OW-4, which has gone dry.
June 17-18, 2002	Brown and Caldwell conducted the June 2002 groundwater sampling event.
September 16, 2002	Brown and Caldwell conducted the September 2002 groundwater sampling event.
November 11, 2002	Brown and Caldwell submitted the June 2002 Groundwater Sampling Report and Biosparging System Closure Report.

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	8/10/1992	53.22	0.00	3,594.31	(1)
		2/9/1993	53.03	0.00	3,594.50	
		8/18/1993	53.10	0.00	3,594.43	
	1/26/1994	53.31	0.00	3,594.22	(2)	
	5/3/1995	54.64	0.20	3,593.05	(2)	
		7/31/1995	54.14 53.69	0.00 0.00	3,593.39 3,593.84	
		11/14/1995 2/23/1996	54.32	0.00	3,593.84	
		5/31/1996	54.14	0.00	3,593.39	
		8/23/1996	56.17	0.00	3,591.36	
		12/2/1996	55.27	0.00	3,592.26	
		3/12/1997	55.70	0.27	3,592.05	
		6/12/1997	55.08	0.02	3,592.47	
		9/12/1997	55.64	0.51	3,592.31	
		12/10/1997	55.46	0.00	3,592.07	PSH Sheen
		3/24/1998	55.81	0.00	3,591.72	PSH Sheen
		6/23/1998	56.38	0.06	3,591.20	part of
		9/30/1998	56.82	0.00	3,590.71	PSH Sheen
		12/9/1998	57.05	0.00	3,590.48	
		3/10/1999	57.45 58.02	0.00 0.00	3,590.08 3,589.51	
		6/10/1999 7/2/1999	58.02 57.90	0.00	3,589.63	
		9/14/1999	58.14	0.00	3,589.39	
		12/9/1999	38.17	0.00	5,567.57	(3)
		3/9/2000	58.99	0.00	3,588.54	
		06/00	-	-	÷	
		09/00	-	-	-	
		12/7/00	-	-	=	
		03/08/01	60.35	0.00	3587.18	
		6/21/01	60.99	0.00	3,586.54	
		9/10/01	61.17	0.00	3,586.36	1
		12/6/2001		not measured		
		03/11/02	62.11	0.00	3585.42	
		6/17/02	62.53	0.00	3,585.00	
	3 6 4 4 9 4	9/16/2002	62.43	0.00	3,585.10	(1)
MW-2	3,644.84	8/10/1992	52.82	0.00	3,592.02	(1)
		2/9/1993 8/18/1993	49.60 49.71	0.00 0.00	3,595.24 3,595.13	
		1/26/1994	49.71	0.00	3,594.87	
		5/3/1995	-	-	J,JJ4.67 -	(4),(5)
MW-3	3,645.00	8/10/1992	52.99	0.00	3,592.01	(1)
		2/9/1993	52.72	0.00	3,592.28	
		8/18/1993	52.82	0.00	3,592.18	
		1/26/1994	53.05	0.00	3,591.95	
		5/3/1995	54.31	0.00	3,590.69	1
		7/31/1995	51.24	0.00	3,593.76	[
		11/14/1995	51.10	0.00	3,593.90	1
		2/23/1996	51.68	0.00	3,593.32	
		5/31/1996 8/23/1996	51.45 51.55	0.00 0.00	3,593.55 3,593.45	
		12/2/1996	51.55	0.00	3,593.45 3,592.77	
		3/12/1997	52.23	0.00	3,592.77	
		6/12/1997	52.68	0.00	3,592.32	
		9/11/1997	52.71	0.00	3,592.29	
		12/10/1997	52.89	0.00	3,592.11	
		3/23/1998	53.22	0.00	3,591.78	
		6/23/1998	53.66	0.00	3,591.34	
		9/30/1998	54.06	0.00	3,590.94	
		12/9/1998	54.36	0.00	3,590.64	
		3/10/1999	54.72	0.00	3,590.28	
		6/10/1999	55.17	0.00	3,589.83	
		7/2/1999	55.15	0.00	3,589.85	
		9/14/1999	55.42	0.00	3,589.58	
		12/9/1999	55.78	0.00	3,589.22	
				0.00	3,588.77	1
		3/9/2000	56.23			
		6/8/2000	56.66	0.00	3,588.34	
		6/8/2000 9/13/2000	56.66 56.77	0.00	3,588.34 3,588.23	
		6/8/2000	56.66	0.00	3,588.34	

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-3	3,645.00	9/10/01	58.54	0.00	3,586.46	
		12/6/2001	59.04	0.00	3,585.96	
		03/11/02	59.50	0.00	3,585.50	
		6/17/02	59.83	0.00	3,585.17	
MW-4	2 645 20	9/16/2002 8/10/1992	59.80 50.55	0.00	3,585.20	(1)
M W -4	3,645.28	2/9/1993	50.26	0.00 0.00	3,594.73 3,595.02	(1)
		8/18/1993	50.38	0.00	3,594.90	
		1/26/1994	50.90	0.30	3,594.63	
į		5/3/1995	51.51	0.45	3,594.14	1
		7/31/1995	51.74	0.26	3,593.75	
		11/14/1995	51.03	0.00	3,594.25	
		2/23/1996	51.65	0.01	3,593.64	
	[	5/31/1996	51.48	0.00	3,593.80	
		8/23/1996 12/2/1996	53.49 52.32	0.00 0.00	3,591.79	
		3/12/1997	52.32 52.74	0.00	3,592.96 3,592.58	
ĺ		6/12/1997	53.08	0.44	3,592.56	
.	[	9/12/1997	52.60	0.15	3,592.80	
,		12/10/1997	52.89	0.00	3,592.39	PSH Sheen
		3/24/1998	53.20	0.25	3,592.29	
	į	6/23/1998	53.82	0.22	3,591.64	
		9/30/1998	53.96	0.00	3,591.32	200 ml PSH
1		12/9/1998	54.27	0.00	3,591.01	
		3/10/1999 6/10/1999	54.69 55.07	0.04 0.00	3,590.62 3,590.21	
	· ',	7/2/1999	55.10	0.00	3,590.21	
		9/14/1999	55.33	0.00	3,589.95	
		12/9/1999	55.79	0.00	3,589.49	
		3/10/2000	56.12	0.00	3,589.16	
		6/8/2000	56.67	0.00	3,588.61	
		9/13/2000	56.65	0.00	3,588.63	
]	]	12/07/00	57.05	0.00	3,588.23	)
		03/08/01	57.72	0.00	3,587.56	
		6/21/01 9/10/01	58.18 58.54	0.00 0.00	3,587.10 3,586.74	
		12/6/2001	58.88	0.00	3,586.40	
		03/11/02	59.41	0.00	3,585.87	
		6/17/02	59.67	0.00	3,585.61	
		9/16/2002	59.71	0.00	3,585.57	
MW-5	3,647.72	8/10/1992	52.38	0.00	3,595.34	(1)
		2/9/1993	52.06	0.00	3,595.66	ì
	İ	8/18/1993	52.16	0.00	3,595.56	
		1/26/1994	52.50	0.00	3,595.22	
ļ		5/3/1995	53.57	0.00	3,594.15	
		7/31/1995 11/14/1995	53.27 52.83	0.00	3,594.45 3,594.89	1
		2/23/1996	52.83 53.57	0.00	3,594.89 3,594.15	
		5/31/1996	53.16	0.00	3,594.56	
-		8/23/1996	53.41	0.00	3,594.31	ĺ
}		12/2/1996	53.98	0.00	3,593.74	
		3/12/1997	54.44	0.00	3,593.28	
		6/12/1997	54.48	0.00	3,593.24	
}		9/12/1997	54.29	0.00	3,593.43	
1		12/10/1997	54.66	0.00	3,593.06	1
		3/23/1998 6/23/1998	55.05 55.44	0.00	3,592.67	
ļ		9/30/1998	55.44 55.65	0.00 0.00	3,592.28 3,592.07	
		12/9/1998	56.00	0.00	3,592.07 3,591.72	
}		3/9/1999	56.45	0.00	3,591.72	
		6/10/1999	56.91	0.00	3,590.81	
-	İ	7/2/1999	56.93	0.00	3,590.79	
1		9/14/1999	57.12	0.00	3,590.60	
}		12/9/1999	57.41	0.00	3,590.31	
1		3/9/2000	57.92	0.00	3,589.80	
		6/8/2000 9/13/2000	58.32 58.36	0.00	3,589.40	
		12/07/00	58.36 58.71	0.00 0.00	3,589.36 3,589.01	
	l	03/08/01	59.36	0.00	3,588.36	
		6/21/01	59.94	0.00	3,587.78	1

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-5	3,647.72	9/10/01	59.85	0.00	3,587.87	
		12/6/2001	60.56	0.00	3,587.16	
	ĺ	3/11/02	61.12	0.00	3,586.60	
		6/17/02	61.43	0.00	3,586.29	
Yawa	3 644 74	9/16/2002	61.52	0.00	3,586.20	
MW-6	3,644.74	2/9/1993	50.58	0.00	3,594.16	(1)
		8/18/1993 1/26/1994	50.78 51.00	0.00 0.00	3,593.96 3,593.74	
		5/3/1995	52.63	0.00	3,592.11	
		7/31/1995	51.90	0.00	3,592.84	
		11/14/1995	51.19	0.00	3,593.55	
		2/23/1996	52.10	0.00	3,592.64	
		5/31/1996	51.76	0.00	3,592.98	
		8/23/1996	51.63	0.00	3,593.11	
		12/2/1996	52.85	0.00	3,591.89	
		3/12/1997	53.55	0.00	3,591.19	
	*	6/12/1997	52.08	0.00	3,592.66	1
		9/11/1997	53.72	0.00	3,591.02	
		12/10/1997 3/23/1998	53.27 53.56	0.00 0.00	3,591.47	
		6/23/1998	52.88	0.00	3,591.18 3,591.86	
		9/30/1998	54.89	0.00	3,589.85	
		12/9/1998	54.57	0.00	3,589.17	
		3/10/1999	55.10	0.00	3,589.64	
		7/2/1999			<b>,</b>	(5),(6)
MW-7	3,644.55	2/9/1993	50.53	0.00	3,594.02	(1)
		8/18/1993	50.74	0.00	3,593.81	
		1/26/1994	51.01	0.00	3,593.54	
		5/3/1995	52.25	0.00	3,592.30	1
		7/31/1995	51.92	0.00	3,592.63	
		11/14/1995	51.48 52.15	0.00	3,593.07	
		2/23/1996 5/31/1996	52.15 51.78	0.00 0.00	3,592.40 3,592.77	Į.
		8/23/1996	52.02	0.00	3,592.53	
		12/2/1996	52.52	0.00	3,592.03	
		3/12/1997	52.99	0.00	3,591.56	
		6/12/1997	53.08	0.00	3,591.47	
		9/11/1997	53.00	0.00	3,591.55	
		12/10/1997	53.28	0.00	3,591.27	
		3/23/1998	53.59	0.00	3,590.96	Į.
		6/23/1998	54.20	0.00	3,590.35	
		9/30/1998	54.54	0.00	3,590.01	
		12/9/1998	54.74	0.00	3,589.81	
		3/9/1999	55.15 55.66	0.00	3,589.40	
		6/10/1999 7/2/1999	55.73	0.00 0.00	3,588.89 3,588.82	
		9/13/1999	55.94	0.00	3,588.61	
	<b>\</b>	12/9/1999	56.38	0.00	3,588.17	
		3/9/2000	56.74	0.00	3,587.81	
		6/8/2000	57.17	0.00	3,587.38	
		9/13/2000	57.40	0.00	3,587.15	
		12/07/00	57.77	0.00	3,586.78	!
		03/08/01	58.29	0.00	3,586.26	1
		6/21/01	58.91	0.00	3,585.64	1
		9/10/01	59.25	0.00	3,585.30	<b>\</b>
		12/6/2001 03/11/02	59.75	0.00	3,584.80	
			60.03	0.00	3,584.52	
		6/17/02	60.39	0.00	3,584.16	l
MANTO	2 (44 07	9/16/2002	60.39	0.00	3,584.16	<u> </u>
MW-8	3,644.87	2/9/1993	50.48	0.00	3,594.39	(1)
		8/18/1993 1/26/1994	50.67 50.96	0.00 0.00	3,594.20 3,593.91	
		5/3/1995	52.15	0.00	3,593.91	}
		7/31/1995	51.77	0.00	3,592.72	
		11/14/1995	51.37	0.00	3,593.50	
		2/23/1996	52.17	0.00	3,592.70	
		5/31/1996	51.55	0.00	3,593.32	
		8/23/1996	51.92	0.00	3,592.95	
		12/2/1996	52.43	0.00	3,592.44	
	1	3/12/1997	52.93	0.00	3,591.94	I.

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-8	3,644.87	6/12/1997	53.96	0.00	3,590.91	·
		9/11/1997	52.73	0.00	3,592.14	
	ļ.	12/10/1997	53.15	0.00	3,591.72	
		3/23/1998	53.51	0.00	3,591.36	
		6/23/1998	54.01	0.00	3,590.86	
		9/30/1998	54.35	0.00	3,590.52	
		12/9/1998	54.60	0.00	3,590.27	
		3/9/1999	55.00	0.00	3,589.87	
		6/10/1999	55.56	0.00	3,589.31	
		7/2/1999	55.57	0.00	3,589.30	
	)	9/13/1999	55.72	0.00	3,589.15	(3)
		12/9/1999 3/9/2000	- 56.52		2 500 25	(3)
		06/00	56.52	0.00	3,588.35	
		09/00		-	•	
		12/00	<del>-</del>	-	-	
		03/08/01	58.11	0.00	3,586.76	
		6/21/01	58.72	0.00	3,586.15	
		9/10/01	58.94	0.00	3,585.93	
		12/6/2001	36.54	not measured	5,565.75	
		03/11/02	59.94	1 0.00	3,584,93	
		6/17/02	60.22	0.00	3,584.65	
		9/16/2002	60.24	0.00	3,584.63	
MW-9	3,644.78	4/22/1993	49.73	0.00	3,595.05	(1)
141 44 - 3	3,044.78	7/15/1993	49.65	0.00	3,595.13	(1)
	,	8/18/1993	49.85	0.00	3,594.93	
7	i .	1/26/1994	50.02	0.00	3,594.76	
		5/3/1995	51.35	0.00	3,593.43	
	1	7/31/1995	50.97	0.00	3,593.81	
		11/14/1995	50.43	0.00	3,594.35	
		2/23/1996	51.12	0.00	3,593.66	
		5/31/1996	50.89	0.00	3,593.89	
		8/23/1996	50.98	0.00	3,593.80	
		12/2/1996	51.58	0.00	3,593.20	
		3/12/1997	52.21	0.05	3,592.61	
	Í	6/12/1997	52.10	0.00	3,592.68	PSH Sheen
		9/12/1997	51.95	0.00	3,592.83	PSH Sheen
		12/10/1997	52.37	0.00	3,592.41	PSH Sheen
		3/23/1998	52.68	0.00	3,592.10	PSH Sheen
		6/23/1998	53.08	0.00	3,591.70	PSH Sheen
		9/30/1998	53.39	0.01	3,591.40	PSH Sheen
		12/9/1998	53.68	0.00	3,591.10	
		3/10/1999	54.15	0.00	3,590.63	
		6/10/1999	54.68	0.00	3,590.10	
		7/2/1999	54.71	0.00	3,590.07	
		9/13/1999	54.71	0.00	3,590.07	1
		12/9/1999	-	-	-	(3)
		3/9/2000	55.69	0.00	3,589.09	
		06/00	-	-	-	
i	İ	09/00	-	-	-	
		12/00	<u>-</u>	·	<u>.</u>	
		03/08/01	57.03	0.00	3,587.75	
		6/21/01	57.91	0.00	3,586.87	
		9/10/01	57.95	0.00	3,586.83	
		12/6/2001		not measured	1	
		03/11/02	58.96	0.00	3,585.82	
		6/17/02	59.14	0.00	3,585.64	ļ
					2,230.01	1
MW 10	2 (44 45	9/16/2002	C1 C4	not measured	2 402 62	
MW-10	3,644.47	8/18/1993	51.54	0.00	3,592.93	(1)
		1/26/1994	51.90	0.00	3,592.57	1
		5/3/1995	52.97	0.00	3,591.50	
		7/31/1995	52.87	0.00	3,591.60	1
		11/14/1995	52.51	0.00	3,591.96	
	İ	2/23/1996	53.05	0.00	3,591.42	
		5/31/1996	52.79	0.00	3,591.68	
		8/23/1996	53.03	0.00	3,591.44	
		12/2/1996	53.41	0.00	3,591.06	1

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	3/12/1997	54.21	0.00	3,590.26	
		6/12/1997	53.99	0.00	3,590.48	
		9/12/1997	53.94	0.00	3,590.53	
		12/10/1997	54.12	0.00	3,590.35	
		3/23/1998	54.51	0.00	3,589.96	
		6/23/1998	55.12	0.00	3,589.35	
		9/30/1998	55.61	0.00	3,588.86	
		12/9/1998	55.80	0.00	3,588.67	
		3/9/1999	56.09	0.00	3,588.38	
		6/10/1999	56.60	0.00	3,587.87	
		7/2/1999	56.64	0.00	3,587.83	
		9/14/1999	56.91	0.00	3,587.56	
		12/9/1999	57.37	0.00	3,587.10	
		3/10/2000	57.71	0.00	3,586.76	
		6/8/2000	58.08	0.00	3,586.39	
		9/13/2000	58.44	0.00	3,586.03	
		12/07/00	58.89	0.00	3,585.66	
		03/09/01	59.31	0.00	3,585.24	
		6/21/01	59.89	0.00	3,584.66	
		9/10/01	61.34	0.00	3,583.21	1
		12/6/2001	60.65	0.00	3,583.90	
		03/11/02	60.69	0.00	3,583.86	
		6/17/02	60.98	0.00	3,583.57	
		9/16/2002	61.00	0.00	3,583.55	
MW-11	3,643.78	8/18/1993	51.92	0.00	3,592.63	(1)
	2,0 12.110	1/26/1994	52.32	0.00	3,591.46	(-)
		5/3/1995	53.38	0.00	3,590.40	
		7/31/1995	53.35	0.00	3,590.43	
		11/14/1995	52.96	0.00	3,590.82	
		2/23/1996	53.50	0.00	3,590.28	
		5/31/1996	53.25	0.00	3,590.53	
		8/23/1996	53.49	0.00	3,590.29	
		12/2/1996	53.79	0.00	3,589.99	
		3/12/1997	53.79	0.00		
		6/12/1997	53.96	0.00	3,589.97	
		9/12/1997		1	3,589.82	
			52.93	0.00	3,590.85	(5) (6)
1W-11A	2 (44 24	12/10/1997	54.70	0.00	2.500.45	(5),(6)
1 W-11A	3,644.24	3/23/1998	54.79 55.42	0.00 0.00	3,589.45	(7)
		6/23/1998	55.43 55.06	1	3,588.81	
		9/30/1998	55.96 56.12	0.00	3,588.28	
		12/9/1998	56.13	0.00	3,588.11	
		3/10/1999	56.43	0.00	3,587.81	
		6/10/1999	56.94	0.00	3,587.30	ļ
		7/2/1999	57.01	0.00	3,587.23	
		9/14/1999	57.36	0.00	3,586.88	
		12/9/1999	57.72	0.00	3,586.52	
		3/9/2000	58.01	0.00	3,586.23	
		6/8/2000	58.40	0.00	3,585.84	
		9/13/2000	58.84	0.00	3,585.40	
		12/07/00	59.29	0.00	3,584.95	1
		03/08/01	59.72	0.00	3,584.52	
		6/21/01	60.28	0.00	3,583.96	1
		9/10/01	60.69	0.00	3,583.55	
		12/6/2001	60.88	0.00	3,583.36	
		03/11/02	61.42	0.00	3,582.82	
		6/17/02	61.55	0.00	3,582.69	
		9/16/2002	61.59	0.00	3,582.65	
MW-12	3,644.29	3/23/1998	54.72	0.00	3,589.57	(7)
		6/23/1998	55.48	0.00	3,588.81	
	I	9/30/1998	56.02	0.00	3,588.27	

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-12	3,644.29	12/9/1998	56.17	0.00	3,588.12	
	,	3/10/1999	56.45	0.00	3,587.84	
		6/10/1999	56.97	0.00	3,587.32	
		7/2/1999	56.99	0.00	3,587.30	
		9/14/1999	57.41	0.00	3,586.88	
		12/9/1999	57.76	0.00	3,586.53	
		3/10/2000	58.08	0.00	3,586.21	
		6/8/2000	58.42	0.00	3,585.87	
		9/13/2000				
			58.85	0.00	3,585.44	
		12/07/00	59.31	0.00	3,584.98	
		03/08/01	59.76	0.00	3,584.53	
		6/21/01	60.29	0.00	3,584.00	
		9/10/01	60.79	0.00	3,583.50	
		12/6/2001		ng this and subsequent monito		
MW-12D	3,644.38	7/2/1999	57.13	0.00	3,587.25	(8)
1		9/14/1999	57.74	0.00	3,586.64	
		12/9/1999	57.86	0.00	3,586.52	
		3/9/2000	58.24	0.00	3,586.14	
		6/8/2000	58.56	0.00	3,585.82	
		09/00	-	_	•	
		12/00	-	-	_	
		03/08/01	-	_	_	
	!	6/21/01	_	_	-	
		9/10/01	_	_	-	
		12/6/2001	61.30	0.00	3,583.08	
		03/11/02	61.61	0.00	3,582.77	
		6/17/02	61.71	0.00	3,582.67	
l		9/16/2002	61.75	0.00	3,582.63	
MW-13	3,645.52	7/2/1999	56.60			(9)
WIW-13	3,643.32	9/14/1999		0.00	3,588.92	(9)
			56.92	0.00	3,588.60	
		12/9/1999	57.28	0.00	3,588.24	1
		3/10/2000	57.68	0.00	3,587.84	
		6/8/2000	58.04	0.00	3,587.48	
		9/13/2000	58.29	0.00	3,587.23	
		12/07/00	58.68	0.00	3,586.84	
		03/08/01	59.19	0.00	3,586.33	
1		6/21/01	59.80	0.00	3,585.72	
		9/10/01	60.03	0.00	3,585.49	
		12/6/2001	60.59	0.00	3,584.93	
		03/11/02	60.94	0.00	3,584.58	1
		6/17/02	61.28	0.00	3,584.24	1
		9/16/2002	61.23	0.00	3,584.29	
MW-14	3,642.45	03/08/01	61.07	0.00	3,581.38	
		6/21/01	61.71	0.00	3,580.74	
		9/10/01	62.31	0.00	3,580.14	
		12/6/2001	62.80	0.00	3,579.65	
		03/11/02	62.70	0.00	3,579.75	
		6/17/02	62.65	0.00	3,579.80	
		9/16/2002	62.55	0.00	3,579.90	
MW-15	3,643.24	03/08/01	59.79	0.00	3,583.45	<del>                                     </del>
13	2,012.47	6/21/01	60.49	0.00	3,582.75	
		9/10/01	61.02		1	
				0.00	3,582.22	
		12/6/2001	61.47	0.00	3,581.77	
		03/11/02	61.65	0.00	3,581.59	
		6/17/02	61.68	0.00	3,581.56	
		9/16/2002	61.47	0.00	3,581.77	1
OW-4	3,644.06	7/2/1999	58.18	0.00	3,585.88	(8)
		9/14/1999	58.63	0.00	3,585.43	
		12/9/1999	58.92	0.00	3,585.14	
		3/9/2000	59.19	0.00	3,584.87	1

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	6/8/2000	59.56	0.00	3,584.50		
		9/13/2000	60.16	0.00	3,583.90		
		12/07/00	61.15	0.00	3,582.91		
		03/08/01	61.43	0.00	3,582.63	(10)	
		6/21/01	61.48	0.00	3,582.58		
]		9/10/01	61.53	0.00	3,582.53		
<u> </u>		12/6/2001	well dry during this and subsequent monitoring events				

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

<sup>(2) -</sup> For wells having measurable thickness of free product, the groundwater elevation was calculated as follows:

Groundwater Elevation = (TOC elevation)-(depth to groundwater)+[(free product thickness)x(SG of free product)]

Note: The specific gravity (SG) of the free product is 0.82.

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

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

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

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

 $<sup>^{(7)}</sup>$ - TOC elevations for MW-11A and MW-12 estimated relative to TOC elevation for MW-10.

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

<sup>&</sup>lt;sup>(9)</sup>- TOC elevation for MW-13 estimated relative to TOC elevation for MW-7.

<sup>(10)-</sup>Well dry (measured depth to water is below base of screen), true groundwater elevation is less than listed groundwater elevation.

Table 3
September 16, 2002 Field Screening Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor Well	Cumulative Gallons Removed	pН	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)
MW-5	1.5	8.35	19.29	1058	370.9	5.73	9.0	0.0	249
MW-10	0.5	8.17	21.09	2148	-102.0	3.70	NM	NM	844
MW-11A	1.5	8.34	20.62	5569	-62.2	3.26	8.25	0.0	364
MW-12D	1.25	8.93	19.32	1089	-114.0	0.23	0.0	7.25	262
MW-14	3.5	8.78	19.31	1879	141.1	6.23	NM	NM	NM
MW-15	3.0	8.78	18.97	1462	124.2	6.35	NM	NM	NM_

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

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.

Monitor wells MW-12 and OW-4 were dry.

NM=Not Measured

Alkalinity reported as bicarbonate.

Lab measurement reported for alkalinity.

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре			is per liter, ug/L		milligrams po	
MW-I	8/10/92	Regular	5550.0	12090.0	2160.0	7370.0	NA	NA
	2/9/93	Regular	2100.0	6500.0	1300.0	7400.0	NA NA	NA NA
	8/19/93	Regular	3200.0	7300.0	1200.0	3700.0	NA NA	NA
	1/27/94	Regular	1930.0	4580.0	672.0	2390.0	NA NA	NA NA
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA NA	NSP
	1					1 1		
	8/1/95	Regular	390.0	1300.0 1800.0	230.0	800.0	NA NA	5.7
	11/15/95	Regular	880.0		300.0	970.0 2200.0	NA	6.8
	2/23/96	Regular	1500.0	3700.0	620.0	1 1	NA	21
	5/31/96	Regular	1100.0	1700.0	380.0	990.0	NA 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
	9/30/1998	Regular	3.2	90.0	280.0	970.0	2.5	3.6
	12/10/1998	Regular	< 1.0	1.5	17.0	110.0	1.4	0.31
	3/10/1999	Regular	< 1.0	< 1.0	8.2	110.0	0.62	0.85
	3/10/1999	Duplicate	< 1.0	< 1.0	7.9	110.0	0.66	0.84
	6/10/1999	Regular	< 1.0	1.1	< 1.0	28.0	0.53	0.55
	6/10/1999	Duplicate	< 1.0	1.8	< 1.0	41.0	0.69	0.76
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	-	NS	NS	NS	NS	NS	NS
	3/9/2000	Regular	< 1	< 1	< 1	9.1	14	1.3
	6/8/2000	-	. NS	NS	NS	NS	NS	NS
	9/13/2000	-	NS	NS	NS	NS	NS	NS
	12/7/2000	-	NS	NS	NS	NS	NS	NS
	3/8/2001	Regular	2.0	< 1	< 1	< 1	0.49	0.58
	6/21/2001	-	NS	NS	NS	NS	NS	NS NS
	9/10/2001	-	NS	NS	NS	NS	NS	NS NS
	12/6/2001	- Damilar	NS < 1	NS < 1	NS	NS	NS - 0.2	NS
	3/12/2002 6/18/2002	Regular	NS	NS	< 1 NS	<   NC	< 0.2	< 0.1 NS
	9/16/2002	-	NS NS	NS NS	NS NS	NS NS	NS NS	NS NS
MW-2 <sup>T</sup>	8/10/92	Regular	14.9	< 4	< 4	< 4	NA NA	NA NA
141 44 -2	2/9/93	Regular	< 2	< 2	< 2	< 6	NA NA	NA NA
	8/19/93			I				
	l I	Regular	100.0	12.0	3.0	13.0	NA NA	NA NA
1407.3	1/27/94	Regular	< 1	1.2	2.0	2.5	NA_	NA NA
MW-3	8/10/92	Regular	304.9	2099.0	6760.0	1586.0	NA NA	NA NA
	2/9/93	Regular	130.0	< 10	< 10	190.0	NA 	NA NA
	8/19/93	Regular	560.0	3100.0	630.0	1900.0	NA	NA
	1/27/94	Regular	1070.0	5380.0	510.0	3120.0	NA	NA
	5/4/95	Regular	770.0	3300.0	470.0	1800.0	NA	NA
	8/1/95	Regular	490.0	2900.0	890.0	1600.0	NA	14
	11/15/95	Regular	250.0	0.0001	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
MW-3	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
	9/30/1998	Regular	42.0	470.0	450.0	530.0	1.0	3.8
	12/10/1998	Regular	13.0	220.0	160.0	290,0	1.3	0.43

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type		microgran	ıs per liter, ug/L		milligrams p	er liter, mg/L
	3/10/1999	Regular	3.2	7.4	42.0	32.0	0.2	0.44
	6/10/1999	Regular	1.7	3.1	<1.0	36.0	< 0.20	0.18
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	Regular	< l	< t	< 1	<1	< 0.2	< 0.1
	3/9/2000	Regular	<1	<1	< 1	<1	0.32	< 0.1
	6/8/2000	Regular	<1	<1	< 1	<1	< 0.22	< 0.1
	9/13/2000	Regular	<1	<1	<1	<1	< 0.2	< 0.1
	12/7/2000	Regular	<1	< 1	<1	<1	< 0.25	< 0.1
	3/8/2001	Regular	<1	<1	<1	<1	0.42	< 0.1
	6/21/2001	Regular	<1	<1	<1	<1	< 0.22	< 0.1
	9/10/2001	Regular	<1	<1	<1	<1	< 0.2	< 0.1
	12/6/2001	Regular	<1	<1	<1	<1	< 0.2	< 0.1
	3/12/2002	Regular	< 1	<1	<1	<1	< 0.2	< 0.1
	6/18/2002	Regular	<1	<1	<1 <1	<1	<0.2	<0.1
	9/16/2002	Keguiai	NS	NS	NS	NS	NS	NS
MW-4	8/10/92	Damilar	2594.0	10360.0	2160.0	6740.0	NA NA	NA NA
192 94	2/9/93	Regular	5200.0	15000.0	2160.0	10000.0	NA NA	NA NA
	l I	Regular		1				
	8/19/93	Regular	3000.0	12000.0	< 2000	7000.0	NA NA	NA NGD
,	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
	9/30/1998	_	80.0	180.0	370.0	1		3.9
		Regular		l		840.0	2.0	
	12/10/1998	Regular	28.0	70.0	210.0	960.0	9.3	4.3
	12/10/1998	Duplicate	26.0	62.0	180.0	830.0	3.9	4.3
	3/10/1999	Regular	8.0	20.0	250.0	1400.0	13.0	13
	6/10/1999	Regular	<1.0	<1.0	12.0	12.0	0.44	0.63
	9/14/1999	Regular	< 1.0	< 1.0	3.3	13.1	0.35	0.17
	12/9/1999	Regular	< 1	2.5	2.3	20.1	2	0.53
	3/10/2000	Regular	< 1	< 1	< 1	3.6	2.6	0.15
	6/8/2000	Regular	< 1	< 1	< 1	< 1	0.44	0.23
	9/13/2000	Regular	< 1	< l	< 1	< 1	0.61	< 0.1
	12/7/2000	Regular	<1	< 1	1.3	< 1	0,53	0.16
	3/8/2001	Regular	< 1	< 1	< 1	< 1	0.43	0.16
	6/21/2001	Regular	< 1	< 1	< 1	< 1	< 0.25	< 0.1
MW-4	9/10/2001	Regular	< 1	<1	< 1	< 1	< 0.2	< 0.1
	12/6/2001	Regular	< }	< 1	< 1	< 1	0.6	< 1
	3/12/2002	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	6/18/2002	Regular	<1	<1	<1	<1	<0.2	<0.1
	9/16/2002	- Kegulai	NS	NS	1	1		NS
MW-5			< 4	< 4	NS 5.1	NS NS	NS NA	
IVI W-3	8/10/92	Regular			< 4	< 4	NA NA	NA NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94	Regular	8.7	29.9	4.0	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

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре	Democrac		s per liter, ug/L	- Aylenes	milligrams pe	
77 C11	8/23/96		< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular Regular	< I	< 1	< 1	<1	< 0.1	< 0.1
	3/12/97		<1	<1		<1	< 0.1	< 0.1
	l i	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		< 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	
	9/30/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/9/1999	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	6/10/1999	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	9/14/1999	Regular	<1.0	<1.0	<1.0	<2.0	< 0.20	< 0.10
	12/9/1999	Regular	<1	<1	< 1	< 1	< 0.2	< 0.1
	3/9/2000	Regular	< 1	<1	< 1	< 1	0.55	< 0.1
	6/8/2000	Regular	<1	<1	< 1	< 1	< 0.2	< 0.1
	9/13/2000	Regular	< 1	<1	< 1	<1	< 0.2	< 0.1
	12/7/2000	Regular	<1	<1	< 1	<1	< 0.25	< 0.1
	3/8/2001	Regular	< 1	< 1	< 1	< 1	0.56	< 0.1
	6/21/2001	Regular	<1	<1	< 1	<1	0.26	< 0.1
	9/10/2001	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	12/6/2001	Regular	< 1	< 1	< 1	< 1	0.49	< 0.1
	3/12/2002	Regular	< 1	< 1	< 1	< 1	< 0.24	< 0.1
	6/18/2002	Regular	<1	<1	<1	<1	<0.2	<0.1
	9/16/2002	Regular	< 0.074	<0.11	<0.068	< 0.082	0.3	<0.05
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	< 0.1
MW-6	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
	9/30/1998	Regular	1000.0	420.0	140.0	270.0	4.0	3.3
	12/10/1998	Regular	7.6	6.6	1.7	5.8	2.0	< 0.1
•	3/10/1999	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 NA	< 0.1
	5/31/96	Regular	29.0	83.0	10.0	21.0	NA NA	0.25
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA NA	< 0.1
			- 0.2		- 0.5	- 0.0	1 1/1	

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	ns per liter, ug/L	-	milligrams p	er liter, mg/L
	3/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	6/12/97	Regular	< 1	< I	<1	<1	< 0.1	< 0.1
	9/11/97	Regular	<1	<1	< i	<1	< 0.1	< 0.1
	12/10/97	Regular	<1	<1	<1	<1	< 0.2	< 0.1
	3/23/98	-	<1	<1	< 1	<1	< 0.2	< 0.1
	6/23/98	Regular	<1	<1	<1	<1	< 0.2	< 0.1
		Regular		i				< 0.1
	9/30/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	
	12/10/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/9/1999	Regular	<1.0	<1.0	<1.0	<1.0	4.7	< 0.1
	6/10/1999	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	Regular	< 5	< 5	< 5	< 5	1.8	< 0.5
	3/9/2000	Regular	< 1	< 1	< 1	< 1	0.66	< 0.1
	6/8/2000	Regular	<1	< 1	< 1	<1	< 0.21	< 0.1
	9/13/2000	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	12/7/2000	Regular	< 1	<1	< 1	<1	< 0.29	< 0.1
	3/8/2001	Regular	< 1	< 1	< 1	<1	1.2	< 0.1
	6/21/2001	Regular	3.1	< 1	< 1	<1	< 0.22	< 0.1
:	9/10/2001	Regular	< 1	< 1	< 1	< I	< 0.33	< 0.1
	12/6/2001	Regular	< 1	< l	< 1	<1	1.3	< 0.1
	3/12/2002	Regular	< 1	< 1	< 1	< 1	NA	< 0.1
	6/18/2002	Regular	<1	<1	<1	<1	<0.2	<0.1
	9/16/2002		NS	NS	NS	NS	NS	NS
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	< l	< i	< 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
MW-8	12/2/96	Regular	< 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
	9/30/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/9/1999	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	6/10/1999	Regular	< 1.0	< 1.0	< 1.0	1	< 0.20	< 0.1
	9/13/1999		< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.10
	12/9/1999	Regular	NS NS	NS NS	< 1.0 NS	< 2.0 NS	< 0.20 NS	< 0.10 NS
	3/9/2000	Regular	NS < 1	N3   <	< I	NS < 1	0.55	< 0.1
	6/8/2000	Regulai	NS	NS	NS	NS	NS NS	NS
	9/13/2000		NS NS	NS NS	NS NS	NS NS	NS NS	NS NS
	12/7/2000	_	NS	NS	NS	NS	NS NS	NS NS
	3/8/2001	Regular	<1	< 1	< 1	<1	1.6	< 0.1
	6/21/2001		NS	NS	NS	NS	NS	NS
	9/10/2001		NS	NS	NS	NS	NS	NS
	12/6/2001	-	NS	NS	NS	NS	NS	NS
	3/12/2002	Regular	< l	<1	< 1	<1	0.38	< 0.1
	6/18/2002	-	NS	NS	NS	NS	NS	NS
	9/16/2002	<u> </u> -	NS _	NS	NS	NS	NS	NS
MW-9	4/22/93	Regular	570.0	380.0	< 50	870.0	NA	NA

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	ns per liter, ug/L		milligrams po	er liter, mg/L
	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 NA	1.9
	2/23/96	Regular	170.0	18.0	2.3	160.0	NA NA	4.3
	5/31/96	Regular	120.0	16.0	3.0	200.0	NA 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		61.0	< 25	< 25	210.0	2.6	2.8
	1	Regular				1		
	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
	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
	9/30/1998	Regular	1.1	5.5	21.0	59.0	0.27	0.27
	12/10/1998	Regular	< 1.0	1.9	17.0	79.0	5.1	0.25
	3/10/1999	Regular	< 1.0	< 1.0	5.7	68.0	< 0.2	0.22
	6/10/1999	Regular	< 1.0	1.8	1.8	71.0	< 0.20	0.43
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	-	NS	NS	NS	NS	NS	NS
	3/9/2000	Regular	< 1	< 1	<1	64.0	0.66	1.3
MW-9	6/8/2000	-	NS	NS	NS	NS	NS	NS
	9/13/2000	-	NS	NS	NS	NS	NS	NS
	12/7/2000	-	NS	NS	NS	NS	NS	NS
	3/8/2001	Regular	< 1	< l	< 1	< 1	1.4	< 0.1
	6/21/2001	-	NS	NS	NS	NS	NS	NS
	9/10/2001	-	NS	NS	NS	NS	NS	NS
	12/6/2001	-	NS	NS	NS	NS	NS	NS
	3/12/2002	Regular	1	< 1	< 1	< 1	0.37	< 0.1
	6/18/2002	-	NS	NS	NS	NS	NS	NS
	9/16/2002	-	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 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 87.0	2.3	i	2.7	0.79	0.33
	1	-			26.0	1		
	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
	9/30/1998	Regular	84.0	3.2	30.0	2.2	1.4	0.36
	12/10/1998	Regular	29.0	1.0	7.0	1.0	0.86	0.18
	3/9/1999	Regular	28.0	<5.0	5.8	<5.0	0.92	<0.5

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	ТРН-G
Well	Date	Туре		microgran	ns per liter, ug/L		milligrams p	er liter, mg/L
	6/10/1999	Regular	17.0	<1.0	<1.0	<1.0	0.30	0.16
	9/14/1999	Regular	10.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/1999	Regular	23.0	< 1	< 1	1.2	0.44	0.16
	3/10/2000	Regular	300.0	4.3	6.6	43.2	1.2	0,85
	6/8/2000	Regular	78.0	1.7	7.2	9.0	0.67	0.74
	9/13/2000	Regular	23.0	1.5	1.1	2.9	1.6	0.41
	12/7/2000	Regular	7.2	< 1	< 1	<1	1.5	0.15
	3/8/2001	Regular	3.4	1.1	< 1	<1	3.4	0.2
	6/22/2001	Regular	3.4 < 1	< 1	<1	<1	1.2	<0.1
	9/10/01 and	Regulai	` '	`'	C 1	`'	1.2	
	9/18/01	Regular	2	< I	< 1	< 1	2.3	<0.1
	12/6/2001	Regular		l	<u> </u>	No Valid Data	· /	
	3/12/2002	Regular	< 1	< ]	< 1	<1	3.2	<0.1
	6/18/2002	Regular	<1	<1	<1	<1	1.2	<0.1
	9/16/2002	Regular	<0.074	<0.11	0.1	<0.082	3 J	<0.05
MW-11	8/19/93	Regular	< 2	< 2	< 2	< 2	NA NA	NA
11	1/27/94	Regular	<1	<1	< 1	<1	NA NA	NA NA
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA NA	NA NA
	8/1/95	Regular	44.0	29.0	5.5	13.0	NA NA	0.2
!	11/15/95	Regular	190.0	29.0	6.2	11.0	NA NA	0.4
	2/23/96	Regular	49.0	1.2	0.5	4.0	NA NA	0.25
	5/31/96	Regular	300.0	83.0	12.0	28.0	NA NA	0.8
	8/23/96	Regular	100.0	1.2	0.3	4.7	NA NA	0.26
	12/2/96	Regular	970.0	< 5	6.0	8.1	2	1.3
	3/12/97		130.0	< 5	13.0	5.8	0.42	< 0.5
	3/12/97	Regular	100.0	< 5	1	1		< 0.5
	6/12/97	Duplicate	150.0	23.0	10.0	5.1	0.43	0.55
		Regular			19.0	< 5	1.1	
) (11/ 11 A	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
	9/30/1998	Regular	9.3	3.7	2.2	7.0	<0.20	0.1
	12/10/1998	Regular	1.7	<1.0	<1.0	<1.0	<0.20	<0.1
	3/10/1999	Regular	<5	< 5	< 5	< 5	0.3	<0.5
	6/10/1999	Regular	<1.0	< 1.0	< 1.0	< 1.0	<0.20	<0.10
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/1999	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/9/2000	Regular	1.2	< 1	< 1	< l	0.43	< 0.1
	6/8/2000	Regular	3.6	< 1	< 1	< 1	0.37	< 0.1
	9/13/2000	Regular	1.4	< 1	< 1	< 1	0.36	< 0.1
	12/7/00	Regular	26	< 1	< 1	3.3	0.3	0.12
	3/8/01	Regular	12	< 5	< 5	< 5	2.2	< 0.5
	6/22/2001	Regular	1.5	< 1	< 1	< 1	1	< 0.1
	9/10/2001	Regular	7.9	< 1	< 1	< 1	1.1	< 0.1
	12/6/2001	Regular	<1	<1	< 1	< 1	l	< 0.1
	3/12/2002	Regular	1.8	< 1	< 1	1	1.6	< 0.1
	6/18/2002	Regular	2.9	<0.1	1.3	<1	0.91	<0.1
	9/16/2002	Regular	9.0	<0.11	41.0	<0.082	13	0.2
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
	9/30/1998	Regular	260.0	3.0	1.2	7.9	<0.20	0.62
	12/10/1998	Regular	160.0	< 1.0	< 1.0	1.2	0.21	0.36
	3/10/1999	Regular	160.0	1.1	< 1.0	2.9	0.38	0.45
	6/10/1999	Regular	49.0	1.4	< 1.0	< 1.0	0.22	0.13
	9/14/1999	Regular	75.0	< 1.0	< 1.0	< 2.0	<0.20	0.23
	12/9/1999	Regular	64.0	< 1	< 1	< 1	< 0.2	0.21
	3/10/2000	Regular	93.0	< i	< 1	< 1	< 0.2	0.21
	3/10/2000	Duplicate	99.0	< 1	< 1	<1	0.22	0.22
	6/8/2000	Regular	62.0	< i	< 1	< 1	< 0.2	< 0.1

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	ТРН-D	TPH-G
Well	Date	Type		microgran	is per liter, ug/L		milligrams p	er liter, mg/L
	9/13/2000	Regular	34.0	< 1	< I	< 1	0.23	< 0.1
	12/7/2000	Regular	27	< 1	2.9	1.9	<0.25	< 0.1
	3/8/2001	Regular	14	< 1	< 1	<1	2.1	0.1
	6/22/2001	Regular	12	< 1	< 1	< 1	0.51	0.11
	9/10/2001			Well Dry (Not	Sampled) During This	and Subseque	nt Monitoring Events	
MW-12D	7/2/1999	Regular	< 5	< 5	< 5	< 5	<0.20	<0.10
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
Ì	12/9/1999	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/9/2000	Regular	< 1	< 1	< 1	<1	0.24	< 0.1
	6/8/2000	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	9/13/2000	-	NS	NS	NS	NS	NS	NS
	12/7/2000	-	NS	NS	NS	NS	NS	NS
	3/8/2001		NS	NS	NS	NS	NS	NS
	6/22/2001		NS	NS	NS	NS	NS	NS
	9/18/2001	Regular	< 1	< 1	< 1	<	< 0.2	< 0.1
	12/6/2001	Regular	< 1	< 1	<1	<1	< 0.2	< 0.1
	3/12/2002	Regular	< l	< 1	<1	<1	0.44	< 0.1
	6/18/2002	Regular	<1	<1	<1	<1	<0.2	<0.1
	9/16/2002	Regular	<0.074	<0. <u>11</u>	<0.068	<0.082	0.2	<0.05
MW-13	7/2/1999	Regular	1500.0	23.0	750.0	58.0	2.2	5.1
	9/14/1999	Regular	860.0	16.0	450.0	34.4	2.1	3.1
	12/9/1999	Regular	430.0	16.0	410.0	40.9	0.46	3.2
	3/10/2000	Regular	88.0	2.8	200.0	1.3	1.9	0.99
	6/8/2000	Regular	6.0	< 1	63.0	3.3	1.1	0.91
	9/13/2000	Regular	<1.0	<1.0	3.4	<1.0	0.44	0.12
	12/7/2000	Regular	<1	<1	<1	<1	0.43	< 0.1
	3/8/2001	Regular	<1	<1	1.2	<1	2	< 0.1
	6/22/2001	Regular	< 1	< 1	< 1	< 1	0.31	< 0.1
	9/10/2001	Regular	< 1	< 1	< 1	< 1	0.3	< 0.1
	12/6/2001	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/12/2002	Regular	< 1	< 1	< 1	< 1	0.84	< 0.1
	6/18/2002	Regular	<1	<1	<1	<1	0.3	<0.1
	9/16/2002		NS	NS	NS	NS	NS	NS
MW-14	1/14/2001	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/16/2002	Regular	NA	NA	NA	NA	NA	NA
MW-15	1/14/2001	Regular	< ]	<1	< 1	< 1	< 0.2	< 0.1
	9/16/2002	Regular	NA	NA	NA	NA	NA_	NA
OW-4	6/10/1999	Regular	<1.0	<1.0	<1.0	4.4	< 0.2	< 0.10
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.2	< 0.1
	3/9/2000	Regular	< 1.0	< 1.0	< 1.0	< 1.0	0.25	< 0.1
	6/8/2000	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.21	< 0.1
	9/13/2000	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.2	< 0.1
	12/7/2000			Well Dry (Not	Sampled) During This	and Subseque	nt Monitoring Events	

<sup>&</sup>lt;sup>1</sup> Well plugged and abandoned 7/1/99

NA=Not Analyzed NS=Not Sampled

NS-D=Not Sampled because well was dry

NSP=Not Sampled due to Phase Separated Hydrocarbons

Cumulative Results<sup>(1)</sup> for Chloride<sup>(2)</sup> Analyses Table 5

BJ Services Company, U.S.A.

Hobbs, New Mexico Facility

		OW-4	NS(3)	SN	SN	SN	266	258	SN	NS-D(1)	NS-D	NS-D	NS-D	NS-D	NS-D	NS-D	NS-D
		MW-15	ďN	dN	dN	ď	ďN	NP	219	NA	222	228	NA	215	224	233	246
		MW-14	NP	NP	ďN	NP	NP	NP	368	327	222	245	NA	276	284	258	293
		MW-13	NP	NP	ď	NP	496	276	SN	276	NA	NA	NA	NA	207	145	NS
		MW-12D	NP	dN	dN	dN	195	117	SN	NS	NS	NA	78.8	NA	75.8	NA	98
		MW-12	NP	NP	1200	314	ΑN	327	SN	286	NA	NS-D	NS-D	NS-D	NS-D	NS-D	NS-D
1		MW-11A	$NP^{(4)}$	NP	940	834	NA	1290	NS	1720	NA	NA	NA	NA	1230	NA	1550
3	Monitor Wells"	$\overline{}$	3400	2900	NS	SN	NP	NP	NP	NP	NP	ďΝ	NP	NP	NP	NP	ďN
	Monito	MW-10 MW-11	2200	2000	2390	1160	NA	474	SN	879	NA	NA	NA	NA	861	NA	1030
		MW-9	110	140	164	123	NA	131	NS	127	ΝA	NA	NA	NA	110	NS	NS
3	L	MW-8	350	360	364	274	NA	241	SN	250	NA	NA	NA	NA	241	SN	NS
		MW-7	310	250	223	238	NA	224	NS	224	NA	NA	NA	NA	188	NA	NS
		MW-6	380	210	183	411	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
		MW-5	130	66	151	155	NA	961	NS	152	NA	NA	NA	NA	127	NA	121
		MW-4	310	100	126	142	NA	961	NS	172	NA	NA	NA	NA	183	NA	NS
		MW-3	150	140	206	156	NA	196	NS	165	NA	NA	NA	NA	172	NA	NS
	_ 1	MW-1	160	130	212	163	NA <sup>(6)</sup>	258	NS	NA	NA	NA	NA	NA	177	SN	NS
	Sample Date		8/1/95	8/23/96	3/23-24/98	3/9-10/99	6/10-1/5/99	3/9-10/00	1/14/2001	3/8-9/01	6/21/2001	9/10/2001	9/18/2001	12/6/2001	3/11-12/02	6/18/2002	9/16/2002

 $^{(1)}$  - in mg/L.

 $^{(2)}\,$  - NMWQCC standard for chloride is 250 mg/L.

(3) - MW-2 not operative after May 3, 1995; P&A'd 7/1/99.

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

MW-11 P&A'd 7/1/99.

MW-11A installed February 1998.

MW-12 installed February 1998.

MW-12D installed June 1999.

MW-14 installed January 2001. MW-13 installed June 1999.

MW-15 installed January 2001.

- (4) NP indicates that well was not present at time of sampling event.
- (5) NS indicates that well was not sampled during applicable sampling event.
- (6) NA indicates that well was not analyzed for chloride during applicable sampling event.
  - (7) NS-D indicates that well was dry (not sampled) during applicable sampling event.

Table 6
Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, and MW-12D

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

Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	Dissolved Methane (mg/L)
	3/23/1998	3.87	190	< 0.0012
	3/9/1999	<0.1	195	< 0.0012
	6/10/1999	4.73	209	< 0.0012
1	9/14/1999	4.3	210	< 0.0012
	12/9/1999	4.2	210	< 0.0012
	3/9/2000	5.3	260	< 0.0012
	6/8/2000	4.7	240	< 0.0012
<b>{</b>	9/13/2000	3.93	200	< 0.0012
MW-5		<del></del>		<del></del>
	12/7/2000	3.27	160	< 0.0012
	3/8/2001	3.24	180	< 0.0012
	6/21/2001	2.74	150	0.0017
	9/10/2001	NA <sup>(2)</sup>	130	< 0.0012
	12/6/2001	2.38	120	< 0.0012
	3/12/2002	2.98	120	< 0.0012
	6/18/2002	2.56	110	0.002
	9/16/2002	2.4	105	0.002
	3/23/1998	0.07	320	0.91
	6/23/1998	< 0.1	325	0.55
	9/30/1998	< 0.1	204	0.81
	12/10/1998	< 0.1	180	0.091
	3/9/1999	< 0.1	142	0.035
	3/9/1999	<b>\\ 0.1</b>	223 <sup>(3)</sup>	0.055
	9/14/1999	<0.10	160	0.0049
	12/9/1999	0.49	170	0.0039
MW-10	3/10/2000	0.1	160	0.0056
}	6/8/2000	< 0.1	150	0.031
	9/13/2000	< 0.1	160	0.031
	12/7/2000	< 0.1	190	0.17
	3/8/2001	< 0.1	270	< 0.0012
	6/22/2001	< 0.1	270	0.044
	9/10/2001	NA	NA	NA
	3/12/2002	< 0.1	230	NA
	6/18/2002	< 0.1	240	0.007
	9/16/2002	< 0.03	318	0.006

Table 6 Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, and MW-12D

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

Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	Dissolved Methane (mg/L)		
	3/23/1998	< 0.05	190	0.14		
	6/23/1998	< 0.1	225	0.11		
	9/30/1998	0.4	196	0.043		
	12/10/1998	0.7	188	0.033		
	2/10/1000	< 0.1	164	0.004		
	3/10/1999	< 0.1 (4)	227 <sup>(3)</sup>	0.094		
	6/10/1999	< 0.1	181	0.0036		
	9/13/1999	0.22	250	< 0.0012		
	12/9/1999	< 0.1	290	0.0079		
1007.114	3/9/2000	0.11	270	0.037		
MW-11A	6/8/2000	< 0.1	240	0.0069		
	9/13/2000	< 0.1	320	< 0.0012		
	12/7/2000	< 0.1	260	0.0096		
	3/8/2001	< 0.1	330	0.0028		
	6/22/2001	< 0.1	180	0.0074		
	9/10/2001	NA	280	< 0.0012		
	12/6/2001	< 0.1	240	0.0041		
	3/12/2002	< 0.1	350	0.0044		
	6/18/2002	< 0.1	560	0.0028		
	9/16/2002	0.3	383	< 0.0012		
	3/23/1998	< 0.05	240	< 0.0012		
	6/23/1998	< 0.1	240	< 0.0012		
	9/30/1998	< 0.1	168	< 0.0012		
1	12/10/1998	< 0.1	202	< 0.0012		
	2/10/1000	< 0.1	137	.0.0010		
	3/10/1999	< 0.1 (4)	193 <sup>(3)</sup>	< 0.0012		
) AUV 10	6/10/1999	< 0.1	217	< 0.0012		
MW-12	9/14/1999	< 0.10	230	< 0.0012		
,	12/9/1999	< 0.1	180	< 0.0012		
	3/10/2000	< 0.1	210	< 0.0012		
	6/8/2000	< 0.1	220	< 0.0012		
	9/13/2000	< 0.1	240	< 0.0012		
	12/7/2000	< 0.1	260	< 0.0012		
	3/8/2001	< 0.1	300	< 0.0012		

# Table 6 Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, and MW-12D

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

Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	Dissolved Methane (mg/L)					
MW-12	6/22/2001	< 0.1	360	0.0021					
101 W - 12	9/10/2001	Well Dry (Not Sample	Well Dry (Not Sampled) During This and Subsequent Monitoring Even						
	9/18/2001	NA	190	< 0.0012					
	12/6/2001	< 0.1	200	< 0.0012					
MW-12D	3/12/2002	< 0.1	200	< 0.0012					
	6/18/2002	< 0.1	180	0.0012					
	9/16/2002	0.06	172	< 0.0012					

<sup>(1) -</sup> By EPA Method 300, except as noted

mg/L = milligrams per liter

<sup>(2) -</sup> NA indicates not analyzed

<sup>(3) -</sup> By EPA Method 375.4

<sup>(4) -</sup> By EPA Method 353.3

<sup>(5) -</sup> NS-D indicates not sampled (well dry)

## **APPENDICES**

The special section is

## APPENDIX A

**Groundwater Sampling Forms** 

# BROWN AND CALDWELL

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-5

1 DDO	ECT INEC	DNAAT	ON				<del></del>			
1. PROJECT INFORMATION  Project Number: 12832 Task Number: 017 Date: 9/16/07 Time: 15/5										
	lumber: 10 () BT St			oer: <u>(/ (</u>		Date:	Egbul	1000 / N	Time: 15/5	
1				M		Personnel:	PA,	MOC/VV	10111	
Project L	ocation:	170V	105, N			Weather:	005			
2. WELL	DATA									
Casing D	iameter: 2	inch	es	Type: PV	'C ☐ Stainles	ss 🔾 Galv. St	eel 🗆 Teflon®	Other:		
Screen, C	Diameter. Z	inch	es	Type: P	C 🗅 Stainles	s Galv. St	eel 🗆 Teflon®	Other:		
Total De	pin of Well:	12 fee	. 1					ive Casing 🚨 Ot	her:	
	Static Water:						Top of Protect			
Depth to	Product:	feet		From: 焰 T	op of Well Casi	ng (TOC)	Top of Protec	tive Casing Q O	ther;	
Length o	f Water Column	2.98		Well Volume	0.48	gal	Screened Inte	erval (from GS):		
								ch well = 0.167 gal/1		
3. PURC	SE DATA	, 10								
Purge M	ethod: Dent	r, Size:	☐ Bladde	erPump 🛄 2" tic Pump 🔘 Ir	Submersible F nertial Lift Pump	Pump □ 4"S	iubmersible Pur	np	Facilities and \$45 date 5	
Name and a fee	s: Pump/Baile	☐ Stainle	ss 🗅 PVC	☐ Teflon®	Other:			<u> </u>	Equipment Model(s)	
i	$\sim$				O Field Clear	,	sable	1Y	51610	
Materials	s: Rope/Tubing				☐ Teflon® 〔 ☐ Field Clea		osable	2.		
Was well	I purged dry?		∕ <b>α</b> j Nο		g Rate:	gai/				
	Cum. Gallons	1	· -	Spec.		Dissolved	T	3. Other:		
Time	Removed	pH	Temp	Cond.	ORP	Oxygen	Turbidity	01107.	Comments	
1520	0.9	214	19.89	1082	350	5.63			clear	
1525	1.5	8.35	19.29	1058	370.9	5.73				
<b></b>				<del></del>						
<del></del>		<del> </del>				<del></del>				
<b></b>		-				<del> </del>				
L										
4. SAMF	PLING DA	TA _						Geoc	hemical Analyses	
Method(s	ու <b>թ</b> ailer, Si	ze: <u> </u>			bmersible Pum	p 🗆 4" Subr	nersible Pump	F	us Iron: OO mg/L	
[ `	Peristanti	Pump 💷 l		imp 🖸 Other:	O Other:	<del>-</del>		Ferro		
Materials	s: Pump/Bailer			ared Off-Site	☐ Field Clea	ned S Disp	osable	DO:	9. <u>0</u> mg/L	
Materials	s: Tubing Rope			Polypropylene epared Off-Site	☐ Teflon®		nosable	Nitrat	e: mg/L	
Donth to	Water at Time		A . A .	à .		Δ	posable	rantat		
	Sulfate:mg/L									
	Sample ID: /// Sample Time: / 5 4 9 # of Containers: ()  Alkalinity: mg/L									
Duplicate Sample Collected?										
5. COMMENTS										
Willian good condition										
Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.										
Note: Include	comments such a	s well condit	ion, odor, pre	sence of NAP	_, or other item	s not on the fie	ld data sheet.		7	
	Camor H									

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

## BROWN AND CALDWELL

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-10

1. PROJECT INFORMAT	ION		<del></del>							
• • • • • • • • • • • • • • • • • • •	Task Number: 017	1	Date:	9/16/02	, <del>-</del> .	Time: 410				
Client: BJ Semus	rask (valliber.	<del>_</del>	Personnel:	Fabuli	rese M	MAT				
Project Location: Hobb3, /	IM		Weather: $\mathcal{E}$		1 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	<del></del>				
2. WELL DATA										
Casing Diameter: 7 inch			ss 🛚 Galv. Ste							
Screen Diameter: inch		··	ss 🗆 Galv. Ste							
Total Depth of Well: 655 fee		* **			tive Casing 🚨 O					
Depth to Static Water: 61.00 f	-1		ng (TOC)			ther:				
Depth to Product:feet										
Length of Water Column: 2.5/	feet Well Volume	: <u>D. 7 D</u>	gal		erval (from GS): ch well = 0.167 gal/					
3. PURGE DATA										
Bailer Size:	_5 □ Bladder Pump □ 2"	' Submersible f	oump □4"S	ubmersible Pur	mp					
C State	Peristaltic Pump		p 🛚 Other:		_ , ,	Equipment Model(s)				
Materials: Primple aller	ess     □  PVC            Teflon® ated     □  Prepared Off-Site	Other: D Field Clear	ned 🔏 Dispo	sable	1. <u>¥</u> 5/	(611)				
	thylene			nsable	7					
			gal/		۷٠					
Cum. Gallons	Spec.		Dissolved	min	3 Other:					
Time Removed pH	Temp Cond.	ORP	Oxygen	Turbidity	Other.	Comments				
4.150.4 8.17	21.092198	-1020	3.70							
1.101	mina de	11 11	7. 00	224 224	1.0-2/	2 = 10 MA				
- 2W 44 - 4	rugea ov	y of	14 2001	mou	mg 3-6	19 gallion				
		0 -	<del> </del>		U	U				
		-	<del>                                     </del>							
		-								
					,					
4. SAMPLING DATA					Geod	hemical Analyses				
Method(s): Bailer, Size: 1.5	☐ Bladder Pump ☐ 2" Su	bmersible Pum	np 🛚 4" Subr	nersible Pump	<b></b>					
Peristatic Pump U	Inertial Lift Pump  Other:	:	<del></del>		Ferro	ous Iron: mg/L				
Materials: Pump/baller	cated D Prepared Off-Site	☐ Field Clea	,	osable	DO:	mg/L				
	ethylene 🖸 Polypropylene cated 🚨 Prepared Off-Site			posable	Nitra	te: mg/L				
Depth to Water at Time of Samplir	A c A A		ed? 🗆 Yes		0.4	uto:				
Sample ID: MW 10 Sample Time: 7.300M # of Containers: 8										
Duplicate Sample Collected?										
5. COMMENTS well purged dry Return to sample after 3 hours										
of recharge ull in good condition										
Note: Include comments such as well condi	tion, odor, presence of NAP	L, or other iten	ns not on the fie	ld data sheet						
					25					

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

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

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-11 A

1. PROJECT INFORMATION									
Project Number: 2832 Task Number: 017 Date: 9/16/17 Time: 503 pm									
$I \leftarrow I \leftarrow I \leftarrow I \leftarrow I \leftarrow I \leftarrow I \leftarrow I \leftarrow I \leftarrow I \leftarrow$	ber:	Date: 1   [	1100001	Enlardings	Ime: / // / / / / / / / / / / / / / / / /				
Client: 67 Services			MUKICI	Egbuluese	<u></u>				
Project Location: TOURS, WM		Weather:	905						
2. WELL DATA									
Casing Diameter: 2 inches	Type: 12 PVC - Stainles	ss 🖸 Galv. St	eel 🗆 Teflon®	☐ Other:					
Screen Diameter: 2 inches	Type: PVC 🗅 Stainles	ss 🛭 Galv. St	eel 🖸 Teflon®	Other:					
Total Depth of Well: 63.82 feet	From: Top of Well Casin	ng (TOC)	Top of Protect	ive Casing 🚨 O	ther:				
Depth to Static Water: 61,59 feet	From: 15 Top of Well Casin	ng (TOC)	Top of Protect	tive Casing 🔲 O	ther:				
Depth to Product:feet	From: 🞾 Top of Well Casi	ng (TOC)	Top of Protec	tive Casing 🚨 O	ther:				
Length of Water Column: 2-23 feet	Well Volume: 0.36	_ gal	Screened Into	erval (from GS):_					
				ch well = 0.167 gal/					
3. PURGE DATA									
Purge Method: Bailer, Size: 1 D Bladd	er Pump	Pump 🚨 4" S	iubmersible Pun	np					
C Statisland C DV		J G Other:			Equipment Model(s)				
Materials: Pump/Baller Dedicated Pre	pared Off-Site	ned Dispo	sable	1	151-610				
	Polypropylene		oosable	2					
Was well purged dry?	_	gal/		<u>.</u> .					
Cum. Gallons	Spec.	Dissolved	········	3					
Time Removed pH Temp	Cond. ORP	Oxygen	Turbidity	Omer.	Comments				
5.10 1.0 8.34 20.62	9569 -67.2	3.26							
5 10 10 05 120 W		7.27							
	<u> </u>								
1.5 gallons pinne	1								
J									
		<u> </u>							
4. SAMPLING DATA				<u>Geoc</u>	hemical Analyses				
Method(s):	ump 🔲 2" Submersible Pum	p 🖸 4" Subr	mersible Pump	Ferro	ous Iron: OO mg/L				
Materials: Pump/Bailer	C Teflon® D Other:				025				
Dedicated Upre	pared Off-Site    Field Clea Polypropylene    Teflon®		osable	DO:	0.69 mg/L				
	repared Off-Site		posable	Nitral	te: mg/L				
Depth to Water at Time of Sampling: $\mathcal{N}$	Field Filtere	ed? 🗅 Yes	M No	Sulfa	te: mg/L				
Sample ID: <u>MW7/ A</u> Sample 1	ime: $5.6$	# of Contain	ners: <u>//</u>						
Duplicate Sample Collected? 🗀 Yes 🞖	No ID:	<del>-</del>		Alkal	inity: mg/L				
5. COMMENTS									
Wellingwood wondution									
Note: Include comments such as well condition, odor, pr									
, , , , , , , , , , , , , , , , , , ,	,		73	20					

## BROWN AND CALDWELL

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-12D

1. PROJECT INFORMATION	1 -7		al	1, 1-		1 22				
Project Number: 12,337 Task N	ımber: 017		q	16/02		rime: 4 19 DM				
Client: IST SENIU	<u> </u>		Personnel:	tayi	Murse/1	1071				
Project Location: HOWS INVI			Weather:	D037						
2. WELL DATA										
Casing Diameter: 2 inches	Type: pvc	☐ Stainles	s 🗆 Galv. Ste	eel 🗆 Teflon®	Other:					
Screen Diameter: inches	Type: 🗗 PVC	☐ Stainles	s □ Galv. Ste	eel 🛚 Teflon®	Other:					
Total Depth of Well: 87.50 eet	From: Top	of Well Casir	g (TOC)	Top of Protect	ive Casing 🔲 Ot	her:				
Depth to Static Water: 4 15 feet From: 17 Top of Well Casing (TOC)  Top of Protective Casing  Other:										
Depth to Product: feet	From: 💆 Top	of Well Casi	ng (TOC) 🚨	Top of Protect	ive Casing 🚨 O	ther:				
Length of Water Column 25,83 feet	Well Volume:_	4.1	_ gal		erval (from GS):_ h well = 0.167 gal/f					
3. PURGE DATA				7000. 2 1110		THICH WEN - 0.007 Gash				
Bailer, Size: D Bia					ıp					
Commingari ump a rei			Other:		- \ \ //	Equipment Model(s)				
Materials: Pump/Bailer Dedicated D	repared Off-Site	S Field Clean	•	sable	1. YS	1-610				
	☐ Polypropylene Prepared Off-Site			osable	2					
Was well purged dry?	Pumping	Rate: <u>() · (</u>	083 gal/	min	3					
Time Cum. Gallons pH Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments				
4-30 0.25 898 22-11	1126	-117.2	0.80			flack				
4.33 0.50 8.99 199	3 1090	-117.2	0.37	_						
936 0.75 892 19.4	2 (087)	-109.8	0.24			(Uned we				
4-39 1.D 8.92 19-39	1087	-110.8	6.24							
4.42 1.25 8.93 19.3	2 (089).	-114-0	0.23							
4. SAMPLING DATA					Geoc	nemical Analyses A AA				
Mothod(s).   Bailer, Size:   Bladde	rPump ∕Ši2"Subr	mersible Pum	p 🖸 4" Subm	nersible Pump		12 CAW				
Penstaitic Pump II Inertial Li		□ Other:			Ferro	us Iron: O D mg/L				
Materials: Pump/Baller	repared Off-Site	Field Clea	•	osable	DO:	1. 6.5 mg/L				
	☐ Polypropylene Prepared Off-Site	☐ Teflon® ☐ Field Cle		posable	Nitrat	e: mg/L				
Depth to Water at Time of Sampling: $N$	$M_{\perp}$	Field Filtere	d? □ Yes	Æ) No	Sulfat	te: ma/l				
Sample ID: MUTZD Sample Time: 4-72 /m # of Containers: 10										
Duplicate Sample Collected?   Yes	√ No ID:		-		Alkali	nity: mg/L				
5. COMMENTS					<u> </u>					
· · · · · · · · · · · · · · · · · · ·	Willi	n Agi	d w	ditio	U.	— · · · · · · · · · · · · · · · · · · ·				
* PTW meta would ha	A Fif u	orlain	ment	14 W/S	whome	siele amo di				
Note: Include comments such as well condition, odor	presence of NAPL,	or other item	s not on the fie			7 7				
				a	410: AD					

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

## BROWN AND CALDWELL

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-14

1. PROJ	ECT INFO	RMATI	ON			,				
Bi .	umber: (2.83			per: 017	f	Date: 9//(	0/02		Time: 630pm	
Client:	BJ Servi	lies				Personnel:	Mortl	Egloulese		
Project L	ocation:	665,N	M			Weather:	XO'S	J		
2. WELL		<u> </u>								
Casing D		inch	98	Type: KÁLPV	C □ Stainles	s □ Galv Ste	eel 🖸 Teflon®	Other:		
	iameter: 2						eel 🗅 Teflon®			
1	oth of Well: N		-,x-				Top of Protect		ther:	
Depth to	Static Water; (	2.55 fe					Top of Protect		ther:	
Depth to	Depth to Product: From: 12 Top of Well Casing (TOC) Top of Protective Casing Other:									
	f Water Column:							erval (from GS):		
								ch well = 0.167 gal/		
3. PURG	SE DATA	15	-							
Purge Me	ethod: 🗯 Bailer	r, Size: <u>/- )</u> ifugal Pump	□ Bladde □ Perista	erPump □ 2" IticPump □ In	Submersible Pump ertial Lift Pump	Pump 🗀 4" Se o 🗀 Other:	ubmersible Pun	np 	Equipment Model(s)	
Materials	: Pump/Bailer				Other:			. 🗸	4-610	
ł	Rope/Tubing	☐ Polyet	hylene 🔲 l	Polypropylene	☐ Teflon® [	ned 🔎 Dispo:		1	<u> </u>	
						aned 👰 Disp		2		
Was well	purged dry?	☐ Yes	80, No	Pumpin	g Rate:	gat/i	min	3		
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments	
7.00	1.0	8.84	19.26	184Z	1037	6.59				
7.10	2.0	9.79	19.23	1984	124.3	6.31				
7.20	3. <b>5</b>	8.78	19.31	1879	141.1	6.23				
	<u> </u>	<u> </u>						<u> </u>		
		<del> </del>								
		ļ								
4. SAMF	PLING DAT	Α						Geoc	hemical Analyses	
Method(s	s): Sa Bailer, Siz				bmersible Pum	p 🗀 4" Subm	nersible Pump	Forro	un Iron: mall	
Ì	Peristaltic	·	nertial Lift Pr ess □ PV(	ump □ Other: □ Teflon®	Other:			remo	us Iron: mg/L	
Materials	s: Pump(Bailer	☐ Dedic	ated 🗅 Prep	pared Off-Site	☐ Field Clea	,	osable	DO:	mg/L	
Materials	s: Tubing/Rope	Dedic	ated □ Pr	epared Off-Site	☐ Teflon® ☐ Field Cle	aned Disp	posable	Nitrat	e: mg/L	
Depth to	Water at Time	of Samplin	g _ <i>[V] N</i>	1	Field Filtere	d? □ Yes	Ø No	Sulfa	te: mg/L	
Sample	10: MW-/	4	Sample T	ime: 7, 20	pm	# of Contain	iers:			
Duplicate Sample Collected?   Yes  No ID:  Mg/L										
5. COMMENTS										
Well in good condition										
Note: Include	comments such as	s well condit	ion, odor, pre	esence of NAPI	L, or other item	s not on the fie	ld data sheet.			

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amout)

## BROWN AND CALDWELL

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW15

1 DDO	IECT INFO	DMAT	ION								
	170		Task Numi	017		Date: 9/	160/02		- 6:477am		
<b>'</b>	17 60	Vier	Task Numi	per: Ot I			MAGI	TEabulu	Time: 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
Client:	13	16051	UM			Personnel: Weather:	2002	19000	11,50		
		M. 2 11	VI \			vveatner:	4/5				
2. WELL	DATA										
Casing D	Diameter:	inch	es	Type: נבאים	/C 🔾 Stainle:	ss 🛘 Galv. St	eel 🗆 Teflon@	Other:			
Screen [	Diameter: 2	inch	es	Type: 12 P	/C 🗆 Stainle:	ss 🛚 Galv. St	eel 🗆 Teflon®	Other:			
Total De	pth of Well:	1.01 fee	<u> </u>	From: 🗹 T	op of Well Casi	ng (TOC) 🚨	Top of Protec	tive Casing 🚨 O	ther:		
Depth to	Depth to Static Water: 6/1/2/7 feet From: 125 Top of Well Casing (TOC) Top of Protective Casing Other:										
Depth to	Product:	feet		From: 🕱 T	op of Well Casi	ng (TOC)	Top of Protec	tive Casing 🚨 O	Other:		
Length o	f Water Column	5.54	feet	Well Volume	: <u>0.89</u>	_ gal	Screened Int	erval (from GS):			
		<b></b>	_				Note: 2-in	ch well = 0.167 gal/	ft 4-inch well = 0.667 gal/ft		
3. PURC	GE DATA	17	,								
Purge M					" Submersible F nertial Lift Pum			mp 	Equipment Model(s)		
Materials	s: Pump/Bailer	☐ Stainle	ss 🗅 PVC	☐ Teflon®	Other:			/	<1-(1)		
ł	$\sim$		•		☐ Field Clear ☐ Teflon® [	, ,	sable	1. <u> </u>	)   PIU		
Materials	s: Rope/Tubing	☐ Dedica	ated D Pre	pared Off-Site	☐ Field Clea	aned PrDisp	osable	2	)		
Was wel	I purged dry?	☐ Yes	<b>∭</b> No	Pumpir	ng Rate:	gal/	min .	3			
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	ORP	Dissolved Turbidity Other		Other:	Comments		
6.04	1.0	9.72	1930	1499	86.2	7.25					
100	70	375	19 17	1513							
6.07	7.0	070	10.07		106.8	6.69					
6.14	3.0	8.18	18.91	1462	124.2	6.35					
-											
ļ ———											
<u></u>											
1											
A SAME	PLING DAT	ΓΔ	<u> </u>		<u> </u>			Cooo	chemical Analyses		
1	B Bailer Siz		⊐ 8ladder Pເ	ımıp ⊡.2"Su	bmersible Pum	o ⊡'4" Subn	nersible Pump	Geoc	nemical Analyses		
Method(				ımp 🗆 Other				Ferro	ous Iron: mg/L		
Materials	s: Pump/Baile	☐ Stainle		C ☐ Teflon@	D Other: ☐ Field Clea	ned 🔊 Disp	osable	DO:	mg/L		
Materials	s: Tubing/Rope	☐ Polyet	hylene 🗆	Polypropylene	☐ Teflon®						
	$\sim$			epared Off-Site 1			posable	Nitra	te: mg/L		
Depth to	Water at Time of	of Samplin	•	1 1	Field Filtere	d? 🖸 Yes	. ~	Sulfa	ite: mg/L		
1	10: <u>MW-1</u>		Sample Ti	me: <u>6 · 1</u> 4	tpin	# of Contain	ners:	Alkai	linity: ma/l		
Duplicate Sample Collected?   Yes No ID: Alkalinity: mg/L											
5. COMMENTS											
	Well in good condition										
in the contract of the contrac											
Note: Include	comments such as	s well condit	ion, odor, pre	sence of NAP	L, or other item	s not on the fie	ld data sheet.				
			-						1		

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## APPENDIX B

**Laboratory Analytical Report** 



#### HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

### **Case Narrative for: Brown & Caldwell**

## Certificate of Analysis Number:

#### 02090533

**Report To:** 

**Brown & Caldwell** 

**Rick Rexroad** 

1415 Louisiana **Suite 2509** 

Houston

TX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

**Project Name:** 

**BJ Hobbs 12832** 

Site:

State:

Hobbs, NM

Site Address:

PO Number:

**New Mexico** 

State Cert. No.:

**Date Reported:** 10/9/02

See TNRCC Laboratory Review Checklist for non conformance issues. These issues will be documented in the exceptions report of the checklist.

Matrix spike (MS) and matrix spike duplicate (MSD) samples are chosen and tested at random from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. Since the MS and MSD are chosen at random from an analytical batch, the sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The Laboratory Control Sample (LCS) and the Method Blank (MB) are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

Any other 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.

de le In. Sonia West Senior Project Manager

10/15/02

Date



#### LABORATORY DATA PACKAGE SIGNATURE PAGE

This Data	Package	consists of		
V	This sig	nature page and the following Reportable Data:		
\ <u>\</u>	R1	Field Chain-of-Custody Documentation;		
V	R2	Sample Identification Cross-reference;		
V	R3	Test Reports (Analytical Data Sheets) for each environment	nental sample that includes:	
		<ul> <li>a) Items consistent with NELAC 5.13 or ISO/IEC</li> </ul>	17025 Section 5.10	
		b) dilution factors		
		c) preparation methods		
		d) cleanup methods, and		
		e) if required for the project, tentatively identified	compounds (TICs).	
V	R4	Surrogate Recovery Data including:		
		a) Calculated %R, and		
		<ul><li>b) The Laboratory's QC limits.</li></ul>		
V	R5	Test Reports/Summary Forms for Blank Samples;		
V	R6	Laboratory Control Sample (LCS) Data including:		
		<ul> <li>a) LCS spiking amounts,</li> </ul>		
		<ul><li>b) Calculated %R for each analyte, and</li></ul>		
		<ul> <li>c) The laboratory's LCS control limits</li> </ul>		
v	R7	Test Reports for Matrix Spike/Matrix Spike Duplicates (N	/IS/MSD) Including:	
	1	<ul> <li>a) Samples associated with the MS/MSD clearly in</li> </ul>	identified	
	:	<ul><li>b) MS/MSD spiking amounts,</li></ul>		
		c) Concentration of each MS/MSD analyte measu	·	samples,
		d) Calculated %Rs and Relative Percent Differen	ces (RPDs), and	
		e) The laboratory's MS/MSD QC limits		
<b>✓</b>	R8	Laboratory Analytical Duplicate (If Applicable) Recovery		
		a) the amount of analyte measured in the duplica	te,	
		b) the calculated RPD, and		
		c) the laboratory's QC limits for analytical duplica		
<u> </u>	R9	List of Method Quantitation Limits (MQL's) for each anal	yte for each method and mat	rix;
য্যা	R10	Other problems or anomalies;		
닏		The completed Laboratory Review Checklist, and		_
1		An Exception Report for each item in the Laboratory Rev	view Checklist noted with "No	or or
		"Not Reviewed (NR)" or "Not Applicable (NA)".		
data pack noted in the (and if ap	age has i ne attach plicable,	"I am the laboratory manager, or his/her designee, and been reviewed and is complete and technically compliated exception reports. I affirm to the best of my knowle any and all laboratories subcontracted through this laboratory Review Checklist, and that no information or data.	nt with the requirements of dge that all problems/anoma oratory) that might affect th	the methods used, except where alies observed by this laboratory, e quality of the data, have been
		Bullton	10/15/02	
Bernadette	e A. Fini	Lee State G. Jin'	10/15/02	Customer Service Manager
Name (pri	nted)	Signature	Date	Official Title (Printed)
		!		, ,
		ontrolled by the person who by the signature below is rele specifications in the above release statement.	easing the data and is affirmi	ng that the laboratory data
Name (pri	nted)	Signature	Date	Official Title (Printed)



R1 OI CHAIN-OF-CUSTODY (C-O-C):  1) Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?  2) Were all departures from standard conditions described in an exception report?  3) Were all departures from standard conditions described in an exception report?  3) Are all laboratory ID numbers cross-referenced to the laboratory ID numbers?  2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?  7) Diver samples prepared and analyzed within holding times?  2) Other than those results -kMCL, were all other raw values bracketed by calibration standards?  3) Were calculations subject to independent checks by peer or supervisor?  4) Were all analyte identifications subject to checks by peer or supervisor?  5) Were sample quantitation limits reponded for all analytes not detected?  6) Were results for soil and sediment reported on a dry weight basis?  7) Were % moisture (or solids) reported for all soil and sediment samples?  8) If required for the project, were TiC's reported?  8) If required for the project, were TiC's reported?  1) Were surrogates added prior to extraction?  2) Were surrogate percent recoveries in all samples within the laboratory QC limits?  7) Were appropriate type(s) of blanks analyzed?  2) Were planks analyzed at the appropriate frequency?  3) Were method blanks taken through the entire analytical process, including preparation and, if applicable, dearup procedures?  4) Were blank concentrations AMCL?  9) Were LCS canduced in the LCS'2  1) Were all COC's included in the LCS'2  2) Were LCS's analyzed at required frequency?  3) Were LCS's analyzed at required frequency?  4) Were LCS is analyzed at required frequency?  3) Were LCS is subjected in the LCS'2 control limits?  4) Were LCS is procedures?  5) Does the detectability deta document the laboratory QC control limits?		TNRCC LABORATORY REVIEW CHECKLIST: REPORTABLE DATA												
Analysis   DesCRIPTION   See neclosed QC report   Analysis   DesCRIPTION   YES   NO   NA   NR   E   E   NA   NR   E   E   NA   NR   E   E   E   NR   NR   E   E   E   E   E   E   E   E   E	Labora	atory Name:		10/1	5/02									
# Analysis								<del></del>						
R1 OI CHAIN-OF-CUSTODY (C-O-C):  1) Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?  2) Were all departures from standard conditions described in an exception report?  R2 OI SAMPLE AND QUALITY CONTROL (QC) IDENTIFICATION:  1) Are all laboratory ID numbers cross-referenced to the laboratory ID numbers?  2) Are all laboratory ID numbers cross-referenced to the corresponding OC data?  R3 OI TEST REPORTS:  1) Were samples prepared and analyzed within holding times?  2) Other than those results <mol., %="" (or="" 1)="" 2)="" 3)="" 4)="" 5)="" 6)="" 7)="" 8)="" <="" a="" all="" analyte="" analytes="" analytical="" analyzed="" analyzed?="" and="" and,="" applicable,="" appropriate="" at="" basis?="" blank="" blanks="" bracketed="" by="" calculations="" calibration="" checks="" cleanup="" concentrations="" data:="" detected?="" dry="" entire="" for="" forms="" frequency?="" identifications="" if="" in="" including="" independent="" laboratory="" limits="" limits?="" method="" moisture="" not="" o="" oc="" of="" oi="" on="" or="" other="" peer="" percent="" preparation="" procedures?="" process,="" project,="" proportiate="" quantitation="" r4="" r5="" raw="" recoveries="" recovery="" reponded="" reported="" reported?="" reports="" required="" results="" sample="" samples="" samples:="" samples?="" sediment="" soil="" solids)="" standards?="" subject="" summary="" supervisor?="" surrogate="" taken="" td="" test="" the="" through="" tic's="" to="" type(s)="" values="" weight="" were="" within=""></mol.,>	7.7													
1) Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?  2) Were all departures from standard conditions described in an exception report?  2) Were all departures from standard conditions described in an exception report?  3) Are all field sample ID numbers cross-referenced to the laboratory ID numbers?  2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?  7) TEST REPORTS:  1) Were samples prepared and analyzed within holding times?  2) Other than those results -MOL, were all other raw values bracketed by calibration standards?  2) Other than those results -MOL, were all other raw values bracketed by calibration standards?  3) Were calculations subject to independent checks by peer or supervisor?  4) Were all analyte identifications subject to checks by peer or supervisor?  5) Were sample quantitation limits reported for all analytes not detected?  6) Were results for soil and sediment reported on a dry weight basis?  7) Were % moisture (or soilds) reported for all soil and sediment samples?  8) If required for the project, were TiC's reported?  84 O SURROGATE RECOVERY DATA:  1) Were surrogate percent recoveries in all samples within the laboratory QC limits?  85 OI TEST REPORTS/SUMMARY FORMS FOR BLANK SAMPLES:  1) Were appropriate type(s) of blanks analyzed?  2) Were blanks analyzed at the appropriate frequency?  3) Were method blanks taken through the entire analytical process, including preparation and, if papicable, cleanup procedures?  4) Were all COC's included in the LCS?  2) Was each LCS taken through the entire analytical procedure, including preparation and, if papicable, cleanup procedures?  3) Were LCS's analyzed at required frequency?  4) Were LCS (and LCSD, if applicable) %Re within the laboratory OC control limits?  5) Does the detectability data document the laboratory's capability to detect the COC's at the MDL used	<b>I</b>	<del></del>		WORLDSON DO NO.	NO	NA	NR*	ER# <sup>5</sup>						
2) Were all departures from standard conditions described in an exception report?  R2 OI SAMPLE AND QUALITY CONTROL (QC) IDENTIFICATION:  1) Are all field sample ID numbers cross-referenced to the laboratory ID numbers?  2) Are all laboratory ID numbers cross-referenced to the laboratory ID numbers?  2) Are all laboratory ID numbers cross-referenced to the corresponding OC data?  R3 OI TEST REPORTS:  1) Were samples prepared and analyzed within holding times?  2) Other than those results -cMQL, were all other raw values bracketed by calibration standards?  2) Other than those results -cMQL, were all other raw values bracketed by calibration standards?  3) Were calculations subject to independent checks by peer or supervisor?  4) Were all analyte identifications subject to checks by peer or supervisor?  5) Were sample quantitation limits reported for all analytes not detected?  6) Were results for soil and sediment reported on a dry weight basis?  7) Were % moisture (or soilds) reported for all soil and sediment samples?  8) If required for the project, were TiC's reported?  1) Were surrogates added prior to extraction?  2) Were surrogates added prior to extraction?  2) Were surrogate percent recoveries in all samples within the laboratory QC limits?  R5 OI TEST REPORTS/SUMMARY FORMS FOR BLANK SAMPLES:  1) Were appropriate type(s) of blanks analyzed?  2) Were blanks analyzed at the appropriate frequency?  3) Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?  4) Were all COC's included in the LCS?  2) Was each LCS taken through the entire analytical procedure, including preparation and, if applicable, deanup procedures?  3) Were LCS can analyzed at required frequency?  4) Were LCS can analyzed at required frequency?  5) Does the delectability data document the laboratory's capability to detect the COC's at the MDL used	R1	Ol												
R2 OI SAMPLE AND QUALITY CONTROL (QC) IDENTIFICATION:  1) Are all field sample ID numbers cross-referenced to the laboratory ID numbers?  2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?  2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?  3) Were samples prepared and analyzed within holding times?  2) Other than those results -MQL, were all other raw values bracketed by calibration standards?  3) Were calculations subject to independent checks by peer or supervisor?  4) Were all analyte identifications subject to checks by peer or supervisor?  5) Were sample quantitation limits reported for all analytes not detected?  6) Were results for soil and sediment reported for all analytes not detected?  7) Were % moisture (or soilds) reported for all soil and sediment samples?  8) If required for the project, were TIC's reported?  R4 O SURROGATE RECOVERY DATA:  1) Were surrogates added prior to extraction?  2) Were surrogate percent recoveries in all samples within the laboratory QC limits?  2) Were planks analyzed at the appropriate frequency?  3) Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?  4) Were blank concentrations -MQL?  R6 OI LABORATORY CONTROL SAMPLES (LCS's)  1) Were all COC's included in the LCS?  2) Was each LCS taken through the entire analytical procedure, including preparation and, if applicable, cleanup procedures?  3) Were LCS's analyzed at required frequency?  4) Were LCS (and LCSO, if applicable) %Rs within the laboratory QC control limits?  5) Does the detectability data document the laboratory's capability to detect the COC's at the MDL used			Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?											
1) Are all field sample ID numbers cross-referenced to the laboratory ID numbers?  2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?  R3 OI TEST REPORTS:  1) Were samples prepared and analyzed within holding times?  2) Other than those results <a href="Molecular-width">Molecular-width</a> 2) Other than those results <a href="Molecular-width">Molecular-width</a> 3) Were calculations subject to independent checks by peer or supervisor?  4) Were all analyte identifications subject to checks by peer supervisor?  4) Were all analyte identifications subject to checks by peer supervisor?  5) Were sample quantitation limits reported for all analytes not detected?  6) Were results for soil and sediment reported on a dry weight basis?  7) Were % moisture (or soilds) reported for all soil and sediment samples?  8) If required for the project, were TIC's reported?  8) If required for the project, were TIC's reported?  1) Were surrogate percent recoveries in all samples within the laboratory QC limits?  2) Were surrogate percent recoveries in all samples within the laboratory QC limits?  2) Were appropriate type(s) of blanks analyzed?  2) Were blanks analyzed at the appropriate frequency?  3) Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?  4) Were blank concentrations <a href="Molecular-width">MOLECULAR-WIDCH CONTROL SAMPLES (LCS's)</a> 1) Were all COC's included in the LCS?  2) Was each LCS taken through the entire analytical procedure, including preparation and, if applicable, cleanup procedures?  3) Were LCS's analyzed at required frequency?  4) Were LCS (and LCSD, if applicable) %Rs within the laboratory OC control limits?  5) Doss the detectability data document the laboratory's capability to detect the COC's at the MDL used			2) Were all departures from standard conditions described in an exception report?	V										
2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?    2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?   3	R2	OI	SAMPLE AND QUALITY CONTROL (QC) IDENTIFICATION:											
TEST REPORTS:   1) Were samples prepared and analyzed within holding times?			1) Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	V										
1) Were samples prepared and analyzed within holding times?  2) Other than those results <mol, %="" (lcs's)="" (or="" 1)="" 2)="" 3)="" 4)="" 5)="" 6)="" 7)="" 8)="" <mql?="" a="" added="" all="" analyte="" analytes="" analytical="" analyzed="" analyzed?="" and="" and,="" applicable,="" appropriate="" at="" basis?="" blank="" blanks="" bracketed="" by="" calculations="" calibration="" checks="" cleanup="" coc's="" concentrations="" control="" data="" detectability="" detected?="" document="" does="" dry="" each="" entire="" extraction?="" for="" frequency?="" identifications="" if="" in="" included="" including="" independent="" laboratory="" lcs="" lcs's="" lcs?="" limits="" limits?="" limits?<="" method="" moisture="" not="" oc="" of="" oi="" on="" or="" other="" peer="" percent="" preparation="" prior="" procedure,="" procedures?="" process,="" project,="" quantitation="" r6="" raw="" recoveries="" reported="" reported?="" required="" results="" sample="" samples="" samples?="" sediment="" soil="" soilds)="" standards?="" subject="" supervisor?="" surrogates="" taken="" th="" the="" through="" tic's="" to="" tor="" type(s)="" values="" was="" weight="" were="" within=""><th></th><th></th><th>2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?</th><th>V</th><th></th><th></th><th></th><th></th></mol,>			2) Are all laboratory ID numbers cross-referenced to the corresponding QC data?	V										
2) Other than those results <mql, %="" %rs="" (and="" (or="" 1)="" 2)="" 3)="" 4)="" 5)="" 6)="" 7)="" 8)="" <mql,="" <mql?="" a="" added="" all="" analyte="" analytes="" analytical="" analyzed="" analyzed?="" and="" and,="" applicable)="" applicable,="" appropriate="" at="" basis?="" blank="" blanks="" bracketed="" by="" calculations="" calibration="" capability="" checks="" cleanup="" coc's="" concentrations="" control="" data="" detect="" detectability="" detected?="" document="" does="" dry="" each="" entire="" extraction?="" for="" frequency?="" identifications="" if="" in="" included="" including="" independent="" laboratory="" laboratory's="" lcs="" lcs's="" lcs?="" lcsd,="" limits="" limits?="" mdl="" method="" moisture="" not="" of="" on="" or="" other="" peer="" percent="" planks="" preparation="" prior="" procedure,="" procedures?="" process,="" project,="" qc="" quantitation="" raw="" recoveries="" reported="" reported?="" required="" results="" sample="" samples="" samples?="" sediment="" soil="" solids)="" standards?="" subject="" supervisor?="" surrogate="" surrogates="" taken="" th="" than="" the="" those="" through="" tic's="" to="" type(s)="" used<="" values="" was="" weight="" were="" within=""><th>R3</th><th>OI</th><th>TEST REPORTS:</th><th></th><th>NEW Y</th><th></th><th></th><th></th></mql,>	R3	OI	TEST REPORTS:		NEW Y									
3) Were calculations subject to independent checks by peer or supervisor?  4) Were all analyte identifications subject to checks by peer supervisor?  5) Were sample quantitation limits reported for all analytes not detected?  6) Were results for soil and sediment reported on a dry weight basis?  7) Were % moisture (or solids) reported for all soil and sediment samples?  8) If required for the project, were TiC's reported?  7) Were surrogates added prior to extraction?  2) Were surrogates added prior to extraction?  2) Were surrogate percent recoveries in all samples within the laboratory QC limits?  7) Were appropriate type(s) of blanks analyzed?  2) Were blanks analyzed at the appropriate frequency?  3) Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?  4) Were blank concentrations <mql? (lcs's)="" 1)="" 2)="" 3)="" 4)="" 5)="" all="" analytical="" analyzed="" and,="" applicable,="" at="" capability="" cleanup="" coc's="" control="" data="" detect="" detectability="" document="" does="" each="" entire="" frequency?="" if="" in="" included="" including="" laboratory="" laboratory's="" lcs="" lcs's="" lcs?="" mdl="" oi="" preparation="" procedure,="" procedures?="" r6="" required="" samples="" taken="" th="" the="" through="" to="" used<="" was="" were=""><th></th><th></th><th>1) Were samples prepared and analyzed within holding times?</th><th>V</th><th></th><th></th><th></th><th></th></mql?>			1) Were samples prepared and analyzed within holding times?	V										
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R6 OI LABORATORY CONTROL SAMPLES (LCS's)  1) Were all COC's included in the LCS? 2) Was each LCS taken through the entire analytical procedure, including preparation and, if placed procedures? 3) Were LCS's analyzed at required frequency? 4) Were LCS (and LCSD, if applicable) %Rs within the laboratory QC control limits? 5) Does the detectability data document the laboratory's capability to detect the COC's at the MDL used				v										
1) Were all COC's included in the LCS?  2) Was each LCS taken through the entire analytical procedure, including preparation and, if applicable, cleanup procedures?  3) Were LCS's analyzed at required frequency?  4) Were LCS (and LCSD, if applicable) %Rs within the laboratory QC control limits?  5) Does the detectability data document the laboratory's capability to detect the COC's at the MDL used			4) Were blank concentrations <mql?< th=""><th>V</th><th></th><th></th><th></th><th></th></mql?<>	V										
2) Was each LCS taken through the entire analytical procedure, including preparation and, if applicable, cleanup procedures?  3) Were LCS's analyzed at required frequency?  4) Were LCS (and LCSD, if applicable) %Rs within the laboratory QC control limits?  5) Does the detectability data document the laboratory's capability to detect the COC's at the MDL used	R6	OI	LABORATORY CONTROL SAMPLES (LCS's)											
applicable, cleanup procedures?  3) Were LCS's analyzed at required frequency?  4) Were LCS (and LCSD, if applicable) %Rs within the laboratory QC control limits?  5) Does the detectability data document the laboratory's capability to detect the COC's at the MDL used														
4) Were LCS (and LCSD, if applicable) %Rs within the laboratory QC control limits?  5) Does the detectability data document the laboratory's capability to detect the COC's at the MDL used				d, if										
5) Does the detectability data document the laboratory's capability to detect the COC's at the MDL used			Were LCS's analyzed at required frequency?	V										
				ı —										
				used	V			533-01						
6) Was the LCSD RPD within QC limits?			6) Was the LCSD RPD within QC limits?			Image: section of the content of the								



	TNRCC LABORATORY REVIEW CHECKLIST (continued): REPORTABLE DATA										
abora	atory Name:	SPL, Inc. LRC Date:	10/1	5/02							
Projec	t Name:	BJ Hobbs, NM # 12832 Laboratory Project Number:	020	90533							
Reviev	ver Name:	Bernadette A. Fini Prep Batch Number(s):		See enclosed QC report							
#'	Analysis <sup>2</sup>	DESCRIPTION	YES	NO	NA <sup>3</sup>	NR⁴	ER#5				
R7	Ol	MATRIX SPIKE (MS) and MATRIX SPIKE DUPLICATE (MSD) DATA:		100							
		Were all project/method specified analytes included in the MS and MSD?	V								
		2) Were MS/MSD analyzed at the appropriate frequency?	V								
		3) Were MS (and MSD, if applicable) %Rs within the laboratory QC control limits?	V								
		4) Were MS/MSD RPDs within laboratory QC limits?		V			533-02				
R8	OI	ANALYTICAL DUPLICATE DATA:									
		Were appropriate analytical duplicates analyzed for each matrix?	V								
		Were analytical duplicates analyzed at the appropriate frequency?	V								
		3) Were RPD's or relative standard deviations within the laboratory QC control limits?	V								
R9	OI	METHOD QUANTITATION LIMITS (MQL'S)					945811837				
		Are the MQL's for each method analyte listed and included in the laboratory data package?	V								
		Do the MQL's correspond to the concentration of the lowest non-zero calibration standard?	V								
		Are unadjusted MQL's included in the laboratory data package?	V								
R10	OI	OTHER PROBLEMS/ANOMALIES:		18,944							
		Are all known problems/anomalies/special conditions noted in the LRC and ER?	Image: section of the content of the								
		Were all necessary corrective actions performed successfully for the reported data?	V								
		3) If requested, is the justification for elevated SQL's dcournented?	V								

Items identified by the letter "R" should be submitted to TNRCC in the Data Package. Items identified by the letter "S" should be retained and made available to the TNRCC upon request for a period of three years after the data are submitted.

<sup>&</sup>lt;sup>2</sup> O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

NA = Not applicable; NR = Not Reviewed;

<sup>&</sup>lt;sup>5</sup> ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked.



	TNRCC LABORATORY REVIEW CHECKLIST (continued): SUPPORTING DATA											
Labora	atory Name:	SPL, Inc. LRC Date:	10/15/02									
Projec	t Name:	BJ Hobbs, NM # 12832 Laboratory Project Number:		90533								
	ver Name:	Bernadette A. Fini Prep Batch Number(s):		enclo								
#¹ S1	Analysis <sup>2</sup>	DESCRIPTION  INITIAL CALIBRATION (ICAL):	YES	NO	NA <sup>3</sup>	NR⁴	ER#5					
31	<u> </u>	INITIAL CALIBRATION (ICAL):  1) Were response factors (RFs) and/or relative response factors (RRFs) within the method-required QC			Г							
		limits?	V	$\square$								
		Were percent RSDs or correlation coefficient criteria met?	V									
		Was the number of standards recommended in the method used for all analytes?	V									
		4) Were all points generated between the lowest and highest standard used to calculate the curve?	V									
		5) Are ICAL data available for all instruments used?	V									
		6) Has the initial calibration curve been verified using an appropriate second source standard?	V									
52	OI	INITIAL AND CONTINUING CALIBRATION VERIFICATION (ICV AND CCV):					i de la companya de la companya de la companya de la companya de la companya de la companya de la companya de					
		1) Was the CCV analyzed at the method-required frequency?	V									
ļ		2) Were percent differences for each analyte within the method-required QC limits?	V									
		3) Was the ICAL curve verified for each analyte of interest?	V									
<b>,</b>		4) Was the absolute value of the anlayte concentration in the inorganic CCB <mdl?< th=""><th>v</th><th></th><th></th><th></th><th></th></mdl?<>	v									
53	0	MASS SPECTRAL TUNING:										
		1) Was the appropriate compound for the method used for tuning?			V							
		2) Were ion abundance data within the method-required QC limits?			V							
S4	0	INTERNAL STANDARD (IS):					100					
		Were IS area counts and retention times within the method-required QC limits?	V									
S5	OI	RAW DATA (NELAC Section 1 Appendix A Glossary, and Section 5.12):										
		1) Were the raw data (e.g., chromatograms, spectral data) reviewed by an analyst?	V									
		2) Were all data associated with manual integrations flagged flagged on raw data?	V									
S6	0	DUAL COLUMN CONFIRMATION:										
		Did dual column confirmation results meet the method-required QC control limits?			V							
S7	0	TENTATIVELY IDENTIFIED COMPOUNDS (TIC's):					HRY					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			V							
S8	<u> </u>	INTERFERENCE CHECK SAMPLE (ICS) RESULTS:										
<u> </u>		Were percent recoveries within method QC limits?			V							
S9		SERIAL DILUTIONS, POST DIGESTION SPIKES, AND METHOD OF STANDARD ADDITIONS:	MAZ	Vii 200								
ľ		Were percent differences, recoveries, and linearity within the QC limits specified in the method?			v		İ					
S10	Ol	PROFICIENCY TEST REPORTS:										
		Are proficiency testing or inter-laboratory comparison results on file?	v									
S11	Ol	METHOD DETECTION LIMIT (MDL) STUDIES:										
	Ī	1) Was an MDL study performed for each reported analyte?	V									
		2) Is the MDL either adjusted or supported by the analysis of DCSs?		V			533-03					
S12	Ol	STANDARDS DOCUMENTATION:										
		1) Are all standards used in the analyses NIST-traceable or obtained from other appropriate source?	v									



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	T	NHCC LABORATORY R	EVIEW CHECKLIST (continued): SUPPOR	HIIN	G DA	AIA			
Labora	atory Name:	SPL, Inc.	LRC Date:	10/	5/02				
Projec	t Name:	BJ Hobbs, NM # 12832	Laboratory Project Number:	020	02090533				
Revie	wer Name:	Bernadette A. Finî	Prep Batch Number(s):	See	enclo	sed Q0	C repo	rt	
#'	Analysis <sup>2</sup>	DESCRIPTION		YES	NO	NA <sup>3</sup>	NR <sup>4</sup>	ER #⁵	
S13	OI	COMPOUND/ANALYTE IDENTIFICA	ATION PROCEDURES:						
		Are the procedures for compound/ana	V						
S14	Ol	DEMONSTRATION OF ANALYST C				100			
		1) Was DOC conducted consistent wi	V						
		2) Is documentation of the analyst's c	ompetency up-to-date of and on file?	V					
S15	OI	VERIFICATION/VALIDATION DOCU	MENTATION FOR METHODS						
		, ,	) Are all the methods used to generate the data documented, verified, and validated, where applicable, (NELAC 5.10.2 or ISO/IEC I7025 Section 5.4.5)?						
S16	Ol	LABORATORY STANDARD OPERA	ATING PROCEDURES(SOPS):					Mary Mary	
		1) Are laboratory SOP's current and c	on file for each method performed?	V					

Items identified by the letter "R" should be submitted to TNRCC in the Data Package. Items identified by the letter "S" should be retained and made available O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

<sup>&</sup>lt;sup>3</sup> NA = Not applicable;

ANR = Not Reviewed;

ER# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked.



VITE IN THE SECTION

	7	TNRCC LABORATORY	<b>REVIEW CHECKLIST (continued)</b>	: Exception Reports
Labor	atory Name:	SPL, Inc.	LRC Date:	10/15/02
Projec	ct Name:	BJ Hobbs, NM # 12832	Laboratory Project Number:	02090533
Revie	wer Name:	Bernadette A. Fini	Prep Batch Number(s):	See enclosed QC report
ER#	Description			
533-01	Detectability detected at t		h each MDL study. However, the data does not indicat	te that the analytes reported for this project can be
533-02	For Purgeab	le Aromatics by Method 8021B anal	ysis, in Batch R68774 the MS and MSD exceeded cor	ntrol limits for Ethylbenzene.
533-03	Detectability detected at t		h each MDL study. However, the data does not indica	te that the analytes reported for this project can be
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8880 INTERCHANGE DRIVE HOUSTON, TX 77054 (713) 660-0901

#### **Brown & Caldwell**

#### **Certificate of Analysis Number:**

#### 02090533

Report To:

**Brown & Caldwell** 

**Rick Rexroad** 

1415 Louisiana

Suite 2509 Houston

nous

TX

Client Sample ID

77002-

ph: (713) 759-0999

fax: (713) 308-3886

PO Number:

**Project Name:** 

Site Address:

State:

**Date Collected** 

Site:

**New Mexico** 

10/9/2002

Date Received

**BJ Hobbs 12832** 

Hobbs, NM

State Cert. No.:

Date Reported:

Fax To:

Brown & Caldwell

Rick Rexroad

fax: (713) 308-3886

Matrix

Lab Sample ID

COC ID

HOLD

иW-5	02090533-01	Water	9/16/2002 3:45:00 PM	9/18/2002 8:00:00 AM	179997	
MW-10	02090533-02	Water	9/16/2002 7:30:00 PM	9/18/2002 8:00:00 AM	179997	
MW-11A	02090533-03	Water	9/16/2002 5:15:00 PM	9/18/2002 8:00:00 AM	179997	
/W-12D	02090533-04	Water	9/16/2002 4:42:00 PM	9/18/2002 8:00:00 AM	179997	
/W-14	02090533-05	Water	9/16/2002 7:20:00 PM	9/18/2002 8:00:00 AM	179997	
MW-15	02090533-06	Water	9/16/2002 6:14:00 PM	9/18/2002 8:00:00 AM	179997	

Bee Jett a In

10/9/2002

Date

Senior Project Manager

Joel Grice Laboratory Director

Ted Yen
Quality Assurance Officer



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

Client Sample ID MW-5 Collected: 09/16/2002 15:45 SPL Sample ID: 02090533-01

Analyses/Method		Result	QUAL	SQL	MDL		MQL	PQL	DF	Date Analyzed	Analys
ALKALINITY, BICARBO	DNAIE						M2320 B	}	Units	: mg/L	
Alkalinity, Bicarbonate		249		1	0.77		2	2	1	09/28/02 17:00	DG
ALKALINITY, CARBON	ATE						M2320 B	)	Units	mg/L	
Alkalinity, Carbonate		ND		1	0.77		2	2	1	09/28/02 17:00	DG
CHLORIDE, TOTAL							E325.3	}	Units	: mg/L	
Chloride		121		2.5	0.66		1	5	5	09/26/02 16:30	CV
DIESEL RANGE ORGA	NICS						SW8015B	}	Units	ug/mL	
Diesel Range Organics		0.3		J 0.1			1		1	09/20/02 18:00	AR
Surr: n-Pentacosane		59.4			* **	%	18-120		1	09/20/02 18:00	AR
	5 5 .								·		
	Prep Date	4.4		rep Initials							
SW3510C	09/20/2002 9:	14	K	L							
GASOLINE RANGE ORGANICS						SW8015B	1	Units	mg/L		
Gasoline Range Organics	<u>-</u>	ND		0.05	0.028		0.1	0.1	1	09/30/02 14:01	DL
Surr: 1,4-Difluorobenze	ene	96.7				%	74-121		1	09/30/02 14:01	DL
Surr: 4-Bromofluorober	nzene	94.7				%	55-150		1	09/30/02 14:01	DL
HEADSPACE GAS ANA	LYSIS						RSK147	•	Units	mg/L	
Methane		0.002		0.0006	0.0012		0.0012	0.0012	1	09/26/02 14:27	ER
NITROGEN, NITRATE (A	AS N)						E300	)	Units	mg/L	
Nitrogen, Nitrate (As N)		2.4		0.05	0.03		0.1	0.1	1	09/18/02 13:00	SN
PURGEABLE AROMAT	ICS						SW8021B	}	Units	ug/L	
Benzene		ND		0.074	0.074		1	1	1	09/30/02 14:01	DL
Ethylbenzene		ND		0.068	0.068		1	1	1	09/30/02 14:01	DL
Toluene		ND		0.11	0.106		1	1	1	09/30/02 14:01	DL
Xylenes,Total		ND		0.082	0.082		1	1	1	09/30/02 14:01	DL
Surr: 4-Bromofluorober	nzene	97.9				%	56-158		1	09/30/02 14:01	DL
Surr: 1,4-Difluorobenze	ne	97.5				%	46-160		1	09/30/02 14:01	DL
							~	~~~~		- Indiana and the second secon	

Qualifiers: ND/U - Not Detected above Sample Quantitation Limit

Sulfate

>PCL - Result exceeds Protective Concentration Limit

2

10

B - Analyte detected in associated Method Blank above MDL D - Surrogate Recovery not reportable due to dilution

0.04

1

\* - Surrogate Recovery Outside QC Limits

MI - Matrix Interference

0.2

J - Estimated Value between MDL and MQL

105

CV

09/30/02 15:22



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

Client Sample ID MW-10 Collected: 09/16/2002 19:30 SPL Sample ID: 02090533-02

				Site	e: Hobb	os, N	IM				
Analyses/Method		Result	QUAL	SQL	MDL		MQL	PQL	DF	Date Analyzed	Analys
ALKALINITY, BICARB	ONATE						M2320 I	3	Units	s: mg/L	
Alkalinity, Bicarbonate	100000000000000000000000000000000000000	844		0.77	0.77		2	2	1	09/28/02 17:00	DG
ALKALINITY, CARBOI	NATE	# <del>                                     </del>					M2320 I	В	Units	s: mg/L	
Alkalinity, Carbonate		ND		0.77	0.77		2	2	1	09/28/02 17:00	DG
CHLORIDE, TOTAL							E325.	3	Units	s: mg/L	
Chloride		1030		16	0.66		1	25	25	09/26/02 16:30	CV
DIESEL RANGE ORGA	NICS						SW80151	В	Units	: ug/mL	
Diesel Range Organics		3 J		J 0.5			1		5	09/20/02 18:40	AR
Surr: n-Pentacosane		60.2				%	18-120		5	09/20/02 18:40	AR
Prep Method	Prep Date		Р	rep Initials	]						
SW3510C	09/20/2002 9:1	4	K								
GASOLINE RANGE ORGANICS							SW8015	3	Units	:: mg/L	
Gasoline Range Organic	S	ND		0.05	0.028		0.1	0.1	1	09/30/02 14:26	DL
Surr: 1,4-Difluorobenz	ene	101				%	74-121		1	09/30/02 14:26	DL
Surr: 4-Bromofluorobe	nzene	104				%	55-150		1	09/30/02 14:26	DL
HEADSPACE GAS ANA	ALYSIS						RSK14	7	Units	: mg/L	
Methane		0.006		0.0012	0.0012		0.0012	0.0012	1	09/26/02 14:41	ER
NITROGEN, NITRATE (	(AS N)						E30	0	Units	: mg/L	
Nitrogen, Nitrate (As N)		ND		0.03	0.03		0.1	0.1	1	09/18/02 13:00	SN
PURGEABLE AROMAT	rics						SW8021	3	Units	: ug/L	******
Benzene		ND		0.074	0.074		1	1	1	09/30/02 14:26	DL
Ethylbenzene		0.1		0.068	0.068		1	1	1	09/30/02 14:26	DL
Toluene		ND		0.11	0.106		1	1	1	09/30/02 14:26	DL
Xylenes,Total		ND		0.082	0.082		1	1	1	09/30/02 14:26	DL
Surr: 4-Bromofluorobe	nzene	99.8				%	56-158		1	09/30/02 14:26	DL
Surr: 1,4-Difluorobenze	ene	98.3				%	46-160		1	09/30/02 14:26	DL
SULFATE		·					E30	0	Units	: mg/L	
Sulfate		318		5	0.04		0.2	10	50	09/30/02 15:22	CV

Qualifiers:

ND/U - Not Detected above Sample Quantitation Limit

>PCL - Result exceeds Protective Concentration Limit

B - Analyte detected in associated Method Blank above MDL D - Surrogate Recovery not reportable due to dilution

\* - Surrogate Recovery Outside QC Limits

MI - Matrix Interference



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

Client Sample ID MW-11A Collected: 09/16/2002 17:15 SPL Sample ID: 02090533-03

Site:	Hobbs.	. NM
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				Site	: Hobb	s, N	М				
Analyses/Method		Result	QUAL	SQL	MDL		MQL	PQL	DF	Date Analyzed	Analys
ALKALINITY, BICARB	ONATE						M2320	В	Units	: mg/L	
Alkalinity, Bicarbonate		364		0.77	0.77		2	2	1	09/28/02 17:00	DG
ALKALINITY, CARBOI	NATE						M2320	В	Units	: mg/L	
Alkalinity, Carbonate		ND		0.77	0.77		2	2	1	09/28/02 17:00	DG
CHLORIDE, TOTAL	44.						E325.3 Units		:: mg/L		
Chloride		1550		16	0.66		1	25	25	09/26/02 16:30	CV
DIESEL RANGE ORGA	ANICS						SW8015B		Units	: ug/mL	
Diesel Range Organics		1 J		J 0.5			1		5	09/20/02 19:19	AR
Surr: n-Pentacosane		61.6				%	18-120		5	09/20/02 19:19	AR
Prep Method	Prep Date		Р	rep Initials							
SW3510C	09/20/2002 9:1	4	K								
GASOLINE RANGE ORGANICS						SW8015	В	Units	s: mg/L		
Gasoline Range Organic	es es	0.2		0.05	0.028		0.1	0.1	1	09/30/02 14:52	DL
Surr: 1,4-Difluorobenz	ene	101		,		%	74-121		1	09/30/02 14:52	DL
Surr: 4-Bromofluorobe	enzene	134				%	55-150		1	09/30/02 14:52	DL
HEADSPACE GAS AN	ALYSIS						RSK14	17	Units	:: mg/L	
Methane		ND		0.0012	0.0012		0.0012	0.0012	1	09/26/02 14:57	ER
NITROGEN, NITRATE	(AS N)						E30	00	Units	:: mg/L	
Nitrogen, Nitrate (As N)	The same of the sa	0.3		0.03	0.03		0.1	0.1	1	09/18/02 13:00	SN
PURGEABLE AROMA	TICS	-	11.0				SW8021	В	Units	: ug/L	
Benzene		9		0.074	0.074		1	1	1	09/30/02 14:52	DL
Ethylbenzene		41		0.068	0.068		1	1	1	09/30/02 14:52	DL
Toluene		ND		0.11	0.106		1	1	1	09/30/02 14:52	DL
Xylenes,Total		ND		0.082	0.082		1	1	1	09/30/02 14:52	DL
Surr: 4-Bromofluorobe	enzene	112				%	56-158		1	09/30/02 14:52	DL
Surr: 1,4-Difluorobenz	ene	103				%	46-160		1	09/30/02 14:52	DL
SULFATE							E30	)0	Units	s: mg/L	
Sulfate		383		5	0.04		0.2	10	50	09/30/02 15:22	CV

Qualifiers:

ND/U - Not Detected above Sample Quantitation Limit

>PCL - Result exceeds Protective Concentration Limit

B - Analyte detected in associated Method Blank above MDL D - Surrogate Recovery not reportable due to dilution

\* - Surrogate Recovery Outside QC Limits

MI - Matrix Interference



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

Client Sample ID MW-12D Collected: 09/16/2002 16:42 SPL Sample ID: 02090533-04

Site:	Hobbs.	

				Site	: Hobb	os, N	М				
Analyses/Method		Result	QUAL	SQL	MDL		MQL	PQL	DF	Date Analyzed	Analys
ALKALINITY, BICAR	BONATE						M2320	В	Units	: mg/L	
Alkalinity, Bicarbonate		262		0.77	0.77		2	2	1	09/28/02 17:00	DG
ALKALINITY, CARBO	ONATE				· · · · · · · · · · · · · · · · · · ·		M2320	В	Units	: mg/L	
Alkalinity, Carbonate		ND		0.77	0.77		2	2	1	09/28/02 17:00	DG
CHLORIDE, TOTAL							E325.	3	Units	: mg/L	
Chloride		86		1.3	0.66		1	2	2	09/26/02 16:30	CV
DIESEL RANGE ORG	ANICS				***************		SW8015	В	Units: ug/mL		
Diesel Range Organics	 S	0.2		J 0.1			1		1	09/20/02 19:58	AR
Surr: n-Pentacosane		41.0				%	18-120		1	09/20/02 19:58	AR
Prep Method	Prep Date		Pi	rep Initials							
SW3510C	09/20/2002 9:1	4	KI								
GASOLINE RANGE ORGANICS							SW8015	В	Units	: mg/L	
Gasoline Range Organ	nics	ND		0.05	0.028		0.1	0.1	1	09/30/02 15:17	DL
Surr: 1,4-Difluorober	nzene	98.3				%	74-121		1	09/30/02 15:17	DL
Surr: 4-Bromofluorol	benzene	95.7				%	55-150		1	09/30/02 15:17	DL
HEADSPACE GAS A	NALYSIS						RSK14	7	Units	: mg/L	
Methane		ND		0.0012	0.0012		0.0012	0.0012	1	09/26/02 15:25	ER
NITROGEN, NITRATE	E (AS N)						E30	0	Units	: mg/L	
Nitrogen, Nitrate (As N	)	0.06		0.03	0.03		0.1	0.1	1	09/18/02 13:00	SN
PURGEABLE AROMA	ATICS					٠	SW8021	В	Units	: ug/L	
Benzene		ND		0.074	0.074		1	1	1	09/30/02 15:17	DL
Ethylbenzene		ND		0.068	0.068		1	1	1	09/30/02 15:17	DL
Toluene		ND		0.11	0.106		1	1	1	09/30/02 15:17	DL
Xylenes,Total		ND		0.082	0.082		1	1	1	09/30/02 15:17	DL
Surr: 4-Bromofluorob	oenzene	97.3				%	56-158		1	09/30/02 15:17	DL
Surr: 1,4-Difluorober	nzene	97.8				%	46-160		1	09/30/02 15:17	DL
SULFATE							E30	0	Units	: mg/L	
Sulfate		172		2	0.04		0.2	4	20	09/30/02 15:22	CV

Qualifiers:

ND/U - Not Detected above Sample Quantitation Limit

>PCL - Result exceeds Protective Concentration Limit

B - Analyte detected in associated Method Blank above MDL D - Surrogate Recovery not reportable due to dilution

\* - Surrogate Recovery Outside QC Limits

MI - Matrix Interference



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

Client Sample ID MW-14

Collected: 09/16/2002 19:20

SPL Sample ID:

02090533-05

Site:	Ηo	bbs.	, NM
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Analyses/Method	Result	QUAL	SQL	MDL.	MQL	PQL	DF	Date Analyzed	Analys
CHLORIDE, TOTAL					E325.3	}	Units: mg/L		
Chloride	293		3.3	0.66	1	5	5	09/26/02 16:30	CV

Qualifiers:

ND/U - Not Detected above Sample Quantitation Limit

>PCL - Result exceeds Protective Concentration Limit

B - Analyte detected in associated Method Blank above MDL D - Surrogate Recovery not reportable due to dilution

\* - Surrogate Recovery Outside QC Limits

MI - Matrix Interference



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

Client Sample ID MW-15

Collected: 09/16/2002 18:14

SPL Sample ID:

02090533-06

Site: Hobbs, NM

Analyses/Method	Result	QUAL	SQL	MDL	MQL	PQL	DF	Date Analyzed	Analyst
CHLORIDE, TOTAL			E325.3		Units				
Chloride	246		3.3	0.66	1	5	5	09/26/02 16:30	CV

Qualifiers:

ND/U - Not Detected above Sample Quantitation Limit

>PCL - Result exceeds Protective Concentration Limit

B - Analyte detected in associated Method Blank above MDL D - Surrogate Recovery not reportable due to dilution

\* - Surrogate Recovery Outside QC Limits

MI - Matrix Interference

## Quality Control Documentation



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

## Brown & Caldwell BJ Hobbs 12832

Analysis:

**Diesel Range Organics** 

Method:

RuniD:

SW8015B

30 110000 12002

WorkOrder:

02090533

Lab Batch ID:

22579

#### Method Blank

HP\_V\_020920C-1327781

Units:

ug/mL AR

KL

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date: 09/ Preparation Date: 09/

09/20/2002 18:40 09/20/2002 9:14 Analyst: Prep By:

Method SW3510C

02090533-01B 02090533-02B MW-5

02090533-03B

MW-10

02090533-04B

MW-11A MW-12D

Analyte	Result	Qual	Rep Limit
Diesel Range Organics	ND		1.0
Surr: n-Pentacosane	74.4		18-120

#### **Laboratory Control Sample (LCS)**

RunID:

HP\_V\_020920C-1327778

Units:

ug/mL

Analysis Date:

Preparation Date:

09/20/2002 18:00 09/20/2002 9:14 Analyst: AR

R

Prep By: KL Method SW3510C

Analyte	Spike Added	Result	Percent Recovery	Qual	Lower Limit	Upper Limit
Diesel Range Organics	2.5	2.1	84		21	175

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

Sample Spiked:

02090558-02

RuniD:

HP\_V\_020920C-1327785

Units:

ug/mL

Analysis Date:

09/20/2002 21:54

Analyst: AR

Preparation Date: 09/20

09/20/2002 9:14

Prep By: KL

Method SW3510C

Analyte	Sample Result	MS Spike Added	MS Result	MS Qual	MS % Rcvry	MSD Spike Added	MSD Result	MSD % Rcvry	MSD Qual	RPD	RPD Qual	RPD Limit	Low Limit	High Limit
Diesel Range Organics	ND	5	3.5		61	5	3.8	68		11	-	39	13	130

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.



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

## **Brown & Caldwell**

Analysis:

**Headspace Gas Analysis** 

Method:

RunID:

Analysis Date:

Methane

**RSK147** 

**BJ Hobbs 12832** 

WorkOrder:

02090533

Lab Batch ID:

R68587

**Method Blank** 

VARC\_020926B-1332096

Units:

Lab Sample ID

**Client Sample ID** 

09/26/2002 13:29

Analyst:

mg/L ER

02090533-01C

MW-5

02090533-02C

MW-10

02090533-03C

MW-11A

Analyte	

Rep Limit Result Qual 0.0012 ND

02090533-04C

Samples in Analytical Batch:

MW-12D

#### Sample Duplicate

Original Sample: RunID:

02090539-03

VARC\_020926B-1332104

Units:

mg/L

Analysis Date:

09/26/2002 16:04

Analyst: ER

Analyte	Sample Result	DUP Result	DUP Result	RPD	RPD Limit
Butane	ND	ND		0	50
Ethane	0.003	0.0028		6	50
Ethylene	ND	ND		0	50
Isobutane	ND	ND		0	50
Methane	0.013	0.0122		3	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

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.



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

## **Brown & Caldwell**

Analysis:

**Purgeable Aromatics** 

Method:

SW8021B

**BJ Hobbs 12832** 

WorkOrder:

02090533

Lab Batch ID:

R68774

#### Method Blank

RunID: Analysis Date: HP\_U\_020930A-1336179

09/30/2002 13:35

Units:

Analyst:

ug/L DL

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02090533-01A

MW-5

02090533-02A

MW-10

02090533-03A

MW-11A

02090533-04A

MW-12D

Analyte	Result	Qual	Rep Limit
Benzene	ND		1.0
Ethylbenzene	ND		1.0
Toluene	ND		1.0
Xylenes, Total	ND		1.0
Surr: 1,4-Difluorobenzene	97.1		46-160
Surr: 4-Bromofluorobenzene	97.1		56-158

#### **Laboratory Control Sample (LCS)**

RunID:

HP\_U\_020930A-1336178

Units:

ug/L

Analysis Date:

09/30/2002 12:45

Analyst:

DL

Analyte	Spike Added	Result	Percent Recovery	Qual	Lower Limit	Upper Limit
Benzene	50	50.2	100		70	130
Ethylbenzene	50	53.1	106		70	130
Toluene	50	52.1	104		70	130
Xylenes,Total	150	160	107		70	130

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

Sample Spiked:

02090533-03

RunID:

HP\_U\_020930A-1336408

Units:

ug/L

Analysis Date:

09/30/2002 16:08

Analyst:

DL

Analyte	Sample Result	MS Spike Added	MS Result	MS Qual	MS % Rcvry	MSD Spike Added	MSD Result	MSD % Rcvry	MSD Qual	RPD	RPD Qual	RPD Limit	Low Limit	High Limit
Benzene	9.30	20	36.8		137	20	37.7	142		3.41		21	32	164
Ethylbenzene	41.1	20	71	*	149 *	20	72.8	158 *	*	5.85		19	52	142
<b>T</b> oluene	ND	20	20.9		104	20	21.4	107		2.43		20	38	159
ylenes,Total	ND	60	63		100	60	64	110		1.6		18	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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 8880 INTERCHANGE DRIVE

HOUSTON, TX 77054 (713) 660-0901

#### **Brown & Caldwell**

**BJ Hobbs 12832** 

Analysis:

RunID:

Analysis Date:

**Gasoline Range Organics** 

Method: SW8015B

WorkOrder:

02090533

Lab Batch ID:

R68775

Method Blank

HP\_U\_020930B-1336186

09/30/2002 13:35

Units:

Analyst:

mg/L DL

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02090533-01A

MW-5

02090533-02A 02090533-03A MW-10

2030300-007

MW-11A

02090533-04A

MW-12D

Analyte	Result	Qual	Rep Limit
Gasoline Range Organics	ND		0.10
Surr: 1,4-Difluorobenzene	97.3		74-121
Surr: 4-Bromofluorobenzene	95.7		55-150

#### **Laboratory Control Sample (LCS)**

RunID:

HP\_U\_020930B-1336185

Units:

mg/L

Analysis Date:

09/30/2002 13:10

Analyst:

DL

Analyte	Spike Added	Result	Percent Recovery	Qual	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.93	93		70	130

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

Sample Spiked:

02090533-04

RunID:

HP\_U\_020930B-1336511

Units:

mg/L

Analysis Date:

09/30/2002 16:59

Analyst:

st: DL

Analyte	Sample Result	MS Spike Added	MS Result	MS Qual	MS % Rcvry	MSD Spike Added	MSD Result	MSD % Rcvry	MSD Qual	RPD	RPD Qual	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	ND	0.9	0.95		110	0.9	0.96	110		1.1		36	36	160

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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 8880 INTERCHANGE DRIVE

HOUSTON, TX 77054 (713) 660-0901

#### **Brown & Caldwell**

**BJ Hobbs 12832** 

Analysis:

Nitrogen, Nitrate (As N)

Method:

RunID:

Analysis Date:

E300

0 110000 12002

WorkOrder:

02090533

Lab Batch ID:

R68305

Method Blank

WET\_020918ZB-1326525

Units:

mg/L SN

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

09/18/2002 11:45 Analyst:

02090533-01D

MW-5

02090533-02D

MW-10

02090533-03D

MW-11A

02090533-04D

MW-12D

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

#### Laboratory Control Sample (LCS)

RunID:

WET\_020918ZB-1326526

Units:

mg/L

Analysis Date:

09/18/2002 11:45

Analyst:

yst: SN

Analyte	Spike Added	Result	Percent Recovery	Qual	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.71	97		85	115

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

Sample Spiked:

02090539-01

RunID:

WET\_020918ZB-1326528

Units:

mg/L

Analysis Date:

09/18/2002 13:00

Analyst:

SN

Analyte	Sample Result	MS Spike Added	MS Result	MS Qual	MS % Rcvry	MSD Spike Added	MSD Result	MSD % Rcvry	MSD Qual	RPD	RPD Qual	Limit	Low Limit	High Limit
Nitrogen, Nitrate (As N)	ND	10	10.67		106.7	10	10.72	107.2		0.5050		20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.



8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

#### **Brown & Caldwell**

**BJ Hobbs 12832** 

Analysis: Method:

RunID:

Analysis Date:

Chloride, Total

E325.3

WorkOrder:

02090533

Lab Batch ID:

R68665

**Method Blank** 

Analyst:

WET\_020926L-1334114

09/26/2002 16:30

Units:

mg/L CV

Lab Sample ID 02090533-01D

Samples in Analytical Batch:

Client Sample ID MW-5

02090533-02D

MW-10

02090533-03D

MW-11A

02090533-04D

MW-12D

02090533-05D

MW-14

02090533-06D

MW-15

Analyte Result Qual Rep Limit Chloride ND 1.0

#### **Laboratory Control Sample (LCS)**

RunID:

WET\_020926L-1334116

Units:

Analysis Date:

09/26/2002 16:30

Analyst:

mg/L CV

Analyte	Spike Added	Result	Percent Recovery	Qual	Lower Limit	Upper Limit
Chloride	99.1	95.6	96		90	110

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

Sample Spiked:

02090533-01

RuniD:

WET\_020926L-1334118

Units:

mg/L

Analysis Date:

09/26/2002 16:30

Analyst:

CV

Analyte	Sample Result	MS Spike Added	MS Result	MS Qual	MS % Rcvry	MSD Spike Added	MSD Result	MSD % Rcvry	MSD Qual	RPD	RPD Qual	RPD Limit	Low Limit	High Limit
Chloride	120.6	250	370.4		99.93	250	370.4	99.93		C		20	85	115

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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

#### **Brown & Caldwell**

**BJ Hobbs 12832** 

Analysis:

Alkalinity, Bicarbonate

Method:

RunID:

Analysis Date:

M2320 B

WorkOrder:

02090533

Lab Batch ID:

R68693

**Method Blank** 

WET\_020928A-1334553

Units:

Analyst:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

09/28/2002 17:00

DG

02090533-01D 02090533-02D MW-5

MW-10

02090533-03D

MW-11A

02090533-04D

MW-12D

Analyte	Result	Qual	Rep Limit
Alkalinity, Bicarbonate	ND	_	2.0

#### **Laboratory Control Sample (LCS)**

RunID:

WET\_020928A-1334555

Units:

mg/L

Analysis Date:

09/28/2002 17:00

Analyst:

DG

Analyte	Spike Added	Result	Percent Recovery	Qual	Lower Limit	Upper Limit
Alkalinity, Bicarbonate	85.9	87.1	101		90	110

#### Sample Duplicate

Original Sample:

02090533-01

RuniD: Analysis Date: WET\_020928A-1334556 09/28/2002 17:00

Units:

mg/L DG Analyst:

Analyte	Sample Result	DUP Result	DUP Result	RPD	RPD Limit
Alkalinity, Bicarbonate	249	250		0	20

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

#### **Brown & Caldwell**

**BJ Hobbs 12832** 

Analysis:

Alkalinity, Carbonate

09/28/2002 17:00

Method:

RunID:

Analysis Date:

M2320 B

BJ HODDS 12832

WorkOrder:

02090533

Lab Batch ID:

R68694

Method Blank

WET\_020928B-1334562 L

Units: Analyst: mg/L

DG

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02090533-01D 02090533-02D MW-5

02090555-0

MW-10

02090533-03D

MW-11A

02090533-04D

MW-12D

Analyte	Result	Qual	Rep Limit
Alkalinity, Carbonate	ND		2.0

# **Laboratory Control Sample (LCS)**

RunID:

WET\_020928B-1334564

Units:

mg/L

Analysis Date:

09/28/2002 17:00

Analyst:

DG

Analyte	Spike Added	Result	Percent Recovery	Qual	Lower Limit	Upper Limit
Alkalinity, Carbonate	85.9	87.1	101		90	110

#### Sample Duplicate

Original Sample:

02090533-01

RunID:

WET\_020928B-1334565

Units:

Analysis Date:

09/28/2002 17:00

Analyst: DG

mg/L

Analyte	Sample Result	DUP Result	DUP Result	RPD	RPD Limit
Alkalinity, Carbonate	ND	ND		0	20

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

10/9/2002 8:13:29 AM



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

# **Brown & Caldwell**

Analysis: Method:

RunID:

Analysis Date:

Sulfate

E300

**BJ Hobbs 12832** 

WorkOrder:

02090533

Lab Batch ID:

R68817

**Method Blank** 

WET\_020930M-1337041

09/30/2002 15:22

Units: Analyst:

mg/L CV

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02090533-01D 02090533-02D

MW-5

02090533-03D

MW-10

MW-11A

02090533-04D

MW-12D

Analyte	Result	Qual	Rep Limit
Sulfate	ND		0.20

# Laboratory Control Sample (LCS)

RunID:

WET\_020930M-1337042

Units:

mg/L

Analysis Date:

09/30/2002 15:22

Analyst:

CV

Analyte	Spike Added	Result	Percent Recovery	Qual	Lower Limit	Upper Limit
Sulfate	10	9.09	91		85	115

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

Sample Spiked:

02090533-01

RunID:

WET\_020930M-1337044

Units:

mg/L

Analysis Date:

09/30/2002 15:22

CV Analyst:

	Analyte	Sample Result	MS Spike Added	MS Result	MS Qual	MS % Rcvry	MSD Spike Added	MSD Result	MSD % Rcvry	MSD Qual	RPD	RPD Qual	RPD Limit	Low Limit	High Limit
Sulfate		105.5	100	214.5		109.0	100	208.4	102.9		5.746		20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

10/9/2002 8:13:30 AM

# Sample Receipt Checklist And Chain of Custody



# HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

# Sample Receipt Checklist

Workorder:  Date and Time Received:  Temperature:	02090533 9/18/2002 8:00:00 AM 5		Receive Carrier Chilled	name:	RT Client Water Ice	
1. Shipping container/co	poler in good condition?	Yes 🗸	No 🗌	Not Pres	sent	
2. Custody seals intact	on shippping container/cooler?	Yes 🗹	No 🗆	Not Pres	sent	
3. Custody seals intact	on sample bottles?	Yes	No 🗌	Not Pres	sent 🗹	
4. Chain of custody pres	sent?	Yes 🗹	No 🗌			
5. Chain of custody sign	ned when relinquished and received?	Yes 🗹	No 🗌			
6. Chain of custody agre	ees with sample labels?	Yes 🗹	No 🗌			
7. Samples in proper co	ntainer/bottle?	Yes 🗹	No 🗌			
8. Sample containers in	tact?	Yes 🗹	No 🗌			
g. Sufficient sample vol	ume for indicated test?	Yes 🗹	No 🗌			
10. All samples received	within holding time?	Yes 🗹	No 🗌			
11. Container/Temp Blan	k temperature in compliance?	Yes 🗹	No 🗆			
12. Water - VOA vials hav	re zero headspace?	Yes 🗹	No 🗌	Not App	olicable 🗌	
13. Water - pH acceptable	e upon receipt?	Yes 🗹	No 🗆	Not App	olicable 🗀	
SPL Representativ		Contact Date &	Time:			
Non Conformance Issues:						
Client Instructions:						

Chain of Chain of Custody after Sesoil  A wewater Sesoil  A wewater Sesoil  A chain of Custody of Custody after A chain size of the chain of Custody after t	179997	alys	\ \ \ \	h4	-U)			W/W	$\times$	X X X	XXXXX	X X X X	*	*				Intact? UY UN Temp:			ją.	by:	ed by Laboratory: 9/14/2 300	
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BROWN AND CALDWELL

SEPTEMBER 2001 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

**JANUARY 7, 2002** 

# SEPTEMBER 2001 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

Richard L. Rexroad, P.G.

Project Manager

January 7, 2002

**Brown and Caldwell** 

1415 Louisiana, Suite 2500

Houston, Texas 77002 - (713) 759-0999

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

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# 1.0 INTRODUCTION

Brown and Caldwell conducted a 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 in September 2001. This report presents a description of the groundwater sampling field activities, a summary and evaluation of the analytical results, and an evaluation of remedial technologies being applied at the facility. A groundwater potentiometric surface map and a hydrocarbons concentration map are included.

A layout of the facility is shown in Figure 1. The facility formerly operated an on-site fueling system. Subsurface impact near the former diesel fueling system was detected by the New Mexico Oil Conservation Division (NMOCD) during an on-site inspection on February 7, 1991. The fueling system was taken out of operation in July 1995. 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.

A biosparging system was activated in November 1995 and expanded in March/April 1997 and February/March 1998 to remediate soil and groundwater at the former fuel island area of the facility. The biosparging system was deactivated on November 1, 2000 after achieving cleanup goals for groundwater. The confirmation soil sampling program specified in the NMOCD-approved Remedial Action Plan (RAP) for the facility was conducted in July 2001. The results of the confirmation soil sampling program were presented to NMOCD in the report for the June 2001 groundwater sampling event. The September 2001 sampling event is the first groundwater sampling event conducted since the completion of the confirmation soil boring program.

BJ Services removed three field waste tanks at the facility on March 6-7, 1997. The ongoing groundwater monitoring program was expanded 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 site chronology detailing the history of investigations into and remediation of soil and groundwater impacts in the former fueling system and the former field waste tanks areas of the facility is presented in Table 1.

# 2.0 FIELD ACTIVITIES AND RESULTS

Brown and Caldwell purged and sampled 10 monitor wells at the facility during the September 2001 groundwater sampling event to determine concentrations of dissolved-phase hydrocarbons in groundwater and to evaluate general groundwater quality in the area of the facility. Monitor well locations are shown in Figure 1. The following subsections describe the field activities conducted by Brown and Caldwell at the facility in September 2001 and present the results of the associated groundwater analyses.

# 2.1 Groundwater Sampling Activities

Groundwater level measurements were obtained from monitor wells prior to purging and sampling the wells. Groundwater levels were measured to the nearest 0.01 foot with an oil/water interface probe. Current and historic groundwater elevation data are presented in Table 2. The groundwater elevation data indicate that the groundwater flow direction is to the east/northeast, with a hydraulic gradient of approximately 0.008 foot/foot. A groundwater elevation map for September 10, 2001 is presented in Figure 2. The groundwater elevation data presented in Table 2 indicate that groundwater levels have declined in all monitor wells at the facility since late 1995. Monitor wells MW-12 and OW-4 did not contain sufficient water in September 2001 for collection of groundwater samples. Monitor well MW-12D is located adjacent to monitor well MW-12 and is screened in a deeper portion of the aquifer than is monitor well MW-12. Brown and Caldwell collected a groundwater sample from monitor well MW-12D in lieu of sampling monitor well MW-12.

All wells except monitor well MW-10 were purged and sampled using a bladder pump. Downhole tubing was decontaminated between each usage by pumping distilled water through the full length of the tubing to clean its interior and by rinsing its exterior with distilled water. Monitor well MW-10, which contained only a minimal quantity of water, was sampled with a disposable bailer. The wells were sampled in general order of least impacted to most impacted (based on analytical results

from the June 2001 sampling event) to further mitigate the potential for cross-contamination of wells.

Field parameter measurements for pH, conductivity, oxidation-reduction (redox) potential, dissolved oxygen, and temperature were collected from wells containing an adequate volume of water during and upon completion of well purging. 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 typically measured upon conclusion of purging activities. 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 directly from the discharge line of the bladder pump upon completion of purging operations or, in the case of monitor well MW-10, by pouring recovered water from a bailer. 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 delivery to Southern Petroleum Laboratory in Houston, Texas for analysis. Completed chain-of-custody documentation was provided for all samples.

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 an on-site water reclamation system for re-use by BJ Services.

# 2.2 Results of Groundwater Analyses

Groundwater samples from monitor wells MW-14 and MW-15 were analyzed for chloride content using Method 325.3. Groundwater samples from the remaining wells sampled in September 2001 were analyzed for gasoline- and diesel-range total petroleum hydrocarbons (TPH-G and TPH-D) using EPA Method 8015B and for benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA

Method 8021. Selected wells were also sampled for natural attenuation evaluation parameters. The laboratory analytical reports and chain-of-custody documentation for the groundwater samples collected during the September 2001 sampling event are provided in Appendix B.

Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 4. Figure 3 presents a hydrocarbons concentration map for the September 2001 sampling event. Benzene concentrations in excess of the laboratory detection limit were reported in only two of the eight groundwater samples submitted for BTEX analysis during this sampling event. Benzene concentrations were below the New Mexico Water Quality Control Commission (NMWQCC) standard of 0.01 milligrams per liter (mg/L) in all wells. Benzene has not been detected in former fuel island source area monitor wells MW-3, MW-4, or MW-13 since June 1999, March 1999, and June 2000, respectively. Adjustments to the biosparging system in July 1999 and March 2000 to increase air flow to the monitor well MW-13 area resulted in decreases in the concentration of benzene in monitor well MW-13 from 1.5 mg/L on July 2, 1999 to the present non-detectable concentration.

Table 5 presents current and historic results for chloride analyses performed on groundwater samples collected at the facility. The respective chloride concentrations of 245 mg/L and 228 mg/L in downgradient wells MW-14 and MW-15 in September 2001 are less than the NMWQCC standard of 250 mg/L for chloride. The chloride concentration in monitor well MW-15 has remained essentially constant from the time of its installation in January 2001 to the present. The chloride concentration in monitor well MW-14 has decreased from 368 mg/L to less than 250 mg/L during this time period.

Groundwater samples from selected wells were analyzed for sulfate by Method 300.0 and dissolved methane by Method RSK-SOP 147/175 to assist in evaluation of natural attenuation processes at the facility. In accordance with standard procedures for evaluating natural attenuation processes, sample aliquots designated for nitrate analysis by Method 300.0 were also collected from the selected wells on September 10, 2001. Method 300.0 specifies a maximum holding time of 48

hours between collection of samples and completion of nitrate analyses. Nitrate analyses of groundwater samples collected on September 10, 2001 could not be completed within 48 hours due to the national events of September 11, 2001, however. Nitrate analyses from monitor wells MW-5, MW-10, MW-11A, and MW-12D will be performed during upcoming groundwater sampling events. The current and historic results for nitrate, sulfate, and dissolved methane analyses performed on groundwater samples from monitor wells MW-5, MW-10, MW-11A, MW-12, and MW-12D are presented in Table 6.

#### 3.0 EVALUATION OF REMEDIAL TECHNOLOGIES

The following subsections present evaluations of the remedial technologies applied at the former fueling system and former field waste tanks areas of the BJ Services facility at Hobbs, New Mexico.

# 3.1 Biosparging System at the Former Fueling System Area

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 at the former fueling system area of the facility in the RAP submitted to the NMOCD in May 1994. The NMOCD approved the RAP on August 11, 1994. The biosparging system was installed in August 1995 and expanded in April 1997 and February 1998. Operation of the biosparging system resulted in substantial decreases in hydrocarbon concentrations in former fueling system area monitor wells MW-1, MW-3, MW-4, MW-9, and MW-13, as documented in the December 2000 groundwater sampling report for the facility.

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 deactivated on November 1, 2000. The September 2001 sampling event is the fourth sampling event completed since this shut down.

Benzene concentrations in former fueling system source area monitor wells MW-3, MW-4, MW-9, and MW-13 have remained at non-detectable levels since deactivation of the biosparging system. BTEX constituent concentrations in these wells and monitor well MW-1 have now remained below applicable NMWQCC standards for six consecutive quarters.

In accordance with the RAP, confirmation soil sampling activities were conducted at the former fueling system area in July 2001 to verify the effectiveness of the biosparging system in remediating vadose zone soils in this area. The analytical results for these soil samples, as P:\Wp\BJSERV\12832\086r.doc

<sup>&</sup>quot;Use or disclosure of data contained on this sheet is subject to the restriction specified at the beginning of this document."

discussed in the report for the June 2001 groundwater sampling event, indicate that remediation goals for soil in this area have successfully been achieved. The September 2001 sampling event is the first groundwater sampling event conducted since the completion of the confirmation soil boring program. If, in accordance with the requirements specified in the NMOCD-approved RAP, analytical results for groundwater samples collected from monitor wells at the former fueling system source area do not exceed the groundwater remediation goals specified in the RAP during the 1-year followup quarterly monitoring period, then a biosparging system closure report will be submitted for the former fuel island portion of the facility.

#### 3.2 Natural Attenuation at the Former Field Waste Tanks Area

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

Plume behavior is the primary evidence of natural attenuation. 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. 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. Sporadic increases in total BTEX concentrations between quarterly sampling events have been observed in monitor wells in this area since March 1997, however. These increases may be attributed to sporadic loading rates from the vadose zone in excess of the natural attenuation rate of the area. The following

subsections present primary and secondary evidence of natural attenuation of hydrocarbons in groundwater at the former field waste tanks area of the facility.

# 3.2.1 Primary Evidence

The benzene concentration in monitor well MW-10 has decreased from a maximum of 1.3 mg/L in August 1995 (prior to removal of the field waste tanks) to less than the NMWQCC standard of 0.01 mg/L in each of the last four groundwater sampling events. Concentrations of toluene, ethylbenzene, and xylenes in monitor well MW-10 have undergone similar decreases over this time period.

Benzene concentrations at the monitor well MW-11 and MW-11A location have decreased from a maximum of 0.970 mg/L in December 1996 (prior to removal of the field waste tanks) to less than the NMWQCC standard of 0.01 mg/L in the last two groundwater sampling events. There has been only one detection of toluene, ethylbenzene, or xylenes in monitor well MW-11A groundwater since September 1998.

Concentrations of BTEX constituents at the monitor well MW-12 location have displayed decreases similar to those observed at the monitor well MW-11 and MW-11A location since September 1998.

# 3.2.2 Secondary Evidence

The following lines of geochemical evidence can be used to suggest that intrinsic bioremediation (an important natural attenuation mechanism) of dissolved-phase hydrocarbons is occurring in the area of the former field waste tanks.

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

There appear to be no consistent differences in dissolved oxygen concentrations in groundwater at the former field waste tanks area as compared to groundwater from non-hydrocarbon impacted wells at the facility. The lack of a discernible decrease in dissolved oxygen concentrations in groundwater at the former field waste tanks area in September 2001 is probably due to the very low to non-detectable concentrations of hydrocarbon constituents measured in monitor wells MW-10, MW-11A, and MW-12D during this sampling event.

Historic evidence submitted to the NMOCD in previous quarterly groundwater monitoring reports for the facility has indicated that dissolved oxygen concentrations have typically been depressed in hydrocarbon-impacted monitor wells relative to non-impacted wells at the facility (see the June 2001 Groundwater Sampling Report for BJ Services Hobbs, New Mexico Facility, for example). Continued use of dissolved oxygen as an electron acceptor during intrinsic bioremediation of residual hydrocarbons at the former field waste tanks area is likely to occur, but currently observed hydrocarbon concentrations are apparently too low to cause an observable decreases in dissolved oxygen concentrations in this area.

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.

As discussed in Section 2.1, nitrate analyses could not be performed within the method-specified 48-hour holding time during the September 2001 sampling event. However, historic data from the facility suggest that nitrate is used as an electron acceptor during natural attenuation processes in the former field waste tanks area. For example, nitrate concentrations were measured at less than 0.1 mg/L in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12 during the June 2001 sampling event. These concentrations were less than the background nitrate concentration of 2.74 mg/L measured in monitor well MW-5 (see Table 6). The historic non-detections of nitrate in monitor wells MW-10, MW-11A, and MW-12 provided evidence that nitrate has served as an electron acceptor during natural attenuation of hydrocarbons in the former field waste tanks area of 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 5.0 mg/L in former field waste tanks area monitor well MW-11A in September 2001, as shown in Table 3. Ferrous iron was measured at a concentration of 0.5 mg/L in background monitor well MW-5 and at concentrations of 1.5 mg/L in non-hydrocarbon impacted monitor wells MW-4 and MW-14. The elevated ferrous iron concentration in monitor well MW-11A suggests that ferric

iron is being used as an electron acceptor during natural attenuation of hydrocarbons at the former field waste tanks area.

Ferrous iron was measured at a concentration of 2 mg/L in monitor well MW-13 in September 2001. This ferrous iron concentration is greater than the ferrous iron concentrations of 0.5 mg/L to 1.5 mg/L measured in background and other non-hydrocarbon impacted monitor wells at the facility. This ferrous iron concentration is less than the ferrous iron concentration of 5.0 mg/L measured in former field waste tanks area monitor well MW-11A. Thus, the September 2001 ferrous iron concentration of 2 mg/L in monitor well MW-13 is intermediate between the ferrous iron concentrations measured in other non-hydrocarbon impacted monitor wells at the facility and the ferrous iron concentration measured in former field waste tanks area monitor well MW-11A. The intermediate ferrous iron oxygen concentration measured in monitor well MW-13 further suggests that the groundwater geochemistry in the area of well MW-13 is in the process of returning to ambient conditions after the recent removal of hydrocarbons from groundwater in that area and the November 2000 deactivation of the biosparging system, as previously documented for both ferrous iron and dissolved oxygen in the June 2001 Groundwater Sampling Report for BJ Services Hobbs, New Mexico Facility.

- 4. Microbes that utilize sulfate become active when dissolved oxygen, nitrate, and ferric iron are depleted. Sulfate concentrations should therefore decrease in areas where intrinsic bioremediation is occurring through use of sulfate as an electron acceptor. The sulfate concentration in former field waste tanks area monitor well MW-11A is 280 mg/L. The sulfate concentration in background monitor well MW-5 is 130 mg/L. The fact that the sulfate concentration in the hydrocarbon-impacted well is greater than the sulfate concentration in the background well suggests that sulfate is not being utilized as an electron acceptor in the former field waste tanks area.
- 5. Methane is a reaction product generated during utilization of carbon dioxide as an electron acceptor, and its concentration should therefore increase in areas where concentrations of electron acceptors such as dissolved oxygen, nitrate, and ferric iron have diminished.

Methane was not detected in the background monitor well or the monitor wells at the former field waste tanks area during the September 2001 groundwater sampling event. The non-detections of methane in groundwater at the former field waste tanks area in September 2001 may be attributable to the very low to non-detectable concentrations of hydrocarbon constituents measured in monitor wells MW-10, MW-11A, and MW-12D during this sampling event.

Previous quarterly groundwater monitoring reports for the facility submitted to the NMOCD have cited elevated methane concentrations in former field waste tanks area monitor wells (see the June 2001 Groundwater Sampling Report for BJ Services Hobbs, New Mexico Facility, for example). The historically elevated methane concentrations in monitor wells at the former field waste tanks area suggest that utilization of carbon dioxide

as an electron acceptor, resulting in methanogenesis, has occurred during natural attenuation of hydrocarbons at the former field waste tanks area of the facility.

6. Redox potential is a measure of chemical energy in groundwater. The redox potential of groundwater from background well MW-5 was measured at 171 millivolts (mV) in September 2001. Redox values in non-hydrocarbon impacted wells MW-3, MW-4, MW-7, MW-14 and MW-15 ranged from 138.1 mV to 177.1 mV, as shown in Table 3. A redox potential of -117.1 mV was measured in former field waste tanks area monitor well MW-11A. The negative redox value in former field waste tank area monitor well MW-11A provides additional evidence that natural attenuation of hydrocarbons is occurring in the area of the former field waste tanks.

A redox potential of 97 mV was measured in monitor well MW-13 in September 2001. This value is intermediate between the redox values ranging from 138.1 mV to 177.5 mV measured in other non-hydrocarbon impacted wells (i.e., MW-3, MW-4, MW-5, MW-7, MW-14 and MW-15) and the negative redox potential measured in former field waste tanks area monitor well MW-11A, providing further evidence that the groundwater geochemistry in the area of monitor well MW-13 is currently returning to ambient conditions after the recent removal of hydrocarbons in groundwater in that area and the November 2000 deactivation of the biosparging system

7. Alkalinity is expected to increase during natural attenuation processes, due to the leaching of carbonates from mineral substrates by microbially produced organic acids. Alkalinity data collected from monitor wells at the facility in September 2001 are inconclusive, however.

In conclusion, historic dissolved oxygen, nitrate, and methane data suggest that dissolved oxygen, nitrate, and carbon dioxide have acted as electron acceptors during intrinsic bioremediation processes at former field waste tanks area of the facility. Ferric iron also appears to be serving as an electron acceptor during natural attenuation of hydrocarbons, as evidenced by the elevated ferrous iron concentration in monitor well MW-11A at the former field waste tanks area in September 2001. Current redox data provide further evidence that natural attenuation of hydrocarbons is occurring 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-12D and the background well, MW-5. Redox potential, dissolved oxygen content, and alkalinity are good indicators of the occurrence of aerobic bioremediation of hydrocarbons, so it is also recommended that field testing

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for these parameters be performed in all wells to be sampled during upcoming groundwater monitoring events.



#### 4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the September 2001 groundwater sampling event conducted at the BJ Services Hobbs, New Mexico facility.

# 4.1 Conclusions

- Dissolved benzene and BTEX concentrations in all monitor wells located near the former fueling system area are non-detectable. TPH was detected in only one well in this area. Benzene, BTEX, and TPH concentrations in these wells have remained below applicable standards for the past six quarterly groundwater sampling events. Operation of the biosparging system in the former fueling system source area has resulted in substantial reductions in hydrocarbon impacts and achievement of remediation goals for groundwater in this area.
- Benzene concentrations in former field waste tanks area monitor wells sampled in September 2001 are less than the New Mexico WQCC standard of 0.01 mg/L for benzene. Natural attenuation processes appear to be occurring in the vicinity of the former field waste tanks removed in March 1997, based on decreasing hydrocarbon concentrations in local monitor wells over time and as substantiated by geochemical data.
- Groundwater geochemistry in the vicinity of monitor well MW-13, which is located downgradient of the former fueling system source area and the biosparging system, appears to be returning to ambient conditions following removal of hydrocarbons and the November 2000 deactivation of the biosparging system.
- Chloride concentrations in monitor wells MW-14 and MW-15 are less than the NMQCC standard of 250 mg/L. Chloride concentrations in monitor well MW-14 have been less than 250 mg/L for two consecutive quarters. Chloride concentrations in monitor well MW-15 have remained essentially constant since installation of these wells in January 2001.

# 4.2 Recommendations

• Continue the quarterly monitoring program for former field waste tank area monitor wells MW-10, MW-11A, and MW-12D. Continue monitoring for natural attenuation parameters in these wells and the background monitor well MW-5, including field-testing for natural attenuation indicator parameters.

- Continue quarterly monitoring of wells pertaining to the former fueling system source area for the 1-year period commencing in September 2001.
- If analytical results for groundwater samples collected from monitor wells at the former fueling system source area do not exceed the groundwater remediation goals specified in the RAP during the 1-year quarterly monitoring period, then a biosparging system closure report will be submitted for the former fuel island portion of the facility.
- After submittal and approval of the biosparging system closure report by the NMOCD, decommission the biosparging system and P&A the injection wells, extraction wells, and applicable monitor wells.

#### DISTRIBUTION

September 2001Groundwater Sampling Report BJ Services Company, U.S.A. Hobbs, New Mexico

January 7, 2002

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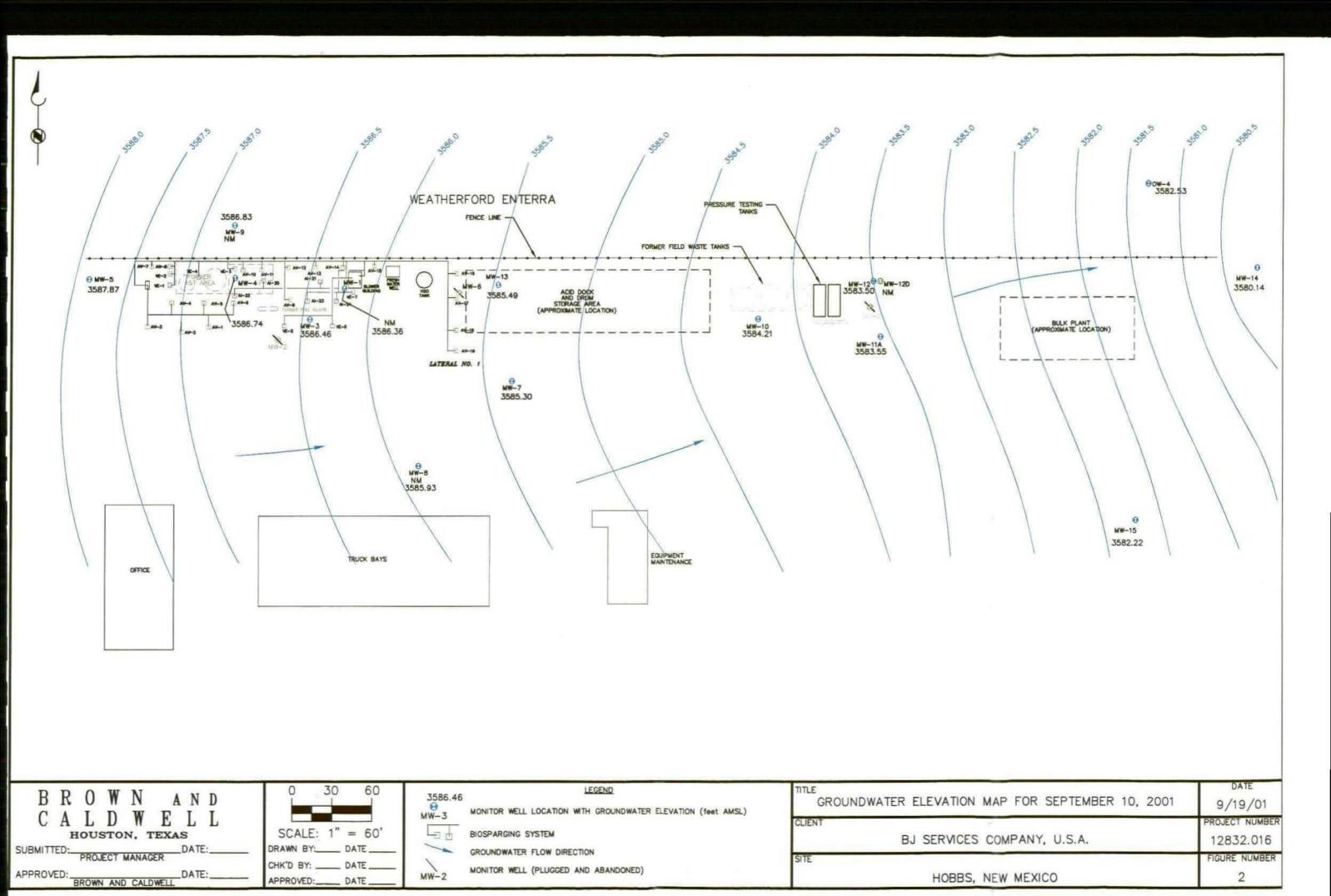
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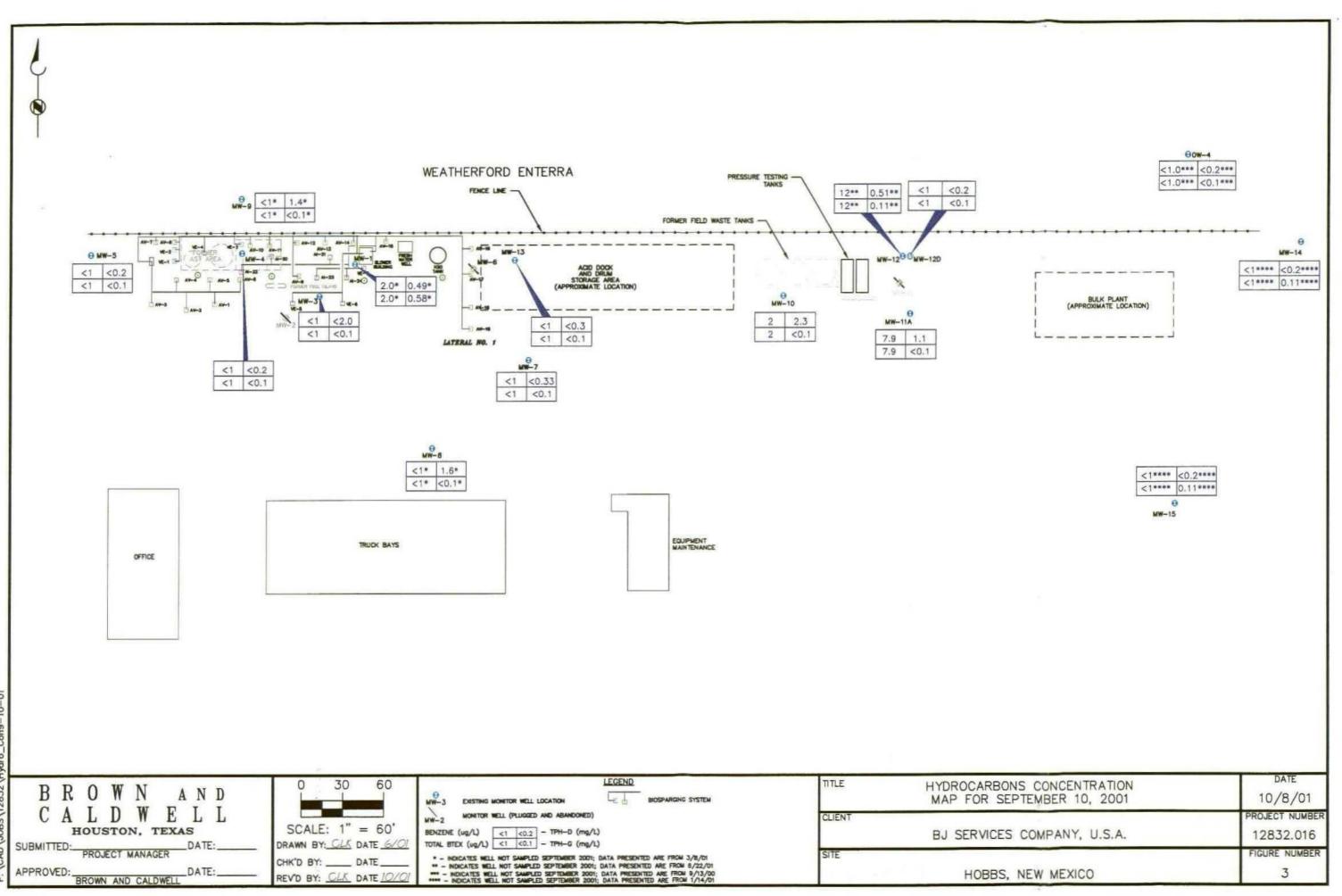
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# **FIGURES**

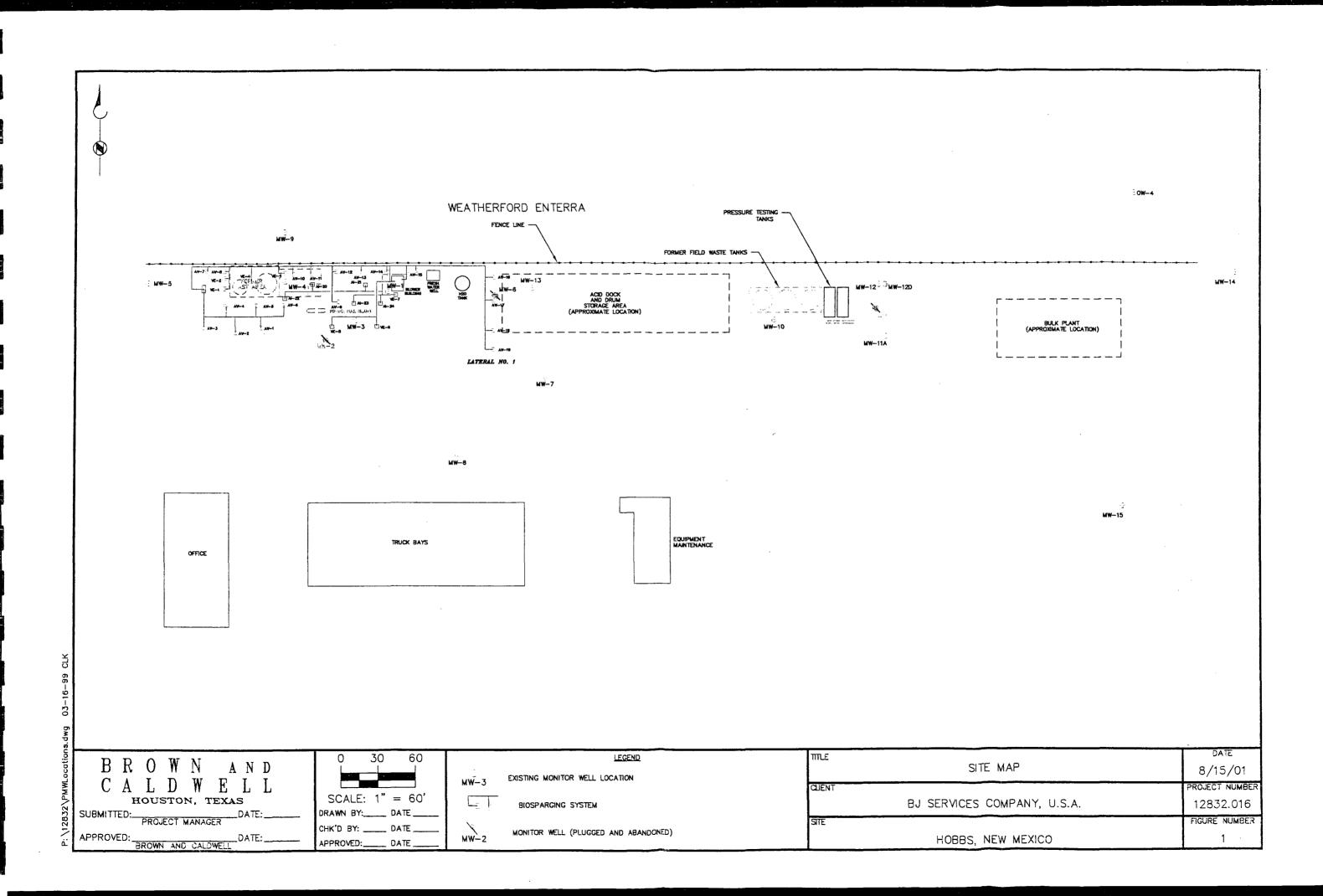
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#### **TABLES**

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Date	Activity
February 7, 1991	The New Mexico Oil Conservation Division (NMOCD) conducted an on-site inspection, including sampling of the on-site fresh water well.
August 6, 1991	The NMOCD 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 NMOCD.
November 15, 1991	The NMOCD approved the Technical Work Plan submitted by RSA.
December 16, 1991	RSA sampled the fresh water well. The analytical results were submitted to the NMOCD.
February 21, 1992	Western sampled the fresh water well. The analytical results were submitted to the NMOCD.
July 29 -	Brown and Caldwell conducted a soil and groundwater investigation
August 10, 1992	according to the approved Technical Work Plan. The investigation included drilling and sampling nine soil borings, sampling six hand-augured soil borings, installation and sampling of five monitor wells, and sampling of the fresh water well.
October 12, 1992	Brown and Caldwell submitted a Soil and Groundwater Investigation Report to the NMOCD.
December 2, 1992	The NMOCD requested the installation and sampling of four additional monitor wells, including a monitor well on an adjacent property.
April 13, 1993	Brown and Caldwell conducted a vapor extraction pilot test on the existing monitor wells.
April 15, 1993	Brown and Caldwell installed off-site monitor well MW-9.
April 22, 1993	Brown and Caldwell sampled off-site monitor well MW-9.
May 27, 1993	Brown and Caldwell submitted a letter report documenting the installation and sampling of off-site monitor well MW-9 to the NMOCD.
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.

Date	Activity
June 21, 1993	ENSR Consulting and Engineering (ENSR), the environmental consultant for the adjacent property owner on which off-site well MW-9 is located, submitted a request to sample monitor well MW-9.
July 15, 1993	ENSR split a groundwater sample collected from monitor well MW-9 with Brown and Caldwell.
July 30, 1993	USTank Management, Inc. submitted a 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 monitor wells. Brown and Caldwell sampled each of the existing and newly installed monitor wells.
January 26, 1994	Brown and Caldwell performed a groundwater monitoring event; the existing monitor wells and the fresh water well were purged and sampled. The groundwater samples were analyzed for BTEX.
May 6, 1994	A Remedial Action Plan (RAP) submitted to the NMOCD.
August 11, 1994	The RAP was approved by the NMOCD.
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 the 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) constructed the initial design of the biosparging system.
September 19, 1995	Operation of the extraction portion of the biosparging system commenced.
November 13, 1995	Operation of the injection portion of the biosparging system commenced.
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.

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Date	Activity
May 31, 1996	Brown and Caldwell conducted the May 1996 groundwater sampling event.
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 tanks 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 was installed.
April 1997	Vapor extraction well VE-4 was 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 was 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.

Date	Activity
December 9-10, 1998	Brown and Caldwell conducted the December 1998 groundwater sampling event.
January 21, 1999	The 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 by the NMOCD.
May 19, 1999	The NMOCD approved the groundwater delineation work plan.
June10, 1999	Brown and Caldwell performed sampling of existing monitor wells for the June /July 1999 groundwater sampling event.
July 2, 1999	Brown and Caldwell completed plugging and abandonment of monitor wells MW-2, MW-6, and MW-11; installed and developed monitor wells MW-12D and MW-13; and sampled monitor wells MW-12D and MW-13 to complete the June/July 1999 groundwater sampling event.
July 14, 1999	Brown and Caldwell redirected air discharge from the shallow injection 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.
November 1, 2000	Brown and Caldwell deactivated the biosparging system.
December 7, 2000	Brown and Caldwell conducted the December 2000 groundwater sampling event.

January 2001	Brown and Caldwell installed and sampled monitor wells MW-14 and MW-15.
March 8-9, 2001	Brown and Caldwell conducted the March 2001 groundwater sampling event.
June 21-22, 2001	Brown and Caldwell conducted the June 2001 groundwater sampling event
July 23, 2001	Brown and Caldwell collected soil samples from four soil borings installed at the former fueling system area of the facility to confirm the effectiveness of the biosparging system in remediating hydrocarbon impact to soil, as specified in the NMOCD-approved RAP.
September 10, 2001	Brown and Caldwell conducted the September 2001 groundwater sampling event

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-I	3,647.53	8/10/1992	53.22	0.00	3,594.31	(1)
		2/9/1993	53.03	0.00	3,594.50	. ,
		8/18/1993	53.10	0.00	3,594.43	
		1/26/1994	53.31	0.00	3,594.22	
		5/3/1995	54.64	0.20	3,593.05	(2)
		7/31/1995	54.14	0.00	3,593.39	(2)
		11/14/1995	53.69	0.00	3,593.84	
		2/23/1996	54.32	0.00	3,593.21	
		5/31/1996	54.14	0.00	3,593.39	
		8/23/1996	56.17	0.00	3,591.36	
		12/2/1996	55.27	0.00	3,592.26	
		3/12/1997	55.70	0.00		
		6/12/1997	55.08		3,592.05	
		9/12/1997	55.08 55.64	0.02 0.51	3,592.47	
		12/10/1997	55.46	0.00	3,592.31	DOLLO
			1		3,592.07	PSH Sheen
		3/24/1998	55.81	0.00	3,591.72	PSH Sheen
		6/23/1998	56.38	0.06	3,591.20	
		9/30/1998	56.82	0.00	3,590.71	PSH Sheen
ĺ		12/9/1998	57.05	0.00	3,590.48	
	1	3/10/1999	57.45	0.00	3,590.08	
		6/10/1999	58.02	0.00	3,589.51	
		7/2/1999	57.90	0.00	3,589.63	
		9/14/1999	58.14	0.00	3,589.39	
		12/9/1999	-	-	-	(3)
		3/9/2000	58.99	0.00	3,588.54	
		6/8/2000	-	-	-	
		9/13/2000	-	-	-	
		12/7/2000	-	-	-	
		3/8/2001	60.35	0.00	3,587.18	
		6/21/01	60.99	0.00	3,586.54	
		9/10/01	61.17	0.00	3,586.36	
MW-2	3,644.84	8/10/1992	52.82	0.00	3,592.02	(1)
		2/9/1993	49.60	0.00	3,595.24	. ,
	,	8/18/1993	49.71	0.00	3,595.13	
		1/26/1994	49.97	0.00	3,594.87	
		5/3/1995	_	-		(4),(5)
MW-3	3,645.00	8/10/1992	52.99	0.00	3,592.01	(1)
		2/9/1993	52.72	0.00	3,592.28	ζ-/
		8/18/1993	52.82	0.00	3,592.18	
		1/26/1994	53.05	0.00	3,591.95	
		5/3/1995	54.31	0.00	3,590.69	
		7/31/1995	51.24	0.00	3,593.76	
		11/14/1995	51.10	0.00	3,593.90	
		2/23/1996	51.68	0.00	3,593.32	
		5/31/1996	51.45	0.00	3,593.55	
		8/23/1996	51.55	0.00	3,593.35 3,593.45	
		12/2/1996	52.23			
			l .	0.00	3,592.77	
		3/12/1997	52.67	0.00	3,592.33	
		6/12/1997	52.68	0.00	3,592.32	
		9/11/1997	52.71	0.00	3,592.29	
		12/10/1997	52.89	0.00	3,592.11	
		3/23/1998	53.22	0.00	3,591.78	

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	3,645.00	6/23/1998	53.66	0.00	3,591.34	
1A1 AA -2	5,5 1515	9/30/1998	54.06	0.00	3,590.94	
		12/9/1998	54.36	0.00	3,590.64	
		3/10/1999	54.72	0.00	3,590.28	
		6/10/1999	55.17	0.00	3,589.83	
		7/2/1999	55.15	0.00	3,589.85	
		9/14/1999	55.42	0.00	3,589.58	
		12/9/1999	55.78	0.00	3,589.22	
		3/9/2000	56.23	0.00	3,588.77	
		6/8/2000	56.6 <b>6</b>	0.00	3,588.34	
		9/13/2000	56.77	0.00	3,588.23	
		12/7/2000	57.15	0.00	3,587.85	
		3/8/2001	57.69	0.00	3,587.31	
		6/21/01	58.34	0.00	3,586.66	
		9/10/01	58.54	0.00	3,586.46	
MW-4	3,645.28	8/10/1992	50.55	0.00	3,594.73	715
1 A F A A	3,043.26	2/9/1993	50.26	0.00	3,595.02	(1)
		8/18/1993	50.38	0.00	3,594,90	
		1/26/1994	50.90	0.30	3,594.63	
		5/3/1995	51.51	0.45	3,594.14	
	7	7/31/1995	51.74	0.45	3,593.75	
		11/14/1995	51.03	0.00	3,594.25	
		2/23/1996	51.65	0.00	3,593.64	
		5/31/1996	51.48	0.00	3,593.80	
		8/23/1996	53.49	0.00	3,591.79	
		12/2/1996	52.32	0.00	3,592.96	
		3/12/1997	52.74	0.05	3,592.58	
		6/12/1997	53.08	0.44	3,592.56	
		9/12/1997	52.60	0.15	3,592.80	
		12/10/1997	52.89	0.00	3,592.39	DCII Chaan
		3/24/1998	53.20	0.00	3,592.39	PSH Sheen
		6/23/1998	53.82	0.23	1 ' 1	
		1 .	53.96	0.00	3,591.64	200 LDGII
		9/30/1998	54.27	0.00	3,591.32	200 ml PSH
		3/10/1999	54.69	0.00	3,591.01 3,590.62	
		6/10/1999	55.07	0.04		
		7/2/1999	55.10	0.00	3,590.21 3,590.18	
		9/14/1999	55.33	0.00	, ,	
		12/9/1999	55.79	0.00	3,589.95	
			1	l .	3,589.49	
		3/10/2000 6/8/2000	56.12	0.00	3,589.16	
			56.67	0.00	3,588.61	
		9/13/2000	56.65	0.00	3,588.63	
		12/7/2000	57.05	0.00	3,588.23	
		3/8/2001	57.72	0.00	3,587.56	
		6/21/01	58.18	0.00	3,587.10	
) (III =	2 (12 22	9/10/01	58.54	0.00	3,586.74	
MW-5	3,647.72	8/10/1992	52.38	0.00	3,595.34	(1)
		2/9/1993	52.06	0.00	3,595.66	
		8/18/1993	52.16	0.00	3,595.56	
		1/26/1994	52.50	0.00	3,595.22	
		5/3/1995	53.57	0.00	3,594.15	
	j .	7/31/1995	53.27	0.00	3,594.45	

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

	To a Contra		Danth to	Free Product	Groundwater	
Monitor	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Thickness (feet)	Elevation (MSL)	Comments
Weil	Elevation (MSL)		Groundwater (leet)	Timexitess (feet)	Elevation (MSL)	
MW-5	3,647.72	11/14/1995	52.83	0.00	3,594.89	
[A1 AA - 2	_,,,,,,,_	2/23/1996	53.57	0.00	3,594.15	
		5/31/1996	53.16	0.00	3,594.56	
		8/23/1996	53.41	0.00	3,594.31	
		12/2/1996	53.98	0.00	3,593.74	
		3/12/1997	54.44	0.00	3,593.28	
		6/12/1997	54.48	0.00	3,593.24	
		9/12/1997	54.29	0.00	3,593.43	
		12/10/1997	54.66	0.00	3,593.06	
		3/23/1998	55.05	0.00	3,592.67	
		6/23/1998	55.44	0.00	3.592.28	
		9/30/1998	55.65	0.00	3,592.07	
		12/9/1998	56.00	0.00	3,591.72	
		3/9/1999	56.45	0.00	3,591.27	
		6/10/1999	56.91	0.00	3,590.81	
		7/2/1999	56.93	0.00	3,590.79	
		9/14/1999	57.12	0.00	3,590.60	
		12/9/1999	57.41	0.00	3,590.31	
		3/9/2000	57.92	0.00	3,589.80	
		6/8/2000	58.32	0.00	3,589.40	
	-21	9/13/2000	58.36	0.00	3,589.36	
		12/7/2000	58.71	0.00	3,589.01	
		3/8/2001	59.36	0.00	3,588.36	
		6/21/01	59.94	0.00	3,587.78	
		9/10/01	59.85	0.00	3,587.87	
MW-6	3,644.74	2/9/1993	50.58	0.00	3,594.16	(1)
141 14-0	3,011.71	8/18/1993	50.78	0.00	3,593.96	(.)
		1/26/1994	51.00	0.00	3,593.74	
		5/3/1995	52.63	0.00	3,592.11	
	į	7/31/1995	51.90	0.00	3,592.84	
		11/14/1995	51.19	0.00	3,593.55	
		2/23/1996	52.10	0.00	3,592.64	
		5/31/1996	51.76	0.00	3,592.98	
		8/23/1996	51.63	0.00	3,593.11	
		12/2/1996	52.85	0.00	3,591.89	
		3/12/1997	53.55	0.00	3,591.19	
		6/12/1997	52.08	0.00	3,592.66	
		9/11/1997	53.72	0.00	3,591.02	
		12/10/1997	53.27	0.00	3,591.47	
		3/23/1998	53.56	0.00	3,591.18	
		6/23/1998	52.88	0.00	3,591.86	
		9/30/1998	54.89	0.00	3,589.85	
		12/9/1998	54.57	0.00	3,590.17	
		3/10/1999	55.10	0.00	3,589.64	
		7/2/1999	33.10	-	3,303.04	(5),(6)
MW-7	3,644.55	2/9/1993	50.53	0.00	3,594.02	(1)
TAT AA	3,044.55	8/18/1993	50.74	0.00	3,593.81	(1)
		1/26/1994	51.01	0.00	3,593.54	
		5/3/1995	52.25	0.00	3,592.30	
		7/31/1995	51.92	0.00	3,592.63	
	1	1		0.00	3,593.07	
	ľ	11/14/1995	51.48			

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

Monitor Weil	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-7	3,644.35	5/31/1996	51.78	0.00	3,592.77	
		8/23/1996	52.02	0.00	3,592.53	
		12/2/1996	52.52	0.00	3,592.03	
		3/12/1997	52.99	0.00	3,591.56	
		6/12/1997	53.08	0.00	3,591.47	
		9/11/1997	53.00	0.00	3,591.55	
		12/10/1997	53.28	0.00	3,591.27	
		3/23/1998	53.59	0.00	3,590.96	
		6/23/1998	54.20	0.00	3,590.35	
		9/30/1998	54.54	0.00	3,590.01	
		12/9/1998	54.74	0.00	3,589.81	
		3/9/1999	55.15	0.00	3,589.40	
		6/10/1999	55.66	0.00	3,588.89	
		7/2/1999	55.73	0.00	3,588.82	
		9/13/1999	55.94	0.00	3,588.61	
		12/9/1999	56.38	0.00	3,588.17	
		3/9/2000	56.74	0.00	3,587.81	
		6/8/2000	57.17	0.00	3,587.38	
		9/13/2000	57.40	0.00	3,587.15	
		12/7/2000	57.77	0.00	3,586.78	
		3/8/2001	58.29	0.00	3,586.26	
		6/21/01	58.91		3,585.64	
		9/10/01	59.25	0.00	3,585.30	
MW-8	3,644.87	2/9/1993	50.48	0.00	3,594.39	(1)
		8/18/1993	50.67	0.00	3,594.20	(-)
		1/26/1994	50.96	0.00	3,593.91	
		5/3/1995	52.15	0.00	3,592.72	
		7/31/1995	51.77	0.00	3,593.10	
		11/14/1995	51.37	0.00	3,593.50	
		2/23/1996	52.17	0.00	3,592.70	
		5/31/1996	51.55	0.00	3,593.32	
		8/23/1996	51.92	0.00	3,592.95	
		12/2/1996	52.43	0.00	3,592.44	
		3/12/1997	52.93	0.00	3,591.94	
		6/12/1997	53.96	0.00	3,590.91	
		9/11/1997	52.73	0.00	3,592.14	
		12/10/1997	53.15	0.00	3,591.72	
		3/23/1998	53.51	0.00	3,591.36	
		6/23/1998	54.01	0.00	3,590.86	
		9/30/1998	54.35	0.00	3,590.52	
		12/9/1998	54.60	0.00	3,590.27	
		3/9/1999	55.00	0.00	3,5 <b>8</b> 9.87	
		6/10/1999	55.56	0.00	3,589.31	
		7/2/1999	55.57	0.00	3,589.30	
		9/13/1999	55.72	0.00	3,5 <b>8</b> 9.15	
		12/9/1999	İ	1	3,307.13	121
		1	54.52	0.00	2 500 25	(3)
		3/9/2000	56.52	0.00	3,588.35	
		6/8/2000	-	-	-	
		9/13/2000	-	-	-	
		12/7/2000		-	-	
		3/8/2001	58.11	0.00	3,586.76	
	1	6/21/01	58.72	0.00	3,586.15	

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	9/10/01	58.94	0.00	3,585.93	
MW-9	3,644.78	4/22/1993	49.73	0.00	3,595.05	(1)
		7/15/1993	49.65	0.00	3,595.13	
		8/18/1993	49.85	0.00	3,594.93	
		1/26/1994	50.02	0.00	3,594.76	
,		5/3/1995	51.35	0.00	3,593.43	
		7/31/1995	50.97	0.00	3,593.81	
		11/14/1995	50.43	0.00	3,594.35	
		2/23/1996	51.12	0.00	3,593.66	
		5/31/1996 8/23/1996	50.89 50.98	0.00	3,593.89	
		12/2/1996	51.58	0.00 0.00	3,593.80	
		3/12/1997	52.21	0.00	3,593.20 3,592.61	
·		6/12/1997	52.10	0.00	3,592.68	PSH Sheen
		9/12/1997	51.95	0.00	3,592.83	PSH Sheen
		12/10/1997	52.37	0.00	3,592.41	PSH Sheen
		3/23/1998	52.68	0.00	3,592.10	PSH Sheen
		6/23/1998	53.08	0.00	3,591.70	PSH Sheen
		9/30/1998	53.39	0.01	3,591.40	PSH Sheen
	2	12/9/1998	53.68	0.00	3,591.10	
	,	3/10/1999	54.15	0.00	3,590.63	
		6/10/1999	54.68	0.00	3,590.10	
		7/2/1999	54.71	0.00	3,590.07	
		9/13/1999	54.71	0.00	3,590.07	
		12/9/1999	-	-	-	(3)
		3/9/2000 6/8/2000	55.69	0.00	3,589.09	
		9/13/2000	-	-	-	
		12/7/2000	_	-	-	
		3/8/2001	57.03	0.00	3,587.75	
		6/21/01	57.91	0.00	3,586.87	
		9/10/01	57.95	0.00	3,586.83	
√IW-10	3,644.47	- 8/18/1993	51.54	0.00	3,592.93	·(1)
		1/26/1994	51.90	0.00	3,592.57	(-)
		5/3/1995	52.97	0.00	3,591.50	
		7/31/1995	52.87	0.00	3,591.60	
		11/14/1995	52.51	0.00	3,591.96	
		2/23/1996	53.05	0.00	3,591.42	
		5/31/1996		0.00		
		i	52.79		3,591.68	
		8/23/1996	53.03	0.00	3,591.44	
		12/2/1996	53.41	0.00	3,591.06	
		3/12/1997	54.21	0.00	3,590.26	
		6/12/1997	53.99	0.00	3,590.48	
		9/12/1997	53.94	0.00	3,590.53	
		12/10/1997	54.12	0.00	3,590.35	
		3/23/1998	54.51	0.00	3,589.96	
		6/23/1998	55.12	0.00	3,589.35	
		9/30/1998	55.61	0.00		
		12/9/1998	ان.در	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	3,644.47	3/9/1999	56.09	0.00	3,588.38	
		6/10/1999	56.60	0.00	3,587.87	
		7/2/1999	56.64	0.00	3,587.83	
i		9/14/1999	56.91	0.00	3,587.56	
		12/9/1999	57.37	0.00	3,587.10	
i		3/10/2000	57.71	0.00	3,586.76	
		6/8/2000	58.08	0.00	3,586.39	
		9/13/2000	58.44	0.00	3,586.03	
		12/7/2000	58.89	0.00	3,585.66	
		3/9/2001	59.31	0.00	3,585.24	
		6/21/01	59.89	0.00	3,584.66	
		9/10/01	61.34	0.00	3,583.21	
MW-11	3,643.78	8/18/1993	51.92	0.00	3,591.86	(1)
		1/26/1994	52.32	0.00	3,591.46	
		5/3/1995	53.38	0.00	3,590.40	
		7/31/1995	53.35	0.00	3,590.43	
	,	11/14/1995	52.96	0.00	3,590.82	
		2/23/1996	53.50	0.00	3,590.28	
		5/31/1996	53.25	0.00	3,590.53	
		8/23/1996	53.49	0.00	3,590.29	
		12/2/1996	53.79	0.00	3,589.99	
		3/12/1997	53.81	0.00	3,589.97	
		6/12/1997	53.96	0.00	3,589.82	
		9/12/1997	52.93	0.00	3,590.85	
		12/10/1997	-	-	-	(5),(6)
MW-11A	3,644.24	3/23/1998	54.79	0.00	3,589.45	(7)
		6/23/1998	55.43	0.00	3,588.81	
		9/30/1998	55.96	0.00	3,588.28	
		12/9/1998	56.13	0.00	3,588.11	
		3/10/1999	56.43	0.00	3,587.81	· ·
		6/10/1999	56.94	0.00	3,587.30	
		7/2/1999	57.01	0.00	3,587.23	
		9/14/1999	57.36	0.00	3,586.88	
		12/9/1999	57.72	0.00	3,586.52	
		3/9/2000	58.01	0.00	3,586.23	
		6/8/2000	58.40	0.00	3,585.84	
		9/13/2000	58.84	0.00	3,585.40	
		12/7/2000	59.29	0.00	3,584.95	
		3/8/2001	59.72	0.00	3,584.52	
		6/21/01	60.28	0.00	3,583.96	
		9/10/01	60.69	0.00	3,583.55	
MW-12	3,644.29	3/23/1998	54.72	0.00	3,589.57	(7)
		6/23/1998	55.48	0.00	3,588.81	Ç. /
		9/30/1998	56.02	0.00	3,588.27	
		12/9/1998	56.17	0.00	3,588.12	

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-12	3,644.29	3/10/1999	56.45	0.00	3,587.84	
		6/10/1999	56.97	0.00	3,587.32	
Ì		7/2/1999	56.99	0.00	3,587.30	
		9/14/1999	57.41	0.00	3,586.88	
		12/9/1999	57.76	0.00	3,586.53	
		3/10/2000	58.08	0.00	3,586.21	
		6/8/2000	58.42	0.00	3,585.87	
		9/13/2000	58.85	0.00	3,585.44	
		12/7/2000	59.31	0.00	3,584.98	
		3/8/2001	59.76	0.00	3,584.53	
		6/21/01	60.29	0.00	3,584.00	
		9/10/01	60.79	0.00	3,583.50	
MW-12D	3,644.38	7/2/1999	57.13	0.00	3,587.25	(8)
		9/14/1999	57.74	0.00	3,586.64	
		12/9/1999	57.86	0.00	3,586.52	
		3/9/2000	58.24	0.00	3,586.14	
		6/8/2000	58.56	0.00	3,585.82	
	· /	9/13/2000	<u>-</u>	-	-	
		12/7/2000	-	-	-	
		3/8/2001	-	-	-	
		6/21/01	-	-	-	
		9/10/01	-	-	-	
MW-13	3,645.52	7/2/1999	56.60	0.00	3,588.92	(9)
		9/14/1999	56.92	0.00	3,588.60	
		12/9/1999	57.28	0.00	3,588.24	
		3/10/2000	57.68	0.00	3,587.84	
		6/8/2000	58.04	0.00	3,587.48	
		9/13/2000	58.29	0.00	3,587.23	
		12/7/2000	58.68	0.00	3,586.84	
		3/8/2001	59.19	0.00	3,586.33	
		6/21/01	59.80	0.00	3,585.72	
		9/10/01	60.03	0.00	3,585.49	
MW-14	3,642.45	3/8/2001	61.07	0.00	3,581.38	
		6/21/01	61.71	0.00	3,580.74	
		9/10/01	62.31	0.00	3,580.14	
MW-15	3,643.24	3/8/2001	59.79	0.00	3,583.45	
		6/21/01	60.49	0.00	3,582.75	
		9/10/01	61.02	0.00	3,582.22	
OW-4	3,644.06	7/2/1999	58.18	0.00	3,585.88	(8)
<u> </u>	. ,	9/14/1999	58.63	0.00	3,585.43	(-)
		12/9/1999	58.92	0.00	3,585.14	
		3/9/2000	59.19	0.00	3,584.87	
		6/8/2000	59.56	0.00	3,584.50	
		9/13/2000	60.16	0.00	3,583.90	
		12/07/00	61.15	0.00	3,582.91	

### 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
OW-4	3,644.06	3/8/2001 6/21/01	61.43 61.48	0.00 0.00	3,582.63 3,582.58	(10)
		9/10/01	61.53	0.00	3,582.53	

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

<sup>(2) -</sup> For wells having measurable thickness of free product, the groundwater elevation was calculated as follows:

Groundwater Elevation = (TOC elevation)-(depth to groundwater)+!(free product thickness)x(SG of free product)]

Note: The specific gravity (SG) of the free product is 0.82.

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

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

<sup>&</sup>lt;sup>(5)</sup> - Weil plugged and abandoned July 2, 1999.

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

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

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

<sup>&</sup>lt;sup>(9)</sup> - TOC elevation for MW-13 estimated relative to TOC elevation for MW-7.

## Table 3 September 10, 2001 Field Screening Results for Groundwater Samples Hobbs, New Mexico Facility BJ Services Company, U.S.A.

Monitor Well	Cumulative Liters Removed	рН	Temperature (°C)	Conductivity (umhos/cm)	Redox (mV)	Dissolved Oxygen (meter) (mg/L)	Dissolved Oxygen (Hach kit) (mg/L)	Ferrous Iron (mg/L)	Alkalinity (mg/L)	Turbidity NTUs <sup>(1)</sup>
	0.1	7.33	23.51	1066	177.1	3.80	NM <sup>(2)</sup>	NM	NM	NM
MW-3	0.5	7.30	23.40	1104	166.3	1,14	NM	NM	NM	51
	1.0	7.28	23.38	1117	163.7	0.80	NM	NM	NM	NM
	1.5	7.26	23,31	1138	161.4	0.77	1.0	NM	770	26
	0.1	7.14	21.24	1344	154.1	1.71	NM	NM	NM	NM
MW-4	0.5	7.11	21.09	1372	157.7	1.15	NM	NM	NM	NM
	1.0	7.09	21.07	1383	161.3	0.85	1.0	1.5	770	26
	0.1	6.44	21.43	1340	141	3.20	NM	NM	NM	NM
MW-5	0.5	6.09	21.20	1310	157	1.14	NM	NM	NM	28
17177-5	1.0	6.07	21.15	1300	163	0.84	NM	NM	NM	NM
	1.5	6.06	21.11	1280	171	0.81	1.0	0.5	770	23,4
	0.1	6.35	26.50	1144	168.1	3.12	NM	NM	NM	NM
MW-7	0.5	6.33	25.70	1340	171.3	1.50	NM	NM	NM	38
(0144-)	1.0	6.31	25.68	1410	175.7	1.12	NM	N <b>M</b>	NM	NM
	1.5	6.31	25.65	1420	177.1	1.08	1.0	0	770	42
MW-10 <sup>(3)</sup>	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	0.1 -	7.14	23.71	4117	-77.1	2.81	NM	NM	NM	642
MW-11A	0.5	7.11	23.32	3944	-89.9	1.74	NM	NM.	NM	NM
	1.0	7.10	23.24	3810	-117.1	1.52	1.0	5.0	770	39
MW-12 <sup>(4)</sup>	NM-D	NM-D	NM-D	NM-D	NM-D	NM-D	NM-D	NM-D	NM-D	NM-D
	0.1	7.42	24.11	3711	147	3.88	NM	N <b>M</b>	NM	460
MW-13	0.5	7.40	23.88	3408	138	2.11	NM	NM	NM	NM
	1.0	7.38	23.27	2710	114	1.46	NM	NM	NM	210
	1.5	7.37	23.24	2418	97	0.75	1.0	2	220	60
	0.1	6.98	23.51	1211	143.3	1.77	NM	N <b>M</b>	NM	NM
MW-14	0.5	6.96	23.48	1417	140.3	1.14	NM	N <b>M</b>	NM	NM
	1.0	6.95	23.46	1428	138.1	0.85	1.0	1.5	770	27
	0.1	6.91	20.91	1377	161.4	1.47	NM	N <b>M</b>	NM	NM
MW-15	0.5	6,90	21.11	1389	163.3	0.88	NM	NM	NM	38
	1.0	6.89	21.13	1394	163.5	0.75	1.5	N <b>M</b>	770	34
OW-4 <sup>(4)</sup>	NM-D	NM-D	NM-D	NM-D	NM-D	NM-D	NM-D	NM-D	NM-D	NM-D

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

NM-D=Not Measured (well dry)

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

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

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

<sup>(2)</sup> NM = Not Measured

<sup>(3)</sup> No data collected due to minimal quantity of water in well

<sup>(4)</sup> Well dry

Table 4

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xyienes	TPH-D	TPH-G
Well	Date	Type		microgran	is per liter, ug/L	į.	milligrams po	er liter, mg/L
MW-l	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
	9/30/1998	Regular	3.2	90.0	280,0	970,0	2.5	3.6
	12/10/1998	Regular	<1.0	1,5	17.0	110.0	1.4	0.31
	3/10/1999	Regular	<1.0	<1.0	8.2	110.0	0.62	0.85
	3/10/1999	Duplicate	<1.0	<1.0	7.9	110.0	0.66	0.84
	6/10/1999	Regular	<1.0	1.1	<1.0	28.0	0.53	0.55
	6/10/1999	Duplicate	<1.0	1.8	<1.0	41.0	0.69	0.76
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999		NS	NS	NS	NS	NS	NS
	3/9/2000	Regular	< 1	< l	< !	9.1	14	1.3
	6/8/2000		NS	NS	NS	NS	NS	NS
	9/13/2000	-	NS	NS	NS	NS	NS	NS
	12/7/2000	-	NS	NS	NS	NS	NS	NS
	3/8/2001	Regular	2.0	<1	<1	<1	0.49	0.58
	6/21/2001	-	NS	NS	NS	NS	NS	NS
	9/10/2001	-	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

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type		microgran	ns per liter, ug/L	·	milligrams p	er liter, mg/L
MW-3	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	0,5 <b>6</b>	3.9
	6/23/98	Regular	100.0	720.0	350.0	490.0	0.40	4.9
	9/30/1998	Regular	42.0	470.0	450.0	530.0	1.0	3.8
	12/10/1998	Regular	13.0	220.0	160.0	290.0	1.3	0.43
	3/10/1999	Regular	3.2	7.4	42.0	32.0	0.2	0.44
	6/10/1999	Regular	1.7	3,1	<1.0	36.0	<0.20	0.18
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	<0.10
	12/9/1999	Regular	< 1	<1	< 1	<1	< 0.20	< 0.10
	3/9/2000	Regular	< 1	<1	< 1	<1	0.32	< 0.1
	6/8/2000	Regular	<1	<1	< 1	<1	<0.22	< 0.1
	9/13/2000	Regular	< 1	<1	< 1	<1	<0.22	< 0.1
	12/7/2000	Regular	< 1	< 1	< 1	<1	< 0.25	< 0.1
	3/8/2001	Regular	< 1	< 1	< 1	<1	0.42	<0.1
	6/21/2001	Regular	< 1	< 1	< 1	< 1	< 0.22	<0.1
	9/10/2001	Regular	< 1	<1	< 1	< 1	<0.2	<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
4	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
	9/30/1998	Regular	80.0	180.0	370.0	840.0	2.0	3.9
	12/10/1998	Regular	28.0	70.0	210.0	960.0	9.3	4.3
	12/10/1998	Duplicate	26.0	62.0	180,0	830.0	3.9	
	3/10/1999	Regular	8.0	20.0	250.0	1400.0		4.3
	6/10/1999	Regular	<1.0	<1.0	12.0	12.0	13.0	13
	9/14/1999			ł	l		0.44	0.63
	12/9/1999	Regular	< 1.0	< 1.0	3.3	13.1	0.35	0.17
	3/10/2000	Regular	< 1	2.5	2.3	20.1	2	0.53
	' ' - ' '	Regular	< 1	<1	< 1	3.6	2.6	0.15
	6/8/2000	Regular	< 1	< 1	< 1	< 1	0.44	0.23
	9/13/2000	Regular	< 1	< 1	< !	< 1	0.61	<0.1
	12/7/2000	Regular	< 1	< 1	1.3	<	0.53	0.16
	3/8/2001	Regular	< 1	< 1	< 1	< 1	0.43	0.16
	6/21/2001	Regular	< 1	< 1	< 1	< 1	< 0.25	<0.1
	9/10/2001	Regular	< 1	< 1	< 1	< 1	< 0.2	<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

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	ns per liter, ug/L		milligrams p	er liter, my/I
MW-5	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	<	< 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
	9/30/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/9/1999	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.1
	6/10/1999	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	<0.1
	9/14/1999	Regular	<1.0	<1.0	<1.0	<2.0	<0.20	<0.10
	12/9/1999	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/9/2000	Regular	< 1	<1	< 1	< 1	0.55	< 0.1
	6/8/2000	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/13/2000	Regular	<1	< 1	< 1	< 1	< 0.2	< 0.1
	12/7/2000	Regular	< 1	< 1	< 1	<	< 0.25	< 0.1
	3/8/2001	Regular	< 1	< }	< 1	< 1	0.56	<0.1
	6/21/2001	Regular	< 1	< 1	< 1	<1	0.26	<0.1
	9/10/2001	Regular	< 1	<1	< 1	< 1	<0.2	<0.1
MW-61	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	< 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	< 0.14
	6/23/98	Regular	170.0	4.1	15.0	7.2	1.2	0.51
	9/30/1998	Regular	1000.0	420.0	140.0	270,0	4.0	3.3
	12/10/1998	Regular	7.6	6.6	1.7	5.8	2.0	< 0.1
	3/10/1999	Regular	2500.0	930.0	590.0	1400.0	11.0	13
MW-7	8/10/92	Regular	NS	930.0 NS	NS	NS	NA	NS NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA NA	NA NA

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

Well MW-7	8/19/93 1/27/94 5/3/95 8/1/95 11/15/95	Type Regular Regular	< 2		ns per liter, ug/L		milligrams pe	er liter, mg/L
MW-7	1/27/94 5/3/95 8/1/95		< 2					
	5/3/95 8/1/95			3.0	< 2	< 2	NA	NA
	8/1/95	-	1.1	< 1	< 1	< 1	NA	NA
	1	Regular	52.0	3,4	0.7	2.8	NA	NA
	11/15/05	Regular	22.0	2.2	0.9	2.8	NA	< 0,1
	11/13/73 1	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
1	5/31/96	Regular	29.0	83.0	10.0	21.0	NA	0.25
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
į	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	< t	< 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
	9/30/1998	Regular	< 1.0	< 1.0		< 1.0	< 0.20	< 0.1
	12/10/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/9/1999	Regular	<1.0	<1.0	<1.0	<1.0	4,7	< 0.1
	6/10/1999	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/1999	Regular	< 5	< 5	< 5	. < 5	1.8	< 0.5
	3/9/2000	Regular	< 1	< 1	< 1	< 1	0.66	< 0.1
	6/8/2000	Regular	< 1	< 1	< 1	< 1	< 0.21	< 0.1
	9/13/2000	Regular	<1	< 1	< 1	< 1	< 0.2	< 0.1
	12/7/2000	Regular	< 1	< 1	< 1	< 1	< 0.29	< 0.1
	3/8/2001	Regular	<1	< 1	< 1	< 1	1.2	< 0.1
	6/21/2001	Regular	3.1	< 1	< 1	< 1	<0.22	<0.1
ł	9/10/2001	Regular	<1	< 1	< 1	< 1	< 0.33	<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
İ	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
l	5/31/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA 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		i
	6/23/98	Regular	<1	< 1	< 1	1	< 0.2	< 0.1
	1	-	1	l .		< 1	< 0.2	< 0.1
	9/30/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/1998 3/9/1999	Regular Regular	< 1.0 <1.0	< 1.0 <1.0	< 1.0 <1.0	< 1.0 <1.0	< 0.20 < 0.20	< 0.1 < 0.1

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	ıs per liter, ug/L		milligrams p	er liter, mg/I
MW-8	6/10/1999	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.1
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	<0.10
	12/9/1999		NS	NS	NS	NS	NS	NS
	3/9/2000	Regular	< 1	< 1	< 1	<1	0.55	<0.1
	6/8/2000		NS	NS	NS	NS	NS	NS
	9/13/2000	-	NS	NS	NS	NS	NS	NS
	12/7/2000	-	NS	NS	NS	NS	NS	NS
	3/8/2001	Regular	< 1	′ < 1	< 1	< 1	1.6	<0.1
	6/21/2001	-	NS	NS	NS	NS	NS	NS
	9/10/2001	-	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	ŀ
	6/12/97	Regular	4.7	2.1	11.0	97.0	2.6	19
	6/12/97	Duplicate	< 5	< 5	6.6	69.0	5.2	2.2
	9/12/97	Regular		2.3	2.1	120.0		1.9
	1	_	2.1	1		1 1	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	l
	6/23/98	Regular	2.4	22.0	10.0	36.0	< 0.2	0.25
	9/30/1998	Regular	1.1	5.5	21.0	59.0	0.27	0.27
	12/10/1998	Regular	< 1.0	1.9	17.0	79.0	5.1	0.25
	3/10/1999	Regular	<1.0	<1.0	5.7	68.0	< 0.2	0.22
	6/10/1999	Regular	<1.0	1.8	1.8	71.0	<0.20	0.43
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	-	NS	NS	NS	NS	NS	NS
	3/9/2000	Regular	< 1	< 1	< 1	64.0	0.66	1.3
	6/8/2000	-	NS	NS	NS	NS	NS	NS
	9/13/2000	-	NS	NS	NS	NS	NS	NS
	12/7/2000	-	NS	NS	NS	NS	NS	NS
	3/8/2001	Regular	< 1	< 1	< 1	< 1	1.4	<0.1
	6/21/2001		NS	NS	NS	NS	NS	NS
	9/10/2001		NS	NS	NS	NS	NS	NS
MW-10	8/19/93	Regular	190.0	460.0	< 200	240.0	NA	NA NA
	1/27/94	Regular	13.4	4.0	5.5	33.6	NA	NA NA
	5/4/95	Regular	980.0	15.0	11.0	84.0	NA NA	NA NA
	8/1/95	Regular	1300.0	32.0	32.0	100.0	NA NA	ł
	11/15/95	Regular	1000.0	24.0	32.0 15.0	36.0	NA NA	3.6
	2/23/96	Regular	810.0	23.0	27.0	44.0	NA .	1.7

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

Monitor	Sample	Sample	Benzene	Toluene	Ethyibenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type		microgran	is per liter, ug/L		milligrams p	er liter, mg/L
MW-10	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
	9/30/1998	Regular	84.0	3.2	30.0	2.2	1.4	0.36
	12/10/1998	Regular	29.0	1.0	7.0	1.0	0.86	0.18
	3/9/1999	Regular	28.0	<5.0	5.8	<5.0	0.92	<0.5
	6/10/1999	Regular	17.0	<1.0	<1.0	<1.0	0.30	0.16
	9/14/1999	Regular	10.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/1999	Regular	23.0	<	< 1	1.2	0.44	0.16
	3/10/2000	Regular	300.0	4.3	6.6	43.2	1.2	0.85
	6/8/2000	Regular	78.0	1.7	7.2	9.0	0.67	0.74
	9/13/2000	Regular	23.0	1.5	1.1	2.9	1.6	0.41
	12/7/2000	Regular	7.2	<1	<1	<1	1.5	0.15
	3/8/2001	Regular	3.4	1.1	<1	<1	3.4	0.2
	6/22/2001	Regular	< 1	< 1	< 1	< 1	1.2	<0.1
	9/10/01 and 9/18/01	Regular	2	< 1	< 1	< 1	2.3	<0.1
MW-111	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
	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
4 417 1 1 1	9/12/97	Regular	220.0	15.0	27.0	13.0	1	0.46
MW-HA	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
	9/30/1998	Regular	9.3	3.7	2.2	7.0	<0.20	0.1
	12/10/1998	Regular	1.7	<1.0	<1.0	<1.0	<0.20	<0.1
	3/10/1999	Regular	<5	<5	<5	<5	0.3	<0.5
	6/10/1999	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.10
}	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/1999	Regular	< 5	< 5	< 5	< 5	< 0.2	1.0 >
	3/9/2000	Regular	1.2	< 1	< 1	< 1	0.43	< 0.1
	6/8/2000	Regular	3.6	< 1	< 1	< !	0.37	< 0.1
1	9/13/2000	Regular	1.4	< 1	< 1	< 1	0,36	< 0.1

Table 4

Cumulative BTEX and TPH Analytical Results for Groundwater Samples

Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Weil	Date	Туре		microgran	is per liter, ug/L		milligrams p	er liter, mg/L
	12/7/00	Regular	26	<1	<1	3.3	0.3	0.12
MW-11A	3/8/01	Regular	12	<5	<5	<5	2.2	<0.5
	6/22/2001	Regular	1.5	< 1	< 1	< 1	1	<0.1
:	9/10/2001	Regular	7.9	<1	< 1	<1	1.1	<0.1
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
	9/30/1998	Regular	260.0	3.0	1.2	7.9	<0.20	0.62
	12/10/1998	Regular	160.0	<1.0	<1.0	1.2	0.21	0.36
	3/10/1999	Regular	160.0	1.1	<1.0	2.9	0.38	0.45
	6/10/1999	Regular	49.0	1.4	<1.0	<1.0	0.22	0.13
	9/14/1999	Regular	75.0	< 1.0	< 1.0	< 2.0	<0.20	0.23
	12/9/1999	Regular	64.0	< 1	< 1	<1	< 0.2	0.21
	3/10/2000	Regular	93.0	< 1	< 1	< 1	< 0.2	0.21
	3/10/2000	Duplicate	99.0	< 1	< 1	<	0.22	0.22
	6/8/2000	Regular	62.0	< 1	< 1	< 1	< 0.2	< 0.i
	9/13/2000	Regular	34.0	< (	< 1	< 1	0.23	< 0.1
	12/7/2000	Regular	27	<	2.9	1.9	<0.25	<0.1
	3/8/2001	Regular	14	<1	<1	<1	2.1	0.1
7	6/22/2001	Regular	12	< 1	< 1	< 1	0.51	0.11
	9/10/2001	Regular	NS-D	NS-D	NS-D	NS-D	NS-D	NS-D
MW-12D	7/2/1999	Regular	< 5	< 5	< 5	< 5	<0.20	< 0.10
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/1999	Regular	<1	< 1	< 1	< 1	< 0.2	< 0.1
	3/9/2000	Regular	<1	<1	< 1	< 1	0.24	< 0.1
	6/8/2000	Regular	<1	< 1	< 1	< 1	< 0.2	< 0.1
	9/13/2000	-	NS	NS	NS	NS	NS	NS
	12/7/2000	•	NS	NS	NS	NS	NS	NS
	3/8/2001	-	NS	NS	NS	NS	NS	NS
	6/22/2001	-	NS	NS	NS	NS	NS	NS
	9/18/2001	Regular	< 1	< l	< 1	< 1	< 0.2	<0.1
MW-13	7/2/1999	Regular	1500.0	23.0	750.0	58.0	2.2	5.1
	9/14/1999	Regular	860.0	16.0	450.0	34.4	2.1	3.1
	12/9/1999	Regular	430.0	16.0	410.0	40.9	0.46	3.2
	3/10/2000	Regular	88.0	2.8	200.0	1.3	1.9	0.99
	6/8/2000	Regular	6.0	< 1	63.0	3.3	1.1	0.91
	9/13/2000	Regular	<1.0	<1.0	3.4	<1.0	0.44	0.12
	12/7/2000	Regular	<1	<1	<1	<1	0.43	<0.1
	3/8/2001	Regular	<1	<1	1.2	<1	2	<0.1
	6/22/2001	Regular	< 1	< 1	< 1	< 1	0.31	<0.1
	9/10/2001	Regular	< 1	< 1	< 1	< 1	0.3	<0.1
MW-14	1/14/2001	Regular	<1	<1	<1	<1	<0.2	<0.1
	6/21/2001	-	NS	NS	NS	NS	NS	NS
	9/10/2001	-	NS	NS	NS	NS	NS	NS
MW-15	1/14/2001	Regular	<1	<1	<1	<1	<0.2	<0.1
	6/21/2001	-	NS	NS	NS	NS	NS	NS
	9/10/2001	-	NS	NS	NS	NS	NS	NS
OW-4	6/10/1999	Regular	<1.0	<1.0	<1.0	4.4	<0.2	<0.10
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/1999	Regular	<1.0	<1.0	<1.0	<1.0	<0.2	<0.1

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylencs	TPH-D	TPH-G
Well	Date	Type		microgran	ıs per liter, ug/L		milligrams p	er liter, mg/L
	3/9/2000	Regular	<1.0	<1.0	<1.0	<1,0	0,25	<0.1
OW-4	6/8/2000	Regular	<1.0	<1.0	<1.0	<1.0	< 0.21	<0.1
	9/13/2000	Regular	<1.0	<1.0	<1.0	<1.0	<0.2	< 0.1
	12/7/2000	-	NS-D	NS-D	NS-D	NS-D	NS-D	NS-D
	3/8/2001	•	NS-D	NS-D	NS-D	NS-D	NS-D	NS-D
	6/21/2001	-	NS-D	NS-D	NS-D	NS-D	NS-D	NS-D
	9/10/2001		NS-D	NS-D	NS-D	NS-D	NS-D	NS-D

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

NA=Not Analyzed NS=Not Sampled NS-D=Not Sampled because well was Dry NS-P=Not Sampled due to Phase-separated hydrocarbons in well

Cumulative Results<sup>(1)</sup> for Chloride<sup>(2)</sup> Analyses BJ Services Company, U.S.A. Hobbs, New Mexico Facility Table 5

Sample Date									Monitor	Monitor, Wells <sup>(3)</sup>					i		
	MW-I	MW-3	MW-4	MW-4   MW-5	9-MW	MW-7	MW-8	6-MW		MW-11	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
8/1/95	160	150	310	130	380	310	350	110	2200	3400	NA <sup>(4)</sup>	NA	NA	AN	NA A	NA	A N
8/23/96	130	140	100	66	210	250	360	140	2000	2900	NA	NA AN	NA	AN	NA	NA	A
3/23-24/98	212	206	126	151	183	223	364	164	2390	NA	940	1200	NA	NA	NA	NA	NA A
3/9-10/99	163	156	142	155	411	238	274	123	1160	NA	834	314	NA	NA	NA	ΑN	NA
6/10-7/2/99	NA	NA	AN	Ä	NA	A'N	NA A	NA	NA	NA	NA	N A	195	496	N A	NA	266
3/9-10/00	258	196	196	961	NA	224	241	131	474	NA	1290	327	117	276	NA	N.A	258
1/14/2001	NA	NA	AN	ΝΑ	AN	NA	NA	NA	AN	NA	NA	NA	NA	NA	368	219	NA
3/8-9/01	NA	165	172	152	NA	224	250	127	879	NA	1720	586	NA	276	327	٧×	NA
6/21/2001	NA	NA	A'N	NA	NA	NA	NA	NA	AN	AA	NA.	A'A	NA	NA A	222	222	N.A.
9/10/2001	NA	NA	AN	AA	A'A	Z A	X A	NA A	N.A.	Y Y	NA	NA	NA	NA	245	228	NA
9/18/2001	ΥN	ΑN	NA	NA	NA	NA	NA	NA	A'A	NA	NA	NA	78.8	NA	NA	NA	NA
(1)																	

(1) - in mg/L.

 $^{(2)}\,$  - NMWQCC standard for chloride is 250 mg/L.

(3) - MW-2 not operative after May 3, 1995; P&A'd 7/1/99.

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

MW-11 P&A'd 7/1/99.

MW-11A installed February 1998.

MW-12 installed February 1998.

MW-12D installed June 1999.

MW-13 installed June 1999.

MW-14 installed January 2001.

MW-15 installed January 2001.

(4) - NA indicates not analyzed.

Table 6
Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, and MW-12

#### Hobbs, New Mexico

BJ Services Company, U.S.A.

Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	Dissolved Methane (mg/L)	
	3/23/1998	3.87	190	< 0.0012	
	3/9/1999	<0.1	195	< 0.0012	
	6/10/1999	4.73	209	< 0.0012	
	9/14/1999	4.3	210	< 0.0012	
	12/9/1999	4.2	210	< 0.0012	
14377.5	3/9/2000	5.3	260	< 0.0012	
MW-5	6/8/2000	4.7	240	< 0.0012	
	9/13/2000	3.93	200	< 0.0012	
	12/7/2000	3.27	160	< 0.0012	
	3/8/2001	3.24	180	< 0.0012	
	6/21/2001	2.74	150	0.0017	
	9/10/2001	NA <sup>(2)</sup>	130	< 0.0012	
	3/23/1998	0.07	320	0.91	
	6/23/1998	<0.1	325	0.55	
MW-10	9/30/1998	<0.1	204	0.81	
	12/10/1998	<0.1	180	0.091	
	3/9/1999	<0.1	142	0.035	
	3/9/1999	<0.1	223 <sup>(3)</sup>	0.033	
	9/14/1999	<0.10	160	0.0049	
	12/9/1999	0.49	170	0.0039	
	3/10/2000	0.1	160	0.0056	
	6/8/2000	<0.1	150	0.031	
	9/13/2000	<0.1	160	0.031	
	12/7/2000	<0.1	190	0.17	
	3/8/2001	<0.1	270	< 0.0012	
	6/22/2001	<0.1	270	0.044	
	9/10/2001	NA	NA	NA	
MW-11A	3/23/1998	< 0.05	190	0.14	
	6/23/1998	<0.1	225	0.11	
	9/30/1998	0.4	196	0.043	
	12/10/1998	0.7	188	0.033	
	2/10/1000	<0.1	164	0.004	
	3/10/1999	<0.1 <sup>(4)</sup> 227 <sup>(3)</sup>		0.094	

Table 6
Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, and MW-12

#### Hobbs, New Mexico

BJ Services Company, U.S.A.

Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	Dissolved Methane (mg/L)
MW-11A	6/10/1999	<0.1	181	0.0036
	9/13/1999	0.22	250	< 0.0012
	12/9/1999	<0.1	290	0.0079
	3/9/2000	0.11	270	0.037
	6/8/2000	<0.1	240	0.0069
	9/13/2000	<0.1	320	< 0.0012
(	12/7/2000	<0.1	260	0.0096
	3/8/2001	<0.1	330	0.0028
	6/22/2001	<0.1	180	0.0074
	9/10/2001	NA	280	< 0.0012
	3/23/1998	< 0.05	240	< 0.0012
	6/23/1998	<0.1	240	< 0.0012
	9/30/1998	<0.1	168	< 0.0012
	12/10/1998	<0.1	202	< 0.0012
	3/10/1999	<0.1 137 <0.1 <sup>(4)</sup> 193 <sup>(3)</sup>		<0.0012
	3/10/1999			<0.0012
	6/10/1999	<0.1	217	< 0.0012
MW-12	9/14/1999	< 0.10	230	< 0.0012
IVI W - 1 Z	12/9/1999	<0.1	180	< 0.0012
	3/10/2000	<0.1	210	< 0.0012
	6/8/2000	<0.1	220	< 0.0012
	9/13/2000	<0.1	240	< 0.0012
	12/7/2000	<0.1	260	< 0.0012
	3/8/2001	<0.1	300	< 0.0012
	6/22/2001	<0.1	360	0.0021
	9/10/2001	NA	NA	NA
MW-12D	9/18/2001	NA	190	< 0.0012

<sup>(1) -</sup> Analysis by EPA Method 300, except as noted

 $<sup>^{(2)}</sup>$  - NA = not analyzed

<sup>(3) -</sup> Analysis by EPA Method 375.4

<sup>(4) -</sup> Analysis by EPA Method 353.3 mg/L = milligrams per liter

Appendices

#### **APPENDICES**

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

#### APPENDIX A

**Groundwater Sampling Forms** 

P:\Wp\BJSERV\12832\086r.doc

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



#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: Mw-3

4 556	ICAT INCA	CLAAT	1011						
1. PROJECT INFORMATION									
Project Number: 12832 Task Number: 016						Date: (7-13-0) Time: 13.30			
Client:	B121					Personnel:	DEMM G	~ 128~	
Project Location: Hobbs Weather: 5~ n~y, h~t									
2. WELL	DATA 2								
Casing E	Casing Diameter:inches Type: 💁 PVC 🗆 Stainless 🗅 Galv. Steel 🗘 Teflon® 🗇 Other:								
Screen Diameter: inches Type: DPVC D Stainless D Galv. Steel D Teflon® D Other:									
	Depth to Static Water: 5 7 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:  Other:								
	of Water Column				: ::			erval (from GS):	
g								th well = 0.167 gal	
3. PURC	GE DATA								
Purge M							Submersible Pun	ηp	
	□ Cent		o □ Perista ess □ PVC	•	nertial Lift Pum <sub>l</sub>	p 🗓 Other:			Equipment Model(s)
Materials	s: Pump/Bailer	□ Dedic	ated 🗆 Prep	ared Off-Site	A Field Clear		osable	1. <u>36</u> 1	ompis
Materials	s: Rope/Tubing	☐ Polyel	thylene 🗆 l	Polypropylene	☐ Teflon® ☐	Other:	nosable	, ~5	E-610D
Was wel	Il purged dry?		Ø No	-	د ا	\		2	
		7.03			ig Raie	gal,	/min	3.	
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
13:45	3.1	7.33	23.51	1266	17/4	3.80			CLA
13:50	3-5	7.30	23.4)	1104	166.3	1-14	51	· · · · · · · · · · · · · · · · · · ·	
13:55	1.0	7.28	23.38	1117	163.7	2.50			
ندارازي	1.5	7.26	23.71	1138	161.4	0.77	26		Clecr
							<del>                                     </del>	<del></del>	
A SAME	PLING DAT	ΓΔ					!	Cons	homical Analyses
4. SAMPLING DATA  Geochemical Analyses  Mathed(s):  Bailer, Size:   Ä Bladder Pump  2" Submersible Pump  4" Submersible Pump							—		
Method(		Pump 🗆	Inertial Lift Pu	ımp 🚨 Other:			,	Ferro	us Iron: mg/L
Material	s: Pump/Bailer		ess □ PV0 ated □ Pred	C ☐ Teflon® pared Off-Site	Other	ned 🗆 Dispo		: DO:	/・ン mg/L
Material	s: Tubing/Rope	🔏 Polye	thylene 🗆	Polypropylene	Teflon®	Other:			
1				epared Off-Site	☐ Field Cle		posable	Nitrat	e: mg/L
	Water at Time		g:	/u	Field Filtere زید		□ No.	Sulfat	e: mg/L
1	آرسیا میرار :D:		4	me: <u>/ 4?</u>		# of Contain	ers:	Alkali	nity: <u>775</u> mg/L
Duplicate Sample Collected?									
5. COMMENTS were good coulting									
Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.									
ivote: include	comments such a	s well condit	ion, odor, pre	sence of NAPL	or other items	s not on the fiel	o data sheet.		
							/ (C)	)	_

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

Signature

### BROWN AND CALDWELL

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-4

1. PROJECT INFORMATION	. 11	2-6-01							
Project Number: 1283 Task Number:	)   b   Date:	Date: 13-9-31 Personnel: DGAN, CIPC							
Client: CT SV CS	Personnel:	Personnel: DGAN CIPS							
Project Location: H 3655	Weather:_ <u>5</u>	vinny , hot							
2. WELL DATA									
Casing Diameter: inches Type: de PVC									
Screen Diameter: inches Type: Type: PVC Stainless Galv. Steel Teflon® Other:									
Total Depth of Well:									
	☐ Top of Well Casing (TOC)		Other:						
	/olume: gai								
Length of Water Column feet	volumega.	Note: 2-inch well = 0.167	,						
3. PURGE DATA									
☐ Bailer, Size: ☐ Bladder Pum	p 🖸 2" Submersible Pump 🚨 4"	Submersible Pump							
d Centilogar Formp d Fernstante Fun	np 🚨 Inertial Lift Pump 🚨 Other: _ Teflon® 📮 Other:		Equipment Model(s)						
	ff-Site ZNField Cleaned Disp	osable 1. $\bigcirc$	150-mp13						
	pylene ☐ Teflon® ☐ Other: Off-Site ☐ Field Cleaned ☐ Dis	enosable 2	152-6100						
	Pumping Rate: 3 · 1 ga								
		ა							
lime I. DH Iemni '	ond. ORP Dissolved Oxygen	Turbidity Other:	Comments						
14:23 01 7.14 21.24 13	44 154.1 (.7)		Clear						
14.72 2.04 13	72 157.7 1.15								
14:30 1.0 7.09, 21.07 13.	53 161.3 0.85	26							
4. SAMPLING DATA Geochemical Analyses									
Method(s): ☐ Bailer, Size; ☐ ☐ ★Bladder Pump ☐ Method(s): ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐	□ 2" Submersible Pump = □ 4" Sub □ Other:	mersible Pump Fe	errous Iron: 1, 5 mg/L						
<b>1</b>	Teflon® 🕒 Other:		// /						
Dedicated Departed C		posable	D:mg/L						
Materials: Tubing/Rope									
Depth to Water at Time of Sampling: 58 5	Field Filtered?  Yes	DY No Si	ulfate: mg/L						
Sample ID: Mu Sample Time:	14:35 # of Contai	ners: 3							
Duplicate Sample Collected?									
5. COMMENTS well in good condition, capt back in place									
Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.									

Signature

### BROWNAND CALDWELL

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELLID: MUS-5

1. PROJECT INFORMATION									
Project Number: 12832 Task Number: 2/6 Date: 5-10.01 Time: ///.00									
Client: BJ SVC Personnel: DGLP; C/REV									
Project Location: Hobbs Weather: SUANY, LOT									
2. WELL		-	<del>.</del>						
Total Depth of Well: 6 From: Top of Well Casing (TOC) Top of Protective Casing Other  Depth to Static Water: 5 S S feet From: Top of Well Casing (TOC) Top of Protective Casing Other:									
Depth to Static Water: 5 G: 5 feet From: 5 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:									
	f Water Column		feet	Well Volume				erval (from GS)	
Length	YVAICE COIGITITE	•	_ 1661	VVCII VOIDIIIC	′· <del></del>	951		th well = 0.167 ga	
3. PURC	GE DATA								
Purge M	ethod: 🖸 Baile	r, Size:	_ Con Bladde	erPump 🚨 2	" Submersible	Pump 🛄 4"	Submersible Pum	ηp	
•	G Cent			Teflon®					Equipment Model(s)
Materials	s: Pump/Bailer	☐ Dedic	ated 🗆 Prep	ared Off-Site	☐ Field Clea	ined 🚨 Disp	osable		0-1-612
Materials	s: Rope/Tubing			Polypropylene pared Off-Site		Other caned Dis	posable	2 YX	I-6 N D
Was well	l purged dry?		Ø No	•	ng Rate:	1		,	
	Cum. Gallons	1	<del> </del>	Spec.	ī ·	Dissolved	1	3. Other:	
Time	"Removed	рН	Temp	Cond.	ORP	Oxygen	Turbidity		Comments
1/315	01	6-44	2/43	1347	141	3.20			cla
<u>//.'2</u> 3	05	6,39	21.20	13/0	157	1.14	28		
11:25	j.u	6.07	ストリン	1300	163	2.84	The state of the s		
11:30	1.5	6.06	21.11	1286	171	0.81	23.4		cle
		<del> </del>							
		<u> </u>	<u> </u>			+			
			i				į		
4. SAME	PLING DA	ΓΑ						Geoc	chemical Analyses
	o. □ Bailer, Si	ze:				np 🗓 4" Subi	mersible Pump		っつう
Method(s): Peristaltic Pump D Inertial Lift Pump D Other: Ferrous Iron:mg/L									
Materials	s: Pump/Bailer	□ Dedic	ated 🖸 Prep	pared Off-Site		aned Disp	osable	DO:	<u>/、</u> 3 mg/L
Materials	s: Tubing/Rope	CA Polye	thylene 🔲	Polypropylene	☐ Teflon®	Other	nocable	: Nitra	te: mo/l
Materials: Tubing/Rope									
Sample ID: 12 Water at Time of Sampling: 6 3 3 Field Filtered? 1 Yes At No Sulfate:mg/L									
		 cted?			·	# Of Oorlian	.070	Alkal	inity: /// mg/L
Duplicate Sample Collected?									
5. COMMENTS will in good condition , cap & with in yings.									
Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.									
1									
FORM GW-	1 (Rev 6/8/99 - w	an)					Signature		
	. , 313,35 - 10						orginature		

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

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELLID: MW7

L PROJECT INCORNATION	······				**************************************
1. PROJECT INFORMATION  Project Number: 12834 Task Num	nberO16	Date: 91	17.01	-	Time: // ! 4.5
Client: BJ 50" C-3	10010-10		) GAN, C	- / Re-	mic. <u>11 1-</u>
Project Location: الكاملة			nny but		
2. WELL DATA					
Casing Diameter:inches	Type: PVC 🗆 Stainle	ss 🖵 Galv. Ste	el 🗆 Teflon® 🗆	Other:	
Screen Diameter: 2 inches	Type: Ø PVC □ Stainle	ss 🖫 Galv. Ste	el 🗆 Teflon® 🗆	Other:	
Total Depth of Well: 61-5 feet	From: Top of Well Casi	ng (TOC)	Top of Protective	Casing 🗆 Ot	her:
Depth to Static Water タイン feet	From: 💋 Top of Weil Casi				
Depth to Product:feet	From: 🗅 Top of Well Cas	ing (TOC)	Top of Protective	Casing 🗆 Ot	her:
Length of Water Column:feet	Well Volume:	gal S	Screened Interv	al (from GS):_	
			Note: 2-inch v	vell = 0.167 gal/f	t 4-inch well = 0.567 gal/ft
3. PURGE DATA					e t
Purge Method: ☐ Bailer, Size: ☐ Ø Bladd ☐ Centrifugal Pump ☐ Perist					Equipment Model(s)
Materials: Pump/Bailer ☐ Stainless ☐ PV ☐ Dedicated ☐ Pre	C □ Teflon® □ Other: pared Off-Site ☑ Field Clear	ned 🗀 Dispos	able	1. QG	D-mp 13
	Polypropylene ☐ Teflon® if				
Was well purged dry?	Pumping Rate:	•		2. <del>- y s-</del>	F-613D
			nin	3.	
Time Cum. Gallons pH Temp	Spec. ORP	Dissolved Oxygen	Turbidity	Other:	Comments
11:5 21 635 2650	1149 168.1	3./2	~-r		<l-< td=""></l-<>
12:05 3.5 (3) 25:73	1349 17/3	1.50	38		
12:10 1.0 6.31 2568	1410 17518	7/12			
125 1.5 6.31 25.65	1425 177-1	1.08	42		el-
			<u> </u>		
4. SAMPLING DATA		<u>,                                      </u>		Geoch	emical Analyses
Method(s): ☐ Bailer, Size: ☐ Bladder F		p 🔲 4" Subme	ersible Pump	Ferrou	s tron: O ma/L
Materials: Pump/Bailer					1. 0
☐ Dedicated ☐ Pre	epared Off-Site		sable	[ DO:	<u>/ ·</u> mg/L
Materials: Tubing/Rope	repared Off-Site 🚨 Fied Cle		osaple	Nitrate	mg/L
Depth to Water at Time of Sampling: 6 -3	12.31.7	d? 🗀 Yes	4 No	Sulfate	: mg/L
Sample ID: MW-7 Sample	Fime: 12:15	# of Containe	ers:		700
Duplicate Sample Collected? 🔲 Yes 🕏	No ID:			Alkalin	ilty:mg/L
5. COMMENTS were	end condi	took.	C-17 & ()	CK in x	Place
					*** *** *** *** *** *** *** *** *** **
Note: Include comments such as well condition, odor, p	recorded of NARI as other to	e not on the field	data sheet	·	<del>-</del> .
recte. Include comments such as well condition, 000f, pl	essence of NACL, or other item	s not on the itela	yata sileet.	<del></del>	

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



#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-10

1. PROJECT INFORMATION				
Project Number: 2832 Task Number: 0	1 G Date	onnel: DCAN 6	Tir	me: <u>/6:1<sup>3</sup> </u>
Client: BJSV (3	Pers	onnel: DEAN, G	1/84-1	<del></del>
Project Location: كراد للر	Wea	ther: SUANY	~\\d	
2. WELL DATA		77		
	Ø PVC □ Stainless □	Colu Stoot El Toflon®		
	PVC Stainless C			
	Top of Well Casing (TO			
Depth to Static Water 61-34 feet From:	Top of Well Casing (TO	JC)	tive Casing U Othe	Pf;
	☐ Top of Well Casing (To			
Length of Water Column: feet Well V	olume: ga		erval (from GS): ch well = 0.167 gal/ft	
3. PURGE DATA				g-m.
Purge Method: A Bailer, Size: Q Bladder Pump	☐ 2" Submersible Pump	☐ 4" Submersible Pun	np	
		Other:	<del></del>	Equipment Model(s)
Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ ☐ ☐ Dedicated ☐ Prepared Of	feflon® □ Other: F-Site □ Field Cleaned	Choisposable	1	
Polyethylene @ Polyprop	oylene 🛘 Teflon® 🗗 Oth	ner: 12 X ar		
U Dedicated U Prepared C			2	
	umping Rate:		3.	W-110
Time Cum. Gallons pH Temp Sp.	ORP	solved Turbidity	Other:	Comments
	<del></del>	!	i I	
			į	
4. SAMPLING DATA			Geochei	mical Analyses
Method(s): ☐ Bailer, Size: ☐ Bladder Pump ☐ Bailer Pump ☐ Inertial Lift Pump ☐	I 2" Submersible Pump C Other:	1 4" Submersible Pump	Ferrous	Iron: mg/L
Malerials Fumb/baller	Teflon® 🛘 Other:		DO:	ma/l
☐ Polyethylene ☐ Polyero		·	<b>D</b> O.	mg/L
Materials: Tubing/Rope	•	☐ Disposable	Nitrate:	mg/L
Depth to Water at Time of Sampling:	Field Filtered?	í	Sulfate:	mg/L
Sample ID: MLOCI ) Sample Time:	// <sub>2</sub> -US # of	Containers: 1	A.HP. C	
Duplicate Sample Collected? ☐ Yes ☐ No	ID:		Alkalinit	y mg/L
5. COMMENTS COLLECTED COS	- compleasing	h Seiler 1	くらいかん とい	Vinat Wasa
5. COMMENTS COLLECTED GREATER COMMENTS COLLECTED GREATER CO	allet el	anc lares	SOTTION	1.111.15
Theately described to	-distant	- (rok	7/05	Y Trisk
Note. Include comments such as Well condition, odor, presence	of NAPL, or other ilems not o	on the field data sheet.	. = .// 5.54	1 * 4 to 1 ' / "; (

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

Signature

# AN INTEGRAL PART OF BROWN AND

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-10

PROJECT INFORMATION Project Number: 283.2   Task Number: 0 to   Date: 9/18/01   Time: 2024 Personnel: L. Texque. A. Marti Project Location: Habbs: - NM   Weather Learn Dry. No. 5kg data dark)  2. WELL DATA Casing Diameter: 2 inches   Type: 10 kmc   3 stantes   3 dow steel   0 testante   3 other:	CALDWE	LL								
Personnet: L. T. Caugher A. Mart I Project Location: Habbs - NM	1. PROJE	CT INFOR	MATIC	N						
Project Location: Habbs - NM  Weather Location No No No July data fact.  2. WELL DATA  Casing Diometer: Z inches   Type: VPVC   3 stanless   Galv Steel   1 fellone   0 ther.  Screen Diometer: Z inches   Type: VPVC   3 stanless   Galv Steel   1 fellone   0 ther.  Total Depth of Well: _ feel   From: 0 top of Well Cosing (ICC)   0 top of Protective Cosing   0 ther.  Depth to Static Water 57.50   feet   From: 0 top of Well Cosing (ICC)   0 top of Protective Cosing   0 ther.  Depth to Product: _ feel   From: 0 top of Well Cosing (ICC)   0 top of Protective Cosing   0 ther.  Depth to Product: _ feel   From: 0 top of Well Cosing (ICC)   0 top of Protective Cosing   0 ther.  Length of Water Column: _ rest   Well Volume: _ gal   Screened Interval (Irom (S))   4-rich well = 0.867 galm    Purgs Method: 0 Centrifugal Pump   0 restactic Pump	Project N	lumber: <u>1'283</u>	2 1	ask Numb	per: 016	_	Date: 9/1	18/01	1	lime: 2024
Casing Dicrimeter: 2 inches   Type: 1/2 PVC   3 Startess   3 GaV Steel   3 Tefform®   3 Other:   Screen Dicrimeter: 2 inches   Type: 1/2 PVC   3 Startess   3 GaV Steel   3 Tefform®   3 Other:   Total Depth of Welt:   Gest   From:   0 Top of West Cosing (DC)   0 Top of Protective Cosing   0 Other:   Depth to Startic Water: 57.50   Gest   From:   0 Top of West Cosing (DC)   0 Top of Protective Cosing   0 Other:   Depth to Product:   Feet   From:   0 Top of West Cosing (DC)   0 Top of Protective Cosing   0 Other:   Depth to Product:   Feet   From:   0 Top of West Cosing (DC)   0 Top of Protective Cosing   0 Other:   Depth to Product:   Feet   From:   0 Top of West Cosing (DC)   0 Top of Protective Cosing   0 Other:   Depth to Product:   Feet   From:   0 Top of West Cosing (DC)   0 Top of Protective Cosing   0 Other:   Depth to Product:   Feet   From:   0 Top of West Cosing (DC)   0 Top of Protective Cosing   0 Other:   Depth to Product:   Feet   From:   0 Top of West Cosing (DC)   0 Top of Protective Cosing   0 Other:   Depth to Product:   Feet   From:   0 Top of West Cosing (DC)   0 Top of Protective Cosing   0 Other:   Depth to Product:   Feet   From:   0 Top of West Cosing (DC)   0 Top of Protective Cosing   0 Other:   Depth to Product:   Feet   From:   0 Top of West Cosing (DC)   0 Top of Protective Cosing   0 Other:   Depth to Product:   Feet   From:   0 Top of West Cosing (DC)   0 Top of Protective Cosing   0 Other:   Depth to Product   Productive   0 Top of West Cosing (DC)   0 Top of West Cosing   0 Top of Wes	Client:	37 Serv	ices		,		Personnel:	L. Teaq	ne A. N	1ort1
Casing Diameter: 2 inches   Type: QiPVC   3 stantess   3 Galv Steel   3 Other:   Screen Diameter: 7 inches   Type: QiPVC   3 stantess   3 Galv Steel   3 Other:   Screen Diameter: 7 inches   Type: QiPVC   3 stantess   3 Galv Steel   3 Other:   Screen Diameter: 7 inches   Type: QiPVC   3 stantess   3 Galv Steel   3 Other:   Depth to Startic Water 57.50 (seet   From: 0 Top of West Cosing (ICC)   0 Top of Protective Cosing   3 Other:   Depth to Product:	Project L	ocation: Ha	bbs -	NM_			Weather:l	varing 1	ory i No-	siky dang likerk)
Screen Diameter: 2 inches	2. WELL	DATA						· · · · · · · · · · · · · · · · · · ·		
Total Depth of Well:   Feet	Casing C	Dlameter:	$2_{lnct}$	nes	Type: 12 PV	C 🗆 Stainle	ess 🛚 Galv. St	eel 🗅 Teflon	® Q Other:	
Depth to Static Water 57.80 feet From: a top of Well Coung (ICC) a top of Protective Cosing (Alomer, Dawaged Tix Depth to Product: feet From: a top of Well Cosing (ICC) a top of Protective Cosing a Other: Length of Water Column: feet Well Volume: god Screened Interval (from G5): Note: 2-inch well = 0.167 gol/n 4-inch well = 0.06	Screen E	Dlameter:	2 incl	nes	Гуре: ф∕р∨с	C 🛭 Stainle	ess 🖸 Galv. St	eel 🗆 Teflon	Other:	
Depth to Product:	Total De	pth of Well:	fe	et	From: 🗖 To	p of Well Ca	sing (TOC)	Top of Prot	ective Casing (	☐ Other:
Length of Water Column:	Depth to	Static Water:	59.80	feet	From: 🗖 to	p of Well Ca	sing (TOC)	Top of Prot	ective Casing	* Other: Damaged Tix
Anch well = 0.167 gol/fl   Anch well = 0.167 gol/fl   Anch well = 0.167 gol/fl   Anch well = 0.167 gol/fl   Anch well = 0.167 gol/fl   Anch well = 0.167 gol/fl   Anch well = 0.167 gol/fl   Purge Method: @ Centifugel Pump   Perestatic Pump   Inertial Lift Pump   Indicated   Disposoble	Depth to	Product:	fee	t	From: 🗆 To	p of Well Ca	sing (TOC)	I Top of Prot	ective Casing	Other:
3. PURGE DATA Purge Method: Sabler, Size: 1.5 a Bladder Pump a 2' Submersible Pump a 4' Submersible Pump Materials: Pump/8016 a Stainless a PVC a Terion of Content My 2 to Materials: Content Model(S) a Proported of Prepared Off-Site a Field Cleaned & Disposable Materials: Content Model(S) a Proported off-Site a Field Cleaned & Disposable Materials: Content Model(S) a Proported off-Site a Field Cleaned & Disposable Materials: Content Model(S) a Proported off-Site a Field Cleaned & Disposable  Was well purged dry? a ves the No Pumping Rate: gol/min 3.  Time Curn. Gallons pH Temp Spec. Bh Dissolved Disposable Cond. Bh Dissolved Turbidity Other: Comments  Grab Sample Dissolved Turbidity Other: Comments  4. SAMPLING DATA Method(s): gradier: size: 1.5 a Bladder Pump a 2' Submersible Pump a 4' Submersible Pump Average received Average	Length o	of Water Colum	nn:	feet	Well Volume	e:	gal · :	Screened Ir	nterval (from G	S):
Purge Method: a Centrifugal Pump a Peristrific Pump a Individual Pump a Cherry and Statiness and Pump a Cherry and Statiness and Proposed Offsite a Statiness and Proposed Offsite and Statiness and Proposed Offsite and Statiness and Proposed Offsite and Statiness and Proposed Offsite and Statiness and Proposed Offsite and Statiness and Proposed Offsite and Statiness and Proposed Offsite and Statiness and Proposed Offsite and Statiness and Proposed Offsite and Statiness and Proposed Offsite and Statiness and Statines							^	Note: 2-inch v	vell = 0.167 gal/ft	4-inch well = 0.667 gal/ft
Materials: Pump/Bailer   Discolated   Prepared Off-Site   Field Cleaned & Disposable   1			o: 1 <b>«</b>	F3 P41 *	D 7. °	# Cba	- Disease - D 45	Culbana	Dumo	
Materials: Pump/Baller a Proc of Tenore of Other Ny 2 La Debatated a Prepared Off-Site a Pield Cleaned & Disposable a Debatated a Prepared Off-Site a Pield Cleaned & Disposable a Debatated a Prepared Off-Site a Pield Cleaned & Disposable a Debatated a Prepared Off-Site a Pield Cleaned & Disposable a Debatated a Prepared Off-Site a Pield Cleaned & Disposable a Debatated a Prepared Off-Site a Dissolved a Disposable a Debatated a Prepared Off-Site a Dissolved a Disposable a Debatated a Debatated a Debat										Equipment Model(s)
Materials: Cope Tubing a Polypropriene a Polypropriene a Control of Site and Cleaned of Debasable 2.  Was well purged dry? a yes to No Pumping Rate: gol/min 3.  Time Curn. Gallons pH Temp Spec. Eh Dissolved Turbidity Other: Comments  Grab Sample Durbidity Other: Comments  Grab Sample Durbidity Other: Comments  4. SAMPLING DATA  Method(s): Baller, Size: Lis a Bladder Pump a 2' Submersible Pump a 4' Submersible Pump A' Submersible Pump Bear of the Pump and t	Materia	s: Pump/Bailer	Stainle	ess DPVC	☐ Teffon®	Other:_	Nylon P	Dienoschia	4	
Was well purged dry? a yes to No Pumping Rate:	i .							~ 1 1 . 1		
Time Cum. Gallons pH Temp Spec. Eh Dissolved Turbidity Other: Comments  Grab Scygen Turbidity Other: Comments  Grab Scygen Turbidity Other: Comments  Grab Scygen Turbidity Other: Comments  Water Diving with Firscets  and water Diving with Firscets  and the ger (Ch) of the second properties of the second properties of the second properties of the distribution of the second properties of the distribution of the second properties of the distribution of the second properties of the distribution of the second properties of the distribution of the second properties of the distribution of the second properties of the distribution of the second properties of the distribution of the second properties of the distribution of the second properties of the distribution of the second properties of the distribution of the second properties of the sec	Materia	is: Rope/Tubing	Dedic	ated Q.P	repared Off-S	Site 🗆 Field	Cleaned X	Disposable	2	
Time Removed pH Temp Cond. Eh Oxygen Turbidity Comments  Grat Sample Water Diving with Insects and water Diving with Insects and water a	Was we	Il purged dry?	☐ Yes	No Mo	Pumpii	ng Rate:	ga	l/min	3	
4. SAMPLING DATA  Method(s): a Peristatite Pump a libertial Lift Pump a Other.  Materials: Pump/Railer a Dedicated a Prepared Off-Site a Field Cledned Disposable  Moterials: Tubing/Railer a Dedicated a Prepared Off-Site a Field Cledned Disposable  Depth to Water at Time of Sampling:  Sample ID: Mw-10 Sample Time: 2/12 # of Containers: 6  Duplicate Sample Collected? a Yes X No ID: M/A  5. COMMENTS TO C - Broken of F will Cup will not seal  Slow Reinauxy (ownplerly des Trained Tensor) of the field Gladaysheet.  Nate: include comments such as well-bondifion. capi, presence of NAPL or other Items not of the field Gladaysheet.  Alkalinity:  Materials: Power of Time of Sample Collected? a Yes X No ID: M/A  Sample ID: Mw-10 Sample Time: 2/12 # of Containers: 6  Slow Reinauxy (ownplerly des Trained Tensor) of the field Gladaysheet.  Nate: include comments such as well-bondifion. capi, presence of NAPL or other Items not of the field Gladaysheet.	Time		На	Temp		Eh		Turbidity	Other:	Comments
4. SAMPLING DATA  Method(s): Peristatile Pump   12 Submersible Pump   14 Submersible Pump   15 Stainless   1 Pole   16 Stainle		Removed			Cond.		Oxygen			
4. SAMPLING DATA  Method(s): Peristatile Pump   12 Submersible Pump   14 Submersible Pump   15 Stainless   1 Pole   16 Stainle										
4. SAMPLING DATA  Method(s): Bailer, Size: LS a Bladder Pump a 2° Submersible Pump a 4° Submersible Pump  Method(s): Peristatitic Pump a Inertial Lift Pump a Other:  Materials: Pump/Bailer a Stainless a PVC a Teflorifo of Other: Edget lene  Materials: Tubing/Repe a Polypropylene a Polypropylene a Teflorifo of Other: Mylich  Materials: Tubing/Repe a Polypropylene a Polypropylene a Teflorifo of Other: Mylich  Depth to Water at Time of Sampling: Field Eithered? a Yes X No  Sample ID: Mw-10 Sample Time: 212 # of Containers: 6  Duplicate Sample Collected? a Yes X No ID: M/D  5. COMMENTS TO C - Broken of first a Section of the Polypropylene and the Polypropylene and the Polypropylene a Polypropylene a Tellorifo of Other: Mylich  Section of the Polypropylene a Tellorifo of Other Include comments such as well-condition. odor, presence of NAPL or other Herms not on the Tellorifo daysneet.  Manual Alkalinity: mg/L  Manual Alkalinity: mg/L  Manual Alkalinity: mg/L  Slew Re-Manual And Valent and Tellorifo of the Tellorifo daysneet.  Mote: Include comments such as well-condition. odor, presence of NAPL or other Herms not on the Tellorifo daysneet.					Grab	San	ple			with Finerts
4. SAMPLING DATA  Method(s):   Peristatic Pump   Dedicate   Dedicated   Proposed Off-Site   Pield Cleaned   Disposable    Materials: Pump/Nailer   Dedicated   Proposed Off-Site   Pield Cleaned   Disposable    Materials: Tubing/Repe   Dedicated   Prepared Off-Site   Pield Cleaned   Disposable    Moterials: Tubing/Repe   Dedicated   Prepared Off-Site   Pield Cleaned   Disposable    Depth to Water at Time of Sampling:   Field Filtered?   Yes   No    Sample ID:   Mw-10   Sample Time:   2/1/2   # of Containers:   Mylicate   Militate:   mg/L    Duplicate Sample Collected?   Yes   X No   ID:   M/h    5. COMMENTS   C - Broken of f   Well Cap   Will not seed    Sectemical Analyses    Ferrous Iron:   mg/L    Nitrate:   mg/L    Nitrate:   mg/L    Alkalinity:   mg/L    Suffate:   mg/L    Alkalinity:   mg/L    Size   Research										and vegetative
Method(s): Destroy Des				<del> </del>		<u> </u>	<del>                                     </del>			Matter
Method(s): Destroy Des	ļ			-	<u> </u>					
Method(s): Destroy Des						<u></u>				
Materials: Pump/Eailer   Stainless   PVC   Teflon® of Other: Dolycette ene   Do: mg/L    Materials: Tubing/Red   Propagated Off-Site   Field Cledned   Disposable   Do: mg/L    Materials: Tubing/Red   Polycethylene   Polypropylene   Teflon® of Other: My   2h    Depth to Water at Time of Sampling: Field Filtered?   Yes   No   Sulfate: mg/L    Sample ID: Mw-IV   Sample Time:   Z   12	4. SAM	PLING DAT	ΓΑ	·····					Geo	chemical Analyses
Materials: Pump/Eailer   Stainless   PVC   Teflon® of Other: Dolycette ene   Do: mg/L    Materials: Tubing/Red   Propagated Off-Site   Field Cledned   Disposable   Do: mg/L    Materials: Tubing/Red   Polycethylene   Polypropylene   Teflon® of Other: My   2h    Depth to Water at Time of Sampling: Field Filtered?   Yes   No   Sulfate: mg/L    Sample ID: Mw-IV   Sample Time:   Z   12	Method	d(s): SZBailer, Siz	re: 1.5 (	3 Bladder F	Pump 🗆 2" Si	ubmersible P	ump 🗅 4* Su	bmersible Pur	mp Ferr	ous kon: ma/l
Materials: Full projected Declicated Prepared Off-Site Declicated Disposable  Materials: Tubing/Rope Declicated Declipropylene Declipropylene Disposable  Materials: Tubing/Rope Declipropylene Declipropylene Disposable  Depth to Water at Time of Sampling: Field Filtered? Disposable  Depth to Water at Time of Sampling: Field Filtered? Disposable  Sample ID: Mw-10 Sample Time: 2/12 # of Containers: Declipropylene Disposable  Makalinity: mg/L  Duplicate Sample Collected? Disposable  Manuacy Outpleting Declipropylene Disposable  Nitrate: mg/L  Alkalinity: mg/L  Duplicate Sample Collected? Disposable  Nitrate: mg/L  Alkalinity: mg/L  Manuacy Outpleting Des Troped Declipropylene Disposable  Nitrate: mg/L  Alkalinity: mg/L  Note: Include comments such as well-condition. odor, presence of NAPL or other items not on the field datassneet.  Note: Include comments such as well-condition. odor, presence of NAPL or other items not on the field datassneet.	1	,	~ ~ ~ ~ ~		•					703 #OFF.
Depth to Water at Time of Sampling:  Depth to Water at Time of Sampling:  Sample ID: Mw-IV Sample Time: 2/12 # of Containers: 6  Duplicate Sample Collected? 1 Yes X No ID: M/A  S. COMMENTS TO C - Broken of f, well cap will not secil well. Mannay (our letty destroyed include comments such as well-condition, odor, presence of NAPL, or other items not on the field dataspeet.  Nate: Include comments such as well-condition, odor, presence of NAPL, or other items not on the field dataspeet.	Materia	als: Pump/Raile	Dedi 🖆	cated 🗅 P	repared Off-S	Site Q Field	Cledned 🕽	Disposable		mg/L
Sample ID: Mw-ID Sample Time: 2/12 # of Containers: 6  Duplicate Sample Collected? a Yes X No ID: N/A  5. COMMENTS TO C - Broken of P; well cap will not seal well. Manuary completly destroyed needs replacing.  Slew Reinard Reinard Note: Include comments such as well-condition, odor, presence of NAPL or other items not on the field datasseet.	Materia	als: Tubing/R	Polye Dedi	ethylene cated 🗅	<ul><li>Polypropyle</li><li>Prepared Off</li></ul>	ene 🚨 Teflo f-Site 🚨 Field	on® <b>%</b> Other: d Cleaned	Ny 10 ■ Disposable	h_ Nitro	ate:mg/L
Duplicate Sample Collected? a Yes X No ID: N/A  5. COMMENTS TO C - Broken off; well cap will not seal well. Mannay completly destroyed needs replacing.  Slew Recharge Note: Include comments such as well-condition, odor, presence of NAPL or other items not on the field at a sheet.	Depth	to Water at Tin	ne of Sar	npling:	<del></del>	Field Filte	red? 🗆 Yes	X No ∫	Sulfo	ate:mg/L
5. COMMENTS TO C-Broken off! well cap will not seal well. Manuary completly destroyed needs replacing.  Slew Reinard Research of NAPL or other items not on the field addressment.	Sample	> ID: _ MW -	10	Sample	Time: 2	12	# of Conto	ainers: $6$	ΔΙΙνο	niinity: / ma/l
well. Manuay completly destroyed ineeds replacing.  Slow Recharge  Note: Include comments such as well-condition, odor, presence of NAPL or other items not on the field advance.	Duplice	ate Sample Co	ollected?	u Yes	( No ID:_	N/B	_		∆IKC.	
well. Manuay completly destroyed needs replacing.  Slow Recharge  Note: Include comments such as well-condition, odor, presence of NAPL or other items not on the field ataisneet.	5 00	AMENTS	7.4	ر بـ ال	1	C0 ·	1 . 11	/	19.1	
Slew Reinava & Note: Include comments such as well-condition, odor, presence of NAPL or other items not on the field advance.	0.001	11 14	10		, ,	775	10811	cap	1	101 Sec.
Note: Include comments such as well-condition, odor, presence of NAPL or other items not on the field datasneet.	we	n Ma	macy		omplett.	1 95	es Troy e	'd - 17	leeds re	placing.
Like hull	Note: Inclui	de comments su			odor, presen	ce of NAPL	or other items	not on the fie	datasneet.	, /
Lite Multi-								,		(11)
FORM GW-2 (Rev 6/8/99 - wah) Signature	FORM CIA	/-2 (Rev 6/8/00)	· wah)					Signature	ce 2/2	~ H

### BROWN AND CALDWELL

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MINIMA

4 556	FOT INFO		1011	<del></del>					
	ECT INFO	•	_	ai i		ς.	المندين		1677 8
	umber:/\(\frac{1}{2}\) \(\frac{1}{3}\)		Task Numi	ber: 0 6		Date: 5			Time: 15:23
	BJSVC	<i>5</i>				_	DEAN (		· · · · · · · · · · · · · · · · · · ·
Project L	ocation:	كارادا			<del></del>	Weather: _ك	unny	milyd	
2. WELL	. DATA								
Casing D	iameter:	inch	es	Type: 🗖 🙉	/C 🗘 Stainle	ss 🖸 Galv. S	teel 🗅 Teflon®	Other:	
Screen D	iameter:	inch	ies	Type: ぱ(₽\	/C 🗆 Stainle	ss 🖸 Gaiv. S	teel 🛮 Teflon®	○ □ Other:	
Total Dep	oth of Well:	<u>'                                    </u>	t	From: 🗖 T	op of Well Casi	ng (TOC)	Top of Protec	tive Casing 🔲 C	Other:
Depth to	Static Water:	0.696	eet	From: ⊈ ⊤	op of Well Casi	ng (TOC)	Top of Protec		Other:
	Product:	feet		From: 🗆 T	op of Well Casi	ing (TOC)	☐ Tap of Protec		Other:
Length of	f Water Column:	7-61	feet	Well Volume	2-4	gal	Screened Inte	erval (from GS):	
							Note: 2-inc	ch well = 0.167 gal	ft 4-inch well = 0.667 gal/ft
3. PURG	SE DATA		·P						
Purge Me					" Submersible f nertial Lift Pumi		Submersible Pun	np 	Equipment Model(s)
Materials	: Pump/Bailer	Stainle	ess DPVC	Teflon®	Other:	ned 🔾 Dispo	osable	1 1/3/	I-619
Materials	: Rope/Tubing	Polyet	hylene 🗀 l	Polypropylene	☐ Teflon®	☐ Other:			
			_	•	☐ Field Clea			2. <u>XX</u>	10-r-pis
Was well	purged dry?	☐ Yes	⅓ No	Pumpir	ng Rate:	gal.	/min	3.	
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
15:35	7-1	7-14	23.71	4117	.77./	2.81	6112		chily
15:42	つじ	7-11	23.37	39,44	-85.5	1-74			cles -
15:45	100	7-12	23-24	3812	-117-1	1.52	39		4
									•
									·
4 SAME	PLING DAT	ΓA	<u> </u>	<u> </u>	<del></del>			Genci	hemical Analyses
Method(s	□ Bailer Si		<b>a</b> Bladder Pu	ımp □ 2" Sul	bmersible Pum	p 🖫 4" Subn	nersible Pump		C. u
weinod(:	" □ Peristaltio			ump 🖸 Other:		<del></del>		Ferro	us tron: mg/L
Materials	: Pump/Bailer	☐ Dedic		pared Off-Site			osable	DO:	mg/L
Materials	: Tubing/Rope	OXPolye Ø Dedic	thylene 🗅 ated 🖵 Pre	Polypropylene epared Off-Site	☐ Teflon® ☐ Field Cle	□ Other: aned □ Dis	posable	Nitrate	e: mg/L
Depth to	Water at Time	of Samplin	g: 6/.12	1	Field Filtere	d? □ Yes	16 No	Sulfat	e:mg/L
	0: MW-11	Á.	Sample Ti	/ ( ' )	13	# of Contain	ners:	Guilat	
Duplicate	e Sample Collec	ted?	🛕 Yes 🗅	No ID:	Diflice	re .	t 5	Alkalii	nity: 775 mg/L
5. COMI	MENTS	neu	~/\~ \	ه کسان م	2d.4	13~,	= uphl	sell in	Black
			ن <del></del> -	·		-		· · · · · · · · · · · · · · · · · · ·	- <i>O</i>
Note: Include	comments such as	s well condit	ion, odor, pre	esence of NAPL	or other items	s not on the fiel	d data sheet.	-	

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

Signature



#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-12

1. PROJECT INFORMATION	1				
Project Number: 12532 Task Numb	er: <u>316</u>	Date: 9	12.01		Time: 15:55
Client:		Personnel:			
Project Location:		Weather:			
2. WELL DATA					
Casing Diameter: inches	Type: □/PVC □ Stainle	ss 🗆 Galv. St	eel 🛚 Teflon®		
	Type: ZPVC D Stainle				
Total Depth of Well:	From: 🗖 Top of Well Casi	ng (TOC)	Top of Protecti	ve Casing 🔲 🔾	ther:
Septi to otatio Trater.	From: 🖂 Top of Well Casi			ve Casing 🔲 🔾	ther:
Depth to Product:feet	From: ☐ Top of Well Case	ing (TOC)	Top of Protect	ive Casing 🔲 🔾	ther:
Length of Water Column: feet	Well Volume:	gal		rval (from GS):_ h well = 0.167 gal/l	
3. PURGE DATA					
Bailer, Size: Bladde				р	
— Gentriugal Fump G Fensiali	•			<del>_</del>	Equipment Model(s)
Materials: Pump/Bailer	ared Off-Site 🔲 Field Clear	ned 🗆 Dispo	sable	1	
	Polypropylene		osable	2.	
Was well purged dry? 🗀 Yes 🗀 No	Pumping Rate:	gal/	min		
Time Cum. Gallons	Spec	Dissolved		3. Other:	Comments
Time Removed pH Temp	Cond. ORP	Oxygen	Turbidity	······································	Comments
					****
		<u>                                     </u>	:		
4. SAMPLING DATA				Geoct	nemical Analyses
Method(s): ☐ Bailer, Size: ☐ Bladder Pu ☐ Peristaltic Pump ☐ Inertial Lift Pu			nersible Pump	Ferrou	ıs Iron: mg/L
Materials: Pump/Bailer ☐ Stainless ☐ PVC	☐ Teflon® ☐ Other:		<del></del>	DO:	ma/L
Dedicated U Prep	ared Off-Site	·	sable		
	pared Off-Site	aned 🖸 Disp	oosable	Nitrate	e:mg/L
Depth to Water at Time of Sampling;		d? ☐ Yes		Sulfate	e: mg/L
Sample ID: Sample Til			ers:	Alkalir	nity: mg/L
	No ID:				
5. COMMENTS MILL NOT COLLECT GYES SUPPLE NO	su-pled due	to Lich	f wa	ror ATT	re-gild to
Collect gras surfle ~	けんしん、ほか、	Mar	14.4	t 17/00.	
Note: Include comments such as well condition, odor, pre	sence of NAPL or other item	s not on the field	d data sheet		-
1			7	_	

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Signature

## AN INTEGRAL PART OF BROWN AND

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELLID: MW-12D

CALDWE	L L									
1. PROJE	CT INFOR	MATIC	N			a i	1.			
Project N	lumber: 1283	32_ T	ask Numb	per: <u>01</u> b	[	Date: 1/18	/01		ime: 2014	
Cllent:	BJ Jen	الكي			_	Personnel:	Teague;	Marth		
Project L	ocation: 170	bbs			\	Weather:U	carm;	Dark - No	ime: 2024	
2. WELL	DATA									
Casing D	Diameter:	Zinch	es	Type: Pvo	C 🖸 Stainles	ss 🖸 Galv. Ste	eel 🗆 Teflon	19 🖸 Other:		
Screen E	Dlameter:	inch	es	Type: Out	C Q Stainle:	ss 🛚 Galv. St	eel Q Teflork	B Other:		
Total De	pth of Well:	fee	et I	From: 🗖 Top	p of Well Cas	sing (TOC)	Top of Prote	ective Casing C	Offiner:	
	Static Water:	3		From: 10	p of Well Cas	sing (TOC)	Top of Prote	ective Casing C	3 Other:	
Depth to	Product: <i>N</i>	/kfeei		From: 🗅 To	p of Well Ca	sing (TOC)	Top of Prot	ective Casing (	□ Other:	
Length o	of Water Colun	nn:	feet	Well Volume	ə: <del></del> _			iterval (from G vell = 0.167 gal/ft	,	
3 DUDC	E DATA					· ·	S.C. Z II OI W		weil = 0.007 galy/if	
	ethod: Centr	Size: 1.5	D Bladde	er Pump 🛚 2'	* Submersible	Pump 🗆 4*	Submersible i	Pump	•	
Purge M	etnod: 🖸 Centr			taitic Pump C : 🗅 Teflon®					Equipment Model(s)	
Material	s: Pump/Baile	☐ Dedica	ated D Pre	epared Off-Sit	e Offield C	leanéd .	sposable	1		
Materia	ls: Rope/Tubing	D Polyeti	nylene 🗅 ated 🗅 P	Polypropyler repared Off-S	ne 🖸 Teflond Site 🕮 Fleld	® AQ Other: <u>A</u> Cleaned 5 <b>)</b>	Disposable			
Was we	Il purged dry?	C) Yes	No No	Pumpli	ng Rate:	go	l/min	3.		
Time	Cum. Gallons		· · · · · · · · · · · · · · · · · · ·	Spec.	Fh	Dissolved	Turbictity	Other:	Comments	
11110	Time Removed pH Temp Cond. Eh Oxygen Turbidity Comments									
							-			
		Gra	<u> </u>	mile						
				,						
4 641 2		Γ Δ		<u> </u>			<u> </u>			
	PLING DA		3 Bladder E	Pump D 2* %	ibmersible Pi	ump D 4* Su	hmersihle Pur	•	chemical Analyses	
	d(s): 💢 Bailer, Sla D Peristalti							Ferro	ous Iron:mg/L	
Materio	als: Pump/Baile	🕽 🗅 Staini 🗅 Dedic	ess 🗅 PV cated 🖸 P	C 🚨 Teflon repared Off-S	® <b>№</b> Other: Site <b>№</b> Field	Polyerha Cleaned M	Disposable	DO:	mg/L	
	als: Tubing/Rop							Nitro	ate: mg/L	
1	to Water at Tin							Sulfo	ate:mg/L	
	= 10: MW 121			Time: 2c				— Alle		
Duplic	ate Sample Co	ollected?	□ Yes 🎘	No ID:_		_		AIRC	diinity:mg/L	
5. CON	MENTS	5000		n cove	v A	د ده استوس	ن لده		Saule a S	
		0016	<u> </u>	<u> </u>	1-2	2 LAYPH	<del>'tC \</del>	needs r	thereing.	
							· · · · · · · · · · · · · · · · · · ·			
Note: Inclu	de comments su	ch as well	condition,	cdor, presen	ce of NAPL o	or other items	not on the tig	ld data sheet.		
							$-\sqrt{y}$	1		

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



#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-13

1. PROJ	ECT INFO	RMAT	ION				,		
Project N	umber: iみら	37	Task Numb	oer: 016		Date: 13	.5.01		Time: 14:45
Client:	BJSV	خ)				Personnel:_	DGAN C	1414	
Project Lo	ocation: Ho	درار				Weather: 5	sunnyl	10T	·····
2. WELL									
Casing D	<u></u>	inch	es	Type: 🗹 P\	 /C □ Stainle	ess 🗓 Galv. S	Steel 🗆 Teflon®	Other:	······································
Screen D	<u> </u>	inch					Steel 🗆 Teflon®		
	oth of Well: 65								Other:
	Static Water:								Other:
		feet						tive Casing 🔲 (	
	Water Column	5.17	feet	Well Volume	2.4	gal	Screened Inte	erval (from GS):	
					•		Note: 2-inc	ch well = 0.167 gal	Vft 4-inch well = 0.667 gal/ft
3. PURC	SE DATA		х			_			
Purge Me							Submersible Pun		Equipment Model(s)
Materials	: Pump/Bailer	<b>⊈</b> Stainle	ess □ PVC	☐ Teflon®	D Cther:_	ined 🖸 Disp	manhlo		5I-610D
	•	Polye	thylene 🗆 I	Palypropylene	☐ Teflon®	Other:			
Materials	: Rope/Tubing	2 Dedic	ated □ Pre	pared Off-Site	☐ Field Cle	aned 🗆 Dis	posable	2. 4 L L	2.mp15
Was well	purged dry?	C) Yes	<b>∕</b> №	Pumpir	ng Rate:	ga	l/min	3.	
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
14:55	J 1	74)	24.11	3711	147	3.85	1160		Coto Closely
ند:'۱۶	2.5	7-41	23.58	3428	138	2.11	-		cloudy
1542	1.3	7.38	23.37	27/0	114	1-46	えり		cla-
15:15	1.5	7-37	23.24	2418	97	<b>3.7</b> 5	60	· <del></del>	6
		<u> </u>	<u>i</u>	!		<u> </u>	1		
			1						
4. SAMF	PLING DAT		u.					Geog	chemical Analyses
Method(s				ump 🔲 2" Su ump 🖵 Other:		np 🖸 4" Sub	mersible Pump	Ferro	ous tron: mg/L
Materials	s; Pump/Bailer		ess DPV0		DOther:_			DO:	/\ mg/L
	v Tubiac/Dese	3.7		pared Off-Site Polypropylene	•		oosable		
l	s: Tubing/Rope	Ø Dedic	ated 🗅 Pro	epared Off-Site	Field Cl	eaned 🗆 Dis	sposable	Nitra	te: mg/L
	Water at Time	of Samplir		151	Field Filter	ed? ☐ Yes	5	Sulfa	ite:mg/L
j	10:14 W -13	1	Sample T			# of Contai	ners:	Alkai	inity: ユユン mg/L
Duplicate	e Sample Collec	cted?	ପ Yes ଆରି	No ID:		_			
5. COM	MENTS	WCI	L , C	50-2	Cod.	ナルーノイ	inf file	KI RAL	LACE
Alexander de la company				annai sanda		an ant 4: 5	del data at	- ~	
Note: Include	comments such a	s well condi	tion, odor, pre	esence of NAP	L. or other iten	ns not on the lie	au data sheet.		

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

Signatur

## BROWN AND CALDWELLL

#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELLID: Mhorly

A DECLECTINE COMMITTON				·	·····
1. PROJECT INFORMATION	216		10.61		1117
Project Number: 12832 Task Nur	nber:	Date:	1.10.01 DEAN, C	<del></del>	Time: 12.725
Client: 5750 Cd					·····
Project Location: HJJL		Weather:	sinny, b	ا د	· · · · · · · · · · · · · · · · · · ·
2. WELL DATA					
Casing Diameter: inches	Type: □PVC □ Stainle.	ss 🗓 Gaiv. S	teel 🗆 Teflon®	Other:	
Screen Diameter: inches	Type: Ø PVC ☐ Stainle	ss 🖫 Galv. S	teel 🖵 Teflon®	0	
Total Depth of Well: 67-2 feet	From: Top of Well Casi				Other:
Depth to Static Water: 62.71 feet	From: 🗹 Top of Well Casi				Other:
Depth to Product:feet	From: 🖸 Top of Well Casi				Other:
Length of Water Column: feet	Well Volume:			erval (from GS):	
		~		h well = 0.167 gal	
3. PURGE DATA					
Purge Method: Contributed Rume Resistant	der Pump 🔲 2" Submersible F	oump 🖸 4" S	Submersible Pun	np	
Centilityal Fully Great					Equipment Model(s)
Materials: Pump/Baller Dedicated Deri	epared Off-Site	ned 🔾 Dispo		1 461	) mg-13
Materials: Rope/Tubing	Polypropylene ☐ Teflon® ( repared Off-Site ☐ Field Clea	Other: aned Disp	nosable	2 1/5	I-610D
Was well purged dry?	Pumping Rate:			2. <del>- y 3</del>	<del>2</del> 31-12
			/min	3.	
Time Cum. Gallons pH Temp	Spec. ORP	Dissolved Oxygen	Turbidity	Other:	Comments
17:35 0.1 6 98 23:51	1211 1-13-3	1.77		<del> </del>	CLAZV
12:40 05 6.56 23.48	14/7 140.3	1.14			
12:45 1.0 6:35 23.40	1428 1381	2, 8 3	27		cl
		<u> </u>			
4. SAMPLING DATA				Geoc	hemical Analyses
	Pump 🔲 2" Submersible Pum	p 🗆 4" Subn	nersible Pump	Farro	us Iron: 1.5 mg/L
Metariolos Pump (Roiles Distainless DP)				1 6110	13 . 3
Dedicated D Pr	epared Off-Site 🗆 🛱 Field Clea		osable	DO:	mg/L
Materials: Tubing/Rope   ☐Polyethylene ☐ ☐Dedicated ☐ F	☐ Polypropylene ☐ Teflon® repared Off-Site ☐ Field Cle		posaple	Nitrat	يــــ e: mg/L
Depth to Water at Time of Sampling: 62-	7) Field Filtere		No,		٠
Sample ID: 12674 Sample	7) 114	# of Contain	ners:	Sulfat	ie: mg/L
Duplicate Sample Collected?	,	-		Alkali	nity: <u>779</u> mg/L
5. COMMENTS well in	C > 1 C > =	114.34	<u> </u>	·	
10.5ac.11-	-2000	4.1.	<b>, ,</b>		<del>-</del>
	• •	==+			· · · · ·
Note: Include comments such as well condition, odor, p	resence of NAPL, or other item.	s not on the fiel	ld data sheet.		-
			1 -		

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#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-15

4 DDO JECT INFORMATION					
1. PROJECT INFORMATION	n //	Date:	12-3		nree
Project Number: 12 & 32 Task Number: BJ5vC3	mber: 0 / 6	Date:	DEAN (		Time: 17. 7. 5. 5
Project Location: 4 35,65		Personnel:_	vany, l	-X	
		vveatner:	ار پدست	101	
2. WELL DATA					
Casing Diameter: inches	Type: TPVC Stainle	ess 🗆 Galv. S	teel 🗆 Teflon®	Other:	
Screen Diameter: inches	Type: ☐ PVC ☐ Stainle	ess 🖸 Galv. S	teel 🗆 Teflon®	Other:	
Total Depth of Well:	From: Top of Well Cas				Other:
Depth to Static Water 2/ - 2 feet	From: Top of Well Cas	ing (TOC)	Top of Protect	ive Casing 🔲	Other:
Depth to Product:feet	From:	sing (TOC)	Top of Protect	tive Casing 🔲	Other:
Length of Water Column: feet	Well Volume:	gal		erval (from GS)	
			Note: 2-inc	h well = 0.167 ga	l/ft 4-inch well = 0.667 gal/ft
3. PURGE DATA					
Purge Method:     Bailer, Size:	lder Pump □ 2" Submersible taltic Pump □ Inertial Lift Pum	Pump □ 4" 8 ip □ Other:	Submersible Pur	np 	Equipment Model(s)
Materials: Pump/Bailer Stainless DP	/C 🗖 Teflon® 📮 Other:			(D.	•
Dedicated U.Pr	epared Off-Site		osable		D-1-p13
Malerials. Noperrubing Dedicated D F	Prepared Off-Site 🚨 Field Cle	aned 🗆 Disp		2. <u>YS</u>	IT-6100
Was well purged dry? 🔲 Yes 🖒 No	Pumping Rate: 3	· \ gal	/min	3.	
Time Cum. Gallons pH Temp	Spec. ORP	Dissolved Oxygen	Turbidity	Other:	Comments
13:05 01 6.91 2091	1377 161.4	1.47			C6-2
13:10 0.5 6.50 21.11	1383 163.3	0.58	38		
13:15 1.0 689 21.13	1394 163.5	3.75	34		<- le-
		İ			
		<u>.                                    </u>			1
4. SAMPLING DATA				Geor	chemical Analyses
□ Bailer Size: Ø Bladder	Pump 🔲 2" Submersible Pum	np 🖸 4" Subn	nersible Pump	<u>ocar</u>	cnemical Analyses
Method(s): Peristaltic Pump Inertial Lift				Ferro	ous Iron:mg/L
Materials: Pump/Bailer	epared Off-Site		osable	DO:	/\3mg/L
Materials: Tubing/Rope Dolyethylene (	☐ Polypropylene ☐ Teflon® Prepared Off-Site ☐ Field Cle		posable	Nitra	te:mg/L
'a	71.7	ed? 🗆 Yes	· A		-
Sample ID: 1/2 Sample	17 · 10	# of Contain	1	Sulfa	ite: mg/L
·	Z No ID:	,, or contain	<u>/</u>	Alkal	linity: ファッ mg/L
5. COMMENTS WILL I	sold col	うっく、オー			
Note: Include comments such as well condition, odor, p	presence of NAPI or other from	is not on the field	d data shaar		•
			a sala siresi.		

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

#### APPENDIX B

Laboratory Analytical Reports for Groundwater Samples



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

#### Brown & Caldwell

## Certificate of Analysis Number: 01090631

Report To:

Brown & Caldwell
Rick Rexroad
1415 Louisiana
Suite 2509
Houston
TX
77002ph: (713) 759-0999

fax: (713) 308-3886

Project Name: BJ Hobbs
Site: Hobbs, NM

Site Address:

PO Number:

State: New

New Mexico

State Cert. No.:

Date Reported: 10/5

10/5/01

This Report Contains A Total Of 13 Pages

**Excluding This Page** 

And

Chain Of Custody



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

## Case Narrative for: Brown & Caldwell

## Certificate of Analysis Number: 01090631

Report To: BJ Hobbs Project Name: Hobbs, NM Site: Brown & Caldwell Rick Rexroad Site Address: 1415 Louisiana Suite 2509 PO Number: Houston State: **New Mexico** ΤX 77002-State Cert. No.: ph: (713) 759-0999 fax: (713) 308-3886 10/5/01 **Date Reported:** 

Matrix spike (MS) and matrix spike duplicate (MSD) samples are chosen and tested at random from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. Since the MS and MSD are chosen at random from an analytical batch, the sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The Laboratory Control Sample (LCS) and the Method Blank (MB) are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

Any other 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.

Sonallust onia West

10/5/01

Date

Senior Project Manager



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

#### **Brown & Caldwell**

#### Certificate of Analysis Number:

#### 01090631

Report To:

Brown & Caldwell

Rick Rexroad

1415 Louisiana

Suite 2509

Houston

ΤX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

Fax To: Brown & Caldwell

Rick Rexroad

fax: (713) 308-3886

Project Name:

**BJ Hobbs** 

Site:

Hobbs, NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported:

10/5/01

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COCID	HOLD
MW-10	01090631-01	Water	9/18/01 9:12:00 PM	9/20/01 9:30:00 AM	103416	
MW-12D	01090631-02	Water	9/18/01 8:47:00 PM	9/20/01 9:30:00 AM	103416	

Senior Project Manager

10/5/01

Date

Joel Grice Laboratory Director

Ted Yen Quality Assurance Officer



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

Client Sample ID MW-10 Collected: 9/18/01 9:12:00 SPL Sample ID: 01090631-01

Site: Hobbs, NM

	Otto: 110550, 1111								
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #	
GASOLINE RANGE ORGANICS		,		MCL	SW8015B	Units: m	g/L		
Gasoline Range Organics	ND		0.1		1	09/24/01 22:23	DL	840474	
Surr: 1,4-Difluorobenzene	99.3	%	74-121		1	09/24/01 22:23	DL	840474	
Surr: 4-Bromofluorobenzene	107	%	55-150		1	09/24/01 22:23	DL.	840474	
PURGEABLE AROMATICS				MCL	SW8021B	Units: uç	g/L		
Benzene	2		1		1	09/24/01 22:23	DL	840423	
Ethylbenzene	ND		1		1	09/24/01 22:23	DL.	840423	
Toluene	ND		1		1	09/24/01 22:23	DL	840423	
Xylenes, Total	ND		1		1	09/24/01 22:23	DL.	840423	
Total BTEX	2		1		1	09/24/01 22:23	DL	840423	
Surr: 4-Bromofluorobenzene	110	%	48-156		1	09/24/01 22:23	DL	840423	
Surr: 1,4-Difluorobenzene	104	%	72-137		1	09/24/01 22:23	DL	840423	

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

10/5/01 4:50:27 PM



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

Client Sample ID MW-12D Collected: 9/18/01 8:47:00 SPL Sample ID: 01090631-02

				Site	: Hoi	bbs, NM				
Analyses/Method	Res	ult		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL					MCL	E	325.3	Units: m	g/L	
Chloride	7	8.8		4		2		09/24/01 15:30	CV	839907
DIESEL RANGE ORGA	ANICS				MCL	SW8	015B	Units: m	g/L	
Diesel Range Organics		ND		0.2		1		10/02/01 9:21	AM	848222
Surr: n-Pentacosane	6	8.4	%	18-120		11		10/02/01 9:21	AM	848222
Prep Method	Prep Date			Prep Initials						
SW3510B	09/21/2001 7:45			KL						
GASOLINE RANGE OF	RGANICS				MCL	SW8	015B	Units: m	g/L	
Gasoline Range Organic	cs	ND		0.1		1		09/24/01 22:47	DL.	840475
Surr: 1,4-Difluorobenz	zene 9	8.3	%	74-121		1		09/24/01 22:47	DL	840475
Surr: 4-Bromofluorobe	enzene 9	9.3	%	55-150		1		09/24/01 22:47	DL	840475
HEADSPACE GAS AN	ALYSIS				MCL	RS	K147	Units: m	g/L	
Ethane		ND		0.0025		1		10/05/01 10:57	ER	852704
Ethylene		ND		0.0032		1		10/05/01 10:57	ER	852704
Methane		ND		0.0012		1		10/05/01 10:57	ER	852704
PURGEABLE AROMA	TICS				MCL	SW8	021B	Units: ug	1/L	
Benzene		ND		1		1		09/24/01 22:47	DL	840424
Ethylbenzene		ND		1		1		09/24/01 22:47	DL	840424
Toluene	1	ND		1		1		09/24/01 22:47	DL	840424
Xylenes,Total	1	ND		1		1		09/24/01 22:47	DL	840424
Total BTEX	ı	ND		1		1		09/24/01 22:47	DL.	840424
Surr: 4-Bromofluorobe	enzene 1	08	%	48-156		1		09/24/01 22:47	DL	840424
Surr: 1,4-Difluorobenz	zene 1	06	%	72-137		1		09/24/01 22:47	DL	840424
SULFATE					MCL		E300	Units: m	g/L	
Sulfate	1	90		5		25		09/21/01 12:09	SN	847121

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

## Quality Control Documentation



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

#### Brown & Caldwell

BJ Hobbs

Analysis:

Diesel Range Organics

Method:

RunID:

SW8015B

01090631

WorkOrder: Lab Batch ID:

14972b

Method Blank

wethod Blan

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

09/27/2001 17:35

HP\_V\_010927E-848220

Analyst: AM

Units:

01090631-02D

MW-12D

Preparation Date:

09/21/2001 7:45

Prep By:

Method

 Analyte
 Result
 Rep Limit

 Diesel Range Organics
 ND
 0.20

 Surr. n-Pentacosane
 90.8
 18-120

#### Laboratory Control Sample (LCS)

RunID:

Analysis Date:

HP\_V\_010927E-848221

Units:

mg/L

09/27/2001 18:13 .

Analyst: AM

1.4 - 1/4 - -

Preparation Date: 09/21/2001 7:45

Prep By:

Method

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	2	81	21	175

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

Sample Spiked:

01090673-03

Preparation Date: 09/21/2001 7:45

RuniD:

HP\_V\_010927E-848224

Units: mg/L

Analysis Date:

09/30/2001 0:28

Analyst: 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	5	4.1	81.1	5	4.1	81.3	0.246	39	13	130

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

10/5/01 4:50:34 PM



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

#### Brown & Caldwell

BJ Hobbs

Analysis:

Headspace Gas Analysis

Method:

**RSK147** 

WorkOrder:

01090631

Lab Batch ID:

R44808

Method Blank

Samples in Analytical Batch:

RunID:

VARC\_011005A-852703

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

10/05/2001 10:33

ER Analyst:

01090631-02C

MW-12D

Anal	yte	Result	Rep Limit
Ethane		N	0.0025
Ethylene		NE NE	0.0032
Methane		NO	0.0012

#### Sample Duplicate

Original Sample: RunID:

01090631-02

VARC\_011005A-852704

Units:

mg/L

Analysis Date:

10/05/2001 10:57

Analyst: ER

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Butane	ND	ND	0	50
Ethane	ND	ND	0	50
Ethylene	DN	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 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.



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

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

Analysis:

**Purgeable Aromatics** 

Method:

RunID:

Analysis Date:

09/24/2001 11:10

SW8021B

WorkOrder:

01090631

Lab Batch ID:

R44004

Method Blank

VARE\_010924A-839392 Units:

ug/L DL

Analyst:

Lab Sample ID 01090631-01A

Samples in Analytical Batch:

Client Sample ID

01090631-02A

MW-10 MW-12D

Analyte	Result	Rep Limit
Benzene	ND	1.0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
Total BTEX	ND	1.0
Xylenes, Total	ND	1.0
Surr: 1,4-Difluorobenzene	104.2	72-137
Surr: 4-Bromofluorobenzene	109.3	48-156

#### Laboratory Control Sample (LCS)

RuniD:

VARE\_010924A-839391

ug/L

Analysis Date:

09/24/2001 10:21

Analyst: DL

Units:

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	53	106	70	130
Ethylbenzene	50	56	112	70	130
Toluene	50	52	105	70	130
Xylenes,Total	150	164	109	70	130

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

Sample Spiked:

01090580-16

RunID: Analysis Date: VARE\_010924A-840416 09/24/2001 17:28

Units: Analyst:

ug/L DL

Analyte	Sample	MS	MS Result	MS %	MSD	MSD Result	MSD %	RPD	RPD	Low	High
	Result	Spike Added		Recovery	Spike Added		Recovery		Limit	Limit	Limit
		Added			Added						
Benzene	65	20	69	19.8 *	20	70	22.3 *	11.8	21	32	164
Ethylbenzene	8.3	20	27	95.8	20	27	92.8	3.16	19	52	142
Toluene	ND	20	23	114	20	23	114	0.645	20	38	159
Xylenes, Total	4.9	60	67	103	60	65	100	3.27	18	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.



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

#### **Brown & Caldwell**

**BJ** Hobbs

Analysis:

RunID:

Gasoline Range Organics

Method: SW8015B

ם חסטו

Samples in Analytical Batch:

01090631

WorkOrder: Lab Batch ID:

R44057

Method Blank

Units:

Lab Sample ID

Client Sample ID

Analysis Date:

VARE\_010924D-840469 09/24/2001 11:10

Analyst: DL

mg/L

01090631-01A

MW-10

01090631-02A

MW-12D

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	97.7	74-121
Surr: 4-Bromofluorobenzene	104.3	55-150

#### Laboratory Control Sample (LCS)

RunID:

VARE 010924D-840468

Units: mg/L

Analysis Date:

09/24/2001 10:45

Analyst: DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit	
Gasoline Range Organics	1	1.2	119	70	130	

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

Sample Spiked:

01090580-17

Units:

mg/L

RunID: Analysis Date: VARE\_010924D-840471 09/24/2001 18:17

Analyst: DL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit		High Limit
Gasoline Range Organics	1.3	0.9	1.9	59.2	0.9	1.9	60.8	2.59	. 36	36	160

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

10/5/01 4:50:42 PM



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

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

Analysis:

Chloride, Total

Method:

E325.3

WorkOrder:

01090631

Lab Batch ID:

R44037

Method Blank

Samples in Analytical Batch:

RunID:

WET\_010924F-839904

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

09/24/2001 15:30

CV Analyst:

01090631-02B

MW-12D

Analyte	Result	Rep Limit
Chloride	ND	2.0

#### Laboratory Control Sample (LCS)

RunID:

WET\_010924F-839906

Units: mg/L

Analysis Date:

09/24/2001 15:30

Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Chloride	76.2		101	90	110

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

Sample Spiked:

01090631-02

RunID: Analysis Date: WET\_010924F-839908 09/24/2001 15:30

Units:

mg/L 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	79	100	179	99.8	100	179	99.8	0	20	85	115

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference D - Recovery Unreportable due to Dilution

B - Analyte detected in the associated Method Blank 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.



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

#### **Brown & Caldwell**

**BJ Hobbs** 

Analysis:

Sulfate

Method:

E300

פטעטטו נים

WorkOrder:

01090631

Lab Batch ID:

R44443

Method Blank

Samples in Analytical Batch:

RunID:

WET\_010921W-847119

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

09/21/2001 12:09

Analyst: SN

01090631-02B

MW-12D

| Analyte | Result | Rep Limit | Sulfate | ND | 0.20

#### Laboratory Control Sample (LCS)

RunID:

WET\_010921W-847120

Units: mg/L

Analysis Date:

09/21/2001 12:09

Analyst: SN

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:

01090631-02

RunID:

WET\_010921W-847122

Units:

mg/L

Analysis Date:

09/21/2001 12:09

Analyst: SN

Analyte Sample MS MS Result MS % MSD MSD Result MSD % RPD RPD Low High Recovery Recovery Result Spike Spike Limit Limit Limit Added Added Sulfate 190 250 450 106 250 460 108 2.17 20 80 120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference 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.

10/5/01 4:50:48 <sup>9</sup>M

# Sample Receipt Checklist And Chain of Custody



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

#### Sample Receipt Checklist

	····						 
Workorder		01090631		Receive	ed By: N	IB	
Date and 1	ime Received:	9/20/01 9:30:00 AM		Carrier	name: F	edEx	
Temperatu	re:	3		Chilled 1	by: V	later Ice	!
1. Shippi	ng container/c	ooler in good condition?	Yes 🗹	No 🗌	Not Present	t 🗍	
2. Custo	dy seals intact	on shippping container/cooler?	Yes 🗌	No 🗌	Not Present	<b>y</b>	
3. Custo	dy seals intact	on sample bottles?	Yes 🗌	No 🗌	Not Present	<b>V</b>	r
4. Chain	of custody pre	sent?	Yes 🗹	No 🗌			
5. Chain	of custody sig	ned when relinquished and received?	Yes 🗹	No 🗌			
6. Chain	of custody agr	ees with sample labels?	Yes 🗸	No 🗌			
7. Sampl	es in proper co	ontainer/bottle?	Yes 🗹	No 🗌			
8. Sampl	e containers in	tact?	Yes 🗹	No 🗌			
9. Suffici	ent sample vol	ume for indicated test?	Yes 🗹	No 🗌			
10. All san	nples received	within holding time?	Yes 🗹	No 🗌			
11. Contai	ner/Temp Blan	k temperature in compliance?	Yes 🗹	No 🗌			
12. Water	- VOA vials hav	ve zero headspace?	Yes 🔽	No 🗌	Not Applica	bie 🗌	
13. Water	- pH acceptabl	e upon receipt?	Yes 🗹	No 🗌	Not Applica	ble 🗌	
SP	L Representati	ve:	Contact Date	& Time:			-
Client	Name Contact	ed:					
Non Co	nformance Issues:						
Client l	nstructions:						

5			**	Ź				 	 <u> </u>		
8880 Interchange Drive, Houston, TX 77054 (713) 660-0901 459-Hughes Drive, Traverse City, MI 49684 (616) 947-5777	Other 🔲	18hr 🔲 Standard 🔊	24hr 🔲 72hr 🔘		Requested TAT	Client/Consultant Remarks:			Mb-12D	MW-10	Client Name: SKOWA & (U) Address/Phone: 13-759- Client Contact: RICK Rey Project Name: 83 Holbs Project Number: Project Location: Holbs, NM Invoice To: RICK ROAD SAMPLE ID
Houston, T erse City, N	5. Relinquished by:	3. Relinquished by	1. Relinquished b	Sta	Special Report				7/18/21	10/01	DOUL OF THE
X 77054 (71 11 49684 (61	d by:	d by:	quished by Sampler:	Sundard QC 🔄	Special Reporting Requirements				20:47	21.12	TIME comp grab  W=water S=soil SL=sludge O=other:  P=plastic A=amber glass of Custody Record  R=1 liter 4=40z 40=vial 8=80z 16=160z 1=HCl 2=HNO3 3=H2SO4 O=other:  Number of Containers
(713) 660-0901 (616) 947-5777			A.	ŀ,				-	X	X	S Squest &
0901				Level 3 QC	Fax Results	Labon			2	/W/	W=water S=soil matrix SL=sludge O=other: Trix P=plastic A=amber glass of Name
			د.		Ø	Laboratory remarks:			VAP	٧	W=water S=soil matrix SL=sludge O=other: The sludge O=other of Chain of Cha
	da K	dace	daus) /	Level 4 QC	Raw Data	arks:			13	9	l=1 liter 4=4oz 40=vial s. 8=8oz 16=16oz
500 /	20(0)		1901	- ∞ □	å				بر.	MINIT	1=HCl 2=HNO3 P 3=H2SO4 O=other: C
500 Ambassa	in 3C	time	17:00		Special				3	6	Number of Containers
ador C					Special Detection Limits (specify):				X	X	BTEX 8021B
affery P	6. Receive	1. Received by:	2. Received by:		Limits (1					X	TPH-G  SD4 300.D  Regular No.
arkway		d by:	d by:		pecify):			-	X		SD4 300.D FOR STATE OF THE STAT
, Scott,	6. Received by Laboratory:		RO E						X		Requested Anal Chiverdes
LA 705			£χ		,	Intact?			X		Requested Analysis  Chiveldes  TPH-D-TPH 6 6015
ador Caffery Parkway, Scott, LA 70583 (318) 237-4775	00			E	PM review	$\Box$					page page
)237-45					cw (initial):	Y					103416
75					7	4					



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 (713) 560-0901

#### Brown & Caldwell

## Certificate of Analysis Number: 01090040

Report To:

Brown & Caldwell Rick Rexroad

1415 Louisiana Suite 2509

Houston TX

77002ph: (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:

10/1/01

This Report Contains A Total Of 23 Pages

**Excluding This Page** 

And

Chain Of Custody



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

## Case Narrative for: Brown & Caldwell

## Certificate of Analysis Number: 01090040

Report To:

Brown & Caldwell

Rick Rexroad

Suite 2509 Houston

TX

77002-

ph: (713) 759-0999

Project Name:

20

BJ Service, Hobbs, NM

Site:

**BJ-Hobbs** 

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported:

10/1/01

No sample containers were received for your sample ID's "OW-4 and MW-12" (SPL ID's: 01090040-09 and 01090040-07 respecteviley), to perform the requested analyses. Only one liter amber preserved with HCl was received for your sample ID "MW-10" (SPL ID: 01090040-05) for Diesel Range Organic (DRO) analysis. Also SPL did not receive sample contianers to perform requested Nitrate, Sulfate, Ethane, Methane and Ethylene analyses on your sample ID "MW-13" (SPL ID: 01090040-08). Rick Rexroad was notified, via phone conversation, on September 12, 2001.

Your sample ID's "MW-5 and MW-11A" (SPL ID: 01090040-03 and 01090040-06 respectively) were analyzed for Fluoride by method 300.0 per historicals.

As per your request on September 13, 2001, the laboratory cancelled all analyses for Nirtate.

fax: (713) 308-3886

Matrix spike (MS) and matrix spike duplicate (MSD) samples are chosen and tested at random from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. Since the MS and MSD are chosen at random from an analytical batch, the sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The Laboratory Control Sample (LCS) and the Method Blank (MB) are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

Any other 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.

Amallest Sonia West

Senior Project Manager

10/1/01

Date



#### **HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

#### **Brown & Caldwell**

#### Certificate of Analysis Number:

#### 01090040

Report To:

Fax To:

Brown & Caldwell

Rick Rexroad

1415 Louisiana Suite 2509

Houston

ΤX

77002-

ph: (713) 759-0999

Brown & Caldwell

Rick Rexroad

fax: (713) 308-3886

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:

10/1/01

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COCID	HOLD
MW-3	01090040-01	Water	9/10/01 2:00:00 PM	9/11/01 9:00:00 AM	097670	
MW-4	01090040-02	Water	9/10/01 2:30:00 PM	9/11/01 9:00:00 AM	097670	
MW-5	01090040-03	Water	9/10/01 11:30:00 AM	9/11/01 9:00:00 AM	097670	
MW-7	01090040-04	Water	9/10/01 12:15:00 PM	9/11/01 9:00:00 AM	097670	
MW-10	01090040-05	Water		9/11/01 9:00:00 AM		V
MW-10	01090040-05	Water	9/10/01 4:45:00 PM	9/11/01 9:00:00 AM	097670	
MW-10	01090040-05	Water	9/10/01 4:45:00 PM	9/11/01 9:00:00 AM	097670	V
MW-11A	01090040-06	Water	9/10/01 3:45:00 PM	9/11/01 9:00:00 AM	097670	
MW-12	01090040-07	Water		9/11/01 9:00:00 AM		<b>V</b>
MW-13	01090040-08	Water	9/10/01 3:15:00 PM	9/11/01 9:00:00 AM	097670	
OW-4	01090040-09	Water		9/11/01 9:00:00 AM		<b>V</b>
Duplicate	01090040-10	Water	9/10/01	9/11/01 9:00:00 AM	097670	
Duplicate	01090040-10	Water	9/10/01	9/11/01 9:00:00 AM	097671	
Trip Blank 9/4/01	01090040-11	Water	9/10/01	9/11/01 9:00:00 AM	097671	
MW-14	01090040-12	Water	9/10/01	9/11/01 9:00:00 AM	097671	
MW-15	01090040-13	Water	9/10/01	9/11/01 9:00:00 AM	097671	

Senior Project Manager

10/1/01

Date

Joel Grice Laboratory Director

Ted Yen Quality Assurance Officer



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

Client Sample ID: MW-3 Collected: 9/10/01 2:00:00 SPL Sample ID: 01090040-01

				Site:	: BJ-	Hobbs			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE OF	GANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organi	cs	ND		0.2		1	09/14/01 23:34	AM	832938
Surr: n-Pentacosa	ne	87.6	%	18-120		1	09/14/01 23:34	AM	832938
Prep Method	Prep Date			Prep Initials					
SW3510B	09/12/2001 1	1:51		KL					
GASOLINE RANGE	ORGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Orga	anics	ND		0.1		1	09/14/01 15:53	DL	831091
Surr: 1,4-Difluorob	enzene	96.7	%	74-121		1	09/14/01 15:53	DL	831091
Surr: 4-Bromofluor	obenzene	106	%	55-150		1 .	09/14/01 15:53	DL	831091
PURGEABLE ARON	MATICS				MCL	SW8021B	Units: uç	g/L	
Benzene		ND		1		1	09/14/01 15:53	DL	830982
Ethylbenzene		ND		1		1 '	09/14/01 15:53	DL	830982
Toluene		ND		1		1	09/14/01 15:53	DL	830982
Xylenes, Total		ND		1		1	09/14/01 15:53	DL	830982
Total BTEX		ND		1		1	09/14/01 15:53	DL	830982
Surr: 4-Bromofluor	obenzene	106	%	48-156		1	09/14/01 15:53	DL	830982
Surr: 1,4-Difluorob	enzene	110	%	72-137		1	09/14/01 15:53	DL	830982

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



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

Client Sample ID: MW-4 Collected: 9/10/01 2:30:00 SPL Sample ID: 01090040-02

				Site	BJ-	Hobbs			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGA	ANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics		ND		0.2		1	09/15/01 0:13	AM	832939
Surr: n-Pentacosane		31.1	%	18-120		1	09/15/01 0:13	AM	832939
Prep Method	Prep Date			Prep Initials					
SW3510B	09/12/2001 1	1:51		KL					
GASOLINE RANGE O	RGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organic	cs	ND		0.1		1	09/14/01 16:41	DL	831093
Surr: 1,4-Difluoroben:	zene	96.0	%	74-121		1	09/14/01 16:41	DL	831093
Surr: 4-Bromofluorob	enzene	99.0	%	55-150		1	09/14/01 16:41	DL,	831093
PURGEABLE AROMA	TICS				MCL	SW8021B	Units: ug	ı/L	
Benzene		ND		1		1	09/14/01 16:41	DL	830984
Ethylbenzene	,	ND		1		1	09/14/01 16:41	DL	830984
Toluene		ND		1		1	09/14/01 16:41	DL	830984
Xylenes,Total		ND		1		1	09/14/01 16:41	DL	830984
Total BTEX		ND		1		1	09/14/01 16:41	DL	830984
Surr: 4-Bromofluorobe	enzene	105	%	48-156		. 1	09/14/01 16:41	DL	830984
Surr: 1,4-Difluorobenz	zene	106	%	72-137		1	09/14/01 16:41	DL	830984

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



#### **HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE

HOUSTON, TX 77054 (713) 660-0901

Client Sample ID: MW-5	Collected: 9/10/01 11:30:0	0 SPL Sample ID:	01090040-03
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Client Sample ID: MW-5			Colle	ected:	9/10/01 11:30:00	SPL Sample II	<b>)</b> : 0109	0040-03
			Site	BJ-	Hobbs			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: mg	g/L	
Diesel Range Organics	ND		0.2		1	09/15/01 0:52	AM	832940
Surr: n-Pentacosane	50.4	%	18-120		1	09/15/01 0:52	AM	832940
Prep Method Prep Date SW3510B 09/12/2001	11.51		Prep Initials KL					
FLUORIDE-IC	11.31	_=	NL	MCL	E300	l Inite me		
Fluoride	1.5		0.1	IVICE	1	Units: mo 09/11/01 14:45		833673
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mo	=====================================	
Gasoline Range Organics	ND		0.1		1		DL	831092
Surr: 1,4-Difluorobenzene	99.0	%	74-121		1	09/14/01 16:17	DL	831092
Surr: 4-Bromofluorobenzene	107	%	55-150		1	09/14/01 16:17	DL	831092
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: mg	g/L	
Ethane	ND		0.0025		1	09/26/01 16:20	ER	843070
Ethylene	ND		0.0032		1	09/26/01 16:20	ER	843070
Methane	ND		0.0012		1	09/26/01 16:20	ER	843070
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/L	
Benzene	ND		1		1	09/14/01 16:17	DL	830983
Ethylbenzene	ND		1		1	09/14/01 16:17	DL	830983
Toluene	ND		1		1	09/14/01 16:17	DL	830983
Xylenes,Total	ND		1		1	09/14/01 16:17	DL	830983
Total BTEX	ND		1		1	09/14/01 16:17	DL	830983
Surr: 4-Bromofluorobenzene	105	%	48-156		1	09/14/01 16:17	DL	830983
Surr: 1,4-Difluorobenzene	107	%	72-137		1	09/14/01 16:17	DL	830983
SULFATE				MCL	E300	Units: mç		
Sulfate	130		4		20	09/12/01 12:33	SN	833722

Qualifiers:

ND/U - Not Detected at the Reporting Limit

3 - 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



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

Client Sample ID: MW-7 Collected: 9/10/01 12:15:00 SPL Sample ID: 01090040-04

				Site	: BJ-	Hobbs			· ·
Analyses/Method	Res	ult		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGA	ANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics	ľ	VD		0.33		1	09/15/01 1:31	AM	832941
Surr: n-Pentacosane	54	4.8	%	18-120		1	09/15/01 1:31	AM	832941
Prep Method	Prep Date			Prep Initials					
SW3510B	09/12/2001 11:51			KL					
GASOLINE RANGE O	RGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organic	os l	ΝD		0.1		1	09/14/01 17:06	DL	831094
Surr: 1,4-Difluorobenz	zene 1	00	%	74-121		1	09/14/01 17:06	DL	831094
Surr: 4-Bromofluorob	enzene 1	06	%	55-150		1	09/14/01 17:06	DL	831094
PURGEABLE AROMA	TICS				MCL	SW8021B	Units: ug	j/L	
Benzene	1	ND		1		1	09/14/01 17:06	DL	830985
Ethylbenzene	١	ND		1		1	09/14/01 17:06	DL	830985
Toluene	1	۷D		1		1	09/14/01 17:06	DL	830985
Xylenes,Total	١	ΝD		1		1	09/14/01 17:06	DL	830985
Total BTEX	١	ИD		1		1	09/14/01 17:06	DL	830985
Surr: 4-Bromofluorobe	enzene 1	02	%	48-156		1	09/14/01 17:06	DL	830985
Surr: 1,4-Difluorobenz	zene 1	07	%	72-137		1	09/14/01 17:06	DL	830985

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surregate 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



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

Client Sample ID: MW-10

Collected: 9/10/01 4:45:00

SPL Sample ID:

01090040-05

Site:	B 1-1-	lobbs	•
SHE.	ייטע	1000	2

Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS	MCL SW8015B Units: mg/L								
Diesel Range Organics	2.3		0.2		1		09/15/01 2:10	AM	832942
Surr: n-Pentacosane	48.6	%	18-120		1		09/15/01 2:10	AM	832942

Prep Method	Prep Date	Prep Initials
SW3510B	09/12/2001 11:51	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



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

Client Sample ID: MW-11A Collected: 9/10/01 3:45:00 SPL Sample ID: 01090040-06

Client Sample ID: MV	V-11A 			Coll	lected:	9/10/01 3:45:00	SPL Sample II	<b>D:</b> 0109	90040-06
				Site	: BJ-	Hobbs			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: mg/L			
Diesel Range Organics	S	1.1		0.2		1	09/15/01 2:50	AM	832943
Surr: n-Pentacosane	9	39.6	%	18-120		1	09/15/01 2:50	AM	832943
Prep Method	Prep Date			Prep Initials					
SW3510B	09/12/2001	11:51		KL					
FLUORIDE-IC					MCL	E300	00 Units: mg/L		
Fluoride		4.6		0.1		1	09/11/01 14:45	SN	833676
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L				
Gasoline Range Organ	nics	ND		0.1		1	09/14/01 17:30	DL	831095
Surr: 1,4-Difluorober	nzene	99.3	%	74-121		1	09/14/01 17:30	DL.	831095
Surr: 4-Bromofluoro	benzene	110	%	55-150		1	09/14/01 17:30	DL	831095
HEADSPACE GAS A	NALYSIS				MCL	RSK147	17 Units: mg/L		
Ethane		ND		0.0025		1	09/26/01 16:34	ER	843071
Ethylene		ND		0.0032		1	09/26/01 16:34	ER	843071
Methane		ND		0.0012		1	09/26/01 16:34	ER	843071
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/L		
Benzene		7.9		1		1	09/14/01 17:30	DL	830986
Ethylbenzene		ND		1		1	09/14/01 17:30	DL	830986
Toluene		ND		1		1	09/14/01 17:30	DL	830986
Xylenes,Total		ND		1		1	09/14/01 17:30	DL	830986
Total BTEX		7.9		1		1	09/14/01 17:30	DL	830986
Surr: 4-Bromofluoro	benzene	108	%	48-156		1	09/14/01 17:30	DL	830986

Qualifiers:

Surr: 1,4-Difluorobenzene

SULFATE

Sulfate

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

108

280

72-137

4

MCL

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

09/14/01 17:30 DL

09/12/01 12:33 SN

Units: mg/L

E300

20

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

830986

833726



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

Client Sample ID: MW-13 Collected: 9/10/01 3:15:00 SPL Sample ID: 01090040-08

				Site	BJ-	Hobbs				
Analyses/Method		Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS				MCL	SW8	015B	Units: mg/L			
Diesel Range Organics		0.3		0.2		1		09/15/01 3:29	AM	832944
Surr: n-Pentacosane		62.8	%	18-120		1		09/15/01 3:29	AM	832944
Prep Method	Prep Date			Prep Initials						
SW3510B	09/12/2001 1	1:51	***************************************	KL						
GASOLINE RANGE ORGANICS			MCL	SW8	015B	Units: mg/L				
Gasoline Range Organic	cs	ND		0.1		1		09/14/01 17:54	DL	831096
Surr: 1,4-Difluorobenz	zene	96.3	%	74-121		1		09/14/01 17:54	DL	831096
Surr: 4-Bromofluorobe	enzene	98.0	%	55-150		1		09/14/01 17:54	DL	831096
PURGEABLE AROMATICS				MCL	SW8	021B	Units: ug/L			
Benzene		ND		1		1		09/14/01 17:54	DL	830987
Ethylbenzene		ND		1		1		09/14/01 17:54	DL	830987
Toluene		ND		1		1		09/14/01 17:54	DL	830987
Xylenes,Total		ND		1		1		09/14/01 17:54	DL	830987
Total BTEX		ND		1		1		09/14/01 17:54	DL	830987
Surr: 4-Bromofluorobe	enzene	104	%	48-156		1		09/14/01 17:54	DL	830987
Surr: 1,4-Difluorobenz	zene	104	%	72-137		1		09/14/01 17:54	DL	830987

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

10/1/01 8:49:45 AM



Surr: 4-Bromofluorobenzene

Surr: 1,4-Difluorobenzene

# HOUSTON LABORATORY

8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

09/14/01 18:19 DL

09/14/01 18:19 DL

Client Sample ID: Dup	licate			Col	lected:	9/10/01	SPL Sample I	D: 0109	0040-10
				Site	: BJ-	Hobbs			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: m	 g/L			
Diesel Range Organics		0.57		0.2		1	09/15/01 4:08	AM	832945
Surr: n-Pentacosane		39.0	%	18-120		1	09/15/01 4:08	АМ	832945
Prep Method	Prep Date			Prep Initials					
SW3510B	09/12/2001 1	1:51		KL					
GASOLINE RANGE O	RGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organi	cs	0.1		0.1		†	09/14/01 18:19	DL	831097
Surr: 1,4-Difluoroben:	zene	99.3	%	74-121		1	09/14/01 18:19	DL	831097
Surr: 4-Bromofluorob	enzene	108	%	55-150		1	09/14/01 18:19	DL	831097
PURGEABLE AROMA	TICS				MCL	SW8021B	Units: ug	ı/L	
Benzene		8		1		1	09/14/01 18:19	DL	830988
Ethylbenzene		ND		1		1	09/14/01 18:19	DL	830988
Toluene		ND		1		1	09/14/01 18:19	DL	830988
Xylenes, Total		ND		1		1	09/14/01 18:19	DL	830988
Total BTEX		8		1		1	09/14/01 18:19	DL	830988

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

108

107

% 48-156

72-137

%

\* - 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

830988

830988



# HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

Client Sample ID: Trip Blank 9/4/01 Collected: 9/10/01 SPL Sample ID: 01090040-11

Site:	R.L.	Hobbs
JILC.		10003

Site: DV-HOUDS									
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	09/14/01 15:28	DL	831090	
Surr: 1,4-Difluorobenzene	97.3	%	74-121		1	09/14/01 15:28	DL	831090	
Surr: 4-Bromofluorobenzene	97.3	%	55-150		1	09/14/01 15:28	DL	831090	
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug/L			
Benzene	ND		1		1	09/14/01 15:28	DL	830981	
Ethylbenzene	ND		1		1	09/14/01 15:28	DL	830981	
Toluene	ND		1		1	09/14/01 15:28	DL	830981	
Xylenes,Total	ND		1		1	09/14/01 15:28	DL	830981	
Total BTEX	ND		1		1	09/14/01 15:28	DL	830981	
Surr: 4-Bromofluorobenzene	105	%	48-156		1	09/14/01 15:28	DL	830981	
Surr: 1,4-Difluorobenzene	104	%	72-137		1	09/14/01 15:28	DL	830981	

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, TX 77054 (713) 660-0901

 Client Sample ID: MW-14
 Collected: 9/10/01
 SPL Sample ID: 01090040-12

Site: BJ-Hobbs

010.										
Analyses/Method	Result	Rep.Limit	D	il. Factor QUAL	Date Analyzed Analyst	Seq. #				
CHLORIDE, TOTAL			MCL E325.3 Units: mg/L		Units: mg/L					
Chloride	245	10		5	09/14/01 14:00 CV	830265				

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, TX 77054 (713) 660-0901

 Client Sample ID: MW-15
 Collected: 9/10/01
 SPL Sample ID: 01090040-13

Site: BJ-Hobbs

Analyses/Method	Result	Rep.Limit		Dif. Factor QUAL	Date Analyzed Analyst	Seq. #
CHLORIDE, TOTAL			MCL	E325.3 Units: mg/L		
Chloride	228	10		5	09/14/01 14:00 CV	330266

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 HOUSTON, TX 77054 (713) 660-0901

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

Analysis: Method:

RunID:

**Diesel Range Organics** 

Analyte

SW8015B

Diesel Range Organics

Surr: n-Pentacosane

WorkOrder:

01090040

Lab Batch ID:

14783

Method Blank

Analysis Date: Preparation Date:

HP\_V\_010914E-832936 09/14/2001 22:15 09/12/2001 11:51

Units:

AM Analyst:

mg/L Prep By: KL

Method SW3510B

0.20

18-120

Lab Sample ID 01090040-01B

Client Sample ID MW-3

01090040-02B 01090040-03B

Samples in Analytical Batch:

01090040-04B 01090040-05B

MW-7 MW-10 MW-11A

MW-4

MW-5

01090040-06B 01090040-08B 01090040-10B

MW-13 Duplicate

## Laboratory Control Sample (LCS)

RunID:

Analysis Date:

HP\_V\_010914E-832937 09/14/2001 22:54

Result Rep Limit

ND

86.2

Units:

mg/L

Preparation Date: 09/12/2001 11:51 Analyst: ΑM Prep By: KL

Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	2	78	21	175

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

Sample Spiked:

01090355-02

RunID:

HP\_V\_010914E-832951

Units:

Analysis Date:

09/15/2001 10:40

mg/L

Preparation Date: 09/12/2001 11:51

ΑM Analyst: 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	ND	5	4	78.4	5	3.9	77.6				

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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 8880 INTERCHANGE DRIVE

HOUSTON, TX 77054 (713) 660-0901

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

Analysis:

RunID:

Headspace Gas Analysis

Method:

RSK147

WorkOrder:

Samples in Analytical Batch:

01090040

Lab Batch ID:

R44199

Method Blank

Lab Sample ID

Analysis Date:

VARC\_010927A-843076 09/27/2001 8:28

Units: Analyst:

mg/L

ER

01090040-03D

Client Sample ID MW-5

01090040-06D

MW-11A

Analyte	Besult	Rep Limit
Ethane	ND	0.0025
Ethylene	ND	0.0032
Methane	NDI	0.0012

# Sample Duplicate

Original Sample:

01090387-05

RunID:

VARC\_010927A-843067

Units:

mg/L

Analysis Date:

09/26/2001 15:21

Analyst:

ER

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	0.0035	0.0029	19	50	
Propane	ND	ND	O	50	
Propylene	ND	ND	0	50	

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference 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.

10/1/01 8:50:02 AM



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

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

Analysis:

**Purgeable Aromatics** 

Method:

RuniD:

SW8021B

DL

WorkOrder:

01090040

Lab Batch ID:

R43550

Method Blank

Analyte

Analysis Date:

Benzene

Toluene

Ethylbenzene

Total BTEX

Xylenes,Total

Surr: 1,4-Difluorobenzene

Surr: 4-Bromofluorobenzene

VARE\_010914A-830978 09/14/2001 13:02

Units: ug/L Analyst:

1.0

1.0

1.0

1.0

1.0

72-137

48-156

Result Rep Limit

ND

NDI

ND

ND

ND

105.0

107.6

Lab Sample ID 01090040-01A

Samples in Analytical Batch:

Client Sample ID MW-3

01090040-02A 01090040-03A MW-4 MW-5 MW-7

01090040-04A 01090040-06A 01090040-08A

MW-11A MW-13

01090040-10A

Duplicate

01090040-11A

Trip Blank 9/4/01

# Laboratory Control Sample (LCS)

RunID:

VARE\_010914A-830977

Units:

Analysis Date:

09/14/2001 12:13

ug/L Analyst: DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	51	102	70	130
Ethylbenzene	50	53	107	70	130
Toluene	50	51	102	70	130
Total BTEX	300	318	106	70	130
Xylenes,Total	150	163	109	70	130

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

Sample Spiked:

01090040-01

RunID:

VARE\_010914A-830979

Units:

ug/L

Analysis Date:

09/14/2001 13:26

DL Anaiyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery				High Limit
Benzene	ND	20	19	94.9	20	20	98.5	3.70	21:	32	164
Ethylbenzene	ND	20	19	94.8	20	20	98.8	4.15	19	52	142
Toluene	ND	20	19	90.9	20	19	94.7	4.14	20	38	159
Total BTEX	ND	120	115	95.8	120	118	98.3	2.58	20	32	164
Xylenes,Total	ND	601	58	96.7	60	59	98.3	1.71	181	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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

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

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

Analysis:

RuniD:

Gasoline Range Organics

Method: SW8015B

WorkOrder:

01090040

Lab Batch ID:

R43555

Method Blank

Analysis Date:

VARE\_010914B-831087 09/14/2001 13:02

Units: mg/L

DL Analyst:

Lab Sample ID 01090040-01A

Samples in Analytical Batch:

Client Sample ID MW-3

01090040-02A 01090040-03A 01090040-04A

MW-4 MW-5 MW-7

Analyte Result Rep Limit Gasoline Range Organics ND 0.10 Surr: 1,4-Difluorobenzene 100.3 74-121 106.0 55-150 Surr: 4-Bromofluorobenzene

01090040-06A 01090040-08A 01090040-10A

MW-11A MW-13 Duplicate

01090040-11A

Trip Blank 9/4/01

### Laboratory Control Sample (LCS)

RunID:

Analysis Date:

VARE\_010914B-831085 09/14/2001 12:37

Units:

Analyst:

mg/L DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	1.2	123	70	130

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

Sample Spiked:

01090040-03

RunID:

VARE\_010914B-831088

Units:

mg/L

Analysis Date:

09/14/2001 14:15

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	0.88	97.9		0.9	99.9	2.01	36	36	160

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference

J - Estimated value between MDL and PQL

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.

10/1/01 8:50:11 AM



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

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

Analysis:

Chloride, Total

Method:

E325.3

WorkOrder:

01090040

Lab Batch ID:

R43525

Method Blank

Samples in Analytical Batch:

RunID:

WET\_010914M-830258

Units: mg/L

Lab Sample ID

01090040-12A

Client Sample ID

Analysis Date:

09/14/2001 14:00

CV Analyst:

01090040-13A

MW-14

MW-15

Analyte	Result	Rep Limit
Chloride	ND	2.0

# Laboratory Control Sample (LCS)

RunID:

WET\_010914M-830260

Units: mg/L

Analysis Date:

09/14/2001 14:00

Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit	
Chloride	76.2	77.1	101	90	110	

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

Sample Spiked:

01090040-03

RuniD:

WET\_010914M-830262

mg/L

Analysis Date:

09/14/2001 14:00

Units: Analyst: CV

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery		imit	Low Limit	High Limit
Chloride	140	250	390	99.8	250	385	98.1	1.77	20	85	115

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

10/1/01 9:50:16 AM



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

# **Brown & Caldwell**

BJ Service, Hobbs, NM

Analysis: Method: Fluoride-IC

E300

WorkOrder:

Lab Batch ID:

01090040 R43646

Method Blank

Samples in Analytical Batch:

RuniD:

WET\_010911ZE-833671

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

09/11/2001 14:45

Analyst: SN

01090040-03C

MW-5

01090040-06C

MW-11A

ſ	Analyte	Result	Rep Limit
	Fluoride	ND	0.10

# Laboratory Control Sample (LCS)

RunID:

WET\_010911ZE-833672

Units:

mg/L

Analysis Date:

09/11/2001 14:45

Analyst: SN

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:

01090040-03

RuniD:

WET\_010911ZE-833674

Units:

mg/L

Analysis Date:

09/11/2001 14:45

Analyst: SN

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	1.5	10	10	84.8	10	10	85.1	0.330	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

10/1/01 8:50:21 AM



### HOUSTON LABORATORY

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

# **Brown & Caldwell**

BJ Service, Hobbs, NM

Analysis: Method:

RuniD:

Sulfate

E300

WorkOrder:

01090040 R43648

Lab Batch ID:

Samples in Analytical Batch:

Method Blank

Lab Sample ID

Client Sample ID

Analysis Date:

WET\_010912I-833719 09/12/2001 12:33

Units: Analyst: mg/L

SN

01090040-03C

MW-5

01090040-06C

MW-11A

Analyte Sulfate

Result Rep Limit NDI

Laboratory Control Sample (LCS)

RuniD:

WET\_010912I-833721

Units:

mg/L

Analysis Date:

09/12/2001 12:33

Analyst: SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sulfate	10	11	107	90	110

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

Sample Spiked: RunID:

01090040-03

Units:

mg/L

Analysis Date:

WET\_010912I-833723 09/12/2001 12:33

Analyst:

SN

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	130	200	330	101	200	330	99.7	1.04	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

10/1/01 8:50:25 AM

# Sample Receipt Checklist And Chain of Custody



# HOUSTON LABORATORY

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

# Sample Receipt Checklist

Workorder:	0	1090040			Received	d By:	RE			
Date and Time	Received: 9	/11/01 9:00:00 AM			Carrier n	ame:	FedEx			
Temperature:	4				Chilled b	y:	Water	ce		
1. Shipping o	ontainer/coo	ler in good condition?	Yes	<b>V</b>	No 🗌	Not Prese	ent 🗀	]		
2. Custody se	eals intact on	shippping container/cooler?	Yes		No 🗆	Not Prese	ent 💆	]		
3. Custody se	eals intact on	sample bottles?	Yes		No 🗆	Not Prese	ent 💆			
4. Chain of co	ustody preser	nt?	Yes	<b>~</b>	No 🗆					*
5. Chain of co	ustody signed	d when relinquished and received?	Yes	<b>✓</b>	No 🗌					
1.Did not	receive all sar	s with sample labels?  mples for ID#OW-4 and ID#MW-12 and liter preserved with HCL for ID#MW-10.	Yes		No 🗹					
7. Samples in	proper conta	ainer/bottle?	Yes	<b>&gt;</b>	No 🗌					
8. Sample co	ntainers intac	at?	Yes	V	No 🗌					
9. Sufficient	sampie volum	ne for indicated test?	Yes	✓	No 🗌					
2. All sam		thin holding time? e analysis were received past the method	Yes		No 🗹					
11. Container/	Temp Blank to	emperature in compliance?	Yes	<b>Y</b>	No 🗌					
12. Water - VO	A vials have :	zero headspace?	Yes	<b>✓</b>	No 🗌	Not Applic	cable [	]		
13. Water - pH	acceptable u	pon receipt?	Yes	<b>~</b>	No 🗌	Not Applic	cable [	]		
				<del></del>						
SPL Re	presentative	West, Sonia	Cont	act Date & T	ime: 9/13/0	I 1:11:00 P	M			
Client Nam	ne Contacted:	Rick Rexroad								
Non Confo	mance 1.Log Issues:	in on hold until client is notified.Only receiv	/ed 1-co	ooler unable	to track to se	ee if client s	sent mo	re than o	ne cooler	
Client Instru		er Rick OW-4 & MW-12 samples were not t RO, need to proceed with the analysis. 2.				MW-10. Cl	ient cou	ld only co	ollect san	nple

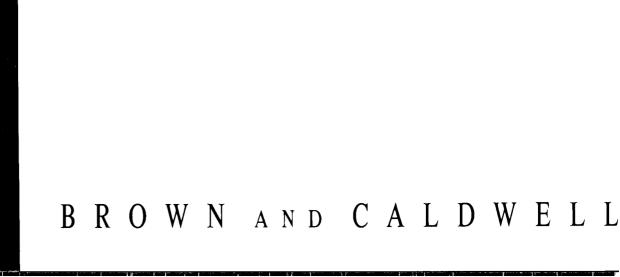
01090040

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48hr 🔲 Standard 🔯	3. Relinquished by:	d by:				date	-	time	4	4. Received by:	J.					
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☐ 8880 Interchange Drive, Houston, TX 77054 (713	Houston, 1	TX 77054 (71:	3) 660-0901	0901		0	500 An	ıbassad	lor Caf	fery Pau	rkway,	500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775	A 7058	3 (318	237-45	3

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

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Address Thome 1415 (90) 57 ~ ~ #2500	、トト・ 井)	٠٤٥٠			Sjass	lsiv	•	<u> </u>							
Client Contact: RICK REXFORD	Pic				per [	-OF	JEL: 103	ners	<u>7</u> 1						
Project Name: DJSVC5				ios =					<u>-17</u> リで	,					
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JUNE 2002 GROUNDWATER SAMPLING REPORT AND BIOSPARGING SYSTEM CLOSURE REPORT HOBBS, NEW MEXICO FACILITY BJ SERVICES COMPANY, U.S.A.

**NOVEMBER 11, 2002** 

# JUNE 2002 GROUNDWATER SAMPLING REPORT AND BIOSPARGING SYSTEM CLOSURE 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: 12832.017

Richard L. Rexroad, P.G.

Project Manager

November 11, 2002

**Brown and Caldwell** 

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# 1.0 INTRODUCTION

Brown and Caldwell conducted a 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 in June 2002. This report presents a description of the groundwater sampling field activities, a summary and evaluation of the analytical results, and an evaluation of remedial technologies being applied at the facility. A groundwater potentiometric surface map and a hydrocarbons concentration map are included.

A layout of the facility is shown in Figure 1. The facility formerly operated an on-site fueling system. Subsurface impact near the former diesel fueling system was detected by the New Mexico Oil Conservation Division (NMOCD) during an on-site inspection on February 7, 1991. The fueling system was taken out of operation in July 1995. 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.

A biosparging system was activated in November 1995 and expanded in March/April 1997 and February/March 1998 to remediate soil and groundwater at the former fuel island area of the facility. The biosparging system was deactivated on November 1, 2000 after achieving cleanup goals for groundwater. The confirmation soil sampling program specified in the NMOCD-approved Remedial Action Plan (RAP) for the facility was conducted in July 2001. The results of the confirmation soil sampling program were presented to NMOCD in the report for the June 2001 groundwater sampling event. The June 2002 sampling event is the fourth groundwater sampling event conducted since the completion of the confirmation soil boring program.

BJ Services removed three field waste tanks at the facility on March 6-7, 1997. The ongoing groundwater monitoring program was expanded 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 site chronology detailing the history of investigations into and remediation of soil and groundwater impacts in the former fueling system and the former field waste tanks areas of the facility is presented in Table 1.

# 2.0 FIELD ACTIVITIES AND RESULTS

Brown and Caldwell purged and sampled 10 monitor wells (MW-3, MW-4, MW-5, MW-7, MW-10, MW-11A, MW-12D, MW-13, MW-14, and MW-15) at the facility on June 17-18, 2002 to determine concentrations of dissolved-phase hydrocarbons in groundwater and to evaluate general groundwater quality in the area of the facility. Monitor well locations are shown in Figure 1. The following subsections describe the field activities conducted by Brown and Caldwell during the June 2002 event, and present the results of the associated groundwater analyses.

# 2.1 Groundwater Sampling Activities

Groundwater level measurements were obtained from monitor wells on June 17, 2002, prior to purging and sampling the wells. Groundwater levels were measured to the nearest 0.01 foot with an oil/water interface probe. Current and historic groundwater elevation data are presented in Table 2. The groundwater elevation data indicate that the groundwater flow direction is to the east/northeast, with an overall hydraulic gradient of approximately 0.008 foot/foot. A groundwater elevation map for June 17, 2002 is presented in Figure 2. The groundwater elevation data presented in Table 2 indicate that groundwater levels have continued to decline in monitor wells at the facility since late 1995.

Monitor wells MW-12 and OW-4 were dry and could not be sampled. Monitor well MW-12D, which is located adjacent to monitor well MW-12 and screened in a deeper portion of the aquifer than monitor well MW-12, had sufficient water for collection of a complete sample. Accordingly, Brown and Caldwell collected a groundwater sample from monitor well MW-12D in lieu of sampling monitor well MW-12. In the March 2002 Groundwater Sampling Report for the facility, Brown and Caldwell recommended installation of a new monitor well, MW-16, to replace monitor well OW-4. Brown and Caldwell will proceed with this well installation activity upon approval by NMOCD and acquisition of access privileges from the off-site landowner.

All wells, with the exception of monitor well MW-12D, were purged and sampled with disposable bailers and clean, previously unused polyethylene string. Monitor well MW-12D was purged and sampled with a 2-inch submersible pump. Monitor wells MW-5, MW-7, MW-8, MW-10 and MW-14 were purged dry. Monitor well MW-8 did not recharge adequately after purging, and was not sampled. All wells that were sampled with the exception of MW-12D did not have enough water to sample on June 16, 2002. These wells were allowed to recharge and were sampled the next day. Monitor wells MW-12D and MW-15 were purged until groundwater stabilization occurred, with stabilization defined as variation of less than 0.1° Celsius, less than 0.1 pH units, less than 1% specific conductivity, and less than 15 millivolts (mV) Eh between consecutive measurements of groundwater during the purging process. The wells were sampled in general order of least impacted to most impacted (based on analytical results from the March 2002 and preceding sampling events) to further mitigate the potential for cross-contamination of wells.

Field parameter measurements for pH, conductivity, oxidation-reduction (redox) potential, dissolved oxygen, and temperature were collected from wells containing an adequate volume of water during and upon completion of well purging. Alkalinity was measured in selected wells upon conclusion of purging activities. Field parameter readings were recorded on the groundwater sampling forms included in Appendix A. Field readings for the June 2002 sampling event are summarized in Table 3.

Groundwater samples were collected by pouring recovered water from a bailer. Each sample was then transferred to laboratory-prepared, clean glass and/or plastic containers, sealed with Teflon®-lined lids, labeled, and placed on ice in an insulated cooler for delivery to Southern Petroleum Laboratory in Houston, Texas for analysis under standard chain-of-custody control.

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 an on-site water reclamation system for re-use by BJ Services.

# 2.2 Results of Groundwater Analyses

Groundwater samples from monitor wells MW-14 and MW-15 were analyzed for Method 325.3 chloride content. Groundwater samples from the remaining wells were analyzed for gasoline- and diesel-range total petroleum hydrocarbons (TPH-G and TPH-D) by EPA Method 8015B, and benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8021. Analyses of groundwater from selected wells for nitrate and sulfate (Method E300) and methane (Method RSK 147) were performed to evaluate the potential for natural attenuation of hydrocarbons at the facility. The laboratory analytical report and chain-of-custody documentation for the groundwater samples collected during the June 2002 sampling event are provided in Appendix B.

Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 4. Figure 3 presents a hydrocarbons concentration map for the June 2002 sampling event. BTEX constituents were detected in only one of the eight applicable wells. Benzene and ethylbenzene were detected in monitor well MW-11A at respective concentrations of 0.0029 milligrams per liter (mg/L) and 0.0013 mg/L. All BTEX concentrations are less than the applicable New Mexico Water Quality Control Commission (NMWQCC) standards. Benzene has not been detected in former fuel island source area monitor wells MW-3 or MW-4 since June 1999 and March 1999, respectively. Adjustments to the biosparging system in July 1999 and March 2000 to increase air flow to the monitor well MW-13 area resulted in decreases in the concentration of benzene in monitor well MW-13 from 1.5 mg/L on July 2, 1999 to the present non-detectable concentration. Benzene has not been detected in monitor well MW-13 since June 2000.

Table 5 presents current and historic results for chloride analyses performed on groundwater samples collected at the facility. The June 2002 chloride concentration of 258 mg/L in downgradient monitor well MW-14 exceeds the NMWQCC chloride standard of 250 mg/L. The chloride concentration in monitor well MW-15 remained below 250 mg/L in June 2002.

The current and historic results for nitrate, sulfate, and dissolved methane analyses performed on groundwater samples from monitor wells MW-5, MW-10, MW-11A, MW-12, and MW-12D to assist in evaluation of natural attenuation processes at the facility are presented in Table 6.

# 3.0 EVALUATION OF REMEDIAL TECHNOLOGIES

The following subsections present evaluations of the remedial technologies applied at the former fueling system and former field waste tanks areas of the BJ Services facility at Hobbs, New Mexico.

# 3.1 Biosparging System at the Former Fueling System Area

Based on the results of previous investigations conducted by Brown and Caldwell and Roberts/Schornick and Associates, Inc., Brown and Caldwell recommended installation of a biosparging system at the former fueling system area of the facility in the RAP submitted to the NMOCD in May 1994. The NMOCD approved the RAP on August 11, 1994. The biosparging system was installed in August 1995 and expanded in April 1997 and February 1998. Operation of the biosparging system resulted in substantial decreases in hydrocarbon concentrations in former fueling system area monitor wells MW-1, MW-3, MW-4, MW-9, and MW-13, as documented in the December 2000 groundwater sampling report for the facility.

Based on the observed 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 deactivated on November 1, 2000. The June 2002 sampling event is the seventh sampling event completed since this shut down.

Benzene concentrations in former fueling system source area monitor wells MW-1, MW-3, MW-4, MW-9, and MW-13 have remained below applicable NMWQCC standards since deactivation of the biosparging system. Furthermore, BTEX constituent concentrations in these wells have now remained below applicable NMWQCC standards for the last nine consecutive quarters.

In accordance with the RAP, confirmation soil sampling activities were conducted at the former fueling system area in July 2001 to verify the effectiveness of the biosparging system in remediating vadose zone soils in this area. The analytical results for these soil samples, as P:\Wp\BJSERV\12832\099r.doc

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discussed in the report for the June 2001 groundwater sampling event, indicate that remediation goals for soil in this area have successfully been achieved. The June 2002 sampling event is the fourth of four groundwater sampling events conducted following the completion of the confirmation soil boring program, as specified in the NMOCD-approved RAP.

Analytical results for groundwater samples collected from the former fuel island monitor wells have not exceeded the groundwater remediation goals specified in the RAP during the 1-year quarterly monitoring period (i.e., September 2001, December 2001, March 2002, and June 2002) following completion of the confirmation soil boring program in July 2001. Therefore, in accordance with the requirements specified in the NMOCD-approved RAP, Brown and Caldwell recommends that BJ Services proceed with closure activities for the biosparging system, as described below in the biosparging system closure report. The remaining biosparging system closure activities will entail the following activities:

- Plug and abandon (P&A) monitor wells MW-1, MW-3, MW-4, MW-7, MW-8, MW-9 and MW-13;
- P&A air injection (AI) wells AI-20, AI-21, AI-22, AI-23, and AI-24;
- P&A vapor extraction (VE) wells VE-1, VE-2, VE-3, VE-4, VE-5, VE-6, and VE-7;
- P&A AI/VE wells AV-1, AV-2, AV-3, AV-4, AV-5, AV-6, AV-7, AV-8, AV-9, AV-10, AV-11, AV-12, AV-13, AV-14, AV-15, AV-16, AV-17, AV-18, and AV-19;
- Remove underground lines from the blower building to the AI, VE, and AI/VE wells listed above; and
- Remove the blowers from the blower building.

# 3.2 Natural Attenuation at the Former Field Waste Tanks Area

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

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Plume behavior is the primary evidence of natural attenuation. 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. 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. Sporadic increases in total BTEX concentrations between quarterly sampling events have been observed in monitor wells in this area since March 1997, however. These increases may be attributed to sporadic loading rates from the vadose zone in excess of the natural attenuation rate of the area. The following subsections present primary and secondary evidence of natural attenuation of hydrocarbons in groundwater at the former field waste tanks area of the facility.

# 3.2.1 Primary Evidence

The benzene concentration in monitor well MW-10 has decreased from a maximum of 1.3 mg/L in August 1995 (prior to removal of the field waste tanks) to less than the NMWQCC standard of 0.01 mg/L in the six applicable groundwater sampling events from December 2000 through March 2002. Concentrations of toluene, ethylbenzene, and xylenes in monitor well MW-10 have undergone similar decreases over this time period. There were no detections of BTEX constituents in monitor well MW-10 in June 2002.

Benzene concentrations at the monitor well MW-11/11A location have decreased from a maximum of 0.970 mg/L in December 1996 (prior to removal of the field waste tanks) to less than the NMWQCC standard of 0.01 mg/L in the last five groundwater sampling events.

Concentrations of BTEX constituents at the monitor well MW-12/12D location have displayed decreases similar to those observed at the monitor well MW-11/11A location since September 1998.

# 3.2.2 Secondary Evidence

The following lines of geochemical evidence can also be used to 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.

Groundwater samples were collected using bailers during the June 2002 sampling event. Dissolved oxygen concentrations in most wells at the facility were elevated in June 2002 relative to previous sampling events in which groundwater samples were collected using a downhole pump. Use of bailers in groundwater sampling causes groundwater samples to be oxygenated, precluding meaningful comparison of dissolved oxygen data from wells at impacted areas to corresponding data from wells in non-impacted areas.

Historic evidence submitted to the NMOCD in previous quarterly groundwater monitoring reports for the facility has indicated that dissolved oxygen concentrations have typically been depressed in hydrocarbon-impacted monitor wells relative to non-impacted wells at the facility (see the June 2001 Groundwater Sampling Report for BJ Services Hobbs, New Mexico Facility, for example).

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 was detected at a concentration of 2.56 mg/L in background monitor well MW-5 during the June 2002 sampling event. Although there was minimal to no hydrocarbon

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impact at former field waste tanks area wells MW-10, MW-11A, and MW-12D in June 2002, nitrate was not detected in any of these wells. The decreased nitrate concentrations observed in June 2002 at former field waste tanks area wells MW-10, MW-11A, and MW-12D relative to the background nitrate concentration at the facility is likely due to residual effects of hydrocarbons.

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 concentrations were not measured in former field waste tanks area monitor wells in June 2002 due to insufficient yield from the wells.

- 4. Microbes that utilize sulfate become active when dissolved oxygen, nitrate, and ferric iron are depleted. Sulfate concentrations should therefore decrease in areas where intrinsic bioremediation is occurring through use of sulfate as an electron acceptor. June 2002 sulfate concentrations in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12D ranged from 180 mg/L to 560 mg/L. The June 2002 sulfate concentration in background monitor well MW-5 is 110 mg/L. The fact that sulfate concentrations in former source area monitor wells are greater than the sulfate concentration in the background well suggests that sulfate is not being utilized as an electron acceptor in the former field waste tanks area.
  - 5. Methane is a reaction product generated during utilization of carbon dioxide as an electron acceptor, and its concentration should therefore increase in areas where concentrations of electron acceptors such as dissolved oxygen, nitrate, and ferric iron have diminished.

Methane was detected in background monitor well MW-5 at a concentration of 0.002 mg/L during the June 2002 groundwater sampling event. Methane was detected in former field waste tanks area monitor wells MW-10 and MW-11A at respective concentrations of 0.007 mg/L and 0.0028 mg/L in June 2002. The elevated methane concentrations in monitor wells MW-10 and MW-11A at the former field waste tanks area suggests that utilization of carbon dioxide as an electron acceptor, resulting in methanogenesis, has occurred during natural attenuation of hydrocarbons in the vicinity of these wells at the former field waste tanks area of the facility.

Methane was detected at a concentration of 0.0012 mg/L in monitor well MW-12D in June 2002. This methane concentration is less than that of the background well (MW-5), suggesting that methanogenesis is not presently occurring in the deeper portion of the aquifer, downgradient of the former field waste tanks. BTEX constituents have never been detected in groundwater samples from monitor well MW-12D.

- 6. Redox potential is a measure of chemical energy in groundwater. The redox potential of groundwater from background well MW-5 was measured at 95.5 mV in June 2002. Respective redox potentials of -52.9 mV, -58.4 mV, and -54.5 mV were measured in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12D in June 2002. The negative redox values in the former field waste tanks area monitor wells as compared to the positive redox value in the background well at the facility provides additional evidence that natural attenuation of hydrocarbons is occurring in the area of the former field waste tanks.
- 7. Alkalinity is expected to increase during natural attenuation processes, due to the leaching of carbonates from mineral substrates by microbially produced organic acids.

Alkalinity measurements collected in the field in June 2002 ranged from 110 mg/L to 165 mg/L in former field waste tanks area monitor wells MW-10 and MW-11A. Alkalinity was measured at 70 mg/L in background monitor well MW-5 in June 2002. Based on the elevated field-measured alkalinity of groundwater in monitor wells MW-10 and MW-11A, it can be inferred that natural attenuation of hydrocarbons is occurring in the area of monitor well MW-11A and MW-10 at the former field waste tanks area.

In conclusion, current and historic dissolved oxygen, nitrate, and methane data suggest that dissolved oxygen, nitrate, and carbon dioxide act as electron acceptors during intrinsic bioremediation processes at former field waste tanks area of the facility. Current redox and alkalinity data provide further evidence that natural attenuation of hydrocarbons is occurring in this area.

It is recommended that monitoring for natural attenuation evaluation parameters continue in former field waste tank area monitor wells MW-10, MW-11A, and MW-12D and the background well, MW-5. Redox potential, 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 continued in all wells to be sampled during upcoming groundwater monitoring events.

# 4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the June 2002 groundwater sampling event conducted at the BJ Services Hobbs, New Mexico facility.

# 4.1 Conclusions

- Dissolved benzene and BTEX concentrations in monitor wells located near and downgradient of the former fueling system area are less than applicable NMWQCC standards. There were no BTEX, TPH-G, or TPH-D detections in June 2002 in monitor wells MW-3, MW-4, and MW-7, which are located near the former fueling system area. BTEX and TPH-G were not detected in monitor well MW-13, which is located downgradient of the former fueling system. BTEX and TPH concentrations in these wells have remained below applicable standards for the pastenine quarterly groundwater sampling events.
- The June 2002 sampling event is the fourth consecutive groundwater sampling event following completion of confirmation soil sampling activities at the former fuel island area in July 2001 in which BTEX and TPH concentrations in former fuel island area monitor wells have remained below the remediation standards specified in the NMOCD-approved RAP.
- June 2002 benzene concentrations in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12D are less than the NMWQCC standard of 0.01 mg/L for benzene. There were no detections of hydrocarbon constituents in monitor well MW-12D during the June 2002 sampling event, and there were no TPH-G or BTEX detections in monitor well MW-10 during the current sampling event. Natural attenuation processes appear to be occurring in the vicinity of the former field waste tanks removed in March 1997, based on decreasing hydrocarbon concentrations in local monitor wells over time and as substantiated by geochemical data.
- The chloride concentration 258 mg/L recorded in monitor wells MW-14 during the June 2002 groundwater sampling event exceeds the NMWQCC standard of 250 mg/L. Chloride concentrations in this well have varied between 222 mg/L and 368 mg/L since its installation in January 2001.

# 4.2 Recommendations

• Continue the quarterly monitoring program for former field waste tank area monitor wells MW-10, MW-14A, and MW-12D. Continue monitoring for natural attenuation

parameters in these wells and the background monitor well NAW 5, including field-testing for natural attenuation indicator parameters.

- Discontinue groundwater monitoring at monitor wells MW-3, MW-4, MW-7, MW-8, MW-9, and MW-13. Decommission the biosparging system at the former fuel island area as specified in Section 3.1 of this report.
- Upon NMOCD approval and acquisition of access rights, installation and sampling of an
  off-site well to define the downgradient extent of chloride impact to groundwater in the
  area of the facility is recommended.

# DISTRIBUTION

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November 11, 2002

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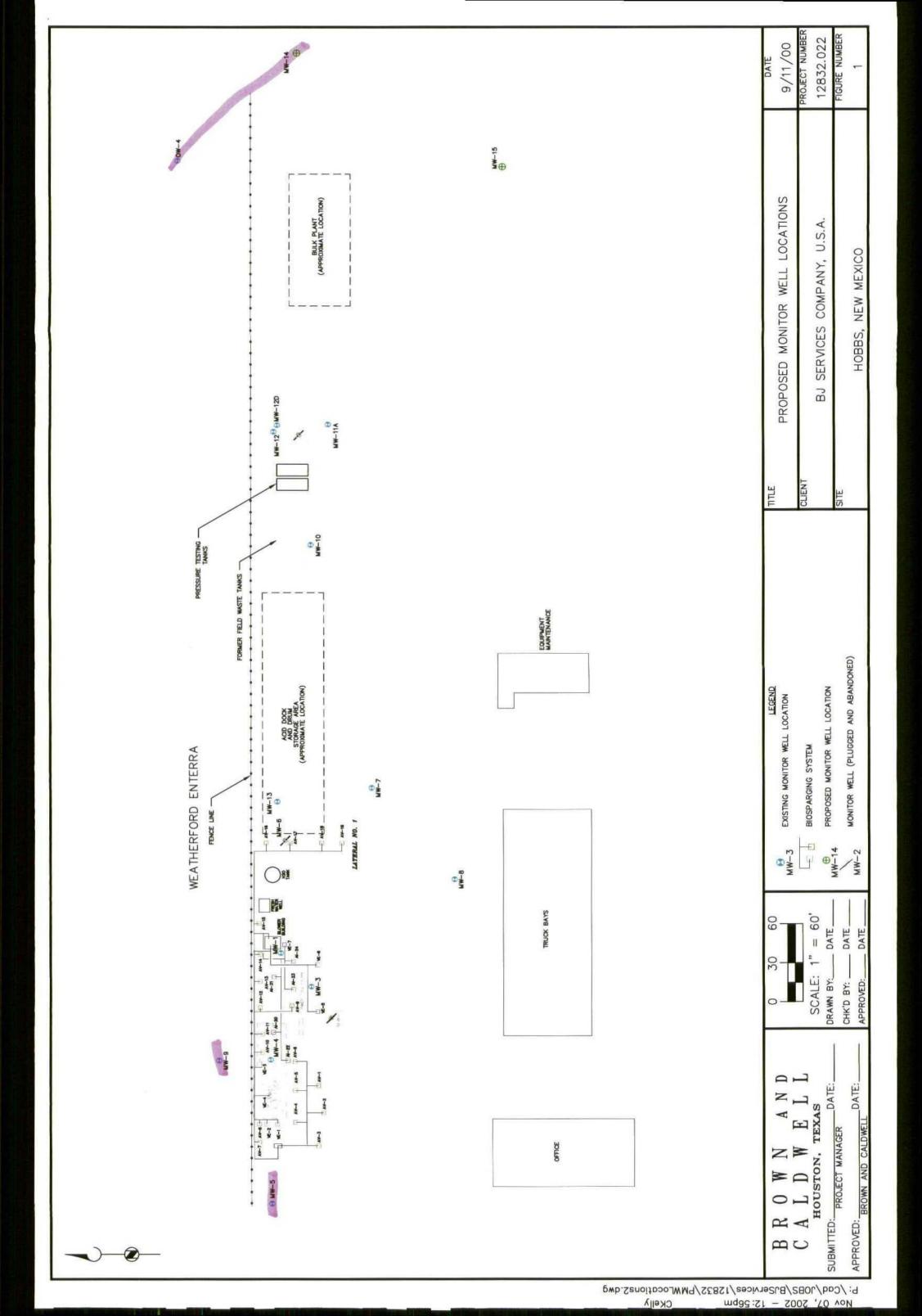
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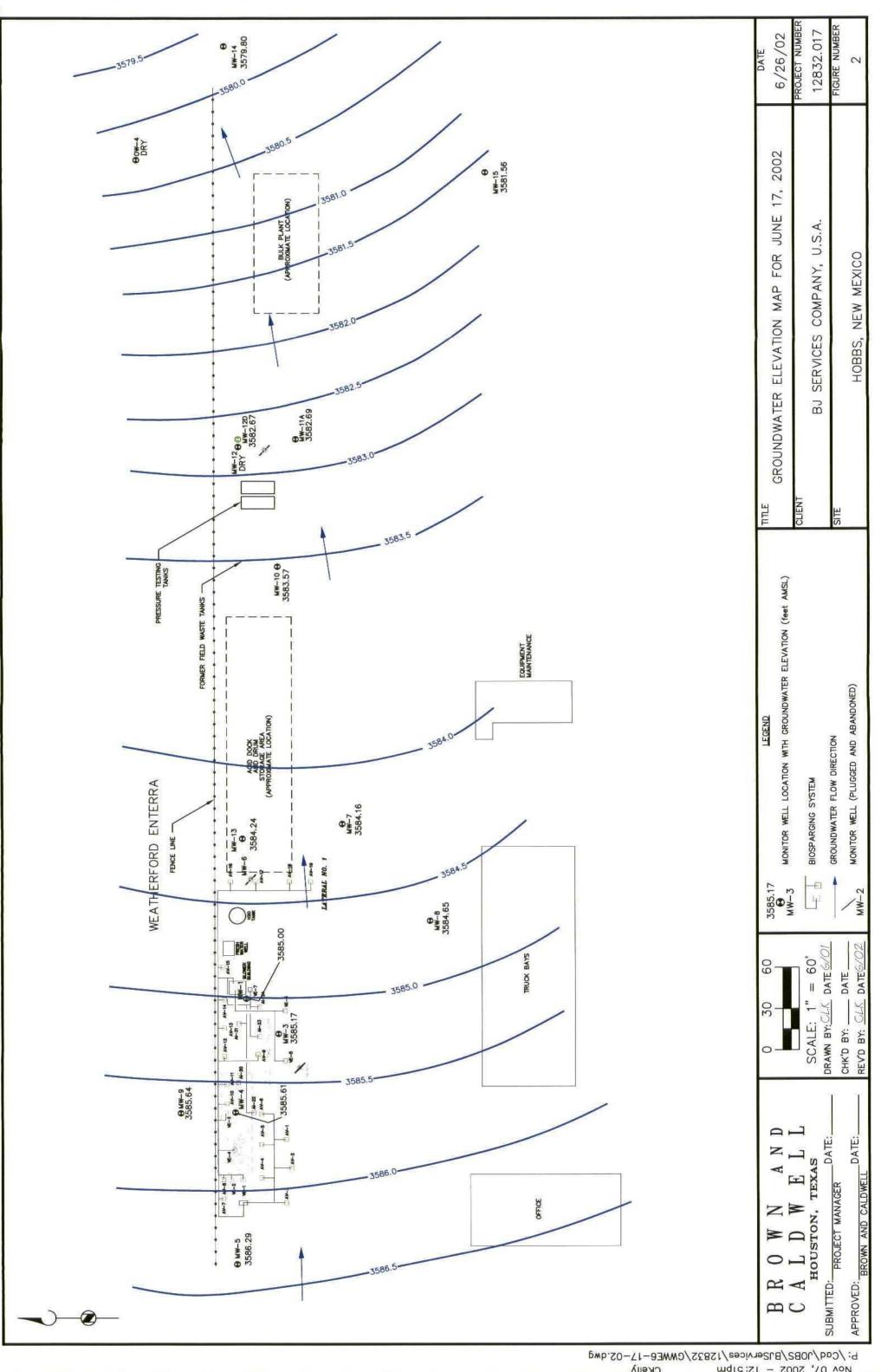
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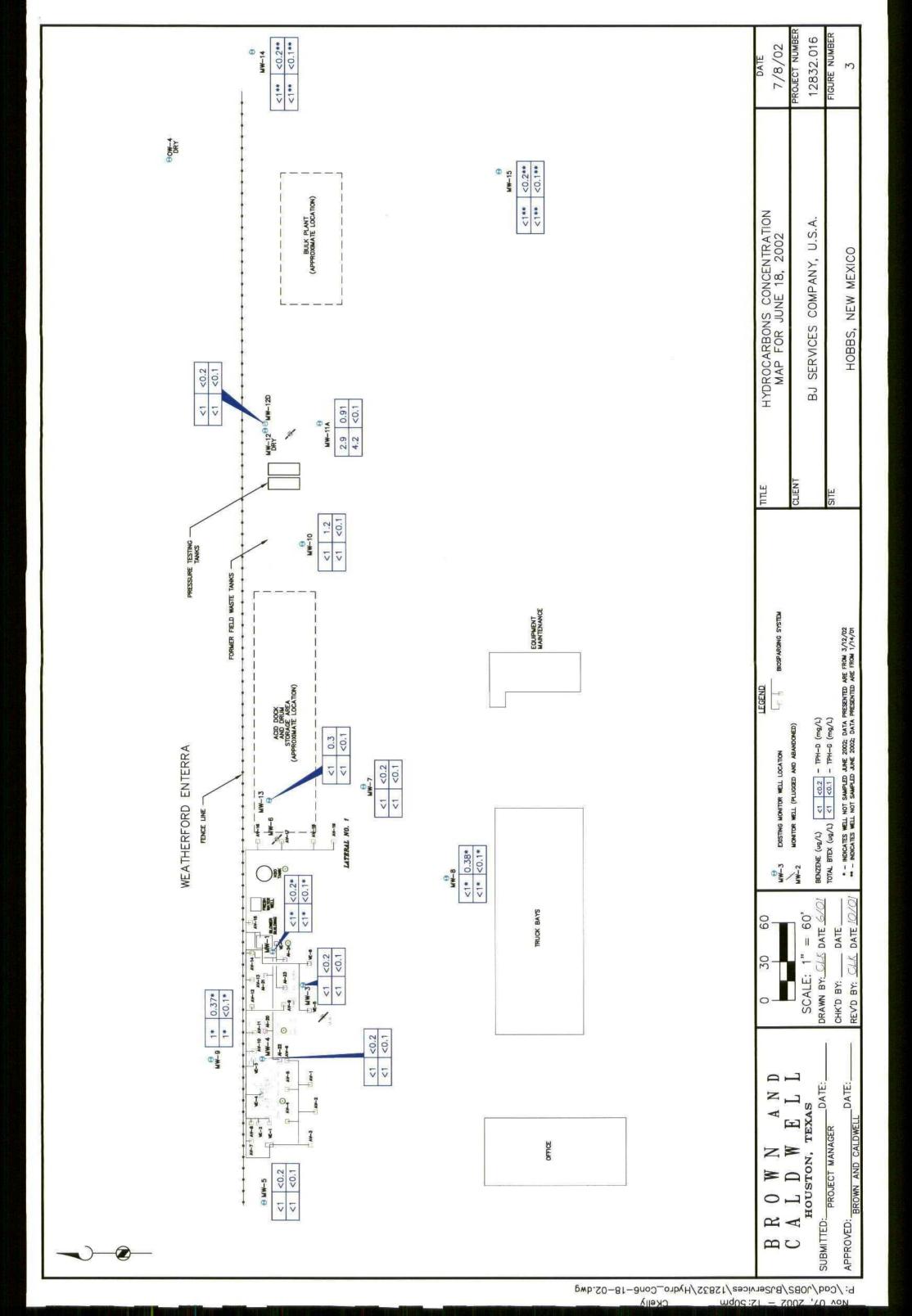
Principal Geologist

RLR/uak

**FIGURES** 







### **TABLES**

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Date	Activity
February 7, 1991	The New Mexico Oil Conservation Division (NMOCD) conducted an on-site inspection, including sampling of the on-site fresh water well.
August 6, 1991	The NMOCD 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 NMOCD.
November 15, 1991	The NMOCD approved the Technical Work Plan submitted by RSA.
December 16, 1991	RSA sampled the fresh water well. The analytical results were submitted to the NMOCD.
February 21, 1992	Western sampled the fresh water well. The analytical results were submitted to the NMOCD.
July 29 -	Brown and Caldwell conducted a soil and groundwater investigation
August 10, 1992	according to the approved Technical Work Plan. The investigation included drilling and sampling nine soil borings, sampling six handaugured soil borings, installation and sampling of five monitor wells, and sampling of the fresh water well.
October 12, 1992	Brown and Caldwell submitted a Soil and Groundwater Investigation Report to the NMOCD.
December 2, 1992	The NMOCD requested the installation and sampling of four additional monitor wells, including a monitor well on an adjacent property.
April 13, 1993	Brown and Caldwell conducted a vapor extraction pilot test on the existing monitor wells.
April 15, 1993	Brown and Caldwell installed off-site monitor well MW-9.
April 22, 1993	Brown and Caldwell sampled off-site monitor well MW-9.
May 27, 1993	Brown and Caldwell submitted a letter report documenting the installation and sampling of off-site monitor well MW-9 to the NMOCD.
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.

Date	Activity
June 21, 1993	ENSR Consulting and Engineering (ENSR), the environmental consultant for the adjacent property owner on which off-site well MW-9 is located, submitted a request to sample monitor well MW-9.
July 15, 1993	ENSR split a groundwater sample collected from monitor well MW-9 with Brown and Caldwell.
July 30, 1993	USTank Management, Inc. submitted a 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 monitor wells. Brown and Caldwell sampled each of the existing and newly installed monitor wells.
January 26, 1994	Brown and Caldwell performed a groundwater monitoring event; the existing monitor wells and the fresh water well were purged and sampled. The groundwater samples were analyzed for BTEX.
May 6, 1994	A Remedial Action Plan (RAP) was submitted to the NMOCD.
August 11, 1994	The RAP was approved by the NMOCD.
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 the 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) constructed the initial design of the biosparging system.
September 19, 1995	Operation of the extraction portion of the biosparging system commenced.
November 13, 1995	Operation of the injection portion of the biosparging system commenced.
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.

Date	Activity
May 31, 1996	Brown and Caldwell conducted the May 1996 groundwater sampling event.
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 tanks 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 was installed.
April 1997	Vapor extraction well VE-4 was 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 was 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.

Date	Activity
December 9-10, 1998	Brown and Caldwell conducted the December 1998 groundwater sampling event.
January 21, 1999	The 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 by the NMOCD.
May 19, 1999	The NMOCD approved the groundwater delineation work plan.
June10, 1999	Brown and Caldwell performed sampling of existing monitor wells for the June /July 1999 groundwater sampling event.
July 2, 1999	Brown and Caldwell completed plugging and abandonment of monitor wells MW-2, MW-6, and MW-11; installed and developed monitor wells MW-12D and MW-13; and sampled monitor wells MW-12D and MW-13 to complete the June/July 1999 groundwater sampling event.
July 14, 1999	Brown and Caldwell redirected air discharge from the shallow injection 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.
November 1, 2000	Brown and Caldwell deactivated the biosparging system.
December 7, 2000	Brown and Caldwell conducted the December 2000 groundwater sampling event.

Date	Activity
January 2001	Brown and Caldwell installed and sampled monitor wells MW-14 and MW-15.
March 8-9, 2001	Brown and Caldwell conducted the March 2001 groundwater sampling event.
June 21-22, 2001	Brown and Caldwell conducted the June 2001 groundwater sampling event.
July 23, 2001	Brown and Caldwell collected soil samples from four soil borings installed at the former fueling system area of the facility to confirm the effectiveness of the biosparging system in remediating hydrocarbon impact to soil, as specified in the NMOCD-approved RAP.
September 10, 2001	Brown and Caldwell conducted the September 2001 groundwater sampling event.
December 6, 2001	Brown and Caldwell conducted the December 2001 groundwater sampling event.
February 26, 2002	Brown and Caldwell repaired the crushed well completion on monitor well MW-10.
February 28, 2002	NMOCD requested an evaluation of chloride content of groundwater at the facility.
March 11-12, 2002	Brown and Caldwell conducted the March 2002 groundwater sampling event. Groundwater samples from all water-producing wells at the facility were analyzed for chloride content.
May 21, 2002	Brown and Caldwell submitted the report for the March 2002 groundwater sampling event, including an evaluation of chloride content of groundwater at the facility and a recommendation for installation of a downgradient off-site well (MW-16) to replace off-site well OW-4, which has gone dry.
June 17-18, 2002	Brown and Caldwell conducted the June 2002 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	201101
		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	DCU Chaan
		09/30/98 12/09/98	56.82 57.05	0.00 0.00	3,590.71 3,590.48	PSH Sheen
				0.00	3,590.48	
		03/10/99 06/10/99	57.45 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	36.14	- 0.00	3,363.33	(3)
		03/09/00	58.99	0.00	3,588.54	(5)
		06/00	30.55	1	- 1	
		09/00	_		- 1	
		12/7/00	<u>.</u>		1 - 1	
		03/08/01	60.35	0.00	3587.18	
		6/21/01	60.99	0.00	3,586.54	
		9/10/01	61.17	0.00	3,586.36	
		12/6/2001		not measured	· 1	
		03/11/02	62.11	0.00	3585.42	
		6/17/02	62.53	0.00	3,585.00	
MW-2	3,644.84	08/10/92	52.82	0.00	3,592.02	(1)
	i i	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	(4) (5)
		05/03/95		-	2.502.01	(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 0.00	3,592.28	
		08/18/93	52.82	0.00	3,592.18 3,591.95	
		01/26/94	53.05	0.00	3,590.69	
		05/03/95 07/31/95	54.31 51.24	0.00	3,593.76	
		11/14/95	51.24 51.10	0.00	3,593.70	
		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	

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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	3,645.00	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	
		03/08/01	57.69	0.00	3,587.31	
		6/21/01	58.34	0.00	3,586.66	
		9/10/01	58.54	0.00	3,586.46	
		12/6/2001	59.04	0.00	3,585.96	
		03/11/02 6/17/02	59.50 59.83	0.00 0.00	3,585.50 3,585.17	
MW-4	3,645.28	08/10/92	50.55	0.00	3,585.17	(1)
IVI VV	3,043.28	02/09/93	50.26	0.00	3,595.02	(1)
		08/18/93	50.38	0.00	3,594.90	
		01/26/94	50.90	0.30	3,594.63	
		05/03/95	51.51	0.45	3,594.14	
		07/31/95	51.74	0.26	3,593.75	
		11/14/95	51.03	0.20	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	200 1 2011
		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 0.00	3,590.21 3,590.18	
		07/02/99 09/14/99	55.10 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	
		03/08/01	57.72	0.00	3,587.56	
		6/21/01	58.18	0.00	3,587.10	
		9/10/01	58.54	0.00	3,586.74	
		12/6/2001	58.88	0.00	3,586.40	
		03/11/02	59.41	0.00	3,585.87	
		6/17/02	59.67	0.00	3,585.61	
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 53.57	0.00	3,594.89	
		02/23/96	53.57	0.00	3,594.15 3,594.56	
		05/31/96	53.16	0.00 0.00	3,594.36 3,594.31	
		08/23/96 12/02/96	53.41 53.98	0.00	3,593.74	
		03/12/97	53.98 54.44	0.00	3,593.74	
		06/12/97	54.44 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	
	1	03/23/98	55.05	0.00	3,592.67	
		06/23/98	55.44	0.00	3,592.28	
1	1	09/30/98	55.65	0.00	3,592.07	
-		12/09/98	56.00	0.00	3,591.72	
	1	03/09/99	56.45	0.00	3,591.27	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-5	3,647.72	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	
		03/08/01	59.36	0.00	3,588.36	
	ľ	6/21/01	59.94	0.00	3,587.78	
		9/10/01	59.85	0.00	3,587.87	
		12/6/2001	60.56	0.00	3,587.16	
	[	3/11/02	61.12	0.00	3,586.60	
		6/17/02	61.43	0.00	∂;586:29 <b>₽</b>	
MW-6	3,644.74	02/09/93	50.58	0.00	3,594.16	(1)
1		08/18/93	50.78	0.00	3,593.96	
-		01/26/94	51.00	0.00	3,593.74	
J	]	05/03/95	52.63	0.00	3,592.11	
	1	07/31/95	51.90	0.00	3,592.84	
		11/14/95	51.19	0.00 0.00	3,593.55 3,592.64	
Į.	1	02/23/96	52.10	0.00		
		05/31/96 08/23/96	51.76 51.63	0.00	3,592.98 3,593.11	
		12/02/96	52.85	0.00	3,593.11	
1		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	
1		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	
i		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	
ľ		07/02/99			1	(5),(6)
MW-7	3,644.55	02/09/93	50.53	0.00	3,594.02	(1)
l	,	08/18/93	50.74	0.00	3,593.81	` ,
		01/26/94	51.01	0.00	3,593.54	
1		05/03/95	52.25	0.00	3,592.30	
j		07/31/95	51.92	0.00	3,592.63	
- 1		11/14/95	51.48	0.00	3,593.07	
i	1	02/23/96	52.15	0.00	3,592.40	
ļ	}	05/31/96	51.78	0.00	3,592.77	
	j	08/23/96	52.02	0.00	3,592.53	
	1	12/02/96	52.52	0.00	3,592.03	
}	ŀ	03/12/97	52.99	0.00	3,591.56	
	1	06/12/97	53.08	0.00	3,591.47	
	1	09/11/97	53.00	0.00	3,591.55	
1	Ì	12/10/97	53.28	0.00	3,591.27	
	ĺ	03/23/98	53.59	0.00	3,590.96	
]		06/23/98	54.20	0.00	3,590.35	
1	ł	09/30/98	54.54	0.00	3,590.01	
1		12/09/98	54.74	0.00 0.00	3,589.81	
1		03/09/99	55.15 55.44	0.00	3,589.40	
- 1	Ī	06/10/99	55.66 55.73	0.00	3,588.89	
		07/02/99	55.73 55.04		3,588.82	
	İ	09/13/99 12/09/99	55.94 56.38	0.00 0.00	3,588.61 3,588.17	
1	[	03/09/00	56.38 56.74	0.00	3,588.17	
		06/08/00	50.74 57.17	0.00	3,587.81	
j	J	09/13/00	57.40	0.00	3,587.15	
	ľ	12/07/00	57.40 57.77	0.00	3,587.15	
		03/08/01		0.00		
1	J	6/21/01	58.29 58.91	0.00	3,586.26	
		9/10/01		0.00	3,585.64	
		12/6/2001	59.25 59.75	0.00	3,585.30 3,584.80	
		12/0/2001	27./3		2,264.80	
1	Į.	03/11/02	60.03	0.00	3,584.52	

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 05/31/96	52.17 51.55	0.00 0.00	3,592.70 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	
	1	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 55.57	0.00	3,589.31	
		07/02/99	55.57	0.00	3,589.30	
		09/13/99 12/09/99	55.72	0.00	3,589.15	(3)
		03/09/00	56.52	0.00	3,588.35	(5)
		06/00	30.32	0.00	3,566.55	
		09/00	•	_		
		12/00	<u>-</u>	-	- 1	
1		03/08/01	58.11	0.00	3,586.76	
		6/21/01	58.72	0.00	3,586.15	
		9/10/01	58.94	0.00	3,585.93	
ł	·	12/6/2001		not measured	1	
		03/11/02	59.94	0.00	3,584.93	
		6/17/02	60.22	0.00	3,584.65	
MW-9	3,644.78	04/22/93	49.73	0.00	3,595.05	(1)
		07/15/93	49.65 49.85	0.00 0.00	3,595.13 3,594.93	
ļ		08/18/93 01/26/94	50.02	0.00	3,594.76	
		05/03/95	51.35	0.00	3,593.43	
ļ		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	
ļ		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
	j	12/10/97	52.37	0.00	3,592.41	PSH Sheen
1		03/23/98	52.68	0.00	3,592.10	PSH Sheen
		06/23/98	53.08 53.39	0.00 0.01	3,591.70	PSH Sheen PSH Sheen
		09/30/98 12/09/98	53.68	0.00	3,591.10	ron onceil
İ		03/10/99	54.15	0.00	3,590.63	
ĺ	ſ	06/10/99	54.68	0.00	3,590.10	
ļ		07/02/99	54.71	0.00	3,590.07	
		09/13/99	54.71	0.00	3,590.07	
		12/09/99	-	•	-	(3)
	ľ	03/09/00	55.69	0.00	3,589.09	
		06/00	•	-	- 1	
		09/00	•	-	- 1	
	1	12/00	•	•	<u>-</u>	
	1	03/08/01	57.03	0.00	3,587.75	
		6/21/01	57.91	0.00	3,586.87	
	j	9/10/01	57.95	0.00	3,586.83	
		12/6/2001		not measured	<u>,                                    </u>	
1	1	03/11/02	58.96	0.00	3,585.82	
i	į	6/17/02	59.14	0.00	3,585.64	

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-10 3,644.47	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	
		03/09/01	59.31	0.00	3,585.24	
		6/21/01	59.89	0.00	3,584.66	
		9/10/01	61.34	0.00	3,583.21	
				0.00	1	
	1	12/6/2001	60.65	0.00	3,583.90	
		03/11/02	60.69	0.00	3,583.86	
1432 11	2 642 70	6/17/02	60.98	0.00	3,583.57	(1)
MW-11	3,643.78	08/18/93	51.92	0.00	3,592.63	(1)
		01/26/94	52.32	0.00	3,591.46	
		05/03/95	53.38 53.35	0.00	3,590.40	
		07/31/95	53.33 52.96	0.00	3,590.43 3,590.82	
		11/14/95		0.00	1	
		02/23/96 05/31/96	53.50	0.00	3,590.28	
		The second secon	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		3,589.82	
!		09/12/97	52.93	0.00	3,590.85	(5) (6)
N4337 1 1 4	2 644 24	12/10/97	64.70	0.00	2.500.45	(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	
i		09/13/00	58.84	0.00	3,585.40	
		12/07/00	59.29	0.00	3,584.95	
		03/08/01	59.72	0.00	3,584.52	

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	3,644.24	6/21/01	60.28	0.00	3,583.96	
		9/10/01	60.69	0.00	3,583.55	
		12/6/2001	60.88	0.00	3,583.36	
		03/11/02	61.42	0.00	3,582.82	
		6/17/02	61.55	0.00	3,582.69	
MW-12	3,644.29	03/23/98	54.72	0.00	3,589.57	(7)
MW-12	, i	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	
		03/08/01	59.76	0.00	3,584.53	
		6/21/01	60.29	0.00	3,584.00	
		9/10/01	60.79	0.00	3,583.50	
		12/6/2001		ng this and subsequent monit		
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	•	<del>-</del>	-	
		03/08/01	₹	-		
1	•	6/21/01	•	-	1 - 1	
	1	9/10/01	-	-	2 502 00	
		12/6/2001	61.30	0.00	3,583.08	
		03/11/02	61.61	0.00	3,582.77	
2432.12	3 (45.52	6/17/02	61.71	0.00	3,582.67	(0)
MW-13	3,645.52	07/02/99	56.60		3,588.92	(9)
		09/14/99	56.92	0.00	3,588.60	
		12/09/99	57.28	0.00 0.00	3,588.24	
		03/10/00	57.68		3,587.84	
	•	06/08/00	58.04	0.00	3,587.48	
	İ	09/13/00	58.29 58.68	0.00 0.00	3,587.23 3,586.84	
		12/07/00	58.68 59.19	0.00	3,586.84	
		03/08/01	59.19	0.00	3,585.72	
	1	6/21/01 9/10/01	60.03	0.00	3,585.72	
ľ	ł	12/6/2001	60.59	0.00	3,585.49	
		03/11/02	60.94	0.00	3,584.58	
		6/17/02	61.28	0.00	3,584.24	
MW-14	3,642.45	03/08/01	61.07	0.00	3,581.38	
141 AA -14	2,042.43	6/21/01	61.71	0.00	3,580.74	
		9/10/01	62.31	0.00	3,580.14	
		12/6/2001	62.80	0.00	3,579.65	
1		03/11/02	62.70	0.00	3,579.75	
j		6/17/02	62.65	0.00	3,579.80	
MW-15	3,643.24	03/08/01	59.79	0.00	3,583.45	
[C1-W IV]	3,043.24		60.49	0.00	3,582.75	
		6/21/01		0.00	1 '	
		9/10/01 12/6/2001	61.02 61.47	0.00	3,582.22 3,581.77	
		03/11/02	61.65	0.00	3,581.77	
		0.3(1.1/0//	0107	0.00		

## 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
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	
		03/08/01	61.43	0.00	3,582.63	(10)
		6/21/01	61.48	0.00	3,582.58	
J		9/10/01	61.53	0.00	3,582.53	
		12/6/2001	well dry durir	ng this and subsequent monit	oring events	

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

<sup>(2) -</sup> For wells having measurable thickness of free product, the groundwater elevation was calculated as follows:

Groundwater Elevation = (TOC elevation)-(depth to groundwater)+[(free product thickness)x(SG of free product)]

Note: The specific gravity (SG) of the free product is 0.82.

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

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

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

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

 $<sup>^{(7)}\</sup>text{-}$  TOC elevations for MW-11A and MW-12 estimated relative to TOC elevation for MW-10.

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

<sup>(9) -</sup> TOC elevation for MW-13 estimated relative to TOC elevation for MW-7.

<sup>(10)-</sup>Well dry (measured depth to water is below base of screen), true groundwater elevation is less than listed groundwater elevation.

Table 3
June 17-18, 2002 Field Screening Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

(a) (A)

1

Monitor	Cumulative Gallons	Hq	Temperature (°C)	Conductivity	Redox	Dissolved Oxygen	Dissolved Oxygen (Hach	Ferrous Iron (ma/I.)	Alkalinity
	Removed					(meter) (mg/L)	kit) (mg/L)	(	(a.e)
MW-3	1.5	7.56	20.05	1267	84.5	7.53	MN	NM	NM
MW-4	2.0	7.51	20.70	1360	6.97	7.55	MN	MN	NM
MW-5	2	7.33	23.42	1093	95.5	95'L	NM	MN	70
MW-7	0.35	7.13	22.20	1408	138.5	5.54	MN	MN	NM
MW-10	1.0	98.9	21.01	4031	-52.9	1.64	NM	NM	165
MW-11A	1.0	6.84	20.73	6241	-58.40	2.53	NM	NM	110
MW-12D	4.6	7.17	20.09	1098	-54.5	0.52	NM	NM	NM
MW-13	2.5	7.32	19.83	1500	-1.6	2.96	NM	NM	NM
MW-14	1.5	7.81	19.55	1941	51.3	7.53	NM	NM	NM
MW-15	2.5	6.81	19.54	1428	132.9	6.19	NM	NM	MN

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

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.

Monitor wells MW-12 and OW-4 were dry.

NM=Not Measured

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type			ns per liter, ug/L			er liter, mg/L
MW-1	8/10/92	Regular	5550.0	12090.0	2160.0	7370.0	NA	NA
10, 00-1	2/9/93	Regular	2100.0	6500.0	1300.0	7400.0	NA NA	NA NA
	8/19/93	Regular	3200.0	7300.0	1200.0	3700.0	NA NA	NA NA
	1/27/94	Regular	1930.0	4580.0	672.0	2390.0	NA NA	NA NA
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA NA	NSP
	8/1/95	Regular	390.0	1300.0	230.0	800.0	NA NA	5.7
	11/15/95	Regular	880.0	1800.0	300.0	970.0	NA NA	6.8
	2/23/96	Regular	1500.0	3700.0	620.0	2200.0	NA NA	21
	5/31/96	Regular	1100.0	1700.0	380.0	990.0	NA NA	7.5
	8/23/96	1 -	1800.0	3300.0	570.0	2100.0	NA NA	17
	12/2/96	Regular	5600.0	9600.0	2100.0	9600.0	100	64
	1	Regular	5500.0	9700.0	2600.0	8200.0	22	62
	3/12/97	Regular	5300.0	I	7500.0	27000.0	180	160
	6/12/97	Regular	1	34000.0	1	į.	ł	ł
	9/12/97	Regular	1800.0	4400.0	1000.0	3000.0	23	21 71
	12/10/97	Regular	7600.0	12000.0	2800.0	8200.0	11	
	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
	9/30/1998	Regular	3.2	90.0	280.0	970.0	2.5	3.6
	12/10/1998	Regular	< 1.0	1.5	17.0	110.0	1.4	0.31
	3/10/1999	Regular	< 1.0	< 1.0	8.2	110.0	0.62	0.85
	3/10/1999	Duplicate	< 1.0	< 1.0	7.9	110.0	0.66	0.84
	6/10/1999	Regular	< 1.0	1.1	< 1.0	28.0	0.53	0.55
	6/10/1999	Duplicate	< 1.0	1.8	< 1.0	41.0	0.69	0.76
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	D1	NS < 1	NS < 1	NS < 1	NS 9.1	NS 14	NS 1.3
	3/9/2000 6/8/2000	Regular	NS NS	NS	NS	NS NS	NS	NS
	9/13/2000		NS	NS	NS	NS	NS NS	NS
	12/7/2000	_	NS	NS NS	NS	NS	NS	NS NS
	3/8/2001	Regular	2.0	<1	<1	<1	0.49	0.58
	6/21/2001	-	NS	NS	NS	NS	NS	NS
	9/10/2001	-	NS	NS	NS	NS	NS	NS
	12/6/2001	-	NS	NS	NS	NS	NS	NS
	3/12/2002	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	6/18/2002		NS	NS	NS	NS	NS	NS
MW-2 1	8/10/92	Regular	14.9	< 4	< 4	< 4	NA NA	NA
i	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	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	NA
	5/4/95	Regular	770.0	3300.0	470.0	1800.0	NA NA	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
1	5/31/96	Regular	670.0	3900.0	1200.0	2300.0	NA NA	15
	8/23/96	Regular	330.0	2200.0	590.0	1500.0	NA	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

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	трн-С
Well	Date	Туре	r	microgran	ns per liter, ug/L		milligrams pe	er liter, mg/L
MW-3	6/12/97	Regular	860.0	4800.0	1700.0	2600.0	1.9	20
141 44 -3	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
	9/30/1998	Regular	42.0	470.0	450.0	530.0	1.0	3.8
	12/10/1998	Regular	13.0	220.0	160.0	290.0	1.3	0.43
	3/10/1999	Regular	3.2	7.4	42.0	32.0	0.2	0.44
		1 -	1.7	3.1	<1.0	36.0	< 0.20	0.18
	6/10/1999 9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	Regular	<1	<1.0	<1.0	<1	< 0.2	< 0.1
	i	Regular	<1	<1	<1	<1	0.32	< 0.1
	3/9/2000 6/8/2000	Regular Regular	<1	<1	<1	<1	< 0.22	< 0.1
	9/13/2000	Regular	<1	<1	<1	<1	< 0.2	< 0.1
	12/7/2000	Regular	<1	<1	<1	<1	< 0.25	< 0.1
	3/8/2001	Regular	< 1	<1	<1	<1	0.42	< 0.1
	6/21/2001	Regular	<1	<1	<1	<1	< 0.22	< 0.1
	9/10/2001	Regular	<1	<1	<1	<1	< 0.2	< 0.1
	12/6/2001	Regular	< 1	< 1	<1	<1	< 0.2	< 0.1
	3/12/2002	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/18/2002	Regular	< 1	<1	_<1	< 1	< 0.2	< 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	0.0011	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
	9/30/1998	Regular	80.0	180.0	370.0	840.0	2.0	3.9
	12/10/1998	Regular	28.0	70.0	210.0	960.0	9.3	4.3
	12/10/1998	Duplicate	26.0	62.0	180.0	830.0	3.9	4.3
	3/10/1999	Regular	8.0	20.0	250.0	1400.0	13.0	13
	6/10/1999	Regular	<1.0	<1.0	12.0	12.0	0.44	0.63
	9/14/1999	Regular	< 1.0	< 1.0	3.3	13.1	0.35	0.17
	12/9/1999	Regular	< l	2.5	2.3	20.1	2	0.53
	3/10/2000	Regular	< 1	< 1	< 1	3.6	2.6	0.15
	6/8/2000	Regular	<1	< 1	<1	< 1	0.44	0.23
	9/13/2000	Regular	< 1	< ]	< 1	< 1	0.61	< 0.1
J	12/7/2000	Regular	< 1	<1	1.3	<1	0.53	0.16
	3/8/2001	Regular	< 1	<1	 < l	<1	0.43	0.16
	6/21/2001	Regular	< 1	< 1	<1	<1	< 0.25	< 0.1

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		<u> </u>	ms per liter, ug/L			er liter, mg/L
MW-4	9/10/2001	Regular	<1	< 1	<1	< 1	< 0.2	< 0.1
	12/6/2001	Regular	<1	< 1	<1	<1	0.6	<1
	3/12/2002	Regular	<1	< 1	< 1	<1	< 0.2	< 0.1
	6/18/2002	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
MW-5	8/10/92	Regular	< 4	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
i	8/10/93	Regular	< 2	< 2	< 2	< 6	NA NA	NA
ļ	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	NA
ł	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA I	NA
	5/31/96	Regular	31.0	86.0	10.0	20.0	NA NA	NA
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
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
Ί	3/23/98	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	6/23/98	Regular	< 1	< 1	<1	<1	< 0.2	< 0.1
i	9/30/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
J	12/10/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/9/1999	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	6/10/1999	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	9/14/1999	Regular	<1.0	<1.0	<1.0	<2.0	< 0.20	< 0.10
ļ	12/9/1999	Regular	< 1	< 1	<1	<1	< 0.2	< 0.1
	3/9/2000	Regular	< 1	< 1	<1	<1	0.55	< 0.1
	6/8/2000	Regular	< 1	< 1	<1	<1	< 0.2	< 0.1
	9/13/2000	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	12/7/2000	Regular	< 1	< 1	< 1	<1	< 0.25	< 0.1
	3/8/2001	Regular	< 1	< 1	< 1	<1	0.56	< 0.1
ļ	6/21/2001	Regular	< 1	< 1	<1	<1	0.26	< 0.1
	9/10/2001	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	12/6/2001	Regular	< 1	< 1	< 1	< 1	0.49	< 0.1
	3/12/2002	Regular	< 1	< 1	< 1	< 1	< 0.24	< 0.1
	6/18/2002	Regular	< 1	< 1	<1	< 1	< 0.2	< 0.1
MW-6 1	8/10/92	Regular	NS	NS	NS	NS	NA 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	NA
	8/1/95	Regular	8300.0	12000.0	2500.0	5100.0	NA	60
İ	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
ł	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	1.7	5.6	< 0.1
1	3/12/97	Regular	12.0	< 5	6.8	18.0	12	< 0.5
ļ	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	11	< 0.1

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type			ns per liter, ug/L		milligrams p	er liter, mg/L
MW-6	12/10/97	Regular	3.0	4.2	1.2	3.9	1.7	0.14
H	3/23/98	Regular	3.6	< 1	4.0	<1	< 0.2	< 0.1
1	6/23/98	Regular	170.0	4.1	15.0	7.2	1.2	0.51
	9/30/1998	Regular	1000.0	420.0	140.0	270.0	4.0	3.3
	12/10/1998	Regular	7.6	6.6	1.7	5.8	2.0	< 0.1
11	3/10/1999	Regular	2500.0	930.0	590.0	1400.0	11.0	13
MW-7	8/10/92	Regular	NS	NS	NS	NS	NA	NS
1	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
1	8/19/93	Regular	< 2	3.0	< 2	< 2	NA	NA
<b>!</b> }	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
i	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 NA	< 0.1
]]	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA NA	< 0.1
	2/23/96	Duplicate	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	29.0	83.0	10.0	21.0	NA NA	0.25
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	<1	<1	< 0.1	< 0.1
	3/12/97	Regular	<1	< 1	<1 .	< 1	< 0.1	< 0.1
İ	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	< 0.2	< 0.1
1	6/23/98	Regular	< 1	/ < i	< 1	< 1	< 0.2	< 0.1
•	9/30/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/1998	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
i	3/9/1999	Regular	<1.0	<1.0	<1.0	<1.0	4.7	< 0.1
	6/10/1999	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	Regular	< 5	< 5	< 5	< 5	1.8	< 0.5
	3/9/2000	Regular	< 1	< 1	<1	<1	0.66	< 0.1
	6/8/2000	Regular	< 1	< 1	< 1	< 1	< 0.21	< 0.1
	9/13/2000	Regular	< 1	< 1	<1	< 1	< 0.2	< 0.1
	12/7/2000	Regular	< 1	< 1	< 1	< 1	< 0.29	< 0.1
1	3/8/2001	Regular	< 1	< 1	< 1	< 1	1.2	< 0.1
	6/21/2001	Regular	3.1	<1	< 1	< 1	< 0.22	< 0.1
	9/10/2001	Regular	< 1	<1	< 1	< 1	< 0.33	< 0.1
	12/6/2001	Regular	< 1	< 1	< 1	< 1	1.3	< 0.1
	3/12/2002	Regular	< 1	< 1	< 1	<1	NA	< 0.1
	6/18/2002	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	3.0	4.9	0.8	3.7	NA	NA
	8/1/95	Regular	3.1	1.2	0.5	1.6	NA	< 0.001
1	8/1/95	Duplicate	3.6	1.5	0.5	1.5	NA	< 0.1
l	11/15/95	Regular	< 0.3	0.5	< 0.3	< 0.6	NA	< 0.1
ļ	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

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type		·	ns per liter, ug/L.		milligrams p	er liter, mg/L
MW-8	12/2/96	Regular	< 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
	9/30/1998		< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/1998	Regular	< 1.0	1		< 1.0	< 0.20	< 0.1
	1	Regular		< 1.0	< 1.0	1		1
	3/9/1999	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	6/10/1999	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	, ,	NS	NS	NS	NS	NS 0.55	NS
	3/9/2000	Regular	< 1	<1	<1	< 1	0.55	< 0.1
	6/8/2000		NS	NS	NS NS	NS NS	NS NS	NS NS
	9/13/2000	-	NS NS	NS NS	NS NS	Į.	NS NS	NS NS
	12/7/2000 3/8/2001	Regular	NS < 1	NS < 1	NS < 1	NS < 1	1.6	NS < 0.1
	6/21/2001	Regular	NS	NS	NS NS	NS	NS	NS
	9/10/2001	-	NS NS	NS NS	NS NS	NS	NS NS	NS NS
	12/6/2001	1	NS	NS	NS NS	NS	NS	NS NS
	3/12/2002	Regular	<1	<1	< 1	<1	0.38	< 0.1
	6/18/2002		NS	NS	NS	NS	NS	NS
MW-9	4/22/93	Regular	570.0	380.0	< 50	870.0	NA	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 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	NA NA
	8/1/95	Regular	660.0	410.0	91.0	310.0	NA NA	6.2
	11/15/95	Regular	240.0	24.0	11.0	140.0	NA NA	1.5
	11/15/95	Duplicate	170.0	18.0	10.0	120.0	NA NA	1.9
	2/23/96	Regular	170.0	18.0	2.3	160.0	NA NA	4.3
	5/31/96	Regular	120.0	16.0	3.0	200.0	NA.	NA NA
	8/23/96	Regular	82.0	13.0	6.0	270.0	NA NA	4
	8/23/96	Duplicate	76.0	14.0	4.8	250.0	NA 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	2.6
	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
	6/12/97	Duplicate	4.7 < 5	2.1 < 5	6.6	69.0	5.2	1.9
	9/12/97		2.1			120.0	1.2	1
!	12/10/97	Regular	4.9	2.3 9.0	2.1 6.8	62.0	0.86	1.9 0.92
		Regular						ř.
	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
	9/30/1998	Regular	1.1	5.5	21.0	59.0	0.27	0.27
	12/10/1998	Regular	< 1.0	1.9	17.0	79.0	5.1	0.25
	3/10/1999	Regular	< 1.0	< 1.0	5.7	68.0	< 0.2	0.22
	6/10/1999	Regular	< 1.0	1.8	1.8	71.0	< 0.20	0.43
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	<0.10
	12/9/1999		NS	NS	NS	NS	NS	NS
	3/9/2000	Regular	< 1	< 1	< 1	64.0	0.66	1.3

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type		microgran	ns per liter, ug/L		milligrams p	er liter, mg/L
MW-9	6/8/2000		NS	NS	NS	NS	NS	NS
	9/13/2000		NS	NS .	NS	NS	NS	NS
	12/7/2000	-	NS	NS	NS	NS	NS	NS
	3/8/2001	Regular	< 1	< 1	<1	< 1	1.4	< 0.1
	6/21/2001	·	NS	NS	NS	NS	NS	NS
	9/10/2001	-	NS	NS	NS	NS	NS	NS
	12/6/2001		NS	NS	NS	NS	NS	NS
	3/12/2002	Regular	1	< 1	< 1	< 1	0.37	< 0.1
	6/18/2002		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 NA	3.6
	11/15/95	Regular	1000.0	24.0	15.0	36.0	NA 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
	9/30/1998	Regular	84.0	3.2	30.0	2.2	1.4	0.36
	12/10/1998	Regular	29.0	1.0	7.0	1.0	0.86	0.18
	3/9/1999	Regular	28.0	<5.0	5.8	<5.0	0.92	<0.5
	6/10/1999	Regular	17.0	<1.0	<1.0	<1.0	0.30	0.16
	9/14/1999	Regular	10.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/1999	Regular	23.0	< 1	< 1	1.2	0.44	0.16
	3/10/2000	Regular	300.0	4.3	6.6	43.2	1.2	0.85
	6/8/2000	Regular	78.0	1.7	7.2	9.0	0.67	0.74
	9/13/2000	Regular	23.0	1.5	1.1	2.9	1.6	0.41
	12/7/2000	Regular	7.2	< 1	< 1	< 1	1.5	0.15
	3/8/2001	Regular	3.4	1.1	< 1	<1	3.4	0.2
	6/22/2001	Regular	< 1	< 1	< 1	< 1	1.2	<0.1
;	9/10/01 and 9/18/01	Regular	2	< 1	< 1	< 1	2.3	<0.1
	12/6/2001	Regular			1	No Valid Data		
	3/12/2002	Regular	<1	< 1	< 1	<1	3.2	1.0>
	6/18/2002	Regular	< 1	< ]	< 1	< 1	1.2	<0.1

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		·	ns per liter, ug/L		milligrams p	
MW-11	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
141.11-11	1/27/94	Regular	<1	<1	<1	<1	NA NA	NA.
į	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA NA	NA NA
ļ	8/1/95		44.0	29.0	5.5	13.0	NA I	0.2
	11/15/95	Regular Regular	190.0	29.0	5.5 6.2	11.0	NA NA	0.2
	2/23/96	_	49.0	i		4.0	NA	0.25
		Regular		1.2	0.5			
	5/31/96	Regular	300.0	83.0	12.0	28.0	NA 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
	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
	9/30/1998	Regular	9.3	3.7	2.2	7.0	<0.20	0.1
	12/10/1998	Regular	1.7	<1.0	<1.0	<1.0	<0.20	<0.1
	3/10/1999	Regular	<5	< 5	< 5	< 5	0.3	<0.5
	6/10/1999	Regular	<1.0	< 1.0	< 1.0	< 1.0	<0.20	<0.10
	9/13/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/1999	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/9/2000	Regular	1.2	< 1	< 1	< 1	0.43	< 0.1
	6/8/2000	Regular	3.6	< 1	< 1	< 1	0.37	< 0.1
	9/13/2000	Regular	1.4	< 1	< 1	< 1	0.36	< 0.1
	12/7/00	Regular	26	< 1	< 1	3.3	0.3	0.12
	3/8/01	Regular	12	< 5	< 5	< 5	2.2	< 0.5
	6/22/2001	Regular	1.5	< 1	< 1	< 1	1	< 0.1
	9/10/2001	Regular	7.9	< 1	< 1	< 1	1.1	< 0.1
	12/6/2001	Regular	<1	< 1	< 1	< 1	1	< 0.1
	3/12/2002	Regular	1.8	< 1	< 1	1	1.6	< 0.1
	6/18/2002	Regular	2.9	< 1	1.3	< 1	0.91	< 0.1
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
	9/30/1998	Regular	260.0	3.0	1.2	7.9	<0.20	0.62
	12/10/1998	Regular	160.0	< 1.0	< 1.0	1.2	0.21	0.36
	3/10/1999	Regular	160.0	1.1	< 1.0	2.9	0.38	0.45
	6/10/1999	Regular	49.0	1.4	< 1.0	< 1.0	0.22	0.13
	9/14/1999	Regular	75.0	< 1.0	< 1.0	< 2.0	<0.20	0.23
	12/9/1999	Regular	64.0	< 1	< 1	< 1	< 0.2	0.21
	3/10/2000	Regular	93.0	<1	< 1	< l	< 0.2	0.21
	3/10/2000	Duplicate	99.0	<1	< }	< 1	0.22	0.22
	6/8/2000	Regular	62.0	< 1	< 1	< 1	< 0.2	< 0.1
ļ	9/13/2000	Regular	34.0	< 1	< 1	< 1	0.23	< 0.1
[	12/7/2000	Regular	27	< 1	2.9	1.9	<0.25	< 0.1
	3/8/2001	Regular	14	<]	< 1	< 1	2.1	0.1
	6/22/2001	Regular	12	< 1	< 1	<1	0.51	0.11
ŀ	9/10/2001				ampled) During This	,	l	

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	трн-G
Well	Date	Type		microgran	ns per liter, ug/L		milligrams po	er liter, mg/L
MW-12D	7/2/1999	Regular	< 5	< 5	. <5	< 5	<0.20	<0.10
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	<0.10
	12/9/1999	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	3/9/2000	Regular	</td <td>&lt;1</td> <td>&lt;1</td> <td>&lt;1</td> <td>0.24</td> <td>&lt; 0.1</td>	<1	<1	<1	0.24	< 0.1
	6/8/2000	Regular	< 1	< 1	<1	< 1	< 0.2	< 0.1
	9/13/2000	-	NS	NS	NS	NS	NS	NS
	12/7/2000	-	NS	NS	NS	NS	NS	NS
	3/8/2001	-	NS	NS	NS	NS	NS	NS
	6/22/2001	-	NS .	NS	NS	NS	NS	NS
	9/18/2001	Regular	< 1	< }	< 1	< 1	< 0.2	< 0.1
	12/6/2001	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/12/2002	Regular	< 1	< 1	< 1	< 1	0.44	< 0.1
	6/18/2002	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
MW-13	7/2/1999	Regular	1500.0	23.0	750.0	58.0	2.2	5.1
	9/14/1999	Regular	860.0	16.0	450.0	34.4	2.1	3.1
	12/9/1999	Regular	430.0	16.0	410.0	40.9	0.46	3.2
	3/10/2000	Regular	88.0	2.8	200.0	1.3	1.9	0.99
	6/8/2000	Regular	6.0	< 1	63.0	3.3	1.1	0.91
	9/13/2000	Regular	<1.0	<1.0	3.4	<1.0	0.44	0.12
	12/7/2000	Regular	<1	<1	<1	<1	0.43	< 0.1
	3/8/2001	Regular	<1	<1	1.2	<1	2	< 0.1
	6/22/2001	Regular	< 1	< 1	< 1	< 1	0.31	< 0.1
	9/10/2001	Regular	< 1	< 1	< 1	<1	0.3	< 0.1
	12/6/2001	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	3/12/2002	Regular	< 1	< 1	< 1	<1	0.84	< 0.1
	6/18/2002	Regular	< 1	< 1	< 1	< 1	0.3	< 0.1
MW-14	1/14/2001	Regular	< 1	< 1	<1	< 1	< 0.2	< 0.1
MW-15	1/14/2001	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
OW-4	6/10/1999	Regular	<1.0	<1.0	<1.0	4.4	< 0.2	< 0.10
	9/14/1999	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.2	< 0.1
	3/9/2000	Regular	< 1.0	< 1.0	< 1.0	< 1.0	0.25	< 0.1
	6/8/2000	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.21	< 0.1
İ	9/13/2000	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.2	< 0.1
	12/7/2000			Well Dry (Not S	Sampled) During This	and Subsequen	t Monitoring Events	

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

NA=Not Analyzed

NS-D=Not Sampled because well was dry NS=Not Sampled NSP=Not Sampled due to Phase Separated Hydrocarbons

Table 5
Cumulative Results<sup>(1)</sup> for Chloride<sup>(2)</sup> Analyses
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

1434

M 1-WM 160 160 160 160 160 160 160 160 160 160	MW-3   M								MINISTER ACTOR							
160		MW-4   N	MW-5   MW-6	9-MM	MW-7	MW-8	6-WM	MW-10 MW-11	-	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
770	150	310	130	380	310	350	110	2200	3400	NP <sup>(4)</sup>	ΝP	dN	ďN	ďΝ	dΝ	NS <sup>(5)</sup>
061	140	001	66	210	250	360	140	2000	2900	ď	NP	NP	ΑN	N.	ΝP	NS
3/23-24/98 212	206	126	151	183	223	364	164	2390	SN	940	1200	NP	ΝP	ďN	ď	SN
3/9-10/99 163	156	142	155	411	238	274	123	0911	SN	834	314	NP	ď	NP	A.	NS
6/10-7/2/99 NA <sup>(6)</sup>	NA	NA	Y X	ĄN	NA A	A'A	NA	Ϋ́	AN	NA	Ϋ́	195	496	NP	ď	566
3/9-10/00 258	196	961	196	ď	224	241	131	474	ď	1290	327	117	276	NP	ď	258
1/14/2001 NS	SN	NS	SN	N.	SN	SN	NS	SN	N.	NS	SN	NS	SN	368	219	NS
3/8-9/01 NA	165	172	152	NP	224	250	127	879	ğ	1720	586	SN	276	327	NA	NS-D <sup>(7)</sup>
6/21/2001 NA I	NA	NA	N A	ďΝ	NA A	Y Y	A A	NA	ğ	NA	Ϋ́	NS	NA	222	222	NS-D
9/10/2001 NA	NA	NA	NA	ď	NA A	AA	NA A	NA	Ā	NA	Q-SN	NA	NA	245	228	NS-D
9/18/2001 NA	NA	NA A	N A	N d	NA A	NA	NA	N A	ğ	NA	NS-D	78.8	NA	NA	ΝΑ	NS-D
12/6/2001 NA	NA L	NA A	NA	dZ	AN	NA	Z A	N A	gN	NA	NS-D	NA	ΥN	276	215	NS-D
3/11-12/02 177		183	127	ď	188	241	110	861	ď	1230	NS-D	75.8	207	284	224	NS-D
6/18/2002 NS	NA	NA	NA	NP	NA	NS	NS	NA	NP	NA	NS-D	NA	145	258	233	NS-D

 $^{(1)}$  - in mg/L.

(2) - NMWQCC standard for chloride is 250 mg/L.

(3) - MW-2 not operative after May 3, 1995; P&A'd 7/1/99.

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

MW-11 P&A'd 7/1/99.

MW-11A installed February 1998.

MW-12 installed February 1998.

MW-12D installed June 1999.

MW-13 installed June 1999.

MW-14 installed January 2001.

MW-15 installed January 2001.

(4) - NP indicates that well was not present at time of sampling event.

- (5) NS indicates that well was not sampled during applicable sampling event.
- (6) NA indicates that well was not analyzed for chloride during applicable sampling event.
  - $^{\left( 7
    ight) }$  NS-D indicates that well was dry (not sampled) during applicable sampling event.

Table 6
Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, and MW-12
Hobbs, New Mexico
BJ Services Company, U.S.A.

				Dissolved Methane
Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	(mg/L)
	3/23/1998	3.87	190	< 0.0012
	3/9/1999	<0.1	195	< 0.0012
	6/10/1999	4.73	209	< 0.0012
	9/14/1999	4.3	210	< 0.0012
	12/9/1999	4.2	210	< 0.0012
	3/9/2000	5.3	260	< 0.0012
	6/8/2000	4.7	240	< 0.0012
MW-5	9/13/2000	3.93	200	< 0.0012
	12/7/2000	3.27	160	< 0.0012
	3/8/2001	3.24	180	< 0.0012
	6/21/2001	2.74	150	0.0017
	9/10/2001	NA <sup>(2)</sup>	130	< 0.0012
	12/6/2001	2.38	120	< 0.0012
	3/12/2002	2.98	120	< 0.0012
	6/18/2002	2.56	110	0.002
	3/23/1998	0.07	320	0.91
	6/23/1998	< 0.1	325	0.55
	9/30/1998	< 0.1	204	0.81
	12/10/1998	< 0.1	180	0.091
	0 (0 (1 0 0 0		142	
	3/9/1999	< 0.1	223 <sup>(3)</sup>	0.035
	9/14/1999	<0.10	160	0.0049
	12/9/1999	0.49	170	0.0039
MW-10	3/10/2000	0.1	160	0.0056
	6/8/2000	< 0.1	150	0.031
	9/13/2000	< 0.1	160	0.031
	12/7/2000	< 0.1	190	0.17
	3/8/2001	< 0.1	270	< 0.0012
	6/22/2001	< 0.1	270	0.044
	9/10/2001	NA	NA	NA
	3/12/2002	< 0.1	230	NA
	6/18/2002	< 0.1	240	0.007

Table 6
Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, and MW-12
Hobbs, New Mexico
BJ Services Company, U.S.A.

Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	Dissolved Methane (mg/L)
***************************************	3/23/1998	< 0.05	190	0.14
	6/23/1998	< 0.1	225	0.11
	9/30/1998	0.4	196	0.043
	12/10/1998	0.7	188	0.033
		< 0.1	164	
	3/10/1999	< 0.1 <sup>(4)</sup>	227 <sup>(3)</sup>	0.094
	6/10/1999	< 0.1	181	0.0036
	9/13/1999	0.22	250	< 0.0012
	12/9/1999	< 0.1	290	0.0079
MW-11A	3/9/2000	0.11	270	0.037
	6/8/2000	< 0.1	240	0.0069
	9/13/2000	< 0.1	320	< 0.0012
	12/7/2000	< 0.1	260	0.0096
	3/8/2001	< 0.1	330	0.0028
	6/22/2001	< 0.1	180	0.0074
	9/10/2001	NA	280	< 0.0012
	12/6/2001	< 0.1	240	0.0041
	3/12/2002	< 0.1	350	0.0044
	6/18/2002	< 0.1	560	0.0028
	3/23/1998	< 0.05	240	< 0.0012
	6/23/1998	< 0.1	240	< 0.0012
	9/30/1998	< 0.1	168	< 0.0012
	12/10/1998	< 0.1	202	< 0.0012
	2/10/1000	< 0.1	137	
•	3/10/1999	< 0.1 <sup>(4)</sup>	193 <sup>(3)</sup>	< 0.0012
MW-12	6/10/1999	< 0.1	217	< 0.0012
10100-12	9/14/1999	< 0.10	230	< 0.0012
	12/9/1999	< 0.1	180	< 0.0012
	3/10/2000	< 0.1	210	< 0.0012
	6/8/2000	< 0.1	220	< 0.0012
	9/13/2000	< 0.1	240	< 0.0012
	12/7/2000	< 0.1	260	< 0.0012
	3/8/2001	< 0.1	300	< 0.0012

# Table 6 Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, and MW-12 Hobbs, New Mexico

BJ Services Company, U.S.A.

Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	Dissolved Methane (mg/L)
MW-12	6/22/2001	< 0.1	360	0.0021
	9/10/2001	Well Dry (Not Sampled) During This and Subsequent Monitoring Events		
MW-12D	9/18/2001	NA	190	< 0.0012
	12/6/2001	< 0.1	200	< 0.0012
	3/12/2002	< 0.1	200	< 0.0012
	6/18/2002	< 0.1	180	0.0012

<sup>(1) -</sup> By EPA Method 300, except as noted

mg/L = milligrams per liter

<sup>(2) -</sup> NA indicates not analyzed

<sup>(3) -</sup> By EPA Method 375.4

<sup>(4) -</sup> By EPA Method 353.3

<sup>(5) -</sup> NS-D indicates not sampled (well dry)

**APPENDICES** 

""

A Section

#### APPENDIX A

**Groundwater Sampling Forms** 

### BROWN AND CALDWELL

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

WELLID: MIN-3

1. PROJECT INFORMATION Project Number: 12.18.72. Task Number: 0.17. Date: (0.1710.72. Time: 9.30. Time								
Client:	$1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot$							
Project Location: Holds, I/M Weather: SC St(I/N)  2. WELL DATA  Casing Diameter: inches								
2. WELL DATA  Casing Diameter:								
Casing Diameter:								
Screen Diameter: 2 inches Type: A PVC	<u> </u>							
Total Depth of Well: \$\begin{array}{c ccccccccccccccccccccccccccccccccccc								
Depth to Static Water: \$\frac{\text{1}}{2}\frac{1}{2}\text{feet}\$ From: \$\frac{\text{1}}{2}\text{ rop of Well Casing (TOC)} \text{ or Top of Protective Casing} \text{ Other:} \\  \text{Length of Water Column: } \frac{\text{1}}{2}\text{ feet}\$ From: \$\frac{\text{1}}{2}\text{ rop of Well Casing (TOC)} \text{ or Top of Protective Casing} \text{ Other:} \\  \text{Length of Water Column: } \frac{\text{1}}{2}\text{ feet}\$ From: \$\frac{\text{1}}{2}\text{ rop of Well Casing (TOC)} \text{ or Top of Protective Casing} \text{ Other:} \\  \text{Depth to Water Column: } \frac{\text{1}}{2}\text{ feet}\$ From: \$\frac{\text{1}}{2}\text{ rop of Well Casing (TOC)} \text{ or Top of Protective Casing} \text{ Other:} \\  \text{Depth of Water Column: } \frac{\text{1}}{2}\text{ feet}\$ From: \$\frac{\text{1}}{2}\text{ rop of Well Casing (TOC)} \text{ or Top of Protective Casing} \text{ Other:} \\  \text{Pump intake depth} \text{ (from GS): } \\  \text{3}\text{ Feet: } \text{ of Selection of Pump Or Protective Casing}  of Note: 2-inch well = 0.16 gating Advisors of Pump Or Protective Casing \text{ of Note: 2-inch well = 0.16 gating Advisors of Pump Or Protective Casing \text{ of Note: 2-inch well = 0.16 gating Advisors of Pump Or Protective Casing \text{ of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Pump Or Protective Casing \text{ of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note: 2-inch well = 0.16 gating Advisors of Note:								
Depth to Product								
Length of Water Column: 3. 9 feet   Well Volume: 1.5 gail   Screened Interval (from GS): 45-60								
Pump Intake depth (from GS)								
Purge Method:   Bailer, Size:	Note: 2-inch well = 0.16 gal/ft							
A SAMPLING DATA   Materials: Pump Bailes   Pump   Departs   Pump   Departs   Pump   Departs   Pump   Departs   Pump   Pemp   Pemp   Pump   Departs   Pump   Pump   Pump   Departs   Pump   Pu	2 DUDGE DATA							
Materials   Mate								
Materials: Roge/Tubing Was well purged dry?  Time   Curn. Gallons   Removed   Ph   Temp   Spec.   Cond.   Eh   Dissolved   Turbidity   Depth to Water (TOC)    SAMPLING DATA   In L   Sample Turbidity   Comments   Sample Turbidity   Comments   Sample Turbidity   Comments   Sample Collected?   Sample Collected?   Properties   Prope	Managala D (DC) Stainless DPVC DTeflon® SOther: 00/VChVPnC							
Was well purged dry?  Time   Cum. Gallons   PH   Temp   Spec.   Eh   Dissolved   Turbidity   Depth to Water   (TOC)    S-49   1.53   7.56   70.09   76.7   84.5   7.53      4. SAMPLING DATA   MA   Method(s):   Bladder Pump   2* Submersible Pump   4* Submersible Pump   Method(s):   Persistatic Pump   Depth to Water   Dissolved   Persistatic Pump   Depth to Water   Dissolved   Persistatic Pump   Depth to Water   Dissolved   Depth to Water   Dissolved   Depth to Water   Dissolved   Depth to Water at Time of Sampling:   Field Cleaned   Disposable   Depth to Water at Time of Sampling:   Field Filtered?   Yes   No   Sample ID:   Yes   Xio   ID:    Duplicate Sample Collected?   Water   Dissolved   Disposable   Depth to Water at Time of Sampling:   Field Filtered?   Yes   No   Sample ID:   Yes   Xio   ID:   Makerials:	Materials: Rond/Tubing Polyethylene Polypropylene Teflon® Other							
Vas well purged dry?   Yes 20 No   Pumping Rate:	Tendedicated difference off-Site difficience adultsposable 2.							
4. SAMPLING DATA  Method(s): Stailers   Depth to Water at Time of Sampler   Depth to Water at Time of	Was well purged dry?   Yes 20 No Pumping Rate: gallmin							
4. SAMPLING DATA    Method(s):   Bialier, Size:     Biadder Pump   2" Submersible Pump   4" Submersible Pump   Method(s):   Peristaltic Pump   Intertial Lift Pump   Other:   Materials: Pump   Bialier   Stainless   PVC     Tellono   Stother:   Mother   Mot	I Time     pH   temp     En     Turbidity     Comments							
Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible Pump Peristaltic Pump Inertial Lift Pump Other:  Materials: Pump Bailer Stainless PVC Teffon® Stother: No Volt Virt Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Tubing/Rope Polyethylene Polypropylene Teffon® Other: Nitrate: mg/L  Depticated Prepared Off-Site Field Cleaned Disposable  Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Sample ID: Sample Time: 12 OB OFF of Containers: Alkalinity: mg/L  Duplicate Sample Collected?  Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible P	5.49 1.53 7.56 20.09 1267 184.5 7.53							
Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible Pump Peristaltic Pump Inertial Lift Pump Other:  Materials: Pump Bailer Stainless PVC Teffon® Stother: No Volt Virt Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Tubing/Rope Polyethylene Polypropylene Teffon® Other: Nitrate: mg/L  Depticated Prepared Off-Site Field Cleaned Disposable  Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Sample ID: Sample Time: 12 OB OFF of Containers: Alkalinity: mg/L  Duplicate Sample Collected?  Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible P								
Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible Pump Peristaltic Pump Inertial Lift Pump Other:  Materials: Pump Bailer Stainless PVC Teffon® Stother: No Volt Virt Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Tubing/Rope Polyethylene Polypropylene Teffon® Other: Nitrate: mg/L  Depticated Prepared Off-Site Field Cleaned Disposable  Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Sample ID: Sample Time: 12 OB OFF of Containers: Alkalinity: mg/L  Duplicate Sample Collected?  Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible P								
Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible Pump Peristaltic Pump Inertial Lift Pump Other:  Materials: Pump Bailer Stainless PVC Teffon® Stother: No Volt Virt Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Tubing/Rope Polyethylene Polypropylene Teffon® Other: Nitrate: mg/L  Depticated Prepared Off-Site Field Cleaned Disposable  Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Sample ID: Sample Time: 12 OB OFF of Containers: Alkalinity: mg/L  Duplicate Sample Collected?  Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible P								
Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible Pump Peristaltic Pump Inertial Lift Pump Other:  Materials: Pump Bailer Stainless PVC Teffon® Stother: No Volt Virt Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Tubing/Rope Polyethylene Polypropylene Teffon® Other: Nitrate: mg/L  Depticated Prepared Off-Site Field Cleaned Disposable  Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Sample ID: Sample Time: 12 OB OFF of Containers: Alkalinity: mg/L  Duplicate Sample Collected?  Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible P								
Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible Pump Peristaltic Pump Inertial Lift Pump Other:  Materials: Pump Bailer Stainless PVC Teffon® Stother: No Volt Virt Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Tubing/Rope Polyethylene Polypropylene Teffon® Other: Nitrate: mg/L  Depticated Prepared Off-Site Field Cleaned Disposable  Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Sample ID: Sample Time: 12 OB OFF of Containers: Alkalinity: mg/L  Duplicate Sample Collected?  Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible P								
Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible Pump Peristaltic Pump Inertial Lift Pump Other:  Materials: Pump Bailer Stainless PVC Teffon® Stother: No Volt Virt Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Tubing/Rope Polyethylene Polypropylene Teffon® Other: Nitrate: mg/L  Depticated Prepared Off-Site Field Cleaned Disposable  Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Sample ID: Sample Time: 12 OB OFF of Containers: Alkalinity: mg/L  Duplicate Sample Collected?  Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible P								
Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible Pump Peristaltic Pump Inertial Lift Pump Other:  Materials: Pump Bailer Stainless PVC Teffon® Stother: No Volt Virt Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Tubing/Rope Polyethylene Polypropylene Teffon® Other: Nitrate: mg/L  Depticated Prepared Off-Site Field Cleaned Disposable  Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Sample ID: Sample Time: 12 OB OFF of Containers: Alkalinity: mg/L  Duplicate Sample Collected?  Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible P								
Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible Pump Peristaltic Pump Inertial Lift Pump Other:  Materials: Pump Bailer Stainless PVC Teffon® Stother: No Volt Virt Dedicated Prepared Off-Site Field Cleaned Disposable  Materials: Tubing/Rope Polyethylene Polypropylene Teffon® Other: Nitrate: mg/L  Depticated Prepared Off-Site Field Cleaned Disposable  Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Sample ID: Sample Time: 12 OB OFF of Containers: Alkalinity: mg/L  Duplicate Sample Collected?  Method(s): Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible P								
Method(s): Bailer, Size: S S Bailer, Size: S S Bailer, Size: S S Bailer, Size: S S S S Cother: More Standard S Deficated S Depth S Sample Depth Standard S Depth S Dedicated S Depth S Dedicated S Depth S Dedicated S Depth S Dedicated S Depth S Dedicated S Depth S Dedicated S Disposable S Depth to Water at Time of Sampling: Field Filtered? S Yes S No Sulfate: mg/L Sample ID: S Sample Time: 12 O S 6 15# of Containers: Alkalinity: mg/L Duplicate Sample Collected?  5. COMMENTS  Waterials: Rump/Baile Do: Stainless Pvr Disposable Do: More S No Sulfate: mg/L Alkalinity: mg/L Duplicate Sample Collected?	4. SAMPLING DATA 607 A Geochemical Analyses							
Materials: Pump/Bailer    Stainles   PVC   Teflon®   Other:   Dedicated   Prepared Off-Site   Field Cleaned   Disposable	Method(s): Bailer, Size: 15  Bladder Pump  2" Submersible Pump  4" Submersible Pump							
Materials: Tubing/Rope  Materi	Peristantic Pump Linerial Lift Pump Liotner.							
Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Sample (D: M) Sample Time: 12 08 6 18 of Containers: Alkalinity: mg/L  Duplicate Sample Collected?  Sample Collected?  Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Alkalinity: mg/L  Duplicate Sample Collected?  Depth to Water at Time of Sampling: Field Filtered? Yes No Sulfate: mg/L  Alkalinity: mg/L  Duplicate Sample Collected?	Materials. 1 Unip/Called							
Sample ID: MU-3 Sample Time: 12 08 6/18# of Containers: 5  Duplicate Sample Collected?  Sample Time: 12 08 6/18# of Containers: 5  Alkalinity:	Materials: Tubing/Rope  M Polyethylene / Polypropylene							
Sample ID: MU-3 Sample Time: 12 03 6/18# of Containers: S  Duplicate Sample Collected?  Sample Time: 12 03 6/18# of Containers: S  Alkalinity:mg/L  Sometime: 12 08 6/18# of Containers: S  Alkalinity:mg/L  Sometime: 12 08 6/18# of Containers: S  Alkalinity:mg/L  Sometime: 12 08 6/18# of Containers: S  Alkalinity:mg/L  Sometime: 12 08 6/18# of Containers: S  Alkalinity:mg/L	Ponth to Water at Time of Sampling: Field Filtered? D. Ves. Th. No.							
5. COMMENTS  Will Mude, a gad. measurements not takingt	Sample ID: MW-3 Sample Time: 12:08 6/15# of Containers: 5							
5. COMMENTS  Well rude, a fad measurements not takingt	Alkalinity:mg/L							
well reeds, a pad measurements not taken at	, , , , , , , , , , , , , , , , , , , ,							
well reeds, a pad measurements not taken at								
	5. COMMENTS							
	lutti needs, a pad-measurements not taken at							

Genlinon-projlforms/Field Data Sheet.xIs/BC-gallons

FORM GW-1 (Rev 2/26/02-dg)

In Inntainer. Not enough water to sample, return next day at 12.08, 6/18/02

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

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

WELL ID: MU-4

VVLLL ID. ITIU							
1. PROJECT INFORMATION  Project Number: 1832 Task Number: 017 Date: 417/02 Time: 5.50  Client: BJ Sew 1665 Personnel: RAMSAN, MIGH  Project Location: HDM4, NM Weather: 005 SMNIV							
2. WELL DATA							
Casing Diameter: inches							
Screen Diameter: inches							
Total Depth of Well: 67 82 feet From: 45 Top of Well Casing (TOC) Top of Protective Casing Other:							
Depth to Static Water: 「つつ・(っつつ feet From: 女 Top of Well Casing (TOC) 口 Top of Protective Casing 口 Other:							
Depth to Product: feet							
Length of Water Column: 3.15 feet Well Volume: 0.50 gal Screened Interval (from GS): 45-60							
Pump intake depth (from GS) Note: 2-inch well = 0.16 gal/ft 4-inch well = 0.65 gal/ft							
3. PURGE DATA  Purge Method: Bailer, Size: Bladder Pump   2" Submersible Pump   4" Submersible Pump   Equipment Model(s)  Materials: Pump/Bailer   Stainless   PVC   Teflon® 2 Other: DVT   NV   YN   YN   YN   YN   YN   YN   YN							
Time Cum. Gallons pH Temp Spec. Fh Dissolved Turbidity Depth to Water Comments							
Removed Cond. Oxygen (10C)							
6.22 2.0 7.51 20.70 1360 76.9 1.55 - (brown)							
4. SAMPLING DATA  Method(s): B Bailer, Size: G Bladder Pump 2" Submersible Pump 4" Submersible Pump Ferrous Iron: mg/L  Materials: Pump Bailer Size: PVC Teflon® Other: M/V//// Depoint Stainless PVC Fepared Off-Site Field Cleaned Disposable  Geochemical Analyses  Ferrous Iron: mg/L  DO: mg/L							
Materials: Tubing Rope    Polyetry lene							
Depth to Water at Time of Sampling: NM Field Filtered? Yes No Sulfate:mg/L  Sample ID: MM Sample Time: 12 18 415 # of Containers: 5  Alkalinity:mg/L							
Duplicate Sample Collected?							
5. COMMENTS							
well in good condition. Not emough that							
Simple . Fefry n 6/18/02 0 12 19 pm. Plading taple at Smallest plading to Note: Include comments such as well condition, odor, presence of NAPL, or other items notion the field data sheet.							

Gen non-proj forms | Field Data Sheet.xls | BC-gallons | Gen | Signature |

intervals that VSI will allow given shall be taken I and ear the equipment.

### BROWN AND CALDWELL

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

Mil >-5 WELL ID:

1. PROJECT INFORMATION	10-10							
Project Number: 17.837 Task Number: 017 Date: (17/62 Time: 3/5								
Client: BT Strvices Personnel: MINT KAUSUM								
Project Location: Hows, NM Weather: 605 hot class								
2. WELL DATA								
Casing Diameter: inches Type: 1 PVC   Stainless   Galv. Steel   Teflon®   Other:								
Screen Diameter: inches Type: #PVC D Stainless D G	Type: APVC Stainless Galv. Steel Teflon® Cher							
	From: 🟂 Top of Well Casing (TOC) 🗆 Top of Protective Casing 🗅 Other:							
	From: ★ Top of Well Casing (TOC) □ Top of Protective Casing □ Other:							
	From: 15 Top of Well Casing (TOC)  Top of Protective Casing  Other:							
Length of Water Column: 5.46 feet Well Volume: 0,87 gal	Screened Interval (from GS): 42 60							
Pump intake depth (from GS)	Note: 2-inch well = 0.16 gal/ft 4-inch well = 0.65 gal/ft							
3. PURGE DATA								
Purge Method:	her; Equipment Model(s)							
Materials: Pump Baile	ytre YCI-(1)							
Disputated in Prepared Oil-Site in Preid Cleaned	rojsposable 1. 19160							
	Disposable 2.							
Was well purged dry? Yes No Pumping Rate:	gal/min3							
Time Cum. Gallons pH Temp Spec. Eh Dissol Oxyg	Turbidity   Comments							
3.20 0.75 7.33 23.42 M3 95.5 7.50								
2 gallous total								
Ta guillas in a								
4. SAMPLING DATA	Geochemical Analyses							
Mathod(s): 为 Bailer, Size: 15 Bladder Pump □ 2" Submersible Pump □ 4"	Submersible Pump							
Wet riou(s). Peristaltic Pump Inertial Lift Pump I Other.								
Materials: Pump/Baile Stainless PVC Teflon® d Other: 10 V/10 V/10 DO:mg/L								
Materials: Tuking/Rene DPolyethylene DPolypropylene DTeflon® DOther:								
Death to Weter at Time of Surface Disposable All March 1978 Death to Weter at Time of Surface Disposable All March 1978 Death to Weter at Time of Surface Disposable All March 1978 Death to Weter at Time of Surface Disposable All March 1978 Death to Weter at Time of Surface Disposable All March 1978 Death to Weter at Time of Surface Disposable All March 1978 Death to Weter at Time of Surface Disposable All March 1978 Death to Weter at Time of Surface Disposable All March 1978 Death to Weter Disposable All March 1978 Death to Weter Disposable All March 1978 Death to Weter Disposable All March 1978 Death to Weter Disposable All March 1978 Death to Weter Disposable All March 1978 Death to Weter Disposable Disposable All March 1978 Death to Weter Disposable Death to Weter Disposable Death to Weter Disposable Death to Weter Disposable Death to Weter Disposable Death to Weter Disposable Death to Weter Disposable Death								
Depth to Water at Time of Sampling: 17/1 Field Filtered? Yes 18 No Sulfate: mg/L  Sample ID: MU/5 Sample Time: 9.36 in 16/12 # of Containers: 9								
Alkalinity: / ( ) mg/L								
Duplicate Sample Collected?								
E COLUMNITO								
5. COMMENTS	I so on I conside it a be comedo							
well in your words	Australia Not enough HO to Sample,							
Note: Include comments such as well condition, odor, presence of NAPL, or other items not of	SAMPIC 4/18/12 9 % am YSI							

Gen\non-proj\forms\Field Data Sheet.xls\BC-gallons FORM GW-1 (Rev 2/26/02 - dg)

Plading intervals are taken at smallest interval possible given 5/20 of YSI probosand am interval

## BROWN AND CALDWELL

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

WELL ID: MUS-7

1. PROJECT INFORMATION (1)							
Project Number: 12832 Task Number: U7 Date: 6/17/82 Time: 41)5							
Client: BT Services Personnel: Raus M MM							
Project Location: Hows, VM Weather: 60s Chan							
2. WELL DATA							
Casing Diameter: inches Type: AD PVC D Stainless D Galv. Steel D Teflon® D Other:							
Screen Diameter: inches Type: #PVC   Stainless   Galv. Steel   Teflon®   Other:							
Total Depth of Well: 63. 6 feet From: A Top of Well Casing (TOC) Top of Protective Casing Other:							
Depth to Static Water: 40-39 feet From: 10 Top of Well Casing (TOC)							
Depth to Product: feet							
Length of Water Column: 2.19 feet Well Volume: 0.45 gal Screened Interval (from GS): 45 60							
Pump intake depth (from GS) Note: 2-inch well = 0.16 gal/ft 4-inch well = 0.65 gal/ft							
3. PURGE DATA							
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: Burnet Bailer   Stainless   PVC   Teflon®   Other:   IRIV PINY HIT							
Dedicated Disposable 1.							
Materials: Rope Tubing							
Was well purged dry? ✓ Yes □ No Pumping Rate: gal/min3							
Time Cum. Gallons PH Temp Spec. Eh Dissolved Oxygen Turbidity Depth to Water (TOC) Comments							
409 0.35 7.13 2220 14-08 1315 5.54							
4. SAMPLING DATA tracks							
Method(s): Bailer, Size: Bladder Pump    2" Submersible Pump    4" Submersible Pump							
Peristaltic Pump U Inertial Lift Pump U Other.							
Materials: Pump/Baile							
Materials: Pullip Balle   Prepared Off-Site   Field Cleaned   Disposable   DO:							
Depth to Water at Time of Sampling: MField Filtered? Yes No. Sulfate: mg/L							
Sample ID: MILL 7 Sample Time: 8:53 6/18 # of Containers:							
Alkalinity:mg/L							
Duplicate Sample Collected?							
5. COMMENTS not enough mater 19, well to sample. Take the sample on							
the next day 6/19. Tuell un and ion district VSI reading tration at							
5Mallest internal possible anom Size of VSI police and continue							
Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.							

 $\label{lem:gennon-proj} Gen\non-proj\forms\Field\ Data\ Sheet.xls\BC-gallons\ FORM\ GW-1 \qquad \end{subarray} (\mbox{Rev}\ 2/26/02 \cdot dg)$ 

# **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-B

			<u> </u>					
1. PROJECT IN	_		nhar: 017		Date:_ 6/1	7/07_		Time: 3 49 pm
Client: 120	Servia		nber: <u>O\_/</u>		Personnel:	RAI	isch/Mor.	- 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Project Location:		.NM			Weather:	itot. ()	car 90°	SF
2. WELL DATA	<u> </u>	+						
Casing Diameter:	<u> </u>	ches	Type: p	VC 🛭 Stainle	ess 🛭 Galv. S	teel @ Teflon		
Screen Diameter:	<u> </u>	ches	Type: Æ P	VC 🗆 Stainle	ess 🛚 Galv. S	teel 🔾 Teflon	® ☐ Other	
Total Depth of Well:	59.251	eet	From: 🙇 T	op of Well Ca	sing (TOC) C	Top of Prote	ctive Casing 🚨 🤇	Other:
Depth to Static Water: 1039 feet From: 15 Top of Well Casing (TOC) Top of Protective Casing Other.								Other
Depth to Product:	Depth to Product:feet							
Length of Water Col	ımn: <u> 👌 🖇</u>	(¿) feet	Well Volum	ne: 0 · 15	gal		nterval (from GS	<del></del>
Pump intake depth_	(fr	rom GS)				Note: 1	?-inch well = 0.16 g	al/ft ` 4-inch well ≈ 0.65 gal/ft
3. PURGE DATA	eiler, size 5	inch						
Purge Method: DC	iller, Sizer <u>. 1</u> entrifugal Pun	U Bladd	der Pump 🚨 2 altic Pump 🔘 i	?" Submersible Inertial Lift Pur	Pump 🚨 4* 3	Submersible P	'ump	Equipment Model(s)
Materials: Pump/Bail	☐ Stain ☐ Dedic	less PVC cated Pre	C D Teflont pared Off-Site	® A Other:∭ D Field Clea	ned Si Disp	nc osable	1	YS1-610
Materials:(Rope/Tube	Dedic	ated Pro	Polypropylene epared Off-Site	☐ Teflon® E ☐ Field Cle	☐ Other: eaned ☑ Disp	posable	2	
Was well purged dry	TW WAL	}~ s:≻Q:No			ga		2	
Time Cum, Gallo Removed	I DH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	3	Comments
3.530m 05	7.07	21.52	51.00	64.2	3.96	,		
		<u>                                      </u>						
					<u> </u>			
					<u> </u>			
	<u> </u>							
4. SAMPLING DA	<b>ATA</b>						<u>Geoc</u>	hemical Analyses
	tic Pump 🚨 i	nertial Lift Pu	ump @ Other:		np 🖸 4" Subr	nersible Pump	Ferro	us Iron: mg/L
Materials: Pump/Baile		ess DPVC eted DPrep		Other: Field Clea	ned Dispo	osable	DO:	mg/L
Materials: Tubing/Rop		•			Other:		Nitrat	e: mg/L
Depth to Water at Tim					d? 🗆 Yes	□ No	Sulfat	te: mg/L
Sample ID:	<del></del>	Sample Ti	me:	<del></del>	# of Contain	ers:	- Alkali	nity: mg/L
Duplicate Sample Coll	ected?	Yes 🖸	No ID:		_		, , , , , , , , , , , , , , , , , , ,	.nty
		<del></del>						
5. COMMENTS	1. 4	11 201	CAMAL	2 J K 1. 1	jî , .	n /	1.6.	Endon line
talien at small	1920 Los	mal one	sample sible gi	100 n C120	il in go		action.	Fleid seading;
* UPI) water o	lid mat		az eno			sample	1	11112 · V
Vote: Include comments such	s well condit							

Gen\non-proj\forms\Field Data Sheet.xls\BC-gallons FORM GW-1 (Rev 2/26/02 - dg)

Signature

# **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW 10

1. PROJECT INFORMATION			1176		177			
Project Number: 17832 Task Nur	mber: 017	Date:(/	11106		Time: (1.27			
Client: BJ Services		Personnel:	<u> </u>	USUN/IVIN	1			
Project Location: HOUS, NM		Weather:	105 SU	nny'				
2. WELL DATA				,				
Casing Diameter: inches	Type: ★ PVC □ Stainle	ess 🗆 Galv. Stee	el 🗆 Teflon	® □ Other:				
Screen Diameter: 4 inches	Type: PVC Stainle	ess 🛘 Galv. Stee	el 🗆 Teflon	Other:				
Total Depth of Well: 63.5) feet	From: Top of Well Cas	sing (TOC)	Top of Prote	ctive Casing D O	Other:			
Depth to Static Water: 6098 feet	From:  Top of Well Cas	sing (TOC)	Top of Prote	ctive Casing   O	Other:			
Depth to Product:feet	From: of Well Ca		Top of Prote	ective Casing   C	Other:			
Length of Water Column: 5.53 feet	Well Volume: ()-50	Well Volume: gal Screened Interval (from GS):						
Pump intake depth (from GS)		***	Note: 2	?-inch well = 0.16 ga	al/ft 4-inch well = 0.65 gal/ft			
3. PURGE DATA								
3. PURGE DATA  **Dailer, Size:   C   NC    **Purge Method: Centrifugal Pump Perist	der Pump 🔲 2" Submersible altic Pump 🔘 Inertial Lift Pun	Pump 🚨 4" Su	ibmersible P	ump	Equipment Model(s)			
Materials: Pump Railer	C ☐ Teflon® ☐ Other:	polvetnyten			Equipment Moder(s)			
Dedicated U Pre	pared Off-Site		able	1	1610			
Dedicated Pr	Polypropylene  Teflon® repared Off-Site  Field Cle		sable	2				
Was well purged dry? \( \mathbb{Y} \cdot \mathbb{Y} \) Yes \( \mathbb{O} \) No	Pumping Rate:	gal/m	nin	3.				
Time Cum. Gallons pH Temp	Spec. Eh	Dissolved Oxygen	Turbidity	Depth to Water (TOC)	Comments			
(0.35 1.0 6.86 21.01	9031 - 12.9	1.69		_	has an odora			
*	1 3 1				and was			
				<del> </del>	1			
4. SAMPLING DATA	<u> </u>	<del></del>		Geoch	nemical Analyses			
Method(s): Bailer, Size 5 M Bladder P	rump □ 2" Submersible Pun	np 🗆 4" Subme	rsible Pump	Forro	us Iron: mg/L			
C D Statelland TO DIV	in.	1 1, 1, 1,	۱۳.	reirou	us Iron: mg/L			
Materials. Puriprediller Dedicated Dere	pared Off-Site    Field Clea	ned Disposa	able	DO:	mg/L			
	Polypropylene    Teflon® ( epared Off-Site    Field Cle		sable	Nitrate	e: mg/L			
Depth to Water at Time of Sampling:	ACAA	d? □ Yes <b>&gt;</b> Ö		Sulfate	e: mg/L			
Sample ID: MU 10 Sample T	ime: 9:15 6/18	Fof Container	rs:		11.0			
☐ Yes □	, , , ,	_		Alkalir	nity: 105 mg/L			
Duplicate Sample Collected?								
			<del></del>	<u> </u>				
5. COMMENTS First stading	taken at small	Test inter	160 00	scilate a	1120 KT			
YSI probe of container. Will	IM angra	1920	7197	SSIVIE 9	incresite of			
That enough water to	and be lot	CO NIXI	de	to sav	n N/P			
Note: Include comments such as well condition, odor, p	resence of NAPL, or other ite	ms not on the fie	Id data shee		710			

 $\label{lem:gennon-proj} Gen\non-proj\forms\Field\ Data\ Sheet.xls\BC-gallons\ FORM\ GW-1 \qquad \end{substitute} (Rev\ 2/26/02\ - dg)$ 

Signature

# **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-11A

1. PROJECT INFORMATION
Project Number: 12837 Task Number: 017 Date: 6 1707 Time: 6 170
Client: RT Services Personnel: KMSM/VIM
Project Location: HOWS, WM Weather: 805 Sunny
2. WELL DATA
Casing Diameter: inches Type: SCPVC D Stainless D Galv. Steel D Teflon® D Other:
Screen Diameter: inches Type: KPVC    Stainless    Galv. Steel    Teflon®    Other:
Total Depth of Well: 63 82 feet From: 4 Top of Well Casing (TOC) Top of Protective Casing Other:
Depth to Static Water: ( feet From: 50 Top of Well Casing (TOC) Top of Protective Casing C Other:
Depth to Product: feet
Length of Water Column: 2-27 feet Well Volume: 0.36 gal Screened Interval (from GS): 37-65
Pump intake depth (from GS) Note: 2-inch well = 0.16 gal/ft 4-inch well = 0.65 gal/ft
3. PURGE DATA  Bailer, Size: 1.5 Bladder Pump 2* Submersible Pump 4* Submersible Pump
Purge Method:  **Bailer, Size: 1.) ** Bladder Pump
Manadala R. G. Stainless DPVC DTeflon® & Other: (ID) VYTNY TNO
A Market deared Off-Site defended of Disposable
Waterials. Robe Tubility  ☐ Decicated ☐ Prepared Off-Site ☐ Field Cleaned ☑ Disposable 2.
Was well purged dry?    Yes  No Pumping Rate: gal/min 3.
Time Cum. Gallons PH Temp Spec. Eh Dissolved Oxygen Turbidity Depth to Water (TOC) Comments
6.50 1.0 6.84 2073 6291 -58.90 2-53
+ - 1.5 gallong removed total has an
DAME.
OUT TO THE TOTAL THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO T
4. SAMPLING DATA , , ; i Geochemical Analyses
2 Bailer, Size: 5 10 Bladder Pump
Peristaltic Pump  Inertial Lift Pump  Other:
Materials: Pump/Bailer
Materials: Tubing/Rone Polyethylene Polypropylene Teflon® Other:
Don'th to Water at Time of San July 2015 AMA Field Filtered 2. D. You & No.
Sample ID: M 11 / Sample Time: 12 · 3 5 (1 f of Containers: 1 )
Alkalinity: 170 mg/L
Duplicate Sample Collected?
5. COMMENTS Field readings tolongt smaltest interval possible given size of ysl
5. COMMENTS freld readings trilon at smallest interval possible given size of yst
+ not enough water to sample. Return next day to sample.
Note: Include comments/such as well condition, odor, presence of NAPL, or other items not on the field data sheet.

Gen\non-proj\forms\Field Data Sheet.xls\BC-gallons

FORM GW-1 (Rev 2/26/02 - dg)

# **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: <u>MW 12</u>

1. PROJECT INFORMATION Project Number: 12832 Task Number: 017 Date: 6/11/02 Time: 10 Mg/d
Project Location: How you weather: White Will was 1005
2. WELL DATA
Casing Diameter: inches Type:   Type:
Screen Diameter: 2 inches Type: Q-PVC □ Stainless □ Galv. Steel □ Teflon® □ Other:
A1.A
Total Depth of Well: N M feet 6/2 5 From: As Top of Well Casing (TOC)
Depth to Product: feet From: X Top of Well Casing (TOC) Top of Protective Casing Other:
Length of Water Column: feet
Pump intake depth (from GS)  Note: 2-inch well = 0.16 gal/ft 4-inch well = 0.65 gal/ft
3. PURGE DATA
Purge Method: Discretifical Ruma Discretification Ruma Discretific
Equipment Model(s)
Materials: Pump/Baller
Materials: Rope/Tubing
Was well purged dry? ☐ Yes ☐ No Pumping Rate:gai/min 3.
Time Cum. Gallons pH Temp Spec. Eh Dissolved Turbidity Depth to Water Comments
Removed Pri Cond. Cond. Coxygen (TOC)
4. SAMPLING DATA Geochemical Analyses
Method(s): Bailer, Size: D Bladder Pump 2" Submersible Pump 4" Submersible Pump Ferrous Iron: mg/L
Materials: Pump/Bailer
Dedicated   Prepared Off-Site   Field Cleaned   Disposable   Disposable   Disposable   Disposable   Disposable   Disposable   Dedicated   Prepared Off-Site   Field Cleaned   Disposable
Depth to Water at Time of Sampling: Field Filtered? □ Yes □ No Sulfate: mg/L
Sample ID: # of Containers:
Duplicate Sample Collected?  Alkalinity: mg/L
Duplione Cample Collected:
5. COMMENTS well was dry no samples collected.
well in lord inndition
Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.
Genland-projecting Steel Data Sheet visibC-gallons

 $\label{lem:gennon-proj} Gen\non-proj\forms\Field\ Data\ Sheet.xls\BC-gallons\ FORM\ GW-1 \qquad \end{substitute} (Rev\ 2/26/02\ - dg)$ 

Signature

# **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-12D

1. PRO	JECT INFO	ORMA"	TION			,	. /		1.17
Project l			Task Num	nber: <u>017</u>		Date: 0	3/02		Time:()-
Client:_	BJ Sc1	VICES				Personnel:		sch/Morg	
		olabs, N	<u>IM</u>	<u> </u>		Weather:	08 F U	undy (lear)	
2. WEL	L DATA								
Casing l	Diameter: 7	inc	hes	Type: 🛛 P	VC Stainle	ss 🛭 Galv. St	eel O Teflon	Other:	
	Diameter: 2		hes	Type: p	VC Stainle	ss 🛭 Galv. St	eel 🛭 Teflon	® 13 Other:	
Total De	epth of Well:	7.58 f	eet	From: 10 T	op of Well Cas	ing (TOC)	Top of Prote	ctive Casing O	ther
Depth to	Static Water:_	01-61	feet	<del></del>	op of Well Cas		Top of Prote	ctive Casing D C	ther
	Product:	feet			op of Well Cas			ective Casing   C	
_	of Water Colum	_		Well Volum	e: <u>4.16                                    </u>	gal		nterval (from GS) 2-inch well = 0.16 g	: 775-87-9 auth 4-inch well = 0.65 gal/fi
	take depth <u></u>		<del></del>	<del></del>			<del> </del>		THICH WE! - 0.00 GOV
	GE DATA	u Size:	AM	111/4/02	* Submorsible	Pump 13 4° S	Submereible P	umn	
Purge M	fethod: Cent	rifugal Pum	_ Derista	er Formp /Q 2 altic Pump □ i	nertial Lift Pur	p Other:			Equipment Model(s)
	s (Pump/Bailer	≯ Stainl	ess DPV0	C 🖸 Teflon®	D 🔲 Other:	ned Dispo		1 V	01-610
Material	s: Rope Tubing	Ø Polye	thylene 🗆 i	Polypropylene	☐ Teflon® (	Other:		· G.	tz Pump
	Il purged dry?					aned MiDisp 0.22 gal		2. <u> </u>	12 pario
was we	<u> </u>	U Yes	√SÚ No		ng Rate:		/min	3.	
Time	Cum. Gallons Removed	pН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Depth to Water (TOC)	Comments
10.43	0.6	7.80	21.07	1103	-(D.)	0.60		62.22	Turbid
1096	1.4	7.97	20.39	1101	-58.5	1.59		62.32	Claring up
10.49	120	7.40	20.14	1098	-16.8	1.14		841	clear 1
10.52	2.6	7.27	1997	1096	-90.2	0.11		62.45	clear
1195	3.4	7.19	19.91	1098	-48.6	0.56		52.16	Mar
10-58	4.0	7.17	20.10	1099	-534	051			
11-01	4.6	7.17	20.09	1098	- 64.5	0.52		62.15	
4. SAMF	PLING DAT	ΓΑ						Geoc	nemical Analyses
Method(s				mp X2 2* Sub mp ☐ Other.	mersible Pum	p 🛛 4" Subn	nersible Pump	Ferro	us Iron: mg/L
Materials	Pump/Bailer	勾 Stainle	ss DPVC	☐ Teflon®			<del></del>	DO:	mg/L
	: (Tubipg/Rope	Polyetl	nylene DP	olypropylene	Teflon® C			- Nitrat	
	Water at Time		•			ened ,Æg Disp d2 □ Ves			
Debiu 10	water at time of $MW^{-1}$	л оатрііі 2 <i>1</i> )		ne:// 0/		d? □ Yes # of Contain	` ^	Sulfat	e: mg/L
Sample I	D. 7-180 1					# OF COHERIN	cis. <u>/</u>	- Alkali	nity: mg/L
Duplicate	Sample Collec	ted?	Yes 💯	נטו טאו	•	-			
						<del> </del>			
5 CONAN	AENTO.	71111	1		- //	1 100			
5. COMN	MENIO -	Well	ing	vod C	ondut	UgV			
lote: Include c	omments such as	well conditi	on, odor, pre	sence of NAF	L, or other iter	ms not on the i	field data she	et.	
	n-proj\form						_(\doldar	mort	
	(Rev 2/26/02 - dg				-	•	Signature		

# **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-13

	JECT INFO			nber: 01	1	Date: 10	117110-	_	Fime: 4.28		
Project Client:	OT Co		Task Nun	nber: <u>U</u>	<u>.l</u>	Date: ()	21114	ch Most	ime: 1 20		
		tobbs. 1	IM			Personnel:_ Weather:	Windy /	4 1			
	L DATA	100M3   1	<u> </u>		<del></del>	Westici	miner 4	( II(e)			
	Diameter:	inc	hes	Type: 6P	VC D Stainle	ess 🛘 Galv. Si	teel @ Teflon	® CI Other:	·		
	Diameter:	Z inc	ches	1		ess 🗆 Galv. S					
Total D	epth of Well:(	1063Bi	eet	From: p 1	op of Well Ca	sing (TOC)	Top of Prote	ective Casing O	lher:		
	o Static Water:			From:   Top of Well Casing (TOC)  Top of Protective Casing  Other.							
Depth t	o Product:	fee	t	From: 🗖 Top of Well Casing (TOC) 🗆 Top of Protective Casing 🗆 Other:							
Length	of Water Colum	nn: <u>5.17</u>	feet	Well Volum	ne: <u>0.8</u> 2	gal		nterval (from GS):			
Pump i	ntake depth	(fr	om GS)				Note:	2-inch <b>well = 0.16</b> ga	al/ft 4-inch well = 0.65 gal/ft		
3. PUR	GE DATA		-mih			Pump 1214*					
Purge I	Method: Den	er, Size: <u>  . ˈ</u> trifugal Pun	<u>O</u> □ Bladd np □ Peristi	ter Pump 🔲 : altic Pump 🗇	2" Submersible Inertial Lift Pur	Pump □ 4* : np □ Other:	Submersible F	ump	Equipment Model(s)		
	ls: Pump(Bailer	Stain	less 🚨 PV	C 🗆 Teflon		polvedur	the	, V(	1-1-17		
Materia	ls: Rope tubing	් Polye	thylene 🗆	Polypropylene	□ Teflon®	ned Dispo		1. <u>()</u> - 2			
Was we	ell purged dry?		5 -60 No	•	ing Rate:	_	Vmin	2			
Time	Cum, Gallons Removed	pН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	3	Comments		
4.36	1.0	17.45	2097	1478	52.2	3.92			Eller		
4.46	2.25	7.32	19.83	1500	-1.6	12.96			Black Color		
	2.5 to	Hai ta	Ken								
4. SAMI	PLING DA	TA = )ac						Geoch	nemical Analyses		
Method(	s): X Bailer, Siz	ze: <u>[ 7</u>	🕽 Bladder Pu	ump 🗆 2" Su ump 🖾 Other:		np 🗆 4" Subr	nersible Pump	FerroL	s Iron: mg/L		
Material	s: Pump/Baile	☐ Stainle	ss 🗅 PVC	☐ Teflon€	Other:		lene	DO:	mg/L		
Matarial	s: Tubing/Rope	4	•		☐ Field Clea		osable				
		Dedica Dedica	ited D Pre	pared Off-Site	☐ Field Cle	aned Disp	oosable	Nitrate	e:mg/L		
	Water at Time	/		コーフつ	4	d? □ Yes		Sulfate	e: mg/L		
Sample	ID: <u> ДД (U і</u>	<del></del>	Sample Ti		- 61181 W	# of Contain	ers:	- Alkalir	nity: mg/L		
Duplicate	e Sample Collec	cted?	⊃ Yes <sub>X</sub> Zı	No ID:		_					
				<del></del>		<del></del>	<del></del>				
5. COM	MENTS	11100	000	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	24 1 1/-	Ma Mi	1 100	ale list	h /a		
الالال . ل 17 مراك	VILIVIO	1 1.	lung	voce at	To Nam	of T	Of enough	you have	N Dample		
~ Ken	IDAN I	1. Al	AF V	Chang!	ra VIANY	YU, F	TUULM	VILLONI	and I contract		
منه ۱۲ م تر در در Note: Include و	comments such as	well conditi	ion, odor, ore	レレン( language of NA)	PL or other ite	ms not on the	field data she	et. Pro K	se ona willing		

Gen\non-proj\forms\Field Data Sheet.xIs\BC-gallons FORM GW-1 (Rev 2/2602 - dg)

Own H

# **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW14

1. PROJECT INFORMATION
Project Number: 12832 Task Number: 017 Date: 617102 Time: 7.430
Client: BJ Services Personnel: RAMSCH/MXT
Project Location: Hobbs INM Weather: 70's FIWINDY
2. WELL DATA
Casing Diameter: inches
Screen Diameter: inches
Total Depth of Well: 6 Top of Well Casing (TOC) Top of Protective Casing Other.
Depth to Static Water: 62.65 feet From: A 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: 6.12 feet Well Volume: 1.05 gal Screened Interval (from GS): 54.5.69.5  Note: 2-inch well = 0.16 gal/ft 4-inch well = 0.65 gal
Pump intake depth (from GS)
3. PURGE DATA  Burge Method: A Bailer, Size: 5 10 Bladder Pump  2" Submersible Pump  4" Submersible Pump
Purge Metriou.   ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:
Materials: Pump(Baile)
Materials Rope Tubing Constitution Depolypropylene Deflor® Def
Dedicated Departed Off-Site Defield Cleaned 30 Disposable 2.
7 Urriping Nate gentilet 3
Time Cum, Gallons PH Temp Spec. Eh Dissolved Oxygen Turbidity Depth to Water (TOC) Comments
7.57 10 7.81 19.55 1941 51.3 7.53
dry @ 1.5 gallons
4. SAMPLING DATA Geochemical Analyses
Method(s): Bailer, Size: 1.5 10 Bladder Pump
Materials: Pump/Railer) Stainless DPVC DTeflon® & Other: ab Weth view
Dedicated Difference of Polymorphiese of Tellon® Of Other
Waterlass. (1997)   □ Dedicated □ Prepared Off-Site □ Field Cleaned □ Disposable   Nitrate:mg/L
Depth to Water at Time of Sampling: N N Field Filtered? Yes No Sulfate: mg/L
Sample ID: /// \(\tau^4\) Sample Time: \(\tau^0\) \(\tau\) \(\tau^0\) \(\tau\) of Containers: \(\tau^0\) Alkalinity: \(\tau\) mg/L
Duplicate Sample Collected?
5. COMMENTS not enough water to sample -> return the next day to sample
well in good condition. Field readings taken at smallest interval
possible given sized YSI-probe and confainer
Note: Include comments such as well condition, odbr, presence of NAPL, or other items not on the field data sheet.

Gen\non-proj\forms\Field Data Sheet.xls\BC-gallons FORM GW-1 (Rev 2/26/02 - ag)

Signature Signature

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-15

1. PROJECT INFORMATION		( )	11712		1 17				
Project Number: 12832 Task Nu	mber: 01]	Date: U	11104	<u> </u>	rime: 4 · 13 pm				
Client: BJ SCNICO		Personnel:_		MMOG1					
Project Location: Holds, {	1101	Weather:	tot. 90°.	<u> </u>					
2. WELL DATA									
Casing Diameter: inches	Type: A PVC Stainle	ess 🗆 Gaiv. Si	teel Teflon	Other					
Screen Diameter: inches	Type: PVC Stainle		teel Teflon	0 Cther:					
Total Depth of Well: 67.01 feet	Total Depth of Well: 6 Top of Well Casing (TOC) Top of Protective Casing Other.								
Depth to Static Water: 1 From:  Top of Well Casing (TOC)  Top of Protective Casing  Other									
Depth to Product:feet	From: Top of Well Ca		Top of Prote	ctive Casing DO	ther				
Length of Water Column: 5.43 feet	Well Volume: 0.87	gal		terval (from GS): -inch well = 0.16 ga	<del></del>				
Pump intake depth (from GS)									
Purge Method:	dder Pump	np 🛘 Other: _		ump	Equipment Model(s)				
Materials: Pump/Baile	VC DTeflon® 10 Other:_[] epared Off-Site DField Clea	ned Dispo	osable	1 YS	6/0				
Was well purged dry?   Yes  No	Pumping Rate:		V <b>m</b> in	3.					
Time Cum. Gallons pH Temp	Spec. Eh	Dissolved	Turbidity	Depth to Water	Comments				
1.11   A 5   7.21   19.67	1402 71 8	Oxygen 6.94		(тос)					
4:10	11.0	6.14							
977 10 696 1949	1365 106.2	10.74	,						
A 27 6 3 1 10 10 54		6.66							
9.25 2.0 6.81 19.54	1920 1229	6.14							
23.5 Total pluged	wolume	<del> </del>							
,					<del></del>				
4. SAMPLING DATA				<u>Geoch</u>	emical Analyses				
Method(s): Bailer, Size: 1-5 Di Bladder I	Pump	np 🖸 4" Subr	nersible Pump	Ferrou	is Iron: mg/L				
Materials: Pump/Bailer		ned S Dispo	Sylene osable	DO:	mg/L				
Materials: Tubing Rose X Polyethylene	Polypropylene Teflon® Frepared Off-Site Field Cle	Other:	posable	Nitrate	: mg/L				
Depth to Water at Time of Sampling:		d? 🗅 Yes		Sulfate	e:mg/L				
Sample ID: MW-15 Sample		# of Contain		_					
Duplicate Sample Collected?		_		Alkalin	ity: mg/L				
	<del></del>								
5. COMMENTS (no/) in a	oval condition	2. And	IMMI ah	11 A TON 12 11	oll to compela				
On 6/17, return next do	u to take sam		well re	ading a	re fakler				

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

Gen non-proi forms | Field Data Sheet x | S|BC-pallons | Community | A

Gen\non-proj\forms\Field Data Sheet.xIs\BC-gallons FORM GW-1 (Rev 2/26/02 - dg)

Signature

# APPENDIX B

Laboratory Analytical Report



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

#### **Brown & Caldwell**

## **Certificate of Analysis Number:**

## 02060636

Report To:

Brown & Caldwell Rick Rexroad 1415 Louisiana

Suite 2509 Houston

TX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

Project Name:

**BJ Hobbs 12832** 

Site:

Hobbs, NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported:

7/3/02

# This Report Contains A Total Of 26 Pages

**Excluding This Page** 

And

Chain Of Custody



(713) 660-0901

# Case Narrative for: Brown & Caldwell

#### **Certificate of Analysis Number:**

#### 02060636

Report To:

**Brown & Caldwell** 

Rick Rexroad 1415 Louisiana

Suite 2509

Houston

ΤX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

**Project Name:** 

**BJ Hobbs 12832** 

Site:

Hobbs, NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported: 7/3/02

3/02

Three sets of trip blanks were received with the samples but was not written on the chain of custody (SPL ID's: 02060636-11, 02060636-12 and 02060636-13). Per Amanda Mortl via voicemail on June 20, 2002, SPL analyzed the trip blanks for VOC.

Additional sample was received for your sample ID "MW-13" (SPL ID: 02060636-08), however, no analyses were requested on the chain of custody. Per a revised chain of custody, received on June 20, 2002, via fax, SPL analyzed your sample for Chloride by method 325.3 as well as the analyses requested on the chain.

Matrix spike (MS) and matrix spike duplicate (MSD) samples are chosen and tested at random from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. Since the MS and MSD are chosen at random from an analytical batch, the sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The Laboratory Control Sample (LCS) and the Method Blank (MB) are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

Any other exceptions associated with this report will be footnoted in the analytical result page(s) or the quality control summary page(s).

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

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

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

Sonia West

Senior Project Manager

HINES R SENTERE CONTROL OF THE CONTR

7/3/02

Date



#### **HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE HOUSTON, TX 77054 (713) 660-0901

**BJ Hobbs 12832** 

Hobbs, NM

#### **Brown & Caldwell**

#### **Certificate of Analysis Number:**

#### 02060636

Report To:

Fax To:

**Brown & Caldwell** 

**Rick Rexroad** 1415 Louisiana

**Suite 2509** 

Houston TX

77002-

ph: (713) 759-0999 Brown & Caldwell

Rick Rexroad

fax: (713) 308-3886

fax: (713) 308-3886

State:

**New Mexico** State Cert. No.:

**Project Name:** 

Site Address:

PO Number:

Site:

**Date Reported:** 

7/3/02

Client Sample I	D Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD
MW-3	02060636-01	Water	6/18/02 12:08:00 PM	6/19/02 10:00:00 AM	174127	
MW-4	02060636-02	Water	6/18/02 12:18:00 PM	6/19/02 10:00:00 AM	174127	
MW-5	02060636-03	Water	6/18/02 9:36:00 AM	6/19/02 10:00:00 AM	174127	
MW-7	02060636-04	Water	6/18/02 8:53:00 AM	6/19/02 10:00:00 AM	174127	
MW-10	02060636-05	Water	6/18/02 9:15:00 AM	6/19/02 10:00:00 AM	174127	
MW-11A	02060636-06	Water	6/18/02 12:35:00 PM	6/19/02 10:00:00 AM	174127	
MW-12D	02060636-07	Water	6/18/02 11:01:00 AM	6/19/02 10:00:00 AM	174127	
MW-13	02060636-08	Water	6/18/02 11:32:00 AM	6/19/02 10:00:00 AM	174127	
иW-13	02060636-08	Water	6/18/02 11:32:00 AM	6/19/02 10:00:00 AM	174127	<b>V</b>
MW-14	02060636-09	Water	6/18/02 10:01:00 AM	6/19/02 10:00:00 AM	174127	
MW-15	02060636-10	Water	6/18/02 10:07:00 AM	6/19/02 10:00:00 AM	174127	
rip Blank #1 rip Blank #2	02060636-11	Water	6/18/02	6/19/02 10:00:00 AM	174127	
rip Blank #2	02060636-12	Water	6/18/02	6/19/02 10:00:00 AM	174127	
Trip Blank #3	02060636-13	Water	6/18/02	6/19/02 10:00:00 AM	174127	

ma West Senior Project Manager

7/3/02

Date

Joel Grice Laboratory Director

Ted Yen Quality Assurance Officer



(713) 660-0901

Client Sample ID MW-3

Collected: 06/18/2002 12:08

**SPL Sample ID:** 

02060636-01

Site:	Hobbs,	NM
-------	--------	----

				Site	: Hol	bbs, NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: m			
Diesel Range Organics		ND		0.2		1	06/25/02 10:08	AR	1195393
Surr: n-Pentacosane		45.8	%	18-120		1	06/25/02 10:08	AR	1195393
Prep Method	Prep Date			Prep Initials					
SW3510B	06/20/2002 10:	45		KL					
GASOLINE RANGE O	RGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organic	cs	ND		0.1		1	06/28/02 15:41	DL	1201408
Surr: 1,4-Difluorobenz	zene	89.3	%	74-121		1	06/28/02 15:41	DL	1201408
Surr: 4-Bromofluorobe	enzene	122	%	55-150		1	06/28/02 15:41	DL	1201408
PURGEABLE AROMA	TICS				MCL	SW8021B	Units: uç	g/L	-
Benzene		ND		1		1	06/28/02 15:41	DL	1201307
Ethylbenzene		ND		1		1	06/28/02 15:41	DL	1201307
Toluene		ND		1		1	06/28/02 15:41	DL	1201307
Xylenes,Total		ND		1	•	1	06/28/02 15:41	DL	1201307
Surr: 4-Bromofluorobe	enzene	90.2	%	48-156		1	06/28/02 15:41	DL	1201307
Surr: 1,4-Difluorobenz	ene	73.7	%	72-137		1	06/28/02 15:41	DL	1201307

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



(713) 660-0901

Client Sample ID MW-4

Collected: 06/18/2002 12:18

SPL Sample ID:

02060636-02

				Site	Hol	obs, NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGA	ANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics		ND		0.2		1	06/25/02 10:46	AR	1195394
Surr: n-Pentacosane		38.2	%	18-120		1	06/25/02 10:46	AR	1195394
Prep Method	Prep Date			Prep Initials					
SW3510B	06/20/2002 1	0:45		KL					
GASOLINE RANGE O	RGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organic	cs	ND		0.1		1	06/28/02 17:48	DL	1201409
Surr: 1,4-Difluoroben:	zene	93.7	%	74-121		1	06/28/02 17:48	DL	1201409
Surr: 4-Bromofluorob	enzene	95.7	%	55-150		1	06/28/02 17:48	DL	1201409
PURGEABLE AROMA	TICS				MCL	SW8021B	Units: uç	<sub>3</sub> /L	·-············
Benzene		ND		1		1	06/28/02 17:48	DL	1201319
Ethylbenzene		ND		1		1	06/28/02 17:48	DL	1201319
Toluene		ND		1		1	06/28/02 17:48	DL	1201319
Xylenes,Total		ND		1		1	06/28/02 17:48	DL	1201319
Surr: 4-Bromofluorobo	enzene	96.4	%	48-156		1	06/28/02 17:48	DL	1201319
Surr: 1,4-Difluorobena	zene	89.7	%	72-137		1	06/28/02 17:48	DL	1201319

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



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

Client Sample ID MW-5 Collected: 06/18/2002 9:36 SPL Sample ID: 02060636-03

			Sit	e: Hol	bbs, NM			
Analyses/Method	Resul	t	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGA	NICS			MCL	SW8015B	Units: m	g/L	
Diesel Range Organics	N	)	0.2		1	06/25/02 11:25	AR	1195395
Surr: n-Pentacosane	41.0	5 %	18-120		1	06/25/02 11:25	AR	1195395
Prep Method	Prep Date		Prep Initials	<u>s</u>				
SW3510B	06/20/2002 10:45		KL					
GASOLINE RANGE OF	RGANICS			MCL	SW8015B	Units: m	g/L	
Gasoline Range Organic	s NE	)	0.1		1	06/28/02 18:13	DL	1201410
Surr: 1,4-Difluorobenze	ene 102	2 %	74-121		1	06/28/02 18:13	DL	1201410
Surr: 4-Bromofluorobe	nzene 92.3	3 %	55-150		1	06/28/02 18:13	DL	1201410
HEADSPACE GAS ANA	ALYSIS			MCL	RSK147	Units: m	g/L	
Ethane	NE	)	0.0025		1	06/28/02 13:26	ER	1200134
Ethylene	NE	)	0.0032		1	06/28/02 13:26	ER	1200134
Methane	0.002	?	0.0012		1	06/28/02 13:26	ER	1200134
NITROGEN, NITRATE (	AS N)			MCL	E300	Units: m	g/L	
Nitrogen, Nitrate (As N)	2.56	3	0.1		1	06/19/02 12:31	SN	1192614
PURGEABLE AROMAT	ics			MCL	SW8021B	Units: uç	g/L	
Benzene	NE	)	1		1	06/28/02 18:13	DL	1201323
Ethylbenzene	NE	)	1		1	06/28/02 18:13	DL	1201323
Toluene	NE	)	1	-	1	06/28/02 18:13	DL	1201323
Xylenes,Total	ND	)	1		1	06/28/02 18:13	DL	1201323
Surr: 4-Bromofluorobei	nzene 85.6	%	48-156		1	06/28/02 18:13	DL	1201323
Surr: 1,4-Difluorobenze	ene 97.5	%	72-137		1	06/28/02 18:13	DL	1201323
SULFATE				MCL	E300	Units: m	g/L	
Sulfate	110		4		20	06/27/02 16:13	ES	1200648

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



(713) 660-0901

SPL Sample ID:

02060636-04

Client Sample ID MW-7

Collected: 06/18/2002 8:53

				Site	Hob	obs, NM			
Analyses/Method	Res	sult		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: m	g/L			
Diesel Range Organics		ND		0.2		1	06/25/02 12:03	AR	1195396
Surr: n-Pentacosane	5	6.4	%	18-120		1	06/25/02 12:03	AR	1195396
Prep Method	Prep Date			Prep Initials					
SW3510B	06/20/2002 10:45			KL					
GASOLINE RANGE OF	RGANICS				MCL	SW8015B	Units: m	g/L	· · · · · · · · · · · · · · · · · · ·
Gasoline Range Organic	s	ND		0.1		1	06/28/02 18:39	DL	1201411
Surr: 1,4-Difluorobenz	ene 9	2.0	%	74-121		1	06/28/02 18:39	DL	1201411
Surr: 4-Bromofluorobe	enzene 1	118	%	55-150		1	06/28/02 18:39	DL	1201411
PURGEABLE AROMA	TICS				MCL	SW8021B	Units: ug	<sub>3</sub> /L	
Benzene		ND		1		1	06/28/02 18:39	DL	1201324
Ethylbenzene		ND		1		1	06/28/02 18:39	DL	1201324
Toluene		ND		1		1	06/28/02 18:39	DL	1201324
Xylenes, Total		ND		1		1	06/28/02 18:39	DL	1201324
Surr: 4-Bromofluorobe	enzene 8	2.4	%	48-156		1	06/28/02 18:39	DL	1201324
Surr: 1,4-Difluorobenz	ene 9	3.5	%	72-137		1	06/28/02 18:39	DL	1201324

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



(713) 660-0901

Client Sample ID MW-10

Collected: 06/18/2002 9:15

SPL Sample ID:

02060636-05

Site: F	łobbs,	NM
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Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS				MCL	SW8	015B	Units: m	g/L	
Diesel Range Organics	1.2		0.2		1		06/25/02 10:08	AR	1195387
Surr: n-Pentacosane	36.8	%	18-120		1		06/25/02 10:08	AR	1195387
Prep Method Prep Date			Prep Initials						
SW3510B 06/20/2002 1	0:45		KL						
GASOLINE RANGE ORGANICS				MCL	SW8	015B	Units: m	g/L	
Gasoline Range Organics	ND		0.1		1		06/28/02 19:04	DL	1201412
Surr: 1,4-Difluorobenzene	110	%	74-121		1		06/28/02 19:04	DL	1201412
Surr: 4-Bromofluorobenzene	124	%	55-150		1		06/28/02 19:04	DL	1201412
HEADSPACE GAS ANALYSIS				MCL RSK147		Units: mg/L			
Ethane	ND		0.0025		1		06/28/02 13:38	ER	1200135
Ethylene	ND		0.0032		1		06/28/02 13:38	ER	1200135
Methane	0.007		0.0012		1		06/28/02 13:38	ER	1200135
NITROGEN, NITRATE (AS N)				MCL		E300	Units: m	g/L	
Nitrogen, Nitrate (As N)	ND		0.1		1		06/19/02 12:31	SN	1192617
PURGEABLE AROMATICS				MCL	SW8	021B	Units: ug	3/L	
Benzene	ND		1		1		06/28/02 19:04	DL	1201325
Ethylbenzene	ND		1	_	1		06/28/02 19:04	DL	1201325
Toluene	ND		1		1	_	06/28/02 19:04	DL	1201325
Xylenes,Total	ND		1		1		06/28/02 19:04	DL	1201325
Surr: 4-Bromofluorobenzene	105	%	48-156		1		06/28/02 19:04	DL	1201325
Surr: 1,4-Difluorobenzene	79.7	%	72-137		1		06/28/02 19:04	DL	1201325
SULFATE				MCL		E300	Units: m	g/L	
Sulfate	240		5		25		06/27/02 16:13	ES	1200651

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



(713) 660-0901

Client Sample ID MW-11A

Collected: 06/18/2002 12:35

SPL Sample ID:

02060636-06

Site:	Hobbs,	NM
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			Site	Hol	bbs, NM				
Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANIC	CS			MCL	SW8	015B	Units: m	g/L	
Diesel Range Organics	0.91		0.2		1		06/25/02 10:46	AR	1195388
Surr: n-Pentacosane	41.4	%	18-120		1		06/25/02 10:46	AR	1195388
Prep Method Pre	ep Date		Prep Initials						
SW3510B 06/	20/2002 10:45		KL						
GASOLINE RANGE ORGA	ANICS			MCL	SW8	015B	Units: m	g/L	
Gasoline Range Organics	ND		0.1		1		06/28/02 19:29	DL	1201413
Surr: 1,4-Difluorobenzene	97.3	%	74-121		1		06/28/02 19:29	DL	1201413
Surr: 4-Bromofluorobenze	ne 141	%	55-150		1		06/28/02 19:29	DL	1201413
HEADSPACE GAS ANALY	/SIS			MCL	RS	K147	Units: m	g/L	
Ethane	ND		0.0025		1		06/28/02 13:49	ER	1200136
Ethylene	ND		0.0032		1		06/28/02 13:49	ER	1200136
Methane	0.0028		0.0012		1		06/28/02 13:49	ER	1200136
NITROGEN, NITRATE (AS	N)			MCL		E300	Units: m	g/L	
Nitrogen, Nitrate (As N)	ND		0.1		1		06/19/02 12:31	SN	1192618
PURGEABLE AROMATICS	S			MCL	SW8	021B	Units: uç	y/L	
Benzene	2.9		1		1		06/28/02 19:29	DL	1201326
Ethylbenzene	1.3		1		1		06/28/02 19:29	DL	1201326
Toluene	ND		1		1		06/28/02 19:29	DL	1201326
Xylenes,Total	ND		1		1		06/28/02 19:29	DL	1201326
Surr: 4-Bromofluorobenze	ne 120	%	48-156		1		06/28/02 19:29	DL	1201326
Surr: 1,4-Difluorobenzene	89.2	%	72-137		1		06/28/02 19:29	DL	1201326
SULFATE				MCL		E300	Units: m	g/L	
Sulfate	560		10		50		06/27/02 16:13	ES	1200652

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



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

Client Sample ID MW-12D

Collected: 06/18/2002 11:01

SPL Sample ID:

02060636-07

Site:	Hobbs,	NM
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			Site:	Hol	obs, NM				
Analyses/Method	Result		Rep.Limit		Dil. Factor Q	UAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGA	ANICS			MCL	SW801	15B	Units: m	g/L	
Diesel Range Organics	ND		0.2		1	-	06/25/02 12:03	AR	1195390
Surr: n-Pentacosane	26.0	%	18-120		1		06/25/02 12:03	AR	1195390
Prep Method	Prep Date		Prep Initials						
SW3510B	06/20/2002 10:45		KL						
GASOLINE RANGE OF	RGANICS			MCL	SW801	15B	Units: m	g/L	
Gasoline Range Organic	s ND		0.1		1		06/28/02 19:55	DL	1201414
Surr: 1,4-Difluorobenz	ene 92.7	%	74-121		1		06/28/02 19:55	DL	1201414
Surr: 4-Bromofluorobe	enzene 111	%	55-150		1		06/28/02 19:55	DL	1201414
HEADSPACE GAS AN	ALYSIS			MCL	RSK1	147	Units: m	g/L	
Ethane	ND		0.0025		1		06/28/02 14:45	ER	1200139
Ethylene	0.004		0.0032		1		06/28/02 14:45	ER	1200139
Methane	0.0012		0.0012		1		06/28/02 14:45	ER	1200139
NITROGEN, NITRATE	(AS N)			MCL	E3	300	Units: m	g/L	
Nitrogen, Nitrate (As N)	ND		0.1		1		06/19/02 12:31	SN	1192619
PURGEABLE AROMA	TICS			MCL	SW802	21B	Units: ug	ı/L	
Benzene	ND		1		1		06/28/02 19:55	DL	1201327
Ethylbenzene	ND		1		1		06/28/02 19:55	DL	1201327
Toluene	ND		1		1		06/28/02 19:55	DL	1201327
Xylenes,Total	ND		1		1		06/28/02 19:55	DL	1201327
Surr: 4-Bromofluorobe	enzene 80.5	%	48-156		1		06/28/02 19:55	DL	1201327
Surr: 1,4-Difluorobenz	ene 91.7	%	72-137		1		06/28/02 19:55	DL	1201327
SULFATE				MCL	E3	300	Units: m	g/L	
Sulfate	180		2		10		06/27/02 16:13	ES	1200653

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



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

Client Sample ID MW-13

Collected: 06/18/2002 11:32

SPL Sample ID:

02060636-08

				Site	Hob	obs, NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL					MCL	E325.3	Units: m	g/L	
Chloride		145		2		2	06/24/02 12:15	CV	1193520
DIESEL RANGE ORGA	NICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics		0.3		0.2		1	06/25/02 11:25	AR	1195389
Surr: n-Pentacosane		24.6	%	18-120		1	06/25/02 11:25	AR	1195389
Prep Method	Prep Date			Prep Initials					
SW3510B	06/20/2002 1	0:45		KL					
GASOLINE RANGE OF	RGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organic	s	ND		0.1		1	06/28/02 20:20	DL	1201415
Surr: 1,4-Difluorobenz	ene	89.7	%	74-121		1	06/28/02 20:20	DL	1201415
Surr: 4-Bromofluorobe	nzene	106	%	55-150		1	06/28/02 20:20	DL	1201415
PURGEABLE AROMAT	rics				MCL	SW8021B	Units: ug	<sub>3</sub> /L	
Benzene		ND		1		1	06/28/02 20:20	DL	1201328
Ethylbenzene		ND	•	1		1	06/28/02 20:20	DL	1201328
Toluene		ND		1		1	06/28/02 20:20	DL	1201328
Xylenes,Total		ND		1		1	06/28/02 20:20	DL	1201328
Surr: 4-Bromofluorobe	nzene	97.4	%	48-156		1	06/28/02 20:20	DL	1201328

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



#### HOUSTON LABORATORY 8880 INTERCHANGE DRIVE

HOUSTON, TX 77054 (713) 660-0901

Client Sample ID MW-14

Collected: 06/18/2002 10:01

SPL Sample ID:

02060636-09

Site:	Hobbs.	NM
OILE.	HUDDUG.	8 4141

Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed Analyst	Seq. #
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/L	
Chloride	258	5		5	06/24/02 12:15 CV	1193521

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



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

Client Sample ID MW-15

Collected: 06/18/2002 10:07

SPL Sample ID:

02060636-10

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL			MCL	E325.3	Units: m	g/L	=======================================
Chloride	233	5		5	06/24/02 12:15	CV	1193523

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



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

Client Sample ID Trip Blank #1 Collected: 06/18/2002 0:00 SPL Samp

SPL Sample ID: 020

02060636-11

			Site	e: Hol	obs, NM			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organics	ND		0.1		1	06/28/02 20:45	DL	1201416
Surr: 1,4-Difluorobenzene	100	%	74-121		1	06/28/02 20:45	DL	1201416
Surr: 4-Bromofluorobenzene	114	%	55-150		1	06/28/02 20:45	DL	1201416
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	]/L	
Benzene	ND		1		1	06/28/02 20:45	DL	1201329
Ethylbenzene	ND		1		1	06/28/02 20:45	DL	1201329
Toluene	ND		1		1	06/28/02 20:45	DL	1201329
Xylenes,Total	ND		1		1	06/28/02 20:45	DL	1201329
Surr: 4-Bromofluorobenzene	96.2	%	48-156		1	06/28/02 20:45	DL	1201329
Surr: 1,4-Difluorobenzene	74.9	%	72-137		1	06/28/02 20:45	DL	1201329

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



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

Client Sample ID Trip Blank #2

Collected: 06/18/2002 0:00

SPL Sample ID:

02060636-12

Site:	Hobbs,	NM
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	,							
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organics	ND		0.1		1	06/28/02 21:11	DL	1201417
Surr: 1,4-Difluorobenzene	96.3	%	74-121		1	06/28/02 21:11	DL	1201417
Surr: 4-Bromofluorobenzene	118	%	55-150		1	06/28/02 21:11	DL	1201417
PURGEABLE AROMATICS				MCL	SW8021B	Units: uç	g/L	
Benzene	ND		1		1	06/28/02 21:11	DL	1201330
Ethylbenzene	ND		1		1	06/28/02 21:11	DL	1201330
Toluene	ND		1		1	06/28/02 21:11	DL	1201330
Xylenes,Total	ND		1		1	06/28/02 21:11	DL	1201330
Surr: 4-Bromofluorobenzene	75.2	%	48-156		1	06/28/02 21:11	DL	1201330
Surr: 1,4-Difluorobenzene	96.2	%	72-137		1	06/28/02 21:11	DL	1201330

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



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

Client Sample ID Trip Blank #3

Surr: 4-Bromofluorobenzene

Surr: 1,4-Difluorobenzene

Xylenes,Total

Collected: 06/18/2002 0:00

1

1

SPL Sample ID:

06/28/02 21:36

06/28/02 21:36

06/28/02 21:36

DL

DL

DL

02060636-13

1201331

1201331

1201331

Site: Hobbs, NM									
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #	
GASOLINE RANGE ORGANICS			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	MCL SW8015B		Units: mg/L			
Gasoline Range Organics	ND		0.1		1	06/28/02 21:36	DL	1201418	
Surr: 1,4-Difluorobenzene	96.0	%	74-121		1	06/28/02 21:36	DL	1201418	
Surr: 4-Bromofluorobenzene	95.3	%	55-150		1	06/28/02 21:36	DL	1201418	
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	<sub>3</sub> /L		
Benzene	ND		1		1	06/28/02 21:36	DL	1201331	
Ethylbenzene	ND		1	1		06/28/02 21:36	DL	1201331	
Toluene	ND	···	1		1	06/28/02 21:36	DL	1201331	

48-156

72-137

ND

101

81.6

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

# Quality Control Documentation



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

#### **Quality Control Report**

#### **Brown & Caldwell BJ Hobbs 12832**

Method SW3510B

0.20

18-120

Rep Limit

Analysis:

**Diesel Range Organics** 

Method: SW8015B WorkOrder:

Samples in Analytical Batch:

02060636

Lab Batch ID:

20751

Method Blank

RunID:

HP\_V\_020625C-1195392

Analyte

Units:

mg/L

Result

ND

63.2

Lab Sample ID 02060636-01B

Client Sample ID

Analysis Date: Preparation Date:

06/25/2002 13:58 06/20/2002 10:45

AR Analyst:

02060636-02B

MW-3

Diesel Range Organics

Surr: n-Pentacosane

Prep By: KL

02060636-03B

MW-4

02060636-04B

MW-5 MW-7

02060636-05B 02060636-06B

MW-10 MW-11A

02060636-07B

mg/L

MW-12D

02060636-08B

MW-13

#### Laboratory Control Sample (LCS)

RunID:

HP\_V\_020625C-1195391

Units:

Analysis Date:

06/25/2002 13:20

Analyst: AR

Preparation Date: 06/20/2002 10:45 Prep By: KL

Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	1.7	70	21	175

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

Sample Spiked:

02060636-01

HP\_V\_020625C-1195397

Units:

mg/L

Analysis Date:

RunID:

06/25/2002 12:41

AR Analyst:

Preparation Date:

06/20/2002 10:45

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	ND	5	2.8	54.2	5	4	78.2	36.3	39	13	130

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

7/3/02 7:26:12 AM



# **Quality Control Report**

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

## **Brown & Caldwell**

**BJ Hobbs 12832** 

Analysis: Method:

RunID:

**Headspace Gas Analysis** 

Analysis Date:

**RSK147** 

WorkOrder:

02060636

Lab Batch ID:

R62368

**Method Blank** 

VARC\_020628A-1200141

06/28/2002 15:32

Units: Analyst:

mg/L ER

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02060636-03C

MW-5

02060636-05C

MW-10

02060636-06C 02060636-07C MW-11A

MW-12D

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

#### Sample Duplicate

Original Sample:

Analysis Date:

RunID:

02060636-07

06/28/2002 14:45

Units:

VARC\_020628A-1200139

mg/L Analyst: ER

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Butane	ND	ND	0	50
Ethane	ND	ND	0	50
Ethylene	0.004	0.0055	32	50
Isobutane	ND	ND	0	50
Methane	0.0012	0.0012	0	50
Propane	ND	ND	0	50
Propylene	ND	ND	0	50

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

7/3/02 7:26:13 AM



8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

#### **Quality Control Report**

#### **Brown & Caldwell BJ Hobbs 12832**

Analysis: Method:

**Purgeable Aromatics** 

SW8021B

WorkOrder: Lab Batch ID: 02060636 R62410

Method Blank

VARD\_020628B-1201290

Units:

ug/L

Lab Sample ID 02060636-01A

Client Sample ID

Analysis Date:

RunID:

06/28/2002 9:53

Surr. 1,4-Difluorobenzene

Surr: 4-Bromofluorobenzene

Analyst:

DL

02060636-02A 02060636-03A

02060636-04A

02060636-05A

02060636-06A

Samples in Analytical Batch:

MW-3 MW-4 MW-5 MW-7

MW-10

**MW-11A** 

Analyte Result Rep Limit ND Benzene 1.0 ND Ethylbenzene 1.0 Toluene ND 1.0 Xylenes,Total ND 1.0

02060636-07A 02060636-08A 02060636-11A

MW-12D MW-13 Trip Blank #1

02060636-12A 02060636-13A Trip Blank #2 Trip Blank #3

**Laboratory Control Sample (LCS)** 

RunID:

VARD 020628B-1201287

Units:

ug/L

Analysis Date:

06/28/2002 3:35

89.9

108.3

72-130

70-130

Analyst: DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	50	100	70	130
Ethylbenzene	50	49	97	70	130
Toluene	50	47	94	70	130
Xylenes,Total	150	152	101	70	130

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

Sample Spiked:

02060628-01

RunID:

VARD\_020628B-1201288 Units:

ug/L DL

Analysis Date:

06/28/2002 4:26

Analyst:

MSD Sample MS MS MS % **MSD** MSD % **RPD** RPD Low High Analyte Spike Result Recovery Result Limit Spike Result Recovery Limit Limit Added Added 22 0.0134 ND 20 22 108 20 108 21 32 164 Benzene 89.9 20 18 92.2 2.52 142 Ethylbenzene ND 20 18 19 52 ND 20 97.3 20 20 97.8 0.470 159 Toluene 19 20 38 Xylenes,Total 1.2 60 63 103 60 65 106 3.18 18 53 144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

MI - Matrix Interference

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.

7/3/02 7:26:13 AM



**Quality Control Report** 

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

#### dailty Control (tepo)

Brown & Caldwell
BJ Hobbs 12832

Analysis:

**Purgeable Aromatics** 

SW8021B

WorkOrder:

02060636

Lab Batch ID:

R62410

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.

7/3/02 7:26:14 AM



8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

#### **Quality Control Report**

#### **Brown & Caldwell BJ Hobbs 12832**

Analysis: Method:

**Gasoline Range Organics** 

SW8015B

Gasoline Range Organics

Surr: 1,4-Difluorobenzene Surr: 4-Bromofluorobenzene

WorkOrder:

02060636

Lab Batch ID:

**R62420** 

**Method Blank** 

RunID:

Analysis Date:

VARD\_020628C-1201406

Analyte

06/28/2002 9:53

Units: Analyst: mg/L DL

02060636-01A

Client Sample ID Lab Sample ID MW-3

02060636-02A

Samples in Analytical Batch:

MW-4 MW-5

02060636-03A 02060636-04A

MW-7 MW-10

02060636-05A 02060636-06A

MW-11A MW-12D

02060636-07A 02060636-08A 02060636-11A

MW-13

02060636-12A

Trip Blank #1 Trip Blank #2

02060636-13A

Trip Blank #3

#### **Laboratory Control Sample (LCS)**

RuniD:

VARD\_020628C-1201403

Result Rep Limit

ND

87.0

126.3

0.10

74-121

55-150

Units:

mg/L

Analysis Date:

06/28/2002 4:01

DL Analyst:

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.81	81	70	130

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

Sample Spiked:

02060628-02

RunID:

VARD\_020628C-1201404

Units:

mg/L

Analysis Date:

06/28/2002 9:02

DL Analyst:

MSD % MS MS MS % MSD MSD RPD RPD Analyte Sample Low High Result Spike Spike Result Recovery Result Recovery Limit Limit Limit Added Added Gasoline Range Organics ND 1.8 1.4 79.0 1.8 1.4 79.9 1.10 36 36 160

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

7/3/02 7:26:14 AM



8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

#### **Quality Control Report**

# **Brown & Caldwell**

Analysis: Method:

RunID:

Nitrogen, Nitrate (As N)

E300

**BJ Hobbs 12832** 

WorkOrder:

02060636

Lab Batch ID:

R61946

**Method Blank** 

mg/L SN

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

06/19/2002 12:31

WET\_020619ZK-1192612

Analyst:

Units:

02060636-03D

MW-5

02060636-05D

MW-10

02060636-06D

MW-11A

02060636-07D

MW-12D

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

#### **Laboratory Control Sample (LCS)**

RunID:

WET\_020619ZK-1192613

Units:

mg/L

Analysis Date:

06/19/2002 12:31

Analyst:

SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.92	99	90	110

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

Sample Spiked:

02060636-03

RunID:

WET\_020619ZK-1192615 Units:

Analysis Date:

06/19/2002 12:31

mg/L Analyst: SN

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)	2.6	10	13.7	111	10	13.5	110	1.40	20	76	124

Qualifiers:

ND/U - Not Detected at the Reporting Limit

J - Estimated value between MDL and PQL

B - Analyte detected in the associated Method Blank

HIRTAR COMMINICATION OF A STATE O

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.

7/3/02 7:26:15 AM



# **Quality Control Report**

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

# **Brown & Caldwell**

**BJ Hobbs 12832** 

Analysis:

RunID:

Chloride, Total

Method: E325.3

WorkOrder:

02060636

Lab Batch ID:

R61982A

Method Blank

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

WET\_020624O-1193499 06/24/2002 12:15

Units: Analyst: CV

02060636-08D 02060636-09A

MW-13

MW-14

02060636-10A

MW-15

Analyte	Result	Rep Limit
Chloride	ND	1.0

#### **Laboratory Control Sample (LCS)**

RunID:

WET\_020624O-1193501

Units:

mg/L

Analysis Date:

06/24/2002 12:15

Analyst:

CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit	
Chloride	143	141	99	90	110	

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

Sample Spiked:

02060552-11

RuniD:

WET\_020624O-1193516

Units:

mg/L

Analysis Date:

06/24/2002 12:15

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
Chloride	37000	50000	86100	98.2	50000	86100	98.2	0	20	85	115

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

7/3/02 7:26:15 AM



Samples in Analytical Batch:

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

#### **Quality Control Report**

# **Brown & Caldwell**

Analysis: Method:

RunID:

Sulfate E300

**BJ Hobbs 12832** 

WorkOrder:

02060636

Lab Batch ID:

R62387

Method Blank

WET\_020627ZC-1200646

Units:

Lab Sample ID

Client Sample ID

Analysis Date:

06/27/2002 16:13

mg/L Analyst: ES

02060636-03D

MW-5

02060636-05D

MW-10

02060636-06D

02060636-07D

MW-11A MW-12D

Sulfate

Analyte Result Rep Limit ND

**Laboratory Control Sample (LCS)** 

0.20

RunID:

WET\_020627ZC-1200647

Units:

ma/L

Analysis Date:

06/27/2002 16:13

Analyst:

ES

Analyte	Spike Result		Percent	Lower	Upper
	Added		Recovery	Limit	Limit
Sulfate	10	9.5	95	90	110

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

Sample Spiked:

02060636-03

06/27/2002 16:13

RunID: Analysis Date: WET\_020627ZC-1200649

Units: Analyst:

mg/L 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		110	200	310	99.0	200	320	101	2.16	20	80	120	

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

7/3/02 7:26:16 AM

# Sample Receipt Checklist And Chain of Custody



(713) 660-0901

## Sample Receipt Checklist

W	orkorder:	02060636			Receive	ed By:	DS	
Da	te and Time Received:	6/19/02 10:00:00 AM			Carrier r	name:	FedEx	
Te	mperature:	4			Chilled I	by:	Water Ice	
1.	Shipping container/co	ooler in good condition?	Yes	<b>V</b>	No 🗆	Not Pres	ent 🗌	
2.	Custody seals intact	on shippping container/cooler?	Yes	<b>~</b>	No 🗌	Not Pres	ent $\square$	
3.	Custody seals intact	on sample bottles?	Yes		No 🗌	Not Pres	ent 🗹	
4.	Chain of custody pres	sent?	Yes	<b>~</b>	No 🗌			
5.	Chain of custody sign	ned when relinquished and received?	Yes	$\checkmark$	No 🗌			
6.	<ol> <li>Client sent three se</li> <li>COC. Also three unp</li> </ol>	ees with sample labels? ets of Trip Banks but did not write them on preserved vials & one unpreserved plastic MW-13 (-08) but analysis was not marked	Yes		No 🗹			
7.	Samples in proper co	ntainer/bottle?	Yes	$\checkmark$	No 🗌			
8.	Sample containers in	tact?	Yes	<b>✓</b>	No 🗆			
9.	Sufficient sample volu	ume for indicated test?	Yes	✓	No 🗀			
10.	All samples received	within holding time?	Yes	$\checkmark$	No 🗌			
11.	Container/Temp Blank	k temperature in compliance?	Yes	$ \checkmark $	No 🗌			
12.	Water - VOA vials hav	e zero headspace?	Yes	✓	No 🗌	Not Appl	icable 🗌	
13.	Water - pH acceptable	e upon receipt?	Yes	$\checkmark$	No 🗆	Not Appl	icable 🗌	
	SPL Representativ		Conta	act Date &	Time:			
		rip Blank and extra containers for MW-13 w	ere logg	ed in for ana	alysis per NV	V		
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713 668 0084

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1415 Louisiana, Suite 2500 Houston, TX 77002

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

May 21, 2002

MAY 2 9 2002
Environmental Bureau Oil Conservation Division Mr. Wayne Price Environmental Bureau New Mexico Energy, Minerals & Natural Resources Department Oil Conservation Division. 2040 South Pacheco Street Santa Fe. New Mexico 87006

12832.017



Environmental Engineering & Consulting

Subject:

Transmittal of Report

March 2002 Quarterly Sampling Event

BJ Services Company U.S.A. – Hobbs Facility: GW-072

2708 West County Road Hobbs, New Mexico

References:

(a) Letter from R. Rexroad (Brown and Caldwell) to W. Price (NMOCD) dated 2/26/02; Subject: Transmittal of Report, December 2001 Quarterly Sampling Event, BJ Services Company U.S.A. - Hobbs Facility: GW-072, 2708 West County Road, Hobbs, New Mexico

(b) Letter from W.Price (NMOCD) to J. Cobb (BJ Services) dated 2/28/02; Subject: BJ Hobbs Facility GW-072, Evaluation of Groundwater Chloride Content

Dear Mr. Price:

Enclosed please find the March 2002 Quarterly Sampling Event report for the BJ Services Company, U.S.A. (BJ Services) facility at Hobbs, New Mexico. As previously described in the Reference (a) correspondence, monitor wells MW-3, MW-4, MW-5, MW-11A, MW-12D, MW-13, and MW-14 were sampled during the December 2001 groundwater sampling event after removal of approximately 0.25 gallons of water, rather than being purged to stability, dryness, or removal of three well volumes of water from the well. As also noted in the Reference (a) correspondence, damage to monitor well MW-10 rendered the December 2001 chemical data from this well invalid. correspondence presents an evaluation of the effects of the December 2001 non-standard purging procedures on chemical data from applicable wells, describes the February 2002 rehabilitation of monitor well MW-10, and responds to the New Mexico Oil Conservation Division (NMOCD) request for evaluation of groundwater chloride content at the subject facility.

#### Effects of December 2001 Purging Procedures

During the March 2002 quarterly sampling event, Brown and Caldwell collected groundwater samples from all water-producing wells at the subject facility after purging wells to stability, dryness, or removal of three well volumes of water. Specifically, monitor wells MW-3, MW-4, MW-5, MW-11A, and MW-14 were purged to dryness on March 11, 2002, and were sampled on March 12, 2002. Monitor wells MW-12D and MW-13 were purged until groundwater stabilization occurred, with stabilization defined

May 21, 2002 Mr. Wayne Price Page 2

as variation of less than 0.1° Celsius, less than 0.1 pH units, less than 1% specific conductivity, and less than 15 millivolts Eh between consecutive measurements of groundwater during the purging process.

Comparison of analytical data from the December 2001 sampling event to current and historical constituent concentration data on a well-by-well basis (see Tables 4, 5, and 7 of the subject report, as applicable) indicates that the deviation from standard monitor well purging procedures that occurred for these wells in December 2001 appears to have had minimal to no effect on chemical analytical data, as described on a well-by-well basis below.

Groundwater samples from monitor wells MW-3, MW-4, MW-5, and MW-12D were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) and diesel- and gasoline-range total petroleum hydrocarbons (TPH-D and TPH-G) in December 2001. As indicated in Table 4 of the subject report, the non-standard December 2001 purging procedures may have resulted in slightly elevated TPH-D concentrations in the groundwater samples collected from monitor wells MW-4 and MW-5 in December 2001 as compared to corresponding June 2001, September 2001, and March 2002 data from these wells, but appear to have had no affect on other December 2001 hydrocarbon data from monitor wells MW-3, MW-4, MW-5, and MW-12D.

Benzene was not detected in monitor well MW-11A in December 2001, but was detected at respective concentrations of 1.5 milligrams per liter (mg/L), 7.9 mg/L, and 1.8 mg/L in June 2001, September 2001, and March 2002. The December 2001 non-detection of benzene in monitor well MW-11A may therefore be attributable to the non-standard purging procedure used for this well during that sampling event. Concentrations of toluene, ethylbenzene, xylenes, TPH-D, and TPH-G reported in monitor well MW-11A in December 2001 appear comparable to corresponding data from the June 2001, September 2001, and March 2002 sampling events, as indicated in Table 4 of the subject report.

TPH-D was not detected in monitor well MW-13 in December 2001, but was detected at respective concentrations of 0.31 mg/L, 0.3 mg/L, and 0.84 mg/L in June 2001, September 2001, and March 2002. As in the case of benzene in monitor well MW-11A, the December 2001 non-detection of TPH-D in monitor well MW-13 may be attributable to the non-standard purging procedure used for this well during that sampling event. BTEX and TPH-G concentrations reported in monitor well MW-13 in December 2001 appear comparable to corresponding data from the June 2001, September 2001, and March 2002 sampling events, as indicated in Table 4 of the subject report.

The chloride concentration of groundwater from monitor well MW-14 was measured in December 2001. The December 2001 chloride concentration of 276 mg/L appears to be consistent with chloride concentrations in the well ranging from 222 mg/L in June 2001 to 284 mg/L in March 2002, as indicated in Table 5 of the subject report.

May 21, 2002 Mr. Wayne Price Page 3

Groundwater samples from monitor wells MW-5, MW-11A, and MW-12D in December 2001 were also submitted for nitrate, sulfate, and methane analyses. With the possible exception of a decreased nitrate concentration in monitor well MW-5 in December 2001, comparison of current and historic nitrate, sulfate, and methane data from monitor wells MW-5, MW-11A, and MW-12D to corresponding December 2001 data (see Table 7 of the subject report) indicates that the non-standard purging procedures used for these wells in December 2001 had no apparent affect on the December 2001 nitrate, sulfate, and methane data from these wells.

#### Rehabilitation of Monitor Well MW-10

As documented in the report for the December 2001 sampling event at the subject facility, the surface completion of monitor well MW-10 was damaged. Surficial soil materials had entered the well and accumulated to an approximate thickness of 1.6 feet in the bottom of the well. The accumulated sediment and low water level in the well resulted in production of a minimal quantity of extremely turbid groundwater from monitor well MW-10 during the December 2001 sampling event, and December 2001 chemical data from monitor well MW-10 were therefore considered invalid.

On February 26, 2002, Brown and Caldwell repaired the surface completion of monitor well MW-10 to ensure that it seals adequately to prevent introduction of surficial soil materials into the well and used compressed air to remove a substantial volume of accumulated sediment from the bottom of the well. The removal of accumulated sediment from the well resulted in increased groundwater production and decreased turbidity of groundwater produced from the well. March 2002 chemical data from monitor well MW-10 appear consistent with recent pre-December 2001 data from the well, as indicated in Tables 4, 5, 6, and 7 of the subject report.

## **Chloride Evaluation**

In response to the request presented in the Reference (b) NMOCD correspondence, chloride content was measured in all wells that yielded an adequate volume of groundwater during the March 2002 sampling event. A chloride isoconcentration map for March 2002 is presented in the attached report.

Monitor wells MW-12 and OW-4 were previously reported to be dry. In the Reference (b) correspondence, NMOCD requested that these wells be re-established for sampling or replaced by new wells installed in these areas. Monitor well MW-12 has been replaced by monitor well MW-12D, which is located immediately adjacent to monitor well MW-12 and screened in a deeper portion of the aquifer. In the attached report, Brown and Caldwell recommends installation of a downgradient well (MW-16) located along the apparent axis of the zone of chloride impact to groundwater. Monitor well MW-16 will

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serve as a replacement well for OW-4, and will be installed upon approval by NMOCD and attainment of right-of-access from the property owner.

If you have any questions regarding the information presented herein, please feel free to contact Mr. Lynn Wright of Brown and Caldwell (713) 759-0999 or Ms. Jo Ann Cobb of BJ Services at (281) 357-2572.

Sincerely,

**BROWN AND CALDWELL** 

Ruhard Reproud

Richard L. Rexroad, P.G.

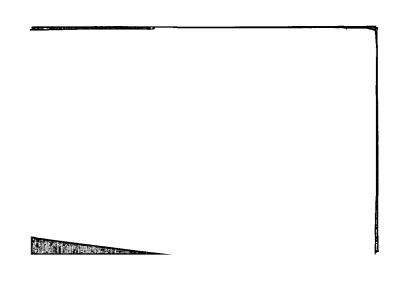
Project Manager

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Attachments (1)

cc: NMOCD - Hobbs, New Mexico Office

Jo Ann Cobb, BJ Services Company, U.S.A. Brown and Caldwell Project File: 12832.02



 $B \quad R \quad O \quad W \quad N \quad \text{A N D} \quad C \quad A \quad L \quad D \quad W \quad E \quad L \quad L$ 



# MARCH 2002 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

MAY 21, 2002

# MARCH 2002 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: 12832.017

Richard L. Rexroad, P.G. Project Manager

Ruhard Klyrows

May 21, 2002

**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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#### 1.0 INTRODUCTION

Brown and Caldwell conducted a 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 in March 2002. This report presents a description of the groundwater sampling field activities, a summary and evaluation of the analytical results, and an evaluation of remedial technologies being applied at the facility. A groundwater potentiometric surface map and a hydrocarbons concentration map are included.

A layout of the facility is shown in Figure 1. The facility formerly operated an on-site fueling system. Subsurface impact near the former diesel fueling system was detected by the New Mexico Oil Conservation Division (NMOCD) during an on-site inspection on February 7, 1991. The fueling system was taken out of operation in July 1995. 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.

A biosparging system was activated in November 1995 and expanded in March/April 1997 and February/March 1998 to remediate soil and groundwater at the former fuel island area of the facility. The biosparging system was deactivated on November 1, 2000 after achieving cleanup goals for groundwater. The confirmation soil sampling program specified in the NMOCD-approved Remedial Action Plan (RAP) for the facility was conducted in July 2001. The results of the confirmation soil sampling program were presented to NMOCD in the report for the June 2001 groundwater sampling event. The March 2002 sampling event is the third groundwater sampling event conducted since the completion of the confirmation soil boring program.

BJ Services removed three field waste tanks at the facility on March 6-7, 1997. The ongoing groundwater monitoring program was expanded 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 site chronology detailing the history of investigations into and remediation of soil and groundwater impacts in the former fueling system and the former field waste tanks areas of the facility is presented in Table 1.

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#### 2.0 FIELD ACTIVITIES AND RESULTS

Brown and Caldwell purged and sampled 13 monitor wells (MW-1, MW-3, MW-4, MW-5, MW-7, MW-8, MW-9, MW-10, MW-11A, MW-12D, MW-13, MW-14 and MW-15) at the facility on March 11-12, 2002 to determine concentrations of dissolved-phase hydrocarbons in groundwater and to evaluate general groundwater quality in the area of the facility. Monitor well locations are shown in Figure 1. The following subsections describe the field activities conducted by Brown and Caldwell during the March 2002 event, and present the results of the associated groundwater analyses.

## 2.1 Groundwater Sampling Activities

Groundwater level measurements were obtained from monitor wells prior to purging and sampling the wells. Groundwater levels were measured to the nearest 0.01 foot with an oil/water interface probe. Current and historic groundwater elevation data are presented in Table 2. The groundwater elevation data indicate that the groundwater flow direction is to the east/northeast, with a hydraulic gradient of approximately 0.008 foot/foot. A groundwater elevation map for March 11, 2002 is presented in Figure 2. The groundwater elevation data presented in Table 2 indicate that groundwater levels have continued to decline in all monitor wells at the facility since late 1995.

Monitor wells MW-12 and OW-4 were dry and could not be sampled. Monitor well MW-12D, which is located adjacent to monitor well MW-12 and screened in a deeper portion of the aquifer than monitor well MW-12, had sufficient water for collection of a complete sample. Accordingly, Brown and Caldwell collected a groundwater sample from monitor well MW-12D in lieu of sampling monitor well MW-12.

Damage to monitor well MW-10 observed during the December 2001 sampling event precluded collection of a valid groundwater sample at that time, as noted in the report for the December 2001 sampling event at the facility. The well was repaired on February 26, 2002 and a partially complete sample was collected during the March 2002 sampling event, as discussed below.

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Monitor wells MW-7, MW-8, MW-9, and MW-10 did not yield sufficient water during the March 2002 sampling event for collection of a complete suite of analytical parameters. Consequently, these wells were sampled selectively for various constituents. All of these wells were sampled for benzene, toluene, ethylbenzene, and xylenes (BTEX), chloride and other anions, gasoline-range total petroleum hydrocarbons (TPH-G), and carbonate and bicarbonate alkalinity. None of these wells were sampled for polynuclear aromatic hydrocarbons (PAHs), and analysis for diesel-range total petroleum hydrocarbons (TPH-D), metals, methane, and hardness was deleted from certain wells because:

- 1. The volume of groundwater required to complete these analyses could not be obtained from the wells over a 2-day time period; and
- 2. Previous data from the wells for these constituents indicate that these analyses were not critical in defining contaminant impact to groundwater at the facility.

Wells were purged and sampled with disposable bailers and clean, previously unused nylon string. Most of the wells were purged dry. Monitor wells MW-12D and MW-13 were purged until groundwater stabilization occurred, with stabilization defined as variation of less than 0.1° Celsius, less than 0.1 pH units, less than 1% specific conductivity, and less than 15 millivolts (mV) Eh between consecutive measurements of groundwater during the purging process. The wells were sampled in general order of least impacted to most impacted (based on analytical results from the December 2001 and preceding sampling events) to further mitigate the potential for cross-contamination of wells.

Field parameter measurements for pH, conductivity, oxidation-reduction (redox) potential, dissolved oxygen, and temperature were collected from wells containing an adequate volume of water during and upon completion of well purging. Ferrous iron and alkalinity were measured in selected wells upon conclusion of purging activities. Field parameter readings were recorded on the groundwater sampling forms included in Appendix A. Field readings for the March 2002 sampling event are summarized in Table 3.

 Groundwater samples were collected by pouring recovered water from a bailer. Each sample was then transferred to laboratory-prepared, clean glass and/or plastic containers, sealed with Teflon®-lined lids, labeled, and placed on ice in an insulated cooler for delivery to Southern Petroleum Laboratory in Houston, Texas for analysis under standard chain-of-custody control.

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 an on-site water reclamation system for re-use by BJ Services.

## 2.2 Results of Groundwater Analyses

Groundwater samples from monitor wells MW-14 and MW-15 were analyzed for chloride content by Method 325.3. Assuming adequate groundwater yield, samples from the remaining wells were analyzed for chloride, TPH-G and TPH-D (EPA Method 8015B), BTEX (EPA Method 8021), PAHs (Method 8310), RCRA metals and calcium, magnesium, potassium, and sodium (Methods 6010B and 7470A), carbonate and bicarbonate alkalinity (Method M2320B), fluoride (Method E300), hardness (Method E130.2), nitrate and sulfate (Method E300), and methane (Method RSK 147). The laboratory analytical reports and chain-of-custody documentation for the groundwater samples collected during the March 2002 sampling event are provided in Appendix B.

Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 4. Figure 3 presents a hydrocarbons concentration map for the March 2002 sampling event. BTEX constituents were detected in only two of 11 applicable wells. Benzene was detected in monitor wells MW-9 and MW-11A at respective concentrations of 0.001 milligrams per liter (mg/L) and 0.0018 mg/L. Xylenes were detected at a concentration of 0.001 mg/L in monitor well MW-11A. All benzene and xylenes concentrations are less than the New Mexico Water Quality Control Commission (NMWQCC) standards of 0.01 mg/L for benzene and 0.62 mg/L for xylenes.

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Benzene has not been detected in former fuel island source area monitor wells MW-3 or MW-4 since June 1999 and March 1999, respectively. Adjustments to the biosparging system in July 1999 and March 2000 to increase air flow to the monitor well MW-13 area resulted in decreases in the concentration of benzene in monitor well MW-13 from 1.5 mg/L on July 2, 1999 to the present non-detectable concentration. Benzene has not been detected in monitor well MW-13 since June 2000.

Table 5 presents current and historic results for chloride analyses performed on groundwater samples collected at the facility. The March 2002 chloride concentration of 284 mg/L in downgradient monitor well MW-14 exceeds the NMWQCC chloride standard of 250 mg/L. The chloride concentration in monitor well MW-15 remained below 250 mg/L in March 2002. Figure 4 depicts the concentration of chloride in groundwater at the facility in March 2002.

Table 6 presents the remaining analytical results for annual sampling and analysis of applicable wells for NMWQCC constituents. The current and historic results for nitrate, sulfate, and dissolved methane analyses performed on groundwater samples from monitor wells MW-5, MW-10, MW-11A, MW-12, and MW-12D to assist in evaluation of natural attenuation processes at the facility are presented in Table 7.

#### 3.0 EVALUATION OF REMEDIAL TECHNOLOGIES

The following subsections present evaluations of the remedial technologies applied at the former fueling system and former field waste tanks areas of the BJ Services facility at Hobbs, New Mexico.

## 3.1 Biosparging System at the Former Fueling System Area

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 at the former fueling system area of the facility in the RAP submitted to the NMOCD in May 1994. The NMOCD approved the RAP on August 11, 1994. The biosparging system was installed in August 1995 and expanded in April 1997 and February 1998. Operation of the biosparging system resulted in substantial decreases in hydrocarbon concentrations in former fueling system area monitor wells MW-1, MW-3, MW-4, MW-9, and MW-13, as documented in the December 2000 groundwater sampling report for the facility.

Based on the observed 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 deactivated on November 1, 2000. The March 2002 sampling event is the sixth sampling event completed since this shut down.

Benzene concentrations in former fueling system source area monitor wells MW-1, MW-3, MW-4, MW-9, and MW-13 have remained below applicable NMWQCC standards since deactivation of the biosparging system. Furthermore, BTEX constituent concentrations in these wells have now remained below applicable NMWQCC standards for the last eight consecutive quarters.

In accordance with the RAP, confirmation soil sampling activities were conducted at the former fueling system area in July 2001 to verify the effectiveness of the biosparging system in remediating vadose zone soils in this area. The analytical results for these soil samples, as P:\Wp\BJSERV\12832\093r.doc

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discussed in the report for the June 2001 groundwater sampling event, indicate that remediation goals for soil in this area have successfully been achieved. The March 2002 sampling event is the third groundwater sampling event conducted since the completion of the confirmation soil boring program. Sampling of former fuel island source area wells that have sufficient groundwater and recharge for collection of valid groundwater samples will continue through June 2002. If, in accordance with the requirements specified in the NMOCD-approved RAP, analytical results for groundwater samples collected from these monitor wells do not exceed the groundwater remediation goals specified in the RAP during the 1-year followup quarterly monitoring period, then a biosparging system closure report will be submitted for the former fuel island portion of the facility.

#### 3.2 Natural Attenuation at the Former Field Waste Tanks Area

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

Plume behavior is the primary evidence of natural attenuation. 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. 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. Sporadic increases in total BTEX concentrations between quarterly sampling events have been observed in monitor wells

in this area since March 1997, however. These increases may be attributed to sporadic loading rates from the vadose zone in excess of the natural attenuation rate of the area. The following subsections present primary and secondary evidence of natural attenuation of hydrocarbons in groundwater at the former field waste tanks area of the facility.

## 3.2.1 Primary Evidence

The benzene concentration in monitor well MW-10 has decreased from a maximum of 1.3 mg/L in August 1995 (prior to removal of the field waste tanks) to less than the NMWQCC standard of 0.01 mg/L in the five groundwater sampling events from December 2000 through March 2002. Concentrations of toluene, ethylbenzene, and xylenes in monitor well MW-10 have undergone similar decreases over this time period. There were no detections of BTEX constituents in monitor well MW-10 in March 2002.

Benzene concentrations at the monitor well MW-11/11A location have decreased from a maximum of 0.970 mg/L in December 1996 (prior to removal of the field waste tanks) to less than the NMWQCC standard of 0.01 mg/L in the last four groundwater sampling events.

Concentrations of BTEX constituents at the monitor well MW-12/12D location have displayed decreases similar to those observed at the monitor well MW-11/11A location since September 1998.

## 3.2.2 Secondary Evidence

The following lines of geochemical evidence can also be used to 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.

Groundwater samples were collected using bailers during the March 2002 sampling event. Dissolved oxygen concentrations in most wells at the facility were elevated in March 2002 relative to previous sampling events in which groundwater samples were collected using a downhole pump. Use of bailers in groundwater sampling causes groundwater samples to be oxygenated, precluding meaningful comparison of dissolved oxygen data from wells at impacted areas to corresponding data from wells in non-impacted areas.

Historic evidence submitted to the NMOCD in previous quarterly groundwater monitoring reports for the facility has indicated that dissolved oxygen concentrations have typically been depressed in hydrocarbon-impacted monitor wells relative to non-impacted wells at the facility (see the June 2001 Groundwater Sampling Report for BJ Services Hobbs, New Mexico Facility, for example).

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 was detected at a concentration of 2.98 mg/L in background monitor well MW-5 during the March 2002 sampling event. Although there was minimal to no hydrocarbon impact at former field waste tanks area wells MW-10, MW-11A, and MW-12D in March 2002, nitrate was not detected in any of these wells. The decreased nitrate concentrations observed in March 2002 at former field waste tanks area wells MW-10, MW-11A, and MW-12D relative to the background nitrate concentration at the facility is likely due to residual effects of hydrocarbons.

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 not detected in background monitor well MW-5 in March 2002. Ferrous iron was detected in monitor wells MW-11A and MW-12D at respective concentrations of 8.5 mg/L and 4.9 mg/L. The elevated ferrous iron concentrations in wells MW-11A and MW-12D suggest that intrinsic bioremediation of hydrocarbons is occurring at the former field waste tanks area.

Ferrous iron concentration was not measured in former field waste tanks area monitor well MW-10 groundwater in March 2002 due to insufficient yield from the well.

- 4. Microbes that utilize sulfate become active when dissolved oxygen, nitrate, and ferric iron are depleted. Sulfate concentrations should therefore decrease in areas where intrinsic bioremediation is occurring through use of sulfate as an electron acceptor. March 2002 sulfate concentrations in former field waste tanks area monitor wells MW-10, MW-11A and MW-12D ranged from 200 mg/L to 350 mg/L. The March 2002 sulfate concentration in background monitor well MW-5 is 120 mg/L. The fact that sulfate concentrations in former source area monitor wells are greater than the sulfate concentration in the background well suggests that sulfate is not being utilized as an electron acceptor in the former field waste tanks area.
  - 5. Methane is a reaction product generated during utilization of carbon dioxide as an electron acceptor, and its concentration should therefore increase in areas where concentrations of electron acceptors such as dissolved oxygen, nitrate, and ferric iron have diminished.

Methane detected in former field waste tanks area monitor well MW-11A at a concentration of 0.0044 mg/L in March 2002, but was not detected in background monitor well MW-5. The elevated methane concentration in monitor well MW-11A at the former field waste tanks area suggests that utilization of carbon dioxide as an electron acceptor, resulting in methanogenesis, has occurred during natural attenuation of hydrocarbons in the vicinity of monitor well MW-11A at the former field waste tanks area of the facility.

Methane concentration was not measured in former field waste tanks area monitor well MW-10 groundwater in March 2002 due to insufficient yield from the well. Methane was not detected in monitor well MW-12D in March 2002.

- 6. Redox potential is a measure of chemical energy in groundwater. The redox potential of groundwater from background well MW-5 was measured at 47.5 mV in March 2002. Respective redox potentials of -102.8 mV, -64.2 mV, and -67.4 mV were measured in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12D in March 2002. The negative redox values in the former field waste tanks area monitor wells as compared to the positive redox value in the background well at the facility provides additional evidence that natural attenuation of hydrocarbons is occurring in the area of the former field waste tanks.
- 7. Alkalinity is expected to increase during natural attenuation processes, due to the leaching of carbonates from mineral substrates by microbially produced organic acids.

Field alkalinity measurements in March 2002 ranged from 70 mg/L in background monitor well MW-5 to 140 mg/L in well MW-11A. Field alkalinity was not measured in former field waste tanks area monitor well MW-10 groundwater in March 2002 due to insufficient yield from the well. Based on the elevated field-measured alkalinity of groundwater in monitor well MW-11A, it can be inferred that natural attenuation of hydrocarbons is occurring in the area of monitor well MW-11A at the former field waste tanks area.

The March 2002 bicarbonate alkalinity data presented in Table 6 provide further substantiation of natural attenuation of hydrocarbons at the former field waste tanks area. Bicarbonate alkalinity was measured at 260 mg/L in background monitor well MW-5, at 784 mg/L in monitor well MW-10, and at 520 mg/L in monitor well MW-11A. The elevated bicarbonate alkalinity values in former field waste tanks area monitor wells MW-10 and MW-11A relative to background well MW-5 provide additional evidence of natural attenuation of hydrocarbons at the former field waste tanks area.

In conclusion, current and historic dissolved oxygen, nitrate, and methane data suggest that dissolved oxygen, nitrate, and carbon dioxide act as electron acceptors during intrinsic bioremediation processes at former field waste tanks area of the facility. Ferric iron also appears to be serving as an electron acceptor during natural attenuation of hydrocarbons, based on ferrous iron data from background wells and monitor wells at the former field waste tanks area. Current redox and alkalinity data provide further evidence that natural attenuation of hydrocarbons is occurring in this area.

It is recommended that monitoring for natural attenuation evaluation parameters continue in former field waste tank area monitor wells MW-10, MW-11A, and MW-12D and the background well, MW-5. Redox potential, 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 continued in all wells to be sampled during upcoming groundwater monitoring events.



#### 4.0 CHLORIDE EVALUATION

In correspondence dated December 13, 2001, the NMOCD requested an evaluation of chloride content in groundwater at the facility. In February 2002, Brown and Caldwell used a BIOSCREEN model to predict the downgradient extent of chloride in groundwater at concentrations in excess of the NMWQCC standard of 250 mg/L for chloride. Based on input of available historic data from March 2000 through December 2001 for monitor wells MW-10, MW-11A, MW-12, MW-14, MW-15, and OW-4, the BIOSCREEN model predicted that the downgradient extent of chloride at concentrations in excess of 250 mg/L is located approximately 60 feet to 100 feet east of monitor well MW-14.

All wells capable of yielding a groundwater sample were sampled for chloride in the March 2002 sampling event. This complete set of contemporaneous chloride data, as presented in Table 5 and Figure 4, confirms the results of the February 2002 BIOSCREEN model. Based on this model, BJ Services and Brown and Caldwell propose installation of a new monitor well (MW-16) at the location indicated in Figure 4. Monitor well MW-16 would be installed with a 20-foot screen set at the top of the saturated zone within the uppermost aquifer present at the proposed location. Based on the previously documented continual decline in groundwater elevation in the uppermost aquifer at the facility, the 20-foot screen length is proposed in order to ensure long-term groundwater yield from monitor well MW-16.

Upon approval of the proposed monitor well MW-16 location by NMOCD and facilitation of access to the proposed well location from the property owner, monitor well MW-16 will be installed, developed, and sampled for chloride to investigate the downgradient extent of chloride impact to groundwater at concentration greater than 250 mg/L in the area of the facility.

#### 5.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the March 2002 groundwater sampling event conducted at the BJ Services Hobbs, New Mexico facility.

#### 5.1 Conclusions

- Dissolved benzene and BTEX concentrations in monitor wells located near and downgradient of the former fueling system area are less than applicable NMWQCC standards. There were no TPH-G detections in March 2002 in monitor wells MW-1, MW-3, and MW-4, which are located near the former fueling system area. BTEX and TPH concentrations in these wells have remained below applicable standards for the past eight quarterly groundwater sampling events.
- March 2002 benzene concentrations in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12D are less than the NMWQCC standard of 0.01 mg/L for benzene. There were no detections of TPH-G or BTEX constituents in monitor wells MW-10 or MW-12D during the current sampling event. Natural attenuation processes appear to be occurring in the vicinity of the former field waste tanks removed in March 1997, based on decreasing hydrocarbon concentrations in local monitor wells over time and as substantiated by geochemical data.
- The chloride concentration 284 mg/L recorded in monitor wells MW-14 exceeds the NMWQCC standard of 250 mg/L. Chloride concentrations in this well have varied between 222 mg/L and 368 mg/L since its installation in January 2001.

#### 5.2 Recommendations

- Continue the quarterly monitoring program for former field waste tank area monitor wells MW-11A, MW-12D, and (if feasible) MW-10. Continue monitoring for natural attenuation parameters in these wells and the background monitor well MW-5, including field-testing for natural attenuation indicator parameters.
- Perform a quarterly sampling event of monitor wells pertaining to the former fueling system source area in June 2002. If analytical results for groundwater samples do not exceed the groundwater remediation goals specified in the RAP, then the 1-year monitoring period following collection of confirmation soil samples in July 2001 (as specified in the RAP) will have been concluded, and a biosparging system closure report will be submitted for the former fuel island portion of the facility.

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- After submittal and approval of the biosparging system closure report by the NMOCD, decommission the biosparging system and P&A the injection wells, extraction wells, and applicable monitor wells.
- Upon NMOCD approval and acquisition of access rights, installation and sampling of an
  off-site well to define the downgradient extent of chloride impact to groundwater in the
  area of the facility is recommended.

### **DISTRIBUTION**

March 2002 Groundwater Sampling Report BJ Services Company, U.S.A. Hobbs, New Mexico

May 21, 2002

Final Distribution as follows:

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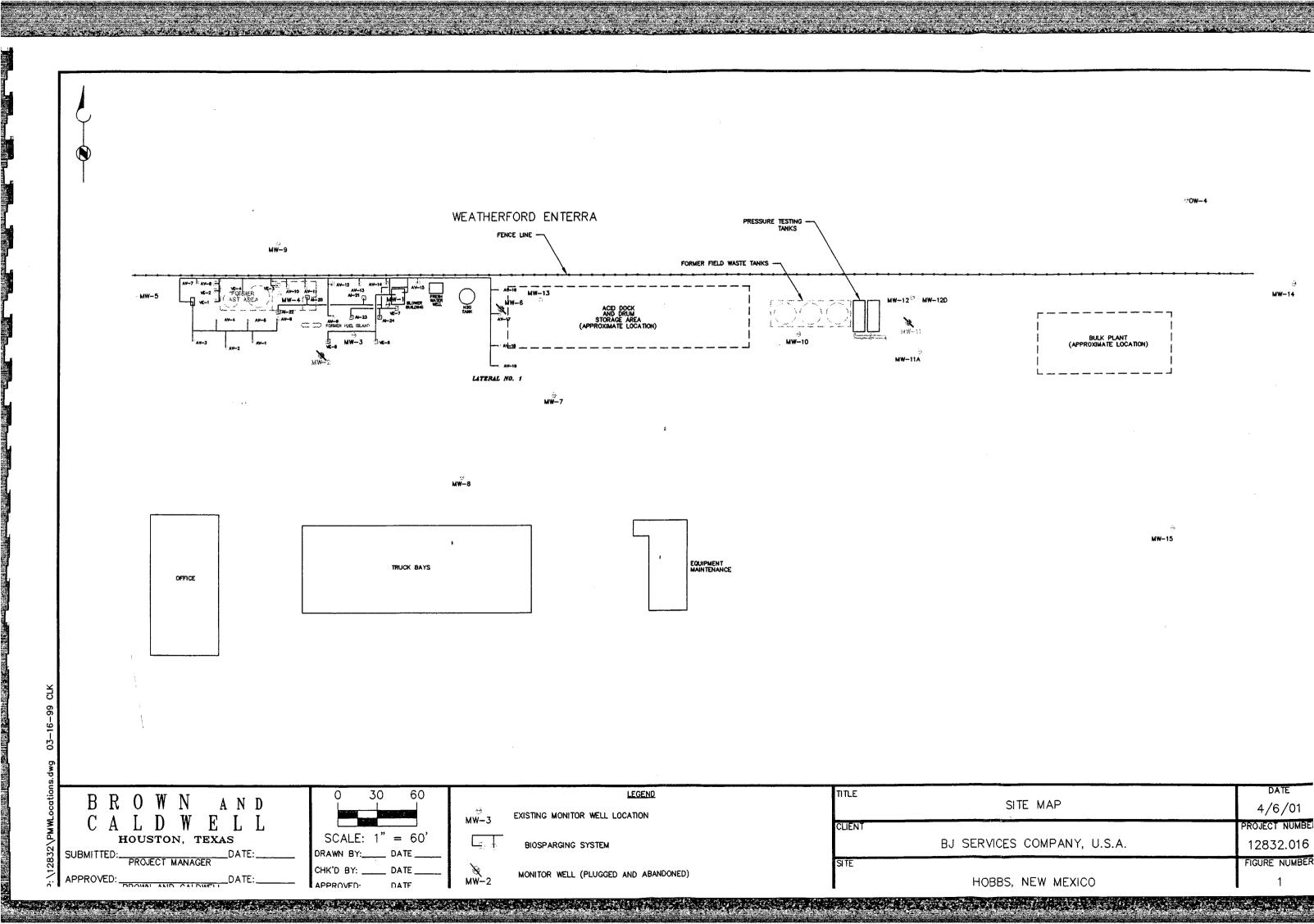
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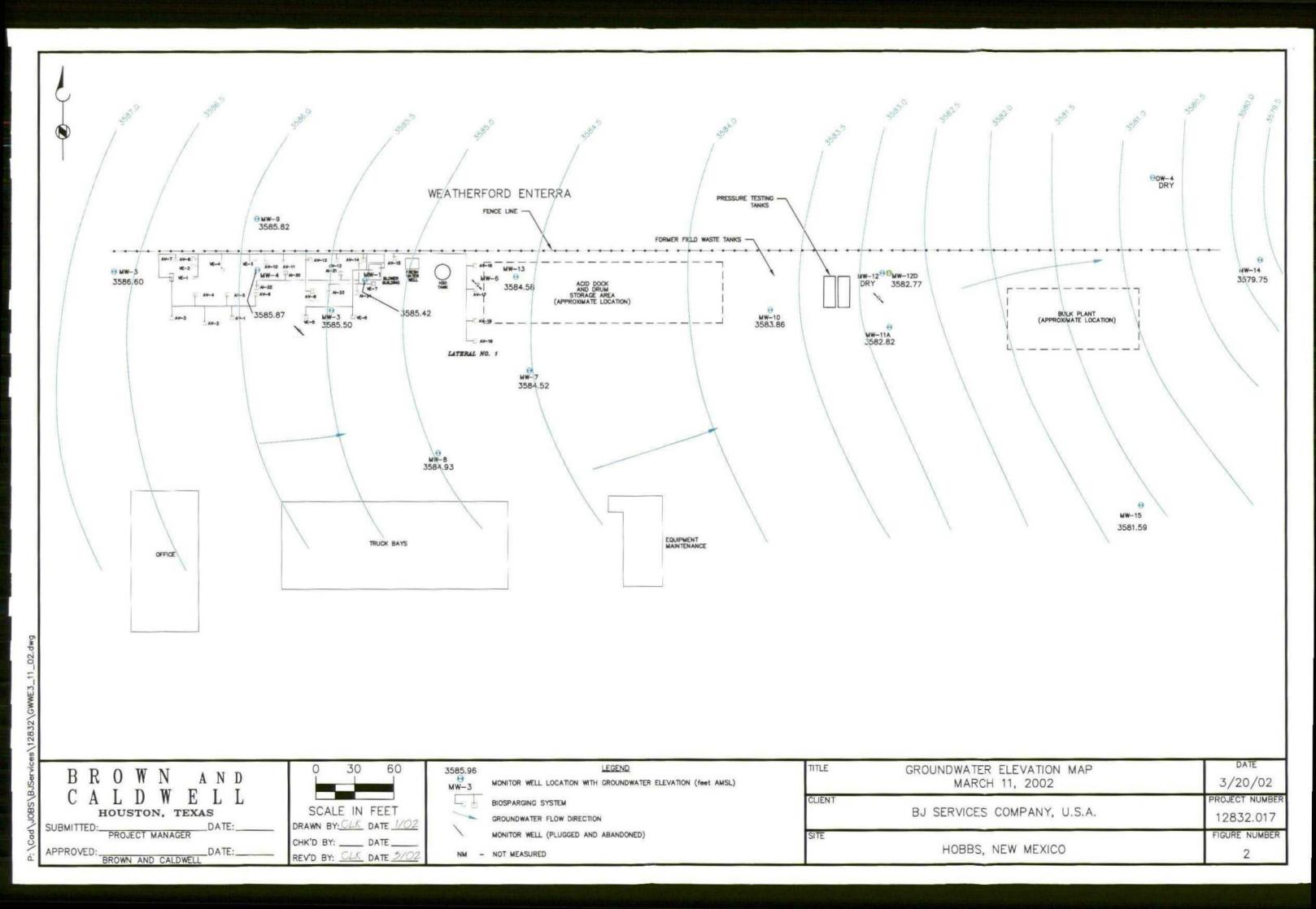
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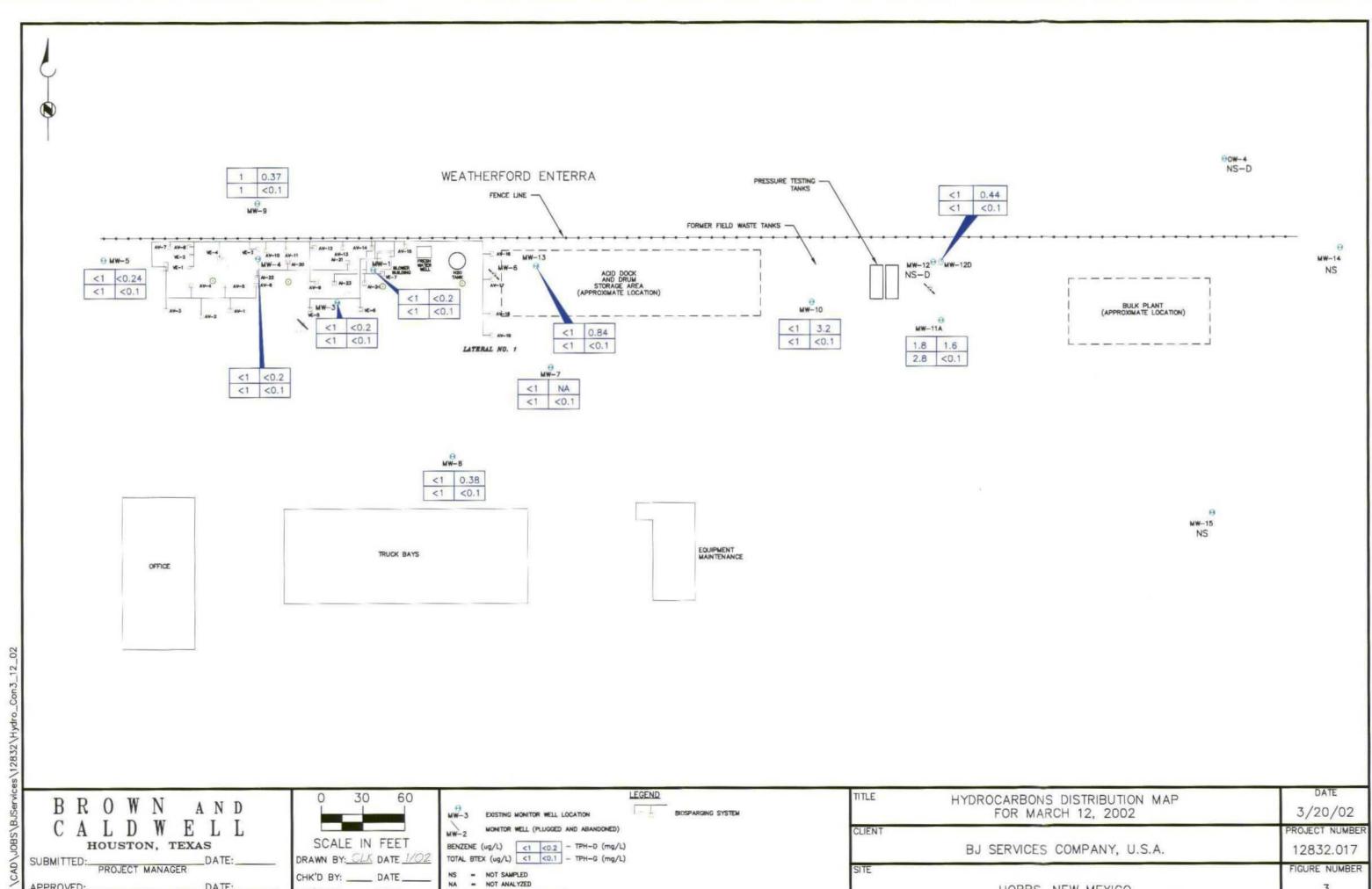


1 Concession

S. Constitution







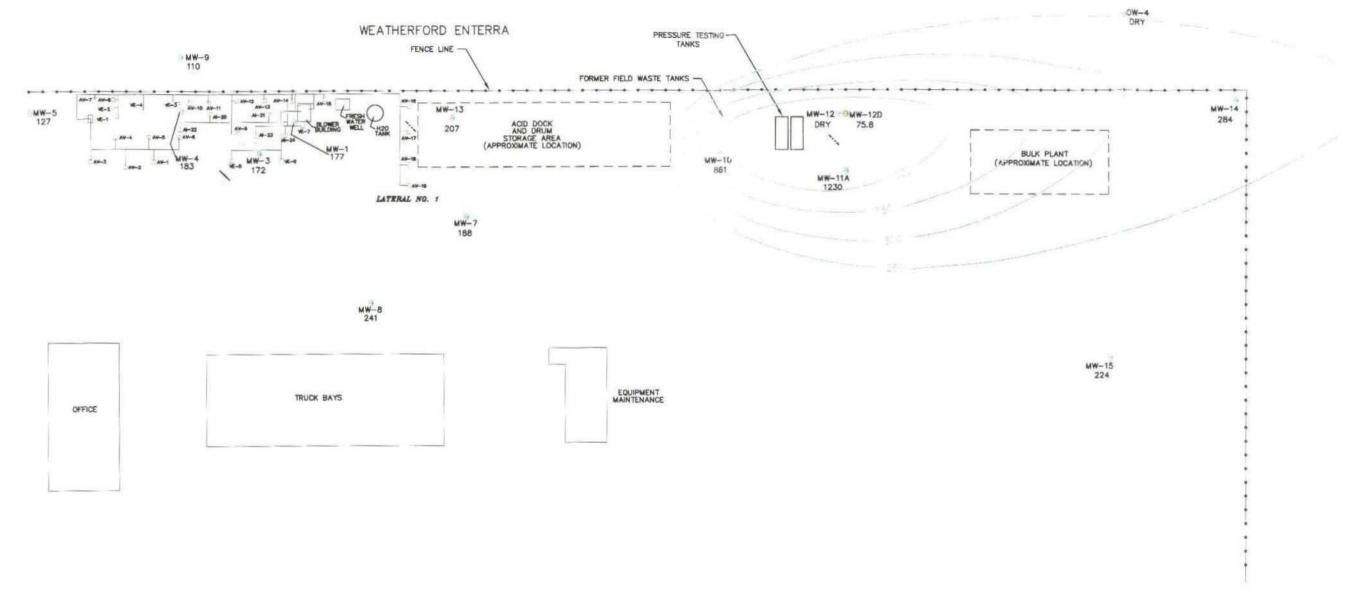
HOBBS, NEW MEXICO

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

DATE.

NS-D - NOT SAMPLED (DRY WELL)





NOTE: DATUM FROM MONITOR WELL MW-12D NOT USED BECAUSE WELL IS SCREENED IN DEEPER PORTION OF THE AQUIFER THAN REMAINING WELLS.

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

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172	LEGEND	
MW-3	MONITOR WELL LOCATION WITH CHLORIDE CONCE	ENTRATION (mg/L)
	BIOSPARGING SYSTEM	
1	MONITOR WELL (PLUGGED AND ABANDONED)	
MW-16	PROPOSED WELL LOCATION	CONTOUR INTERVAL = 250 mg/

TITLE	GROUNDWATER CHLORIDE CONCENTRATION MAP MARCH 12, 2002	4/3/02
CLIENT	BJ SERVICES COMPANY, U.S.A.	PROJECT NUM 12832.01
SITE	HOBBS, NEW MEXICO	FIGURE NUMB



Date	Activity
February 7, 1991	The New Mexico Oil Conservation Division (NMOCD) conducted an on-site inspection, including sampling of the on-site fresh water well.
August 6, 1991	The NMOCD 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 NMOCD.
November 15, 1991	The NMOCD approved the Technical Work Plan submitted by RSA.
December 16, 1991	RSA sampled the fresh water well. The analytical results were submitted to the NMOCD.
February 21, 1992	Western sampled the fresh water well. The analytical results were submitted to the NMOCD.
July 29 -	Brown and Caldwell conducted a soil and groundwater investigation
August 10, 1992	according to the approved Technical Work Plan. The investigation included drilling and sampling nine soil borings, sampling six handaugured soil borings, installation and sampling of five monitor wells, and sampling of the fresh water well.
October 12, 1992	Brown and Caldwell submitted a Soil and Groundwater Investigation Report to the NMOCD.
December 2, 1992	The NMOCD requested the installation and sampling of four additional monitor wells, including a monitor well on an adjacent property.
April 13, 1993	Brown and Caldwell conducted a vapor extraction pilot test on the existing monitor wells.
April 15, 1993	Brown and Caldwell installed off-site monitor well MW-9.
April 22, 1993	Brown and Caldwell sampled off-site monitor well MW-9.
May 27, 1993	Brown and Caldwell submitted a letter report documenting the installation and sampling of off-site monitor well MW-9 to the NMOCD.
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.

Date	Activity
June 21, 1993	ENSR Consulting and Engineering (ENSR), the environmental consultant for the adjacent property owner on which off-site well MW-9 is located, submitted a request to sample monitor well MW-9.
July 15, 1993	ENSR split a groundwater sample collected from monitor well MW-9 with Brown and Caldwell.
July 30, 1993	USTank Management, Inc. submitted a 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 monitor wells. Brown and Caldwell sampled each of the existing and newly installed monitor wells.
January 26, 1994	Brown and Caldwell performed a groundwater monitoring event; the existing monitor wells and the fresh water well were purged and sampled. The groundwater samples were analyzed for BTEX.
May 6, 1994	A Remedial Action Plan (RAP) was submitted to the NMOCD.
August 11, 1994	The RAP was approved by the NMOCD.
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 the 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) constructed the initial design of the biosparging system.
September 19, 1995	Operation of the extraction portion of the biosparging system commenced.
November 13, 1995	Operation of the injection portion of the biosparging system commenced.
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.

Date	Activity
May 31, 1996	Brown and Caldwell conducted the May 1996 groundwater sampling event.
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 tanks 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 was installed.
April 1997	Vapor extraction well VE-4 was 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 was 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.

Date	Activity
December 9-10, 1998	Brown and Caldwell conducted the December 1998 groundwater sampling event.
January 21, 1999	The 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 by the NMOCD.
May 19, 1999	The NMOCD approved the groundwater delineation work plan.
June10, 1999	Brown and Caldwell performed sampling of existing monitor wells for the June /July 1999 groundwater sampling event.
July 2, 1999	Brown and Caldwell completed plugging and abandonment of monitor wells MW-2, MW-6, and MW-11; installed and developed monitor wells MW-12D and MW-13; and sampled monitor wells MW-12D and MW-13 to complete the June/July 1999 groundwater sampling event.
July 14, 1999	Brown and Caldwell redirected air discharge from the shallow injection well injection system to Lateral No. 1 and optimized air flow to injection wells Al-16 and Al-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 deactivated the biosparging system.
December 7, 2000	Brown and Caldwell conducted the December 2000 groundwater sampling event.

Date	Activity
January 2001	Brown and Caldwell installed and sampled monitor wells MW-14 and MW-15.
March 8-9, 2001	Brown and Caldwell conducted the March 2001 groundwater sampling event.
June 21-22, 2001	Brown and Caldwell conducted the June 2001 groundwater sampling event.
July 23, 2001	Brown and Caldwell collected soil samples from four soil borings installed at the former fueling system area of the facility to confirm the effectiveness of the biosparging system in remediating hydrocarbon impact to soil, as specified in the NMOCD-approved RAP.
September 10, 2001	Brown and Caldwell conducted the September 2001 groundwater sampling event.
December 6, 2001	Brown and Caldwell conducted the December 2001 groundwater sampling event.
February 26, 2002	Brown and Caldwell repaired the crushed well completion on monitor well MW-10.
March 11-12, 2002	Brown and Caldwell conducted the March 2002 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)
	ĺ	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	l
		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	1
	İ	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	<del>-</del>	-	-	
		03/08/01	60.35	0.00	3587.18	
		6/21/01	60.99	0.00	3,586.54	
		9/10/01	61.17	0.00	3,586.36	
-		12/6/01	- (3.1)	not measured	2505 12	
MW-2	3,644.84	03/11/02	62.11	0.00	3585.42	
1VI VV-Z	3,044.84	08/10/92 02/09/93	52.82 49.60	0.00	3,592.02 3,595.24	(1)
		08/18/93	49.60	0.00	3,595.13	
		01/26/94	49.71	0.00	3,594.87	
		05/03/95	49.97	-	3,354.67	(4),(5)
MW-3	3,645.00	08/10/92	52.99	0.00	3,592.01	(1)
1.1.1.5	3,013.00	02/09/93	52.72	0.00	3,592.28	(.)
		08/18/93	52.82	0.00	3,592.18	1
		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	
	1	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	
	s.	12/10/97	52.89	0.00	3,592.11	
l	.	03/23/98	53.22	0.00	3,591.78	
l	i i	06/23/98	53.66	0.00	3,591.34	
l	[	09/30/98	54.06	0.00	3,590.94	
J	ļ J	12/09/98	54.36	0.00	3,590.64	
	\ \	03/10/99	54.72	0.00	3,590.28	
ŀ		06/10/99	55.17	0.00	3,589.83	
	1	07/02/99	55.15	0.00	3,589.85	

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	3,645.00	09/14/99	55.42	0.00	3,589.58	
	3,043.00	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	
		03/08/01	57.69	0.00	3,587.31	
		6/21/01	58.34	0.00	3,586.66	
		9/10/01	58.54	0.00	3,586.46	
		12/6/01	59.04	0.00	3,585.96	
		03/11/02	59.50	0.00	3,585.50	
MW-4	3,645.28	08/10/92	50.55	0.00	3,594.73	(1)
	3,613.20	02/09/93	50.26	0.00	3,595.02	(1)
		08/18/93	50.38	0.00	3,594.90	
		01/26/94	50.90	0.30	3,594.63	
		05/03/95	51.51	0.45		
		03/03/93	51.74	0.43	3,594.14 3,593.75	
		11/14/95	51.74	0.26	3,594.25	
		02/23/96	51.03 51.65	0.00	3,594.25 3,593.64	
		05/31/96	51.48	0.00		
		03/31/96	51.48 53.49	0.00	3,593.80 3,591.79	
	-	12/02/96		0.00		
		03/12/97	52.32 52.74	0.00	3,592.96	
		06/12/97	52.74 53.08	0.03	3,592.58	
					3,592.56	
		09/12/97 12/10/97	52.60 52.89	0.15 0.00	3,592.80	PSH Shee
				0.00	3,592.39	rsh snee
		03/24/98	53.20		3,592.29	
		06/23/98	53.82	0.22	3,591.64	200 - 1 DO
		09/30/98	53.96	0.00	3,591.32	200 ml PS
		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	
	<sup>1</sup>	03/10/00	56.12	0.00	3,589.16	
		06/08/00	56.67	0.00	3,588.61	
		09/13/00 12/07/00	56.65	0.00	3,588.63	
			57.05	0.00	3,588.23	
		03/08/01	57.72 58.18	0.00 0.00	3,587.56	
	ļ	6/21/01 9/10/01	58.18 58.54	0.00	3,587.10	
		12/6/01	58.54 58.88	0.00	3,586.74	
		03/11/02	58.88 59.41	0.00	3,586.40 3,585.87	
MW-5	3,647.72	08/10/92	52.38	0.00	3,595.34	(1)
*******	5,077.72	02/09/93	52.38 52.06	0.00	3,595.66 3,595.66	(1)
		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 53.27	0.00	3,594.15 3,594.45	
		11/14/95	52.83	0.00	3,594.45 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	
İ		03/12/97	53.96 54.44	0.00	3,593.28	
		06/12/97	54.48	0.00	3,593.24	
		09/12/97	54.29	0.00	3,593.24 3,593.43	
		12/10/97	54.29 54.66			
	•			0.00 0.00	3,593.06	
İ		03/23/98 06/23/98	55.05 55.44		3,592.67	
	į		55.44 55.65	0.00	3,592.28	
	Ì	09/30/98 12/09/98	55.65 56.00	0.00 0.00	3,592.07 3,591.72	
		17/09/98	טט מכ	1 0.00	1 391 //	

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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	
	ł.	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	
	1	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	
		03/08/01	59.36	0.00	3,588.36	
		6/21/01	59.94	0.00	3,587.78	
	1	9/10/01	59.85	0.00	3,587.87	
		12/6/01	60.56	0.00	3,587.16	
		3/11/02	61.12	0.00	3,586.60	
MW-6	3,644.74	02/09/93	50.58	0.00	3,594.16	(1)
	ĺ	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	
	1	03/23/98	53.56	0.00	3,591.18	
		06/23/98 09/30/98	52.88 54.89	0.00 0.00	3,591.86 3,589.85	
		12/09/98	54.89 54.57	0.00	3,590.17	
		03/10/99	55.10	0.00	3,589.64	
		07/02/99	33.10	0.00	3,307.04	(5),(6)
MW-7	3,644.55	02/09/93	50.53	0.00	3,594.02	(1)
	3,5 1 1133	08/18/93	50.74	0.00	3,593.81	(-)
		01/26/94	51.01	0.00	3,593.54	
	1	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	
	1	05/31/96	51.78	0.00	3,592.77	
	1	08/23/96	52.02	0.00	3,592.53	
		12/02/96	52.52	0.00	3,592.03	
		03/12/97	52.99	0.00	3,591.56	
		06/12/97	53.08	0.00	3,591.47	
		09/11/97	53.00	0.00	3,591.55	
		12/10/97	53.28	0.00	3,591.27	
		03/23/98	53.59	0.00	3,590.96	
		06/23/98	54.20	0.00	3,590.35	
		09/30/98	54.54	0.00	3,590.01	
		12/09/98	54.74	0.00	3,589.81	
		03/09/99	55.15	0.00	3,589.40	
		06/10/99	55.66	0.00	3,588.89	
	1	07/02/99	55.73	0.00	3,588.82	
	) i	09/13/99 12/09/99	55.94 56.38	0.00 0.00	3,588.61 3,588.17	
		03/09/00	56.38 56.74	0.00	3,588.17 3,587.81	
	1	03/09/00	56.74 57.17	0.00	3,587.81 3,587.38	
	1	09/13/00	57.17 57.40	0.00	3,587.15	
		12/07/00	57.40 57.77	0.00	3,586.78	
		03/08/01	51.77 58.29	0.00	3,586.26	
	1	6/21/01	58.29 58.91	0.00	3,585.64	
		9/10/01	58.91 59.25	0.00	3,585.30	
		12/6/01	59.25 59.75	0.00	3,584.80	
		12/0/01	J7.1J	U.UU	2,204,00	1

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
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 0.00	3,592.14	
		12/10/97	53.15	0.00	3,591.72	
		03/23/98 06/23/98	53.51 54.01	0.00	3,591.36 3,590.86	
		09/30/98	54.01 54.35	0.00	3,590.52	
		12/09/98	54.55 54.60	0.00	3,590.32 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 06/00	56.52	0.00	3,588.35	(-)
		09/00	- -	-	-	
		12/00	- 50 11	0.00	3,586.76	
		03/08/01 6/21/01	58.11 58.72	0.00	3,586.15	
		9/10/01	58.72 58.94	0.00	3,585.93	
		12/6/01	38.74	not measured	3,303.73	
		03/11/02	59.94	0.00	3,584.93	
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 0.05	3,593.20 3,592.61	
		03/12/97 06/12/97	52.21 52.10	0.05	3,592.61 3,592.68	PSH Sheen
		09/12/97	52.10 51.95	0.00	3,592.83	PSH Sheen
		12/10/97	51.93 52.37	0.00	3,592.83 3,592.41	PSH Sheen
		03/23/98	52.68	0.00	3,592.10	PSH Sheen
ĺ		06/23/98	53.08	0.00	3,591.70	PSH Sheen
		09/30/98	53.39	0.00	3,591.40	PSH Sheen
		12/09/98	53.68	0.00	3,591.10	1 222 22011
		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	-	- 1	•	(3)
		03/09/00 06/00	55.69	0.00	3,589.09	
		09/00	- -	-	-	
		12/00	-	- 1	2 502 25	
ĺ		03/08/01	57.03	0.00	3,587.75	
1	}	6/21/01	57.91 57.95	0.00	3,586.87	
		9/10/01	57.95	0.00	3,586.83	
		12/6/01		not measured		
		03/11/02	58.96	0.00	3,585.82	ı

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	l I
		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	
	ļ	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	
			59.31	0.00	3,585.24	
		03/09/01 6/21/01	59.89	0.00	3,584.66	
			61.34	0.00	3,583.21	
		9/10/01				
		12/6/01	60.65	0.00	3,583.90	
MW-11	3,643.78	03/11/02 08/18/93	60.69 51.92	0.00	3,583.86 3,591.86	(1)
IVI VV - 1 1	3,043.78	01/26/94	52.32	0.00	3,591.46	(1)
		05/03/95	53.38	0.00	3,590.40	
			53.35	0.00	3,590.40	
		07/31/95				
		11/14/95	52.96 52.50	0.00 0.00	3,590.82	
		02/23/96	53.50		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 3,590.85	
		09/12/97	52.93	0.00	3,390.83	(5) (6)
MW 114	2 (44.24	12/10/97	54.79	0.00	3,589.45	(5),(6)
MW-11A	3,644.24	03/23/98		0.00		(7)
	`	06/23/98	55.43	0.00	3,588.81	
	İ	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	
	1	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	
	1	12/09/99	57.72	0.00	3,586.52	
	1	03/09/00	58.01	0.00	3,586.23	
	ŀ	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	
		03/08/01	59.72	0.00	3,584.52	
		6/21/01	60.28	0.00	3,583.96	

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-11A	3,644.24	9/10/01	60.69	0.00	3,583.55	
	,	12/6/01	60.88	0.00	3,583.36	
		03/11/02	61.42	0.00	3,582.82	
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	
	1	12/09/98	56.17	0.00	3,588.12	
		03/10/99	56.45	0.00	3,587.84	
	J ,	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	
		03/08/01	59.76	0.00	3,584.53	
		6/21/01	60.29	0.00	3,584.00	
		9/10/01	60.79	0.00	3,583.50	
		12/6/01		well dry	-,	
		03/11/02		well dry		
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	(-)
	ł i	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	· •	-	, <u>.</u>	
		12/00	=	-	•	
		03/08/01	•	- 1	-	
		6/21/01	<del>-</del>	-	-	
		9/10/01	=	- 1	-	
		12/6/01	61.30	0.00	3,583.08	
,		03/11/02	61.61	0.00	3,582.77	
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	
	ĺ	09/13/00	58.29	0.00	3,587.23	·
		12/07/00	58.68	0.00	3,586.84	
		03/08/01	59.19	0.00	3,586.33	
		6/21/01	59.80	0.00	3,585.72	
		9/10/01	60.03	0.00	3,585.49	
		12/6/01	60.59	0.00	3,584.93	
		03/11/02	60.94	0.00	3,584.58	
MW-14	3,642.45	03/08/01	61.07	0.00	3,581.38	
		6/21/01	61.71	0.00	3,580.74	
		9/10/01	62.31	0.00	3,580.14	
[		12/6/01	62.80	0.00	3,579.65	
		03/11/02	62.70	0.00	3,579.75	
MW-15	3,643.24	03/08/01	59.79	0.00	3,583.45	
		6/21/01	60.49	0.00	3,582.75	
ļ		9/10/01	61.02	0.00	3,582.22	
ĺ		12/6/01	61.47	0.00	3,581.77	
		03/11/02	61.65	0.00	3,581.59	

#### 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	
		03/08/01	61.43	0.00	3,582.63	(10)
		6/21/01	61.48	0.00	3,582.58	
		9/10/01	61.53	0.00	3,582.53	
	] .	12/6/01		well dry		
		03/11/02		well dry		

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

<sup>(2) -</sup> For wells having measurable thickness of free product, the groundwater elevation was calculated as follows:

Groundwater Elevation = (TOC elevation)-(depth to groundwater)+[(free product thickness)x(SG of free product)]

Note: The specific gravity (SG) of the free product is 0.82.

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

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

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

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

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

 $<sup>^{\</sup>mbox{\scriptsize (8)}}\mbox{-}$  TOC elevations for MW-12D and OW-4 estimated relative to TOC elevation for MW-12.

 $<sup>^{(9)}</sup>$ - TOC elevation for MW-13 estimated relative to TOC elevation for MW-7.

<sup>(10)-</sup>Well dry (measured depth to water is below base of screen), true groundwater elevation is less than listed groundwater elevation.

Table 3
March 11-12, 2002 Field Screening Results for Groundwater Samples
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitor	Cumulative Gallons Removed	рН	Temperature (°C)	Conductivity (umhos/cm)	Redox (mV)	Dissolved Oxygen (meter) (mg/L)	Dissolved Oxygen (Hach kit) (mg/L)	Ferrous Iron (mg/L)	Alkalinity (mg/L)
MW-1	2	7.66	17.99	1354	1.1	5.44	NM	NM	NM
MW-3	2	7.78	17.91	1235	6.61	7.91	MN	WN	NM
MW-4	2	7.87	17.95	1310	35.7	8.27	MN	MN	NM
MW-5	1.0	8.18	18.71	1111.0	47.5	6.26	4	0	70
MW-7	0.25	8.04	18.55	1460	19.7	4.15	MN	MN	NM
MW-8	0.5	8.01	18.48	1506	11.5	5.79	MN	NN	NM
MW-9 <sup>(1)</sup>	0.25	NM	NM	NM	MN	NM	MN	NM	NM
MW-10	0.3	7.23	18.62	3988	-102.8	2.73	NM	NM	NM
MW-11A	1.0	7.39	18.01	5253	-64.2	4.82	0	8.5	140
MW-12D	12	7.77	17.59	1001	-67.4	3.56	0	4.9	80
MW-13	2.6	7.73	18.13	1504	-45.9	4.52	NM	NM	NM
MW-14	9.0	7.41	17.49	1815	54.0	6.40	NM	NM	NM
MW-15	2	7.74	18.04	1351	17.8	5.85	NM	NM	NM

(1) Well yielded insufficient groundwater for measurement of field screening data.

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.

Monitor wells MW-12 and OW-4 were dry.

NM=Not Measured

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	ns per liter, ug/L		milligrams p	er 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 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 NA	7.5
	8/23/96	_	l		570.0	2100.0		17
	12/2/96	Regular	1800.0	3300.0	i e	1	NA 100	
	1	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	< }	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	- Dl	NS 2.0	NS	NS	NS <1	NS 0.40	NS 0.58
	3/8/01 6/21/01	Regular	2.0 NS	<1 NS	<i NS</i 	NS	0.49 NS	0.58 NS
	9/10/01	_	NS NS	NS NS	NS NS	NS NS	NS NS	NS NS
	12/6/01	]	NS NS	NS NS	NS	NS NS	NS NS	NS NS
	3/12/02	Regular	<1	<1	<1	<1	<0.2	<0.1
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 NA
	1/27/94	Regular	< 1	1.2	2.0	2.5	NA.	NA NA
MW-3	8/10/92	Regular	304.9	2099.0	6760.0	1586.0	NA NA	NA NA
11111	2/9/93	Regular	130.0	< 10	< 10	190.0	NA.	NA NA
	8/19/93	Regular	560.0	3100.0	630.0	1900.0	NA NA	NA.
	1/27/94	Regular	1070.0	5380.0	510.0	3120.0	NA NA	NA NA
	5/4/95	Regular	770.0	3300.0	470.0	1800.0	NA NA	NA NA
	8/1/95	Regular	490.0	2900.0	890.0	1600.0	NA NA	14
	11/15/95	Regular	250.0	1000.0	180.0	440.0	NA NA	2.9
	2/23/96	_	120.0	810.0	170.0	560.0	NA NA	
		Regular						4
	5/31/96	Regular	670.0	3900.0	1200.0	2300.0	NA NA	15
	8/23/96	Regular	330.0	2200.0	590.0	1500.0	NA 0.80	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

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	ТРН-D	TPH-G
Well	Date	Type			ns per liter, ug/L	iojiamas	milligrams p	
MW-3	6/12/97		860.0	4800.0	1700.0	2600.0	1.9	20
M1 VV - 3	1	Regular	770.0	3000.0	1600.0	1900.0	1.6	16
	9/11/97	Regular	l :		500.0	450.0		5.3
	12/10/97	Regular	240.0	740.0	· ·		0.59	
	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
i	12/10/98	Regular	13.0	220.0	160,0	290.0	1.3	0.43
	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
Į	12/7/00	Regular	<1	<1	<1	< l	<0.25	< 0.1
	3/8/01	Regular	< 1	< 1	<1	<1	0.42	<0.1
	6/21/01	Regular	<1	<1	< 1	<1	<0.22	<0.1
	9/10/01	Regular	<1 <1	< 1 < 1	< 1 < 1	<1 <1	<0.2 <0.2	<0.1 <0.1
	12/6/01 3/12/02	Regular Regular	<1	<1	<1	<1	<0.2	<0.1
MW-4	8/10/92	Regular	2594.0	10360.0	2160.0	6740.0	NA NA	NA NA
10100-4	2/9/93	Regular	5200.0	15000.0	2200.0	10000.0	NA NA	NA NA
	8/19/93	Regular	3000.0	12000.0	< 2000	7000.0	NA NA	NA NA
	1/27/94	Regular	NSP	NSP	NSP	NSP	NA NA	NSP
	5/3/95		NSP	NSP	NSP	NSP	NA NA	NSP
	8/1/95	Regular	5700.0	17000.0	3500.0	13000.0	NA NA	120
	i .	Regular	490.0	1600.0	310.0	1100.0	NA NA	5.2
	11/15/95	Regular	360.0	2800.0	560.0	2500.0	NA NA	18
	2/23/96	Regular	84.0	830.0	280.0	1100.0	NA NA	6.2
	5/31/96	Regular	110.0	1400.0	430.0	1800.0	NA NA	9.8
	8/23/96 12/2/96	Regular	190.0	2000.0	1800.0	7200.0	56	43
		Regular	220.0	1500.0	1500.0	4400.0	27	27
	3/12/97	Regular						6.2
	6/12/97	Regular	47.0	270.0	360.0	950.0	2.5	
	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 5.6
	3/24/98	Regular	150.0	510.0	270.0	620.0	1.2	
	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
	3/8/01	Regular	<1	< 1	< 1	< 1	0.43	0.16
	6/21/01	Regular	< 1	< 1	< 1	< 1	<0.25	<0.1

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	ТРН-G
Well	Date	Type			ns per liter, ug/L		milligrams p	
MW-4	9/10/01	Regular	< 1	<1	<1	<1	<0.2	<0.1
	12/6/01	Regular	<1	<1	<1	< 1	0.6	<1
	3/12/02	Regular	<1	<1	<i< td=""><td>&lt;1</td><td>&lt;0.2</td><td>1.0&gt;</td></i<>	<1	<0.2	1.0>
MW-5	8/10/92	Regular	< 4	< 4	< 4	< 4	NA	NA NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94	Regular	8.7	29.9	4.0	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
	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	< ]	< 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
	3/8/01	Regular	< 1	< 1	< 1	< 1	0.56	<0.1
	6/21/01	Regular	< 1	< 1	< 1	< 1	0.26	<0.1
	9/10/01	Regular	<1	<1	< 1	<1	<0.2	<0.1
	12/6/01	Regular	< 1	< ]	< 1	<1	0.49	<0.1
	3/12/02	Regular	<1	<1	<1	<1	<0.24	<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	0.00011	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

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	ns per liter, ug/L	· · · · · · · · · · · · · · · · · · ·	milligrams p	er liter, mg/L
MW-6	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 NA	NS
141 44 - 1	2/9/93	Regular	<2	< 2	< 2	< 6	NA NA	NA NA
	8/19/93	Regular	<2	3.0	< 2	< 2	NA NA	NA NA
	1/27/94	Regular	1.1	<1	< 1	<1	NA NA	NA NA
	5/3/95		52.0	3.4	0.7		NA NA	NA NA
	1	Regular				2.8		< 0.1
	8/1/95	Regular	22.0	2.2	0.9	2.8	NA NA	ĺ
	11/15/95	Regular	8.4	0.8	< 0.3	0.9	NA 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 NA	< 0.1
	5/31/96	Regular	29.0	83.0	10.0	21.0	NA NA	0.25
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA . O. I	< 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
	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
	3/8/01	Regular	< 1	< 1	< 1	< 1	1.2	< 0.1
	6/21/01	Regular	3.1	< 1	< 1	< 1	<0.22	<0.1
	9/10/01	Regular	<1	<1	< 1	<1	<0.33	<0.1
	12/6/01	Regular	<1	<1	< 1	< 1	1.3	<0.1
	3/12/02	Regular	<1	<1	<1	< 1	NA	< 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

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Type	_		ns per liter, ug/L		milligrams p	er liter, mg/L
MW-8	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	1 -	<1	<1	< 1	<1	0.1	< 0.1
	t .	Regular			<1	<1	0.3	< 0.1
	12/10/97	Regular	</td <td>&lt;1</td> <td>&lt;1</td> <td>&lt; 1</td> <td></td> <td>&lt; 0.1</td>	<1	<1	< 1		< 0.1
	3/23/98	Regular	<1	<1			< 0.2	
	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
	3/8/01	Regular	<1	<1	< 1	<1	1.6	<0.1
	6/21/01	-	NS NS	NS NO	NS	NS NS	NS NS	NS NS
	9/10/01	-	NS NS	NS NS	NS NS	NS NS	NS NS	NS NS
MW-9	12/6/01 3/12/02	Regular	NS < 1	NS < 1	NS < 1	NS < 1	NS 0.38	NS <0.1
	4/22/93	<del></del>	570.0	380.0	< 50	870.0	NA	NA NA
	7/15/93	Regular	1	7.3	3.0	458.0	NA NA	NA NA
	i .	Regular	121.0	l	40.0	250.0		NA NA
	8/19/93	Regular	390.0	290.0			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	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
	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

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	ТРН-D	ТРН-G
Well	Date	Type		microgran	ns per liter, ug/L		milligrams p	er liter, mg/L
MW-9	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
	3/8/01	Regular	< 1	< 1	< 1	< 1	1.4	<0.1
	6/21/01	-	NS	NS	NS	NS	NS	NS
	9/10/01	-	NS	NS	NS	NS	NS	NS
	12/6/01	-	NS	NS	NS	NS	NS	NS
	3/12/02	Regular	1	<1	< 1	< 1	0.37	<0.1
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. i	< 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
	3/8/01	Regular	3.4	1.1	<1	<1	3.4	0.2
	6/22/01	Regular	< i	< 1	< 1	< 1	1.2	<0.1
	9/10/01 and 9/18/01	Regular	2	< 1	<1	< 1	2.3	<0.1
	12/6/01	Regular			1	No Valid Data		
	3/12/02	Regular	< 1	< 1	< 1	< 1	3.2	<0.1

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре	Dendone		ns per liter, ug/L	22,702.00	milligrams pe	
MW-11			< 2	< 2	< 2	< 2	NA	NA
MW-11	8/19/93 1/27/94	Regular	<1	<1	<1	<1	NA NA	NA NA
		Regular						NA NA
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	0.2
	8/1/95	Regular	44.0	29.0	5.5	13.0	NA NA	0.4
	11/15/95	Regular	190.0	2.8	6.2	11.0		
	2/23/96	Regular	49.0	1.2	0.5	4.0	NA	0.25
1	5/31/96	Regular	300.0	83.0	12.0	28.0	NA	0.8
1	8/23/96	Regular	100.0	1.2	0.3	4.7	NA	0.26
1	12/2/96	Regular	970.0	< 5	6.0	8.1	2	1.3
	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
1	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	< ]	< ]	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
	3/8/01	Regular	12	<5	<5	<5	2.2	<0.5
	6/22/01	Regular	1.5	< 1	<1	< 1	1	<0.1
	9/10/01	Regular	7.9	<1	<1	< 1	1.1	<0.1
ļ	12/6/01	Regular	<1	<1	<1	<1	1	<0.1
	3/12/02	Regular	1.8	<1	<1	1	1.6	<0.1
MW-12	3/24/98	Regular	100.0	11.0	6.0	8.0	0.29	0.41
19179-12	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
ĺ	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	-	34.0	<1	<1	<1	0.23	< 0.1
	9/13/00	Regular	34.0 27	<1	2.9	1.9	<0.25	<0.1
		Regular		l			2.1	0.1
	3/8/01	Regular	14	<1	<1	<1	i	1
	6/22/01	Regular	12	< 1	<1	<1	0.51	0.11
	9/10/01	Regular	NS-D NS-D	NS-D NS-D	NS-D	NS-D	NS-D NS-D	NS-D NS-D
	12/6/01	Regular			NS-D	NS-D	I NE D	

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре			ns per liter, ug/L		milligrams p	er liter, mg/L
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
	3/8/01	-	NS	NS	NS	NS	NS	NS
	6/22/01	-	NS	NS	NS	NS	NS	NS
	9/18/01	Regular	< 1	< 1	< 1	< 1	<0.2	<0.1
	12/6/01	Regular	< 1	< 1	< 1	< 1	<0.2	<0.1
	3/12/02	Regular	< 1	< 1	< 1	< 1	0.44	<0.1
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
:	3/8/01	Regular	<1	<1	1.2	<1	2	<0.1
	6/22/01	Regular	< 1	< 1	< 1	<1	0.31	<0.1
	9/10/01	Regular	< 1	< 1	< 1	<1	0.3	<0.1
	12/6/01	Regular	< 1	< 1	< 1	<1	<0.2	<0.1
	3/12/02	Regular	< 1	< 1	< 1	<1	0.84	<0.1
MW-14	1/14/01	Regular	<1	<1	<1	<1	<0.2	<0.1
	6/21/01	-	NA	NA	NA	NA	NA	NA NA
	9/10/01	-	NA	NA	NA	NA	NA	NA
	12/6/01	-	NA	NA	NA	NA	NA NA	NA
MW-15	1/14/01	Regular	<1	<1	<1	<1	<0.2	<0.1
	6/21/01	-	NA	NA	NA	NA	NA 	NA NA
	9/10/01	-	NA	NA	NA	NA	NA 	NA NA
011/4	12/6/01	-	NA NA	NA	NA	NA	NA	NA 10.10
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 <0.1
	12/9/99 3/9/00	Regular	<1.0	<1.0	<1.0 <1.0	<1.0 <1.0	<0.2 0.25	<0.1 <0.1
	6/8/00	Regular	<1.0	<1.0		<1.0	<0.21	<0.1
ĺ	9/13/00	Regular	<1.0 <1.0	<1.0 <1.0	<1.0 <1.0	<1.0	<0.21	<0.1 <0.1
	9/13/00 12/7/00	Regular	<1.0 NS-D	<1.0 NS-D	NS-D	NS-D	NS-D	NS-D
	3/8/01	_	NS-D NS-D	NS-D NS-D	NS-D NS-D	NS-D NS-D	NS-D NS-D	NS-D NS-D
	6/21/01		NS-D NS-D	NS-D NS-D	NS-D NS-D	NS-D NS-D	NS-D NS-D	NS-D NS-D
	9/10/01	_	NS-D NS-D	NS-D NS-D	NS-D NS-D	NS-D	NS-D NS-D	NS-D NS-D
	12/6/01	-	NS-D NS-D	NS-D NS-D	NS-D NS-D	NS-D NS-D	NS-D NS-D	NS-D NS-D
	12/0/01	<u> </u>	ח-מיו	ח-מיו	149-17	ע-טיגו	113-11	עיטיו

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

Cumulative Results<sup>(1)</sup> for Chloride<sup>(2)</sup> Analyses Hobbs, New Mexico Facility BJ Services Company, U.S.A.

Samule Date									Monito	Monitor Wells <sup>(3)</sup>							
	MW-1	MW-3	MW-4	MW-5	MW-5   MW-6   MW-7	MW-7	MW-8	MW-9 MW-10 MW-11	MW-10	MW-11	MW-11A   MW-12	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
8/1/95	091	150	310	130	380	310	350	110	2200	3400	NP <sup>(4)</sup>	NP	NP	NP	NP	NP	NS(s)
8/23/96	130	140	100	66	210	250	360	140	2000	2900	ď	È	NP	NP	NP	NP	NS
3/23-24/98	212	206	126	151	183	223	364	164	2390	SN	940	1200	NP	ďN	NP	NP	NS
3/9-10/99	163	156	142	155	411	238	274	123	1160	SN	834	314	NP	МР	NP	NP	NS
6/10-1/2/99	NA <sup>(6)</sup>	NA	NA	NA	dN	NA	NA	NA A	NA NA	ďN	NA	NA	195	496	NP	NP	566
3/9-10/00	258	196	196	196	dN	224	241	131	474	È	1290	327	117	276	ΝP	NP	258
1/14/01	NS	NS	NS	NS	NP	SN	SN	SN	SN	ďΝ	NS	NS	NS	SN	368	219	NS
3/8-9/01	NA	165	172	152	NP	224	250	127	879	ΝP	1720	586	NS	276	327	NA	NS-D(7)
6/21/01	NA	NA	NA	NA	NP	Ϋ́	NA	NA	NA	NP	NA	NA	NS	NA	222	222	NS-D
9/10/01	NA	NA	NA	NA	NP	NA	NA	NA	NA	NP	NA	NS-D	NA	NA	245	228	NS-D
9/18/01	NA	NA	NA	NA	NP	NA	NA	NA	ΝΑ	NP	NA	NS-D	78.8	NA	NA	NA	NS-D
12/6/01	N A	NA	NA	NA	NP	ΝA	NA	NA	ΝΑ	NP	NA	NS-D	NA	A A	276	215	NS-D
3/11-12/02	177	172	183	127	NP	188	241	110	861	NP	1230	NS-D	75.8	207	284	224	NS-D

 $^{\left( 1\right) }$  - in mg/L.

 $^{\left(2\right)}$  - NMWQCC standard for chloride is 250 mg/L.

(3) - MW-2 not operative after May 3, 1995; P&A'd 7/1/99.

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

MW-11 P&A'd 7/1/99.

MW-11A installed February 1998.

MW-12 installed February 1998.

MW-12D installed June 1999.

W-12D instance June 1999.

MW-13 installed June 1999. MW-14 installed January 2001.

MW-15 installed January 2001.

(4) - NP indicates that well was not present at time of sampling event.

 $^{(5)}$  - NS indicates that well was not sampled during applicable sampling event.

 $^{(6)}$  - NA indicates that well was not analyzed for chloride during applicable sampling event.

(7) - NS-D indicates that well was dry (not sampled) during applicable sampling event.

Table 6
Summary of Groundwater Quality Parameters and Detected PAHs, Metals, VOCs and SVOCs
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

									Ă	Monitor Wells(1)	(I)  S							
Analyte (units)	Sample Date	MW-1	MW-3	MW-4	MW-5	9-MM	MW-7	WW-8	6-WM	MW-10 MW-11	-1	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
Bicarbonate, as CaCO, (mg/L)	8/1/95	380	430	490	290	0.19	440	360	570	520	560	Np <sup>(3)</sup>	ď	ďN	δZ	ďΣ	ď	NS(3)
	8/23/1996	310	310	210	270	120	400	280	390	520	430	ž	ž	Ν	ğ	ğ	ĝ	SN
	3/23-24/98	286	214	175	247	081	309	260	306	557	SN	319	451	å	ď	ž	ž	SN
	3/9-10/99	92	309	186	283	286	358	317	333	278	SN	335	386	ğ	ď	ž	ž	NS
	6/10-1/2/99	SN	SX	SN	SN	ž	SN	SN	SN	SN	ŝ	SZ	SN	200	520	ž	ŧ	316
	3/9-10/00	1.68	248	160	253	å	301	362	279	455	ž	703	402	244	240	ğ	È	1020
	1/14/2001	SN	SN	SN	SN	ğ	SN	SN	SN	SN	å	SN	SN	SN	SN	374	250	SN
	10/6-8/£	6'06	242	232	222	ž	283	252	252	286	å	646	475	SN	131	NA(s)	SN	NS-D(5)
	3/11-12/02	230	230	210	260	Ā	260	340	760	784	ž	520	NS-D	260	164	NS	NS	NS-D
Carbonate, as CaCO, (mg/L)	56/1/8	01 >	> 10	< 10	ol >	ol >	01 >	01 >	01 >	ot >	01	ž	ď	æ	ďΖ	ď	ď	NS
	8/23/96	ot >	01 >	o1 >	ol >	01 >	01 >	01 >	01 >	01 >	01 >	ž	ž	ž	ž	Š	ž	SX
	3/23-24/98	⊽	~	~	·	~	~	~	-	<u></u>	SZ	-	7	ď	Ž	호	È	SN
	3/9-10/99	⊽	⊽	⊽	⊽	⊽	~	~	-	<u>-</u>	SZ	~	~	N N	Ž	ž	ž	SX
	6/10-1/5/99	SN	SN	SN	SN	ğ	SN	SZ	SN	SN	ž	SN	SN	⊽	⊽	훋	ž	⊽
	3/9-10/00	7	\$	4	\$	ğ	۵	4	4	4	ž	4	4	۵	4	ž	Ż	\$
	1/14/2001	SZ	SN	NS	SN	ď	SN	SN	SN	SN	ž	SN	SN	SZ	SN	4	۵	SN
	3/8-9/01	۵.	4	۵	4	Š	\$	٥	7	۲,	ĝ	4	4	SN	۲,	Ϋ́	SZ	Q-SN
	3/11-12/02	<2	2	\$	<2	ď	ح2	\$	\$	¢.	ďŽ	7	US-D	\$	7	SZ	SS	NS-D
Hardness-Total, as CaCO,	3/23-24/98	430	430	275	342	440	0.09	740	510	1450	å	0001	0091	Ž	Ž	Ž	ž	SX
(mg/L)	3/9-10/99	250	440	310	340	640	780	089	370	720	SX	1150	460	ž	ž	ž	È	SS
	3/9-10/00	009	450	200	1200	ď.	099	760	430	160	ž	880	200	260	540	ž	ž	3000
	3/8-9/01	310	470	610	440	ĝ	290	290	1000	1300	Ž	1900	1300	SN	670	Ϋ́	SZ	NS-D
	3/11-12/02	420	420	450	420	å	ND(6)	Q	Q	1200	Νb	1400	NS-D	330	750	SX	SN	NS-D
Hydroxide (mg/L)	8/1/95	01 >	< 10	ot >	or >	01 >	01 >	01 >	01 >	< 10	01 >	ď	ď	Ā	ž	ž	Z	SN
	8/23/96	01 >	v 10	01 >	01 >	01 >	01 >	01 >	× 10	> 10	ot >	Š	ď	ď	ďV	ž	ď	NS
Methane (mg/L)	3/23-24/98	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0012	0.039	< 0.0012	16.0	SZ	0.14	< 0.0012	å	ğ	ž	<u>F</u>	SN
	3/9-10/99	SN	SN	SN	<0.0012	SX	SN	SN	SN	0.035	SN	0.094	<0.0012	ď	å	Ž	Ż	SN
	6/10-1/5/99	SN	SN	SN	SN	Š	SX	SN	SN	SN	å	Ϋ́	¥ Z	0.0015	0.0017	Ž	Ž	<0.0012
	3/9-10/00	< 0.0012	< 0.0012	< 0.0012	< 0.0012	ĝ	< 0.0012	0.13	< 0.0012	0.0056	ž	0.037	< 0.0012	<0.0012	<0.0012	ž	Ž	<0.0012
	3/8-9/01	<0.0012	<0.0012	<0.0012	<0.0012	ğ	<0.0012	<0.0012	<0.0012	<0.0012	ĝ	0.0028	<0.0012	SN	<0.0012	Y :	SZ ;	NS-D
	3/11-12/02	0.007	<0.0012	0.0024	<0.0012	ď	Q	Q.	Q.	Q	å	0.0044	NS-D	<0.0012	<0.0012	ŝ	ŝ	U-SN
Anions (mg/L)																		
Chloride									See Table	54								
Fluoride	3/23-24/98	6.0	1.2	1.2	9.0	=	8.0	6.0	1.3		SN	2.9	4.2	È	Ž	ĝ	È	SZ
	3/9-10/99	1.54	1.46	5.1	1.38	1.79	1.56	1.4	1.84	4.93	SX	3.08	3.13	ž	È	ž	È	SX
	6/10-1/5	SN	SN	SN	SN	ŝ	SN	SZ	SX	SX	Ž	SZ	SZ	1.83	27.7	Ž	Ž	3.45
	3/9-10/00	1.7	=	=	=	È	0.75	69.0	5.1	_	ž	<b>1</b> .0	1.7	<u></u>	7.7	È	Ž	3.8
	1/14/2001	NS	SX	SN	SZ	È	SX	SS	SZ	SZ	Ž	SX	S	SN	SZ	3.5	1.2	SZ
	3/8-9/01	1.3	0.77	0.63	98.0	ž	69.0	99.0	0.92	1.2	ž	Ξ	67	SN	9:	¥	S	O-SN
	3/11-12/02	1.2	1.4	1.2	4.1	ž	1.3	Ξ	1.5	8:	ž	1.2	US-D	4.1	23	ž	SZ	NS-D
Nitrate (Nitrogen as N)	\$6/1/8	4.7	9.6	15	28	1.3	9.2	=	38	< 0.1	5.5	ž	ž	ž	ž	Ž	ž	SZ
_	8/23/96	=	7.6	9.7	- 12	< 0.5	9	9.8	24	< <b>?</b>	=	ž	ž	ď	Ž	ğ	<del></del>	SZ

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SVOCs Summary of Gro

l able to roundwater Quality Parameters and Detected PAHs, Metals, VOCs and S Hobbs, New Mexico Facility BJ Services Company, U.S.A.
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									Ž	Monitor Wells <sup>(1)</sup>	(I) <sup>S</sup>							
Analyte (units)	Sample Date	MW-1	MW-3	MW-4	MW-5	9-MM	MW-7	MW-8	6-WM	MW-10	1-7	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
Nitrate (Nitrogen as N)	3/23-24/98	1.78	3.07	2.59	3.87	69'0	3.92	1.84	4.27	0.07	SN	< 0.05	< 0.05	ď	£	ž	£	NS
	3/9-10/99	0.7	2.1	2.6	¥		3.3	0.7	3.7	¥	ž	0.0	7.0	Š	ž	ž	ĝ	SZ
	6/10-1/5/	SZ	S	SZ	SN	ž	SZ	SN	SX	SZ	å	SN	NS	2.1	2.4	ž	ž	3.96
	3/9-10/00	0.33	2.9	3.7	5.3	ž	3.6	0.35	7.2	0.1	ğ	0.11	0.1	0.14	-0°	È	È	3.6
	1/14/01-3/01	SN	S	SZ	SN	ž	SN	SS	SZ	SN	ď	SN	SN	SZ	NS	4.5	4.88	SN
	3/8-9/01	4.31	2.56	4.75	3.24	Ž	2.82	0.664	6.7	~ O>	å		6.0	SN	9	¥.	SZ	Q-SN
	3/11-12/02	5.7	3.86	8.55	2.98	N <sub>P</sub>	3.23	0.607	6.34	-0°	ž	T.0>	NS-D	<0.1	<0.1	NS	NS	NS-D
Sulfate	8/1/95	120	150	210	230	6.7	180	160	150	130	230	ď	ğ	ď	ď	ď	ž	SN
	8/23/96	130	150	150	140	88	80	091	180	120	130	ž	ž	ž	ž	ž	ž	SN
	3/23-24/98	130	081	091	061	230	310	250	230	320	SN	061	240	N <sub>P</sub>	å	ď	ž	SN
	3/9-10/99	961	162	178	195	7.2	246	240	146	223	ž	227	193	ď	ğ	ž	호	SN
	6/10-1/2/99	SN	SZ	SX	SN	ž	SN	SN	SZ	SN	ž	SN	SN	249	334	È	ž	192
	3/9-10/00	530	<u>6</u>	250	790	ž	280	260	170	160	ž	270	210	200	170	å	È	200
	1/14/2001	SX	SN	SN	SN	Ē	SN	SN	SN	SN	å	SN	SN	SN	SN	180	130	SN
	3/8-9/01	210	170	081	081	ď	260	240	150	270	ž	330	300	SN	380	¥ Z	SZ	NS-D
	3/11-12/02	130	150	160	120	g I	240	250	130	230	å	350	Q-SN	200	380	SN	SN	NS-D
Cations (mg/L)																		
Calcium	\$6/1/8	120	120	220	091	320	300	300	180	610	490	ď	å	å	N P	ž	ž	SN
	8/23/96	120	130	68	91	62	270	230	81	330	440	ŝ	ž	ž	ğ	ž	ž	SN
	3/23-24/98	129	122	79	60	8	208	215	142	417	SN	259	388	Ž	Ž	Ż	£	SZ
	3/9-10/99	80.2	129	8.06	911	<u>+</u>	233	161	122	214	호	308	148	Ž	ğ	È	ž	SN
	6/10-1/5/99	SN	SX	SN	SN	ğ	SN	NS	SN	SN	ž	SN	SN	113	386	ž	ž	4
	3/9-10/00	155	611	147	387	ž	191	215	110	171	ž	229	081	1.87	122	Ž	ŝ	882
	1/14/2001	SN	SN	NS	SN	ž	SN	SN	SN	SN	Š	SX	SN	SZ	SX	621	051	SZ
	3/8-9/01	8.98	148	214	157	È	172	183	381	331	ŝ	466	338	SN	861	Ϋ́	SZ	Q-SN
	3/11-12/02	112	121	130	143	ģ	Q.	S	Q	303	Ν	330	NS-D	120	225	SN	SN	NS-D
Magnesium	8/1/95	34	36	88	27	72	42	49	43	130	130	N	ğ	Š	ģ	ğ	È	SZ
-	8/23/96	120	32	21	<u>s</u>	28	40	48	44	84	120	ž	å	Ž	ž	Ž	Ē	SZ
	3/23-24/98	36	30	<u>e</u>	50	42	47	52	36	130	SN	%	801	ž	Ż	È	ž	SZ
	3/9-10/99	19.7	31.5	20.4	21.6	62.2	54.4	47.7	28.5	43	ĝ	101	32.1	å	Ē	È	Ż	SZ
	66/7/2-01/9	SN	SN	SN	SN	ĝ	SN	SN	SX	SZ	ž	SX	SX	16.6	83.9	ž	Ž	44.3
	3/9-10/00	41.3	27.5	26.3	29.2	ž	44.3	39.1	26.2	<del>-</del> 9	Š	47.7	30.6	7.25	38.8	Ž	Ž	74.5
	1/14/2001	SN	SX	SZ	SN	ž	SN	SZ	SZ	SZ	ž	SZ	SN	SN	SZ	87.5	28.3	SZ
	3/8-9/01	20.7	24.9	25.9	9.91	Ż	41.1	37.4	28.2	1.26	š	93.4	95.3	SN	52.3	¥	SS	NS-D
	3/11-12/02	27.3	20.7	20.7	13	ğ	Q	QV	Q.	Q	ď	103	NS-D	90.9	44.7	SN	SN	NS-D
Potassium	\$6/1/8	2.4	2.6	3.5	4.2	3	3.4	۰	4.1	35	46	호	Š	Ž	ž	ž	Ž	SZ
	8/23/96	2.4		2.2	<u>.</u>	2.4	3.7	3.9	5.6	4	53	ž	ž	ž	Ž	Ž	È	SZ
	3/23-24/98	< 20	× 20	< 20	< 20	< 20	- 50 ×	< 20	< 20	70	SN	30	6	ž	Ž	Ž	울	S
	3/9-10/99	m	4	m	4	4	6	4	3	5	ž	21	101	Š	Ž	ĝ.	ŝ	SZ SZ
	6/10-1/7	NS	SZ	SX	SN	ž	SX	SN	SX	SN	ž	SN	SN	8	9	Ž	ž	
	3/9-10/00	4.01	4.11	3.95	19.5	ž	86.9	4.53	4.08	18.3	ž	18.6	₹	9.07	2.84	ž	È	10.7
	1/14/2001	SN	SZ	SS	SN	ž	SX	SZ	SX	SX	ğ	SZ	SN	SN	SZ	3.59	4.59	SN

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Table 6
Summary of Groundwater Quality Parameters and Detected PAHs, Metals, VOCs and SVOCs Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

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									Ŭ	Monitor Wells <sup>(1)</sup>	(ı) <sup>S</sup> I							
Analyte (units)	Sample Date	MW-1	MW-3	MW-4	MW-5	9-MM	MW-7	MW-8	6-WM	MW-10	=	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
Potassium	3/8-9/01	۵	2.56	2.76	2.25	ď	5.15	2.94	3.84	19.5	호	33.5	47.2	SN	2.26	٧×	SN	Q-SN
	3/11-12/02	2.82	4.05	2.79	3.55	å	QN	ND.	ND	ND	N <sub>P</sub>	41.5	NS-D	72	2.82	NS	NS	NS-D
Sodium	8/1/8	001	93	140	0:1	130	95	94	86	099	2000	ž	ž	ď	ž	ď	ď	SN
	8/23/96	8	9	<b>8</b>	120	120	8	8	83	096	2600	ž	ğ	Ž	ž	ğ	Š	SZ
	3/23-24/98	13	126	601	130	001	92	101	8=	0601	SN	312	381	Ž	ž	ž	ž	SX
	3/9-10/99	126	135	124	155	14	011	115	122	856	ž	228	180	Ž	ž	ž	Ż	SN
	6/10-1/5/66	SN	SZ	SN	SN	Ž	SN	SN	SN	SN	ž	SN	SN	121	991	ž	å	103
	3/9-10/00	123	112	115	123	å	1.26	95.4	1.06	<u>s</u>	ž	809	129	103	114	ž	å	97.3
	1/14/2001	SN	SN	NS	SN	å	SN	SN	SZ	SX	å	SN	SN	SN	SN	144	108	SZ
	3/8-9/01	4	124	135	147	ğ	121	81	611	410	ž	108	185	SN	142	¥ Z	SN	Q-SN
	3/11-12/02	147	133	128	145	ďN	ND	ΩN	QN	ND	ğ	099	NS-D	79.4	127	NS	NS	NS-D
Metals (mg/L)																		
Arsenic	8/1/95	0.0076	0.0043	< 0.002	0.0059	0.028	0.0033	0.0034	0.0055	0.015	0.0086	ď	ž	ž	호	ď	ď	SN
	8/23/96	0.0078	9900'0	0.0059	0.0067	810.0	0.0036	0.0033	0.0044	0.028	0.011	ď	ž	Š	Š	å	d Z	SN
	3/23-24/98	0.007	0.007	800.0	0.007	0.013	< 0.005	< 0.005	0.005	0.035	SN	610.0	0.013	ğ	ğ	ž	ž	SZ
	3/9-10/99	0.013	600.0	0.012	0.005	0.02	900'0	0.005	0.007	970.0	å	0.036	990'0	ž	ž	Ž	ĝ	SZ
	6/7/2-01/9	SN	SN	SN	SN	ž	SN	SN	SZ	SN	å	SN	SN	0.022	800.0	ž	ŝ	<0.005
	3/9-10/00	0.0178	0.00817	0.0178	0.0173	Š	0.00849	0.00953	0.00757	0.0474	ă	801.0	0.0948	0.0143	<0.005	ă	ď	0.034
	1/14/2001	SN	. SN	SZ	SN	å	NS	NS	SN	NS	ž	NS	SN	SN	SN	0.00511	<0.005	SZ
	3/8-9/01	0.0205	0.0094	0.0386	0.00974	ž	0.00694	٧X	0.013	0.133	ž	80.0	0.0445	SN	0.00673	¥ Z	SN	US-D
	3/11-12/02	0.00939	0.00889	0.0101	0.0104	Š	ND	QN	QN	0.286	ΝP	980'0	NS.D	0.0471	0.012	SN	SN	NS-D
Barium	\$6/1/8	690'0	0.38	0.34	0.049	=	690.0	0.075	680'0	0.37	0.2	ď	ď	ď	ğ	ğ	ž	SZ
	8/23/96	0.064	0.24	690.0	0.038	0.29	0.061	990.0	680'0	0.26	0.2	ž	ď	ž	ğ	ă	ĝ	SZ
	3/23-24/98	0.11	0.182	0.044	0.044	0.208	0.059	0.074	990.0	0.287	SN	0.163	0.157	Ż	ŝ	ž	ğ	S
	3/9-10/99	0.058	0.059	0.045	0.054	0.555	9/0'0	0.052	0.043	0.17	ğ	0.174	0,144	ğ	ž	ž	ž	s Z
	6/10-1/5/99	SN	SN	SN	SN	Š	SN	SN	SN	SN	å	SZ	SS	0.155	0.333	Ž	<u> </u>	0.062
	3/9-10/00	0.0917	0.108	0.0694	0.184	ž	0.046	0.236	0.0419	0.281	ĝ	0.872	0.245	0.0962	0.113	ž	È	- 49
	1/14/2001	SN	SZ	NS	SN	ğ	SN	NS	SX	SX	å	SZ	SN	SN	SZ	0.0833	0.073	SN
	3/8-9/01	0.044	0.119	8260.0	0.0055	ž	0.043	0.0512	0.11	0.23	å	0.401	0.603	SN	0.171	¥ !	SZ :	O-SN
	3/11-12/02	90.0	0.0797	0.0805	0.0524	ž	2	Q	Q	0.294	ď	0.348	Q-SN	0.0865	0.109	SZ :	SZ S	O-SN
Cadmium	8/1/8	< 0.001	< 0.001	0.0052	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	× 0.001	<u>2</u>	ž !	<b>2</b> 5	ž	Ž	ž į	ź ź
	8/23/96	0.0 >	10.0 >	10.0 >	10:00	10:0 >	10.0 >	10:0 >	10.0 >	10:0 >	0.0	ž	Ž	<u> </u>	2 2	2 9	: <u>9</u>	ž
	86/87-57/5	00.00	500.0	0000	00.00	50.00	< 0.005	CO.002	c 0,000	00.00	2 9	00.00	2000	ž §	2 2	2	 2	×
	9/9-10/99	CO.002	CO.002	CO) 50	S 5	COO.00	500.00	500.00	Q 9	CO) 51	<del></del>	CO.O.	60.0	¥ 6	3000	- <del>-</del>	2	5000
	66/7/1-01/9	g .	Ž.	ź	ĝ.	ž !	S.	£	ĝ	e i	<b>ż</b> !	Ž ,	e i	60.00	9 9	<u> </u>	2 9	\$600
	3/9-10/00	<0.00	× 0.005	0.0178	\$000	a. Z	<0.005	00.00 00.000	60.05 00.05	<0.00	<u> </u>	< 0.003	CO:00	68.9	60.0	- J	3000	94
	1/14/2001	SS	SZ	S	SS S	₹	S	S	S	SZ	Ž	Z.	SZ	SZ :	ž	CD0.00	500.00	2 2
	3/8-9/01	<0.005	<0.005	0.0121	<0.00\$	호	<0.00\$	<0.005	<0.00	<0.005	Ż	<0.00	<0.00	SZ.	\$0.00	<u> </u>	2	2-52
	3/11-12/02	<0.005	<0.005	<0.005	<0.005	æ	QV	N Q	Q	<0.005	ğ	<0.005	NS-D	<0.005	<0.005	SZ	SZ	Q-SN
Chromium	8/1/8	< 0.01	< 0.01	10.0 >	10'0 >	10:0>	< 0.01	10'0 >	< 0.01	< 0.01	< 0.01	Ž	Ž	Ž	Ž	ž	₹ !	2
	8/23/96	< 0.01	10'0 ×	< 0.01	10'0 >	0.049	< 0.01	10'0 ×	10'0 >	10'0 >	< 0.01	È	Ž	È	ž	Ž	<del>2</del> :	2 :
	3/23-24/98	< 0.01	< 0.01	10.0 >	10'0 >	10.0 >	< 0.01	< 0.01	< 0.01	< 0.01	SN	< 0.01	< 0.01	Ž	ž	 Ž	<u>-</u>	S.

Table 6
Summary of Groundwater Quality Parameters and Detected PAHs, Metals, VOCs and SVOCs
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

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MW-11   MW-114   MW-12   MW-13   MW-14   MW-14   MW-14   MW-14   MW-15   MW-										Ğ	Monitor Wells(1)	(1)							
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,	Analyte (units)	Sample Date	MW-1	MW-3	MW-4	MW-5	9-MM	MW-7	WW-8		MW-10	7-11	MW-11A	MW-12	MW-12D	$\vdash$	MW-14	MW-15	OW-4
1,11,12,12,   1,11,1	Chromium	3/9-10/99	<0.01	10:0>	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ď	<0.01	<0.01	αž	å	ž	ğ	SN
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,		6/7/2-01/9	SN	SN	SN	SZ	ž	SN	SN	SZ	SN	ž	SN	SN	0.03	0.02	ž	å	<0.01
		3/9-10/00	<0.01	<0.01	<0.01	0.0248	å	< 0.01	< 0.01	< 0.01	0.031	ž	0.0342	0.0124	<0.01	<0.01	Ž	Ž	0.105
11,11,110,   11,111,110,   1		1/14/2001	SN	SZ	NS	NS	å	SN	SZ	SZ	SN	ž	SN	SX	NS	SZ	<0.01	<0.01	SN
1,11,11000   1,11000   1,		3/8-9/01	<0.01	<0.0>	0.0104	0.0101	È	<0.01	<0.01	0.013	6010.0	ğ	0.0392	0.0469	SN	0.0104	¥ Z	SN	NS-D
No. 1964   1964   1964   1964   1964   1965   196		3/11-12/02	<0.01	<0.01	<0.0>	10.0>	ď	Q	QN	ND	0.0246	ď	0.023	NS-D	<0.01	0.0114	NS	SN	NS-D
1,11,12,144   1,000	Lead	5661/1/8	< 0.002	< 0.002	0.0044	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0025	g	ďZ	ď	ďN	Ž	å	SN
11-1-1-10-10-10-10-10-10-10-10-10-10-10-		8/23/96	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	ž	ž	ă	ž	ž	Ž	SN
1,5,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1		3/23-24/98	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.00\$	< 0.005	< 0.005	< 0.005	SZ	< 0.005	< 0.005	ğ	Ž	ž	Ž	SN
11-12-10-1   11-		3/9-10/99	<0.005	<0.005	<0.005	< 0.005	0.013	< 0.005	< 0.005	< 0.005	< 0.005	ž	600'0	<0.00\$	ď	Ž	ğ	d Ž	SX
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,		66/2/1-01/9	SN	SX	SN	SZ	ž	SN	SX	SX	SX	Š	SN	SZ	<0.005	<0.005	ž	å	< 0.005
1111-1200   1011		3/9-10/00	<0.005	<0.005	<0.005	0.00565	ź	< 0.005	< 0.005	< 0.005	19900'0	ğ	0.00595	< 0.005	<0.005	<0.005	ğ	ğ	0.0355
14,14,1500   4000   4		1/14/2001	SZ	SN	SN	SN	a.N	SN	SN	SN	SN	ž	SS	SN	SN	SX	<0.005	<0.005	SZ
		3/8-9/01	<0.005	<0.005	0.00602	<0.005	å	<0.005	<0.005	0.00597	0.0222	ğ	0.0119	0.00627	SZ	<0.005	Ϋ́	SN	Q-SN
		3/11-12/02	<0.005	<0.005	<0.005	<0.005	ğ	Ş	2	Q.	0.0234	ž	<0.005	NS-D	<0.005	<0.005	NS	SN	NS-D
Fig. 1969   Colored	Mercury	8/1/1995	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0002	ž	ď	ď	ď	Ż	ž	SZ
1,11,12,149    1,11		8/23/96	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	ž	ğ	Š	Ž	ž	ž	SX
14-10-19-9   14-		3/23-24/98	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0003	< 0.0002	< 0.0002	SX	< 0.0002	< 0.0002	ď	ğ	ž	Ž	SZ
14   15   15   15   15   15   15   15		3/9-10/99	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	ž	<0.0002	<0.0002	ž	ž	ž	ğ	SZ
14-1000   NS   NS   NS   NS   NS   NS   NS		6/10-1/5/99	SN	SN	SN	SN	₽ Z	SN	SN	SN	SN	ğ	SZ	SZ	<0.0002	<0.0002	ğ	È	<0.0002
11/14/2001   11/		3/9-10/00	SN	SX	SN	SX	ă	<0.0002	<0.0002	<0.0002	<0.0002	Ž	<0.0002	<0.0002	<0.0002	<0.0002	ğ	È	<0.0002
111-11-11-11-11-11-11-11-11-11-11-11-11		1/14/2001	SN	SZ	SN	SN	ğ	SN	SZ	SN	SN	ş	SN	SZ	SN	SN	<0.0002	<0.0002	SN
1111-1201   1111-1202   1111		3/8-9/01	<0.0002	<0.0002	<0.0002	<0.0002	ğ	<0.0002	<0.0002	<0.0002	<0.0002	ž	<0.0002	<0.0002	SN	<0.0002	¥ Z	SZ	Q-SN
1,11,12,12,   1,11,12,13,		3/11-12/02	<0.0002	<0.0002	<0.0002	0.000243	dN	QN	QV	QV	<0.0002	ž	<0.0002	NS-D	<0.0002	<0.0002	SZ	SZ !	Q-SN
17-13-2498	Selenium	8/1/1995	<0.004	<0.004	<0.004	<0.004	<0.004	SN	NS	SN	SN	SN	ž	Ž	ž	ž	<u></u>	<b>2</b> ;	S
1,13,14/98   \$\alpha 0,0005   \$\alpha		8/23/96	<0.004	<0.004	<0.004	<0.004	<0.004	SZ	SZ	SN	SX	SZ	Ž	å	₹ :	₹ 5	ž	ž į	S 2
139-1099   0.0035   0.0065   0.0005		3/23-24/98	<0.005	<0.005	<0.005	<0.005	<00.00>	<0.005	<0.005	<0.005	<0.005	SZ	<0.005	<0.005	å :	ž ;	ž į	ž	2 2
		3/9-10/99	0.005	900'0	<0.005	900'0	<0.005	0.005	<0.005	<0.005	<0.005	ž ;	\$00.00	\$00.00	Ž	ž	ž	<u> </u>	Z
1/14/2001   Colored   Co		6/7/2-01/9	SZ	SZ	SZ	SZ	<u> </u>	SZ	S	S S	2 5	ž	2 0	2000	500	\$00.00	2	Ž	\$00.0>
1169(L)		3/9-10/00	<0.005	<0.005	<0.005	<0.005 7.5	ž	97,600.0	00.002 NG	COO.O>	S00.00	ž	00.00	SN	NS.	SX	<0.005	0.00523	NS
1/11-12/02 0,00549 0,00625 0,00538 NP ND ND ND ND ND ND ND NP NP NP NS NS NS NS NS NS NS NS NS NS NS NS NS		1/14/2001	\$00.00	COTOO 0	0.005.08	0.00587	ž	0 00617	<0.005	0.0054	<0.00	ž	<0.005	<0.005	SN	<0.005	٧X	SN	NS-D
1,10,10,10   1,0,10,10   1,0,10,10   1,0,10,10   1,0,10,10   1,0,10,10   1,0,10,10   1,0,10,10   1,0,10,10   1,0,10,10,10   1,0,10,10,10   1,0,10,10,10   1,0,10,10,10,10   1,0,10,10,10,10   1,0,10,10,10,10,10   1,0,10,10,10,10   1,0,10,10,10,10,10,10   1,0,10,10,10,10,10,10,10,10   1,0,10,10,10,10,10,10,10,10,10,10,10,10,		3/11-12/02	0.00549	0.00625	<0.005	0.00558	ď	QN	Q	QN	<0.005	ďΝ	<0.005	NS-D	<0.005	<0.005	SN	NS	NS-D
St/195   C   C   C   C   C   C   C   C   C	PAHs (µg/L)																		
873396         < 10         < 10         < 50         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         < 5         <	Acenaphthene	8/1/95	< 50	01 >	> 500	\$	< 30	\$	<>	\$	\$	\$>	Ż	å	È	ď	ž	호	SN
3/23-24/98         < 10         < 0.3         < 0.3         < 0.3         < 0.3         < 0.3         < 0.3         < 0.3         < 0.3         NP		8/23/96	01 >	01 >	× 30	\$ <b>&gt;</b>	< 30	< <b>&gt;</b>	< ×	\$>	\$ <b>&gt;</b>	<>	È	ğ	Š	ž	ž	Ē	SZ
3/9-10/99         <0.11         <0.11         <0.11         <0.11         <0.11         <0.11         <0.11         <0.11         NP		3/23-24/98	01 >	<0.3	0,3	<0.3	€.03	€.0>	<0.3	<0.3	<b>C</b> 0.3	SN	€.0	<0.3	호	Ż	Ž	Ž	SN
6/10-772/99         NS         NS         NS         NS         NS         NS         NS         C1.0           3/9-10/00         0.28         < 0.1		3/9-10/99	< 0.1	< 0.1	2.0	· 1.0 >	42.0	<u>8</u>	<del>-</del>	× 0.1	< 0.1	호	< 0.1	< 0.1	ž	È	ž	Ž	SZ
3/9-10/00         0.28         < 0.1         < 0.1         NP         < 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         < 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         < 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         < 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         < 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         < 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 <th< td=""><td></td><td>6/10-1/5/99</td><td>SN</td><td>SN</td><td>SN</td><td>SN</td><td>ŝ</td><td>S</td><td>SZ</td><td>SX</td><td>SN</td><td>Ž</td><td>SN</td><td>SZ</td><td></td><td>0.1 &gt;</td><td>Ž</td><td>Ž</td><td></td></th<>		6/10-1/5/99	SN	SN	SN	SN	ŝ	S	SZ	SX	SN	Ž	SN	SZ		0.1 >	Ž	Ž	
1/4/201   NS	<del></del>	3/9-10/00	0.28	× 0.1	< 0.1	9	ž	₽.	<del>0</del>	₽,	< 0.1	Š	<del>-</del> .	<del>0</del>	<del>0</del>	₽.	Ž	Ž	
3/8-9/01         <0.12         <0.13         <0.12         <0.13         <0.13         <0.13         <0.13         <0.13         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12         <0.12		1/14/2001	SS	SX	SX	SZ	ž	SZ	SZ	SZ	SX	ž	SN	SZ	SS	SN	9	0	S !
3/11-12/02 < 6.01 < 6.01		3/8-9/01	<0.12	<b>€</b> 0.13	<0.12	7.0	È	<0.13	<0.12	<0.12	Q.15	È	© ::	0.13	SN	<0.12	ž	z s	7-SX
8/1/95		3/11-12/02	< 0.1	II (9)	<0.1	<0.1	Ē	Ð	2	g	g	물	<del>0</del>	NS-D	ê -	-0-	SZ	2	O-SN
<10 <10 <10 <20 <2 <30 <2 <30 <2 <30 <3 <30 <4 <4 <4 <4 <4 <4 <4 <4 <4 <4 <4 <4 <4	Acenaphthylene	\$6/1/8	> 20	01 >	> 200	\$ ·	× 30	\$ .	\$ ;	\$	\$	\$ .	2 5	ž	ž	ž	ž \$	ž §	2 2
		8/23/96	2 V	01 >	06 >	÷	Df >	ç	- ;	<b>.</b>	- Ç	- ?	Ę.	Ž.	ž	Ē	<u> </u>	- <u>:</u>	?

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Table 6
Summary of Groundwater Quality Parameters and Detected PAHs, Metals, VOCs and SVOCs
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

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								# - I	Monitor Wells <sup>(1)</sup>								
Σ∣	MW-1	MW-3	MW-4	MW-5	9-MM	MW-7	MW-8	6-MM	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
ľ	01 >	<0.1	-ï 0-i	1.05	1.0	<0.1	-0°	<0.1	<0.1	NS	<0.1	<0.1	ďN	ž	ž	å	SN
٧	< 0.1	< 0.1	< 0.1	< 0.1	<2.0		-0°	< 0.1	< 0.1	ž	< 0.1	< 0.1	ž	Ž	ž	ž	SN
	SX	SN	SN	SN	ğ	SN	SX	SN	SN	ž	SZ	SN	0.0	< 1.0	ž	ž	7.0>
	16.0	< 0.1	< 0.1	<u>6</u>	å	-0>	0.	-0°	9.0	ž	40.1	40.1	₽	æ:	ž	ŝ	 9
	SN	SN	SX	SZ	Ž	SX	SN	SN	SZ	È	SX	SZ	SN	SZ	- 0 -		SZ
	Q.12	<del>0</del>	<0.12	- -	ž	<0.13	<0.12	<0.12	0.71	ž	0,35	<0.13	SZ	<0.12	ž	SZ	US-D
- 1	× 0.1	1-0	< 0.1	< 0.1	ž	Q	g	S	QN	ď	-	NS-D	-0°	-0- -0-	SN	SZ	NS-D
	< 50	01 >	× 500	\$ <b>&gt;</b>	< 30	< <b>&gt;</b>	^ \$	\$>	\$>	< 5	å	ž	ž	È	ž	Ŝ.	SZ
	 0 ∨	01 >	< 30	\$ \$	< 30	\$ \ \$		\$ >	\$ \ \	< > <	a Z	Z	Ĉ.	ž	ž	ž	S.
	01 >	-0>		0.0	<b>-</b> 0	T.0	-0	-0°	-0	SN	9	0,	È	ž	ž	ž	SN
	< 0.1	< 0.1	< 0.1	< 0.1	<2.0	0.0	0	< 0.1	< 0.1	ž	< 0.1	< 0.1	ž	Ž	Ż	È	SZ
	SN	Š	SZ	SZ	ĝ	SZ	NS	SN	SN	ğ	SN	SN	<0.1	< 1.0	Ž	£	<b>-</b> .
	0.12	< 0.1	< 0.1	-0×	ğ	-0>	-0 -0	-0.1	< 0.1	ž	<b>-0</b>	0.0	0.0	<del>-</del> .	ž	ž	- - 0
	SZ	SZ	SN	SZ	ģ	NS	SN	SZ	SN	Š	SZ	SN	SZ	SZ.	-0	- VO-1	SZ
	<0.12	<0.13	<0.12	<0.1	å	<0.13	<0.12	<0.12	<0.15	ğ	<0.13	<0.13	SN	<0.12	Y Y	SN	O-SN
	< 0.1	11.0>	< 0.1	< 0.1	Ž	£	S	Q	S	ŝ	-0	NS-D	-0	-0°	NS	NS	NS-D
	< 50	01 >	< 500	< 5	< 30	< 5	\$\$	\$\$	\$	\$	æ	ĝ	ğ	ž	ď	ď	SN
	01 >	01 >	< 30	<\$	< 30	~ <b>\$</b>	\$ <b>&gt;</b>	<\$>	\$	< \$	ž	ğ	ž	ž	훋	ž	SN
	01 >	9	0.0	-0.0	-0°	0.0	0.0	-0.1	-0°	SN	-0	0.0	Š	ž	ž	ž	SN
	< 0.1	< 0.1	0.2	< 0.1	<2.0	<0.1	₽	< 0.1	< 0.1	ž	< 0.1	< 0.1	ž	Ž	ž	ž	SN
	SS	SN	SN	SN	å	SX	SZ	SN	NS	ž	SN	SN	0.0	0.1 >	ž	ž	70.
	0.18	< 0.1	< 0.1	<b>&amp;</b>	Ē	-0>	-0	9	1.0 >	ž	-0°	-0×	<0.1	-0°	ž	ž	<0.1
	SZ	SN	NS	SN	ğ	NS	SX	NS	SN	Š	SN	SN	SZ	SN	<0.1	- - - - -	SN
	<0.12	<0.13	<0.12	-0°	ğ	<0.13	<0.12	<0.12	<0.15	ğ	<0.13	<0.13	SZ	<0.12	¥.	SZ	O-SN
	< 0.1	1.0>	< 0.1	< 0.1	Š	S	Q	Q	Q	ž	<b>0</b>	NS-D	<0.1	<0.1	SN	SZ	NS-D
	× 50	0 2 ∨	× 500	<>	< 30	\$>	Ş	ŝ	Ş	\$>	ď	δŽ	NP	ď	Ž	ž	SZ
	v 01 ×	01 >	< 30	\$ >	< 30	< <b>S</b> >	< 5	<\$	<\$	< <b>\$</b>	ž	ğ	호	ž	ž	ž	SZ
	01 >	-0°	<b>1</b> .0	1.0>	-0°	<0·	<0.1	-0	- <del>0</del>	SN	0	0,0	ž	Ž	ž	ž	SZ :
	< 0.1	< 0.1	0.2	< 0.1	<2.0	-0	-0	× 0.1	< 0.1	È	< 0.1	< 0.1	a Z	Ž	<b>Ž</b> :	å !	S.
	SN	SN	NS	SN	ž	SN	SN	SZ	SS	Z	SN	SN	-0>	0.	Ž	a !	7.0
	< 0.1	< 0.1	< 0.1	< 0.1	Ž	< 0.1	< 0.1	< 0.1	< 0.1	ž	< 0.1	< 0.1	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	- 0°-	Ž (	ž (	1.0 2
	SZ	SN	SN	SN	ž	SN	SN	SN	SN	ĝ	SZ	SZ	SZ	ź	<del>-</del>		c c
	<0.12	<0.13	<0.12	-0>	ģ	<0.13	<0.12	<0.12	<0.15	£ :	<0.13	C 0.13	ž ę	Z1.05	K U	S X	U-SN
L	< 0.1	- P	-0.	-0,	ž				Ž,	Ž	- P	d-CN dN	a de la companya de l	2	2	ž	SN
	> 20	0 9	200 ,	\$ 1	9 F	€ ¥	Ç (	; ;	7 (		2 2	ž §	ž	ž	ž	ž	SN
	2 9	? ;	25	7 =	2 6	; E	3 5	. 6	. 6	×	= =	0	ž	ž	ž	å	SN
	2 0	; e	; ;	10>		; <del>=</del>	9	× 0.1	< 0.1	ż	< 0.1	< 0.1	물	Ž	ž	ğ	SN
	S	SZ	×	SZ	ž	SZ	SZ	SX	SZ	ž	SN	SN	-0°	< 1.0	ĝ	ž	<0.1
	< 0.1	< 0.1	< 0.1	< 0.1	ĝ	< 0.1	< 0.1	< 0.1	< 0.1	ğ	< 0.1	- O ·	< 0.1	< 0.1	ž	ž	< 0.1
	SZ	SZ	SN	SN	ž	SN	SS	SN	SN	ğ	SN	SN	SZ	SZ	₽.		SZ
	<0.12	<0.13	<0.12	-0°	ž	<0.13	<0.12	<0.12	<0.15	ž	<0.13	<0.13	SZ	<0.12	¥ Z	SZ	NS-D
	< 0.1	1.0>	< 0.1	< 0.1	È	g	Q	Q.	QN	ď	<0.1	Q-SN	09	0.0	SN	SN	Q-SN
	× 50	01 >	> \$00	<\$	°30	< \$	< 5	<\$	<\$	<\$>	ď	ž	Ž	2	¥ Z	¥ Z	SZ
	01 >	01 >	< 30	<>	×30	<>	< <b>\$</b>	\$ ×	<b>~</b>	<\$>	Ż	호	Ž	Ż	¥ Z	₹ Z	S
	0 >	<0.3	6,3	€,0,3	€.0>	€03	<0.3	<0.3	€.03	SX	6.9	€.03	È	ž	¥Z	₹ Z	S
	< 0.1	<0.1	<2.0	< 0.1	<2.0		0.0	< 0.1	< 0.1	ĝ	< 0.1	-0°	ž	ž	ž	¥:	SZ ?
	SZ	SZ	S	SZ	È	S	S	S	SZ	È	SS	SN		0.1	ž ;	۷ ;	
	23	× 0.1	0.36	<del>0</del>	È	₽	₽.	1.5	₽	\$	<del>0</del>		₩.	9 ;	¥ ;	¥ ;	- P
	SN	SZ	S.	SZ	È	SZ	SN	SZ	SZ	ž	SZ	S	ž –	e Z	<del>-</del>	- -	ĝ

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Table 6
Summary of Groundwater Quality Parameters and Detected PAHs, Metals, VOCs and SVOCs
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

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									Ž	Monitor Wells(1)	(I)SI							
Analyte (units)	Sample Date	MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	10	MW-10	7-11	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
Fluorene	3/8-9/01	<0.12	<0.13	<0.12	<0.1	ďΣ	<0.13	<0.12	<0.12	<0.15	æ	<0.13	<0.13	SN	<0.12	NA	SN	NS-D
	3/11-12/02	< 0.1	<0.11	< 0.1	< 0.1	dN	ND	ND	G	Q.	ğ	1.0	NS-D	<0.1	<0.1	NS	NS	NS-D
Naphthalene	8/1/95	\$>	210	1700	<\$	470	< 5	< \$	15	92	< <b>\$</b>	ž	ž	ďN	dN	ď	ďN	NS
	8/23/96	230	011	440	\$ >	< 30	< <b>&gt;</b>	\$ >	× 84	> 76	< <b>\$</b> >	Ē	ž	å	ž	호	ď	NS
	3/23-24/98	130	23	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	4	œ	SN	8.0	=	ď	ž	ž	Ž	SN
	3/9-10/99	2	<b>0</b> 0	170	0.1	160	— ⊙	-0°	0.1	9	ğ	-0>	61	ž	Š	ğ	Ž	SN
	6/10-1/5/99	SN	SN	SN	SN	Š	SN	SN	SZ	SZ	ž	SX	SN	9.0	34	ž	Ž	-0°
	3/9-10/00	2.4	0>	0.44	-0×	ă	-0×	-0>	0.42	51	ž	0.12	0.26	40.1	98	ž	ď	- O>
	1/14/2001	SN	SZ	SN	SX	ğ	SN	SN	SN	SZ	호	SN	SN	SN	SN	9	40.1	SN
	3/8-9/01	<0.12	<0.13	<0.12	- - 0	<u>a</u>	<0.13	<0.12	<0.12	0.15	È	0.21	<0.13	SN	<0.12	Ϋ́	SN	NS-D
	3/11-12/02	< 0.1	<0.11	< 0.1	< 0.1	ģ	Q	Š	<u>Q</u>	Q	ğ	0.14	NS-D	0,	0>	NS	NS	NS-D
Phenanthrene	\$6/1/8	05 >	< 10	> 500	\$>	< 30	\$>	\$>	\$>	<\$>	< <b>\$</b>	ž	å	ď	dN	ğ	ď	NS
	8/23/96	01 >	< 10	< 30	<\$>	< 30	\$ <b>&gt;</b>	< <b>&gt;</b>	\$ >	< 5	< > <	ž	ž	ž	Ŝ	ž	ž	SN
	3/23-24/98	01 >	-0>	-0	-0×	-0×	-0.0	-0×	0	-0°	SN	1.0	-0×	ž	ž	ğ	ž	SZ
	3/9-10/99	- O ×	< 0.1	7	< 0.1	<2.0	-0°	-0	< 0.1	< 0.1	ŝ	< 0.1	< 0.1	ď	ď	ž	ž	SZ
	6/10-1/5/66	SN	SX	SN	SX	ğ	SN	SZ	SN	SN	ŝ	SZ	SZ	< 0.1	< 1.0	ş	Ž	<del>-</del> 0
	3/9-10/00	99.0	0>	< 0.1	<0.1	Ž	<0.1	6	-0°	1.0>	ğ	0.0	0,1	- O>	0.22	ž	ž	- O
	1/14/2001	SX	SN	SN	SX	ď	SN	SZ	SN	SN	ž	S	SN	SN	SN	0.1	<b>€</b> 0.1	SN
·	3/8-9/01	<0.12	<0.13	<0.12	-0°	ď	<0.13	<0.12	<0.12	<0.15	È	<0.13	<0.13	SN	<0.12	Ϋ́	SN	NS-D
	3/11-12/02	< 0.1	<0.11	< 0.1	< 0.1	ž	Q.	ð	ã	ð	ž	0.0	NS-D	<0.1	<0.1	NS	NS	NS-D
Pyrene	8/1/95	< 50	or >	> 500	\$	< 30	\$ >	< <b>\$</b> >	<\$	<\$	< <b>\$</b>	å	ď	Š	ď	ž	ž	SZ
	8/23/96	o1 >	< 10	< 30	< \$	< 30	< <b>?</b>	< <b>&gt;</b>	\$	< > <	< \$	ğ	ŝ	ğ	ď	Ž	ğ	SX
	3/23-24/98	01 >	-0.0	L.0>	-0>	-0×	<0.1	<0.1	0,	9	SN	40.1	-0°	ž	ğ	ž	å	SX
÷	3/9-10/99	< 0.1	< 0.1	0.4	< 0.1	<2.0		-0°	< 0.1	< 0.1	ž	< 0.1	< 0.1	ž	È	ğ	È	SZ
	6/10-1/5/99	SN	SN	SN	SN	ğ	SN	SN	SZ	SZ	ž	SZ	SN	< 0.1	< 1.0	ž	ĝ	-0°
	3/9-10/00	< 2	< 0.1	< 0.1	< 0.1	a Z	< 0.1	< 0.1	< 0.1	< 0.1	ž	< 0.1	< 0.1	< 0.1	< 0.1	ğ	ž	-0>
	1/14/2001	SX	SN	SN	SN	ğ	SN	SN	SN	SZ	ž	SN	SN	SN	NS	<b>1</b> .0>	-0	SZ
	3/8-9/01	<0.12	<0.13	<0.12	< 0.1	ž	€0.13	<0.12	<0.12	<0.15	ğ	<0.13	<0.13	SN	<0.12	¥ Z	SS	NS-D
	3/11-12/02	< 0.1	<0.11	< 0.1	< 0.1	ď	QN	Ð.	Q	Q	Š	±0.1	NS-D	0.1	-0.0	SN	NS	NS-D
VOCs (µg/L)																		
Acetone	3/23-24/98	NS	SN	SN	NS	SN	SN	SN	SN	SX	SN	00 I >	001×	ž	å	æ	ΝP	SN
	6/10-1/5/99	SN	SZ	SX	SN	Š	SN	SN	SZ	SN	ž	SN	SN	130	oo!>	훋	Ž	00I×
	3/9-10/00	Ϋ́	¥	¥ Z	¥ Z	ž	¥ Z	X X	ž	¥	ž	ž	¥ X	¥	٧	È	Ž	SN
	3/8-9/01	Ϋ́	×	¥	Ϋ́	Ž	¥	×	¥	¥	ž	ž	¥	¥Z.	Ϋ́	00I>	00I>	NS-D
	3/11-12/02	¥	¥	¥ X	Ϋ́	å	Ϋ́Α	NA	٧V	NA	Νb	ΝA	NS-D	ΑN	NA	Ş	SN	NS-D
sec-Butylbenzene	3/23-24/98	SN	NS	SN	SN	SN	SN	SN	SN	SX	S	Ž	ŝ	ž	ž	ž	Ž	ž
	6/10-1/5/	SN	SN	SN	SN	ž	NS	SN	SZ	SZ	훋	Ş	ž	\$>	s	ĝ	ž	<\$>
	3/9-10/00	¥.	¥	¥	×	ĝ	Ϋ́	¥	¥	¥	울	¥ Z	¥	ž	¥	Ž	<u>=</u>	SZ
	3/8-9/01	ž	Ϋ́	ž	¥.	Ž	¥	NA NA	¥ Z	¥	ž	¥ Z	×Z	¥	Ϋ́	<\$.0	€3.0	Q-SN
	3/11-12/02	NA	NA	NA	NA	ď	ΝA	ΝΑ	¥	Ϋ́	Š	V.	NS-D	¥	Ϋ́Α	SZ	SN	NS-D
Isopropylbenzene	3/23-24/98	SN	SN	SN	SN	SN	SN	SN	SN	SN	SN	Š	ĝ	ž	š	È	ĝ	SZ
	6/10-1/7	SZ	NS	NS	SN	ž	SZ	NS	SN	SZ	Ž	SN	SZ	\$ >	31	Ž	Ž	\$

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Table 6
Summary of Groundwater Quality Parameters and Detected PAHs, Metals, VOCs and SVOCs Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

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1										Ĭ	Monitor Wells <sup>(1)</sup>	(I) <sup>S</sup> (							
17-1000	Analyte (units)	Sample Date	MW-1	MW-3	MW-4	MW-5	-	MW-7	MW-8		MW-10	V-11	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
1711-124-124-199	Isopropylbenzene	3/9-10/00	¥	Ϋ́	AN A	ΑN	ď	¥	Ϋ́	ΑN	ΑN	ďN	ΑN	ΑN	NA A	٧X	ž	ď	SZ SZ
1711-1202		3/8-9/01	¥ X	ž	¥	Ϋ́	ğ	¥.	¥ Z	ž	¥	ž	Ϋ́	×	Ϋ́	¥ Z	<5.0	<5.0	NS-D
1711-17103   171		3/11-12/02	٧×	Ϋ́	NA	Ϋ́	NP	NA	Ϋ́	Ϋ́	¥	ž	Y.	NS-D	ΥN	NA	NS	NS	NS-D
10-1000	Naphthalene	3/23-24/98	SN	SN	SN	SN	SN	SN	SN	SN	SN	NS	ď	ď	Š	ď	ž	ď	NS
136-3011   NA		6/10-1/5/66	NS	SN	SX	SN	ž	SZ	SZ	SN	SN	ž	SN	SN	< <b>&gt;</b>	061	ž	Š	< × < <
111-12072   1		3/9-10/00	¥ Z	¥	¥.	¥	È	¥	¥	¥	X X	ž	ž	Ϋ́	¥ Z	¥ Z	È	ž	SZ
1111-1202		3/8-9/01	٧	X V	Y Y	ž	ž	¥ ¥	¥	¥	¥	ğ	Ϋ́	Ϋ́	¥	X X	<5.0	<\$.0	NS-D
1,11,1202   N. 1, N. 1		3/11-12/02	V	NA NA	NA	NA A	ď	NA	ΥA	Y X	¥.	ž	Y.	Q-SN	Y.	٧	NS	NS	NS-D
1,000   1,00	n-Propylbenzene	3/23-24/98	SN	SN	SN	SN	SN	NS	NS	SN	SN	SX	ŝ	ž	å	ĝ	ž	ğ	NS
10-1000		6/10-1/2/99	S	SX	SN	SN	ĝ	SN	SN	SN	SN	å	SN	SX	< \$	89	Ž	ğ	< 5
111-12002		3/9-10/00	¥	Ϋ́	×	Y Z	ď	Y Y	× Z	×Z	¥ X	å	¥ Z	¥ Z	Ϋ́	¥ Z	È	ĝ	SN
1711-12072		3/8-9/01	ž	ž	¥	¥ Z	å	¥	¥ Z	¥	×	å	¥ Z	¥ Z	Y X	X X	<5.0	<5.0	Q-SN
1713-2049		3/11-12/02	Y.	¥Z	¥.	×	ĝ	¥Z	¥	¥ X	Y Y	ž	Y Z	NS-D	NA V	Ϋ́Α	NS	NS	NS-D
136-01000	1,2,4-Trimethylbenzene	3/23-24/98	SX	SN	SN	SN	SZ	SN	SN	SN	SN	SZ	ŝ	ž	ď	ď	₽.	ď	SN
136-1000		6/10-1/5/66	SN	SN	SN	SN	å	SN	SN	SN	SN	ž	SN	SN	< \$	93	ď	ğ	< × < <
111-1202		3/9-10/00	¥	Y.	Ą	¥ Z	ă	¥	¥	×	¥ Z	È	¥ X	¥ Z	Y V	¥ Z	ž	È	SX
111-1202		3/8-9/01	¥	¥ Z	× Z	Ą	ğ	¥	¥ X	¥	¥ Z	ž	Ϋ́	¥ Z	¥ Z	Ϋ́Α	<\$.0	<5.0	Q-SN
173-2498		3/11-12/02	ž	¥ Z	Y Z	ž	ď	¥Z	¥	ž	× Z	ž	¥ Z	NS-D	NA	NA	NS	NS	NS-D
130-10700   N.A	1,3,5-Trimethylbenzene	3/23-24/98	SX	SN	SN	SX	SN	NS	SN	SN	SN	SN	ž	ď	ď	ď	Ž	ž	SZ
3/9-10/00   N/A		6/10-1/2/99	S	SN	NS	SZ	å	SN	SZ	SZ	SN	È	S	SN	< 5	93	ž	Š	\$ <b>&gt;</b>
318-901 NA NA NA NA NA NA NA NA NA NA NA NA NA		3/9-10/00	¥	¥ Z	Y.	Y X	ğ	¥ Z	ž	¥ Z	×	å	¥ Z	¥	Ϋ́	Ϋ́Z	ž	ď	SZ
3/11-12/02   NA		3/8-9/01	Ϋ́	Ϋ́Z	Y X	٧	å	¥ X	¥ X	×	¥	ŝ	¥ Z	¥ X	Ϋ́	X X	<5.0	<5.0	Q-SN
3/3-24/98		3/11-12/02	A N	Y V	NA	NA A	Νb	NA	۸A	NA	٧V	ž	ΑN	NS-D	¥Z	¥Z	SX	SN	NS-D
1,0,10,10,00   NA	MTBE	3/23-24/98	SN	SN	SN	NS	NS	SN	SN	SN	NS	SN	ž	ş	ž	ğ	ď	ž	Š
38-301 NA NA NA NA NA NA NA NA NA NA NA NA NA		6/10-1/5/	SN	SN	SN	SN	ž	SN	SN	SN	SX	ž	S	SN	or >	22	2	Ž	0 >
3/11-12/02		3/9-10/00	¥	Y.	Y.	N A	å	Y Y	¥ Z	¥ Z	¥	å	¥ X	¥ Z	Ϋ́	¥	ž	å	S
3/11-12/02 NA NA NA NA NA NB NB NA NA NA NA NA NA NA NA NA NA NA NA NA		3/8-9/01	¥.	¥ Z	V.	¥	d Ž	Y.	× Z	¥	٧×	å	٧	¥ Z	Ν	¥.	<\$.0	<5.0	NS-D
81195		3/11-12/02	٧	NA	NA	NA	ď	NA	Y V	Ϋ́	A N	å	¥z	NS-D	Ϋ́Z	۷ ۷	SN	SN	Q-SN
81796	SVOCs (µg/L)																		
8/13/96         NS <t< td=""><td>2.4-Dimethylphenol</td><td>8/1/95</td><td>&lt; 50</td><td>76</td><td>&lt; 500</td><td>&lt;\$</td><td>42</td><td>\$</td><td>\$</td><td>\$&gt;</td><td>Ş</td><td>&lt;\$</td><td>ĝ</td><td>å</td><td>æ</td><td>ž</td><td>ΔZ</td><td>Š</td><td>SN</td></t<>	2.4-Dimethylphenol	8/1/95	< 50	76	< 500	<\$	42	\$	\$	\$>	Ş	<\$	ĝ	å	æ	ž	ΔZ	Š	SN
6/10-71/2/99         NS		8/23/96	SZ	SN	SN	SN	SN	SN	SN	SN	SN	SZ	ĝ	ž	ž	ď	Š	ď	S
399-10000 NA NA NA NA NA NA NA NA NA NA NA NA NA		6/10-1/5/99	SX	SN	SN	SZ	å	SN	SZ	SN	SS	ž	Š	SN	< <b>?</b>	95	Ž	Ž	\$
3/11-12/02         NA		3/9-10/00	¥	ž	X	٧	È	¥	Y.	¥	ž	ž	٧×	¥	¥ Z	ž	Ž	ž	SZ
81195 280 62 1500 <5 1500 <5 67 150 5 5 5 6 6 6 6 7 1500 5 7 1500 5 7		3/11-12/02	ž	ž	Y X	Ϋ́Z	å	Y.	ΥN	ΥN	٧¥	d.	Ϋ́	NS-D	٧×	ž	SZ	NS	NS-D
8/23/96 NS NS NS NS NS NS NS NS NS NS NS NS NS	2-Methylnaphthalene	8/1/95	280	62	1500	< \$ >	150	< \$	<\$	36	23	<\$	È	ž	ğ	ž	ž	ğ	ş
6/10-772/99 NS NS NS NS NS NS NS NS NS NS NS NS NS		8/23/96	SX	SN	SN	SN	SZ	SN	SX	SN	S	SZ	ž	ž	ď	ž	ž	ž	SZ
39-10/00 NA NA NA NA NA NA NA NA NA NA NA NA NA		6/10-1/2/99	Š	SX	SN	SZ	ž	SN	S	SZ	S	ž	S	SZ	< \$	53	ž	2	۵.
3/11-12/02 NA NA NA NA NP NA NA NA NA NA NA NA NA NA NA NA NA NA		3/9-10/00	¥ Z	Y X	¥	¥	È	¥	ž	¥	¥	Ž	¥	ž	٧×	Ϋ́	훈	2	SZ
8/1/95 < 50 56 < 500 < 5 < 5 < 5 < 5 < 5 < 5 < 5 < 5 <		3/11-12/02	NA	NA	NA	Ϋ́	ďΖ	NA VA	Ϋ́	ΑN	¥N	ž	¥	NS-D	ΥN	Ϋ́Z	SS	SZ.	NS-D
NS NS NS NS NS NS NS NS NS NS NS NS NS N	2-Methylphenol	8/1/95	< 50	99	< 500	\$	< 30	\$	<>	< <b>&gt;</b>	\$ <b>&gt;</b>	\$	È	È	ž	Ž	£	<b>2</b>	S
NS NS NS NS NS NS NS NS NS NS NS NS NS N		8/23/96	SX	S	SN	SN	SZ	SN	SX	SN	SX	SN	ĝ	Ž	ž	물	ž	<b>2</b>	SZ
-	==	6/2/2-01/9	SN	SN	SN	SN	ğ	SN	NS	SZ	S	ž	SZ	SZ	<b>.</b> >	- *	<b>Ž</b>		₹

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Page 8 of 8

Summary of Groundwater Quality Parameters and Detected PAHs, Metals, VOCs and SVOCs Hobs, New Mexico Facility

BJ Services Company, U.S.A.

Table 6

A ....

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									Σ	Monitor Wells(1)	(1)8							
Analyte (units)	Sample Date	MW-I	MW-3	MW-4	MW-5	9-MM	MW-7	8-WM	6-WM	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
2-Methylphenol	3/9-10/00	N A	ΑN	NA	¥	ş	¥	٧×	ΑN	NA	ďN	ΑN	NA	NA	NA	ďN	ďN	NS
	3/11-12/02	٧	Ϋ́	NA	NA	ď	¥ Z	¥	¥ X	¥	ž	¥	Q-SN	ž	ž	SZ	SN	NS-D
4-Methylphenol	\$6/1/8	08 >	< 20	008 >	8 >	150	8,	80	<b>8</b>	<b>80</b>	8 >	ďΖ	ŝ	æ	å	호	å	NS
-	8/23/96	SN	SX	SZ	SX	SN	SZ	SN	sz	SN	SN	ď	å	å	Š	ž	ž	SN
	6/10-1/5/99	SN	SX	SN	SZ	å	SN	SN	SZ	SN	Š	SN	SN	\$	\$	ž	å	\$
	3/9-10/00	Ϋ́	X	¥.	ž	Ē	¥	Ϋ́	¥ X	¥.	ď	¥	ž	¥	A'N	ĝ	š	SN
	3/11-12/02	Y Z	×	Y X	¥	ĝ	¥	Ϋ́	¥ Z	Ϋ́	Ž	×	NS-D	¥ Z	¥	SZ	SZ	NS-D
Bis(2-ethylhexyl)-phthalate	8/1/8	750	< 20	10000	40	< 40	<7	<7	<7	<7	<7	æ	Š	ď	å	£	ď	SN
	8/23/96	NS	SZ	SZ	SN	SN	SX	SN	SZ	SN	SN	å	ž	ž	ž	ž	ž	SN
	6/10-1/5/99	SN	SZ	SN	SZ	ž	SZ	SN	SX	SN	ď	SN	SN	\$	\$	ž	ž	\$
	3/9-10/00	¥	¥Z.	¥ Z	¥ X	å	ž	٧	ž	¥ X	ď	٧	٧	Y.	¥	ž	ž	SN
	3/11-12/02	٧V	NA A	Ϋ́	ΑN	ΝĐ	NA	NA	¥	X X	ž	ž	NS-D	Y X	Y.	SN	NS	NS-D
Phenol	8/1/95	< 50	o1 >	< 500	<\$	< 30	< \$	<\$	<\$	8.2	\$	å	ž	ď	ΔN	ď	å	NS
	8/23/96	NS	SX	SN	SZ	SN	SN	SZ	SN	SN	SN	å	å	ď	ž	ž	Ž	SS
	6/10-1/5/66	SN	SS	SN	SS	ž	SN	SN	NS	SZ	Š	SN	SN	\$	٠	ž	È	۵.
	3/9-10/00	Ϋ́	¥.	×	Ϋ́	å	¥	¥	¥	٧X	ď	Ϋ́	Ϋ́	¥ Z	¥	È	Ž	SN
	3/11-12/02	NA	NA	ΝA	NA	ď	Y.	Ϋ́	NA	N.	ğ	NA	G-SN	νA	NA	NS	SN	NS-D

<sup>(1) -</sup> 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.

<sup>(2) -</sup> NP = Well not present at time of sampling event.

<sup>(3) -</sup> NS = Well not sampled.

<sup>(4) -</sup> NA = Not Analyzed.

<sup>(3) -</sup> NS-D = Well not sampled (dry well). (6) - ND = No data - sample aliquot not collected due to insufficient well yield.

#### Table 7 Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, and MW-12

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

				Dissolved Methane
Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	(mg/L)
	3/23/98	3.87	190	<0.0012
	3/9/99	<0.1	195	< 0.0012
	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-5	6/8/00	4.7	240	< 0.0012
ivivv-5	9/13/00	3.93	200	< 0.0012
	12/7/00	3.27	160	< 0.0012
	3/8/01	3.24	180	< 0.0012
	6/21/01	2.74	150	0.0017
	9/10/01	NA <sup>(2)</sup>	130	< 0.0012
	12/6/01	2.38	120	< 0.0012
	3/12/02	2.98	120	< 0.0012
	3/23/98	0.07	320	0.91
	6/23/98	<0.1	325	0.55
	9/30/98	<0.1	204	0.81
	12/10/98	<0.1	180	0.091
	3/9/99	<0.1	142	0.035
	313133	<b>~0.1</b>	223 <sup>(3)</sup>	0.033
	9/14/99	< 0.10	160	0.0049
MW-10	12/9/99	0.49	170	0.0039
10100 10	3/10/00	0.1	160	0.0056
	6/8/00	<0.1	150	0.031
	9/13/00	<0.1	160	0.031
	12/7/00	< 0.1	190	0.17
	3/8/01	<0.1	270	< 0.0012
	6/22/01	<0.1	270	0.044
	9/10/01	NA	NA	NA
	3/12/02	<0.1	230	NA

# Table 7 Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, and MW-12

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

Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	Dissolved Methane (mg/L)	
	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	
		<0.1	164		
	3/10/99	<0.1 <sup>(4)</sup>	227 <sup>(3)</sup>	0.094	
	6/10/99	<0.1	181	0.0036	
	9/13/99	0.22	250	<0.0012	
	12/9/99	<0.1	290	0.0079	
MW-11A	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	
	3/8/01	<0.1	330	0.0028	
	6/22/01	<0.1	180	0.0074	
	9/10/01	NA	280	<0.0012	
	12/6/01	<0.1	240	0.0041	
	3/12/02	<0.1	350	0.0044	
	3/23/98	< 0.05	240	< 0.0012	
	6/23/98	<0.1	240	< 0.0012	
	9/30/98	<0.1	168	< 0.0012	
	12/10/98	<0.1	202	< 0.0012	
	3/10/99	<0.1	137	< 0.0012	
	3/10/99	<0.1 <sup>(4)</sup>	193 <sup>(3)</sup>	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
	6/10/99	<0.1	217	< 0.0012	
MW-12	9/14/99	< 0.10	230	< 0.0012	
	12/9/99	<0.1	180	< 0.0012	
1	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	
	3/8/01	<0.1	300	< 0.0012	
	6/22/01	<0.1	360	0.0021	
MW-12	9/10/01	NS-D <sup>(5)</sup>	NS-D	NS-D	
	9/18/01	NA	190	< 0.0012	

# Table 7 Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, and MW-12

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

Well	Date	Nitrate <sup>(1)</sup> (mg/L)	Sulfate <sup>(1)</sup> (mg/L)	Dissolved Methane (mg/L)
MW-12D	12/6/01	<0.1	200	<0.0012
	3/12/02	<0.1	200	<0.0012

<sup>(1) -</sup> By EPA Method 300, except as noted

mg/L = milligrams per liter

<sup>(2) -</sup> NA indicates not analyzed

<sup>(3) -</sup> By EPA Method 375.4

<sup>(4) -</sup> By EPA Method 353.3

<sup>(5) -</sup> NS-D indicates not sampled (well dry)

## **APPENDICES**



## APPENDIX A

**Groundwater Sampling Forms** 



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

WELL ID: MWI

1. PROJ	ECT INFO	RMAT	ION				· · · · · · · · · · · · · · · · · · ·			
Project N	umber: <u>1283</u>	2_	Task Numl	per: <u>17</u>	_	Date: 3-11	<u>-02</u>		Time: 13:52	
Client:	3.2			,		Personnel:_(	CG, AM	<u> </u>		
Project L	ocation: HOb	<b>b</b> 5				Weather:	utnd 4	1705		
2. WELL DATA										
Casing D	Casing Diameter: 2 inches Type: DFVC Stainless Galv. Steel GTeflon® G Other:									
Screen Diameter: 2 inches Type: D'PVC D Stainless D Galv. Steel D Teflon® D Other:										
Total De	Total Depth of Well: 64.39 feet From: Top of Well Casing (TOC) Top of Protective Casing Other:									
Depth to	Static Water: _ (	211						ctive Casing 🔘		
	Product:						<del></del>	ctive Casing D	12 ()	
Length o	f Water Column	228	_ feet	Well Volume	1.14	_ gal		erval (from GS): h well = 0.167 gal		
3 PURC	SE DATA								<b>3</b>	
l	-/	r, Size: _2	□ Bladd	er Pump 🖸 2	2" Submersible	Pump 🖸 4"	Submersible P	ump		
	ethod: Centi	☐ StainI	ess □PV0	CX Teflon	® □ Other:			<del></del>	Equipment Model(s)	
	: Pump(Baile)			pared Off-Site	☐ Field Clea		_	1	'5L	
Materials	Rope/Tubing	☐ Polye	unyiene ⊔i ated ⊡ Pre	pared Off-Site	☐ Teflon® ☐ Field Cle	µoruner: <u> </u>	posable	2		
Was wel	purged dry?	Yes	O No	Pumpir	ng Rate:	gal/r	nin	3.	,	
Time	Cum. Gallons Removed	рH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments	
13:55	١	773	18.81	1505	61.6	4.56	-		BLACK COLOR	
14:01	a	7.66	17.99	1354	1.1	5.44	-			
			1							
			<u> </u>							
		<del> </del>						<b>-</b>		
A SAMI	PLING DA	ΤΛ		<u> </u>		<u> </u>		· · · · · · · · · · · · · · · · · · ·	haminal Anglicae	
ĺ	Mailer Si		☐ Bladder F	Pump 🖸 2" Si	ubmersible Pu	mo Da"Suk	mersible Pumi		hemical Analyses	
Method(		c Pump 🛚	Inertial Lift F	omp 🖸 Othe	r:			Ferro	us Iron: mg/L	
Material	s: Pump/Baile	4		- 1	® ☐ Other: ☐ Field Clea		oosable	DO:	mg/L	
Metarials Tubing 6 Delyethylene Delypropylene Define Office NY 10 1										
Denth to Water at Time of Sampling: TIM Field Eithered? Disposable Windle Time of Sampling: Time of Sa										
Depth to Water at Time of Sampling:										
Sample ID: WW 1 Sample Time: 8:44 544 of Containers: 1  Duplicate Sample Collected?										
5. COM	MENTS 1	NSIL	in 6	and c	معتدية المريد	) W	+-6	`^*		
		, <del>, , , , , , , , , , , , , , , , , , </del>	6		>>>	, (.E.) C	- 1:00 O	<u></u>		
			· <b>-</b> -							
Note: Include	comments such	as well cor	dition, odor,	presence of N	IAPL, or other	items not on th	he field data sh	eet.	· · · · · · · · · · · · · · · · · ·	

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

Signature Signature



WELL ID: MW3

7 555	IFOT IN IFO		101						
	JECT INFO lumber: 1283			617		5 <b>3</b>	1-02		- IY' <b>1</b>
	_		rask Numi	per: Ull	<u> </u>	Date: 3-1			Time: 14:12
Client:		1 _					05, A.	<i>N</i> (	
Project L	ocation: 1401	30 D				Weather: 4	INDY		
2. WELI	_ DATA								
Casing [	Diameter:	inch	es		<i></i>		teel 🖸 Teflon®		
Screen Diameter:inches									
	pth of Well:				·				
	Static Water:							tive Casing Q	
	Product:							ctive Casing	17.
Length o	of Water Column	:3.71	feet	Well Volume	1.74	gal		erval (from GS): well = 0.167 gai	
3. PUR	GE DATA								
Purge M						Pump □ 4" mp □ Other:_	Submersible Pu	amp ——	Equipment Model(s)
Materials	s: Pump/Bailer			Teflond				·= 1.	
l	$\bigcirc$	☐ Polyet	hylene 🗅	Polypropylene	☐ Teflon®	aned XDisp	ulo~	1 <b>Y</b>	
Material	s: Rope Tubing	☐ Dedic	ated D Pre	pared Off-Site	Field Cle	eaned 💆 Dis	posable	2	
Was wel	Il purged dry?	<b>∠</b> Yes	□ No	Pumpir	g Rate:	gal/r	min	3	
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1422	l	8.14	الا.ع	1261	-15.9	6.52			Clear
1430	2	7.78	1	1235	19.7	7.91	_		
	-								
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<u></u>		1				<u> </u>			
4. SAMI	PLING DA	\ <b>~</b>	<del></del>						chemical Analyses
Method(				Pump 🚨 2" St Pump 🚨 Other		mp 🗆 4" Sub	mersible Pump	Ferro	ous Iron: mg/L
Material	s: Pump/Bailer	☐ Stainle	ess 🗆 PV	Teflon	D U Other:_			DO:	mg/L
1		☐ Polve	thylene 🔾	pared Off-Site Polypropylene	Teflon®	Sa Other: ¥	osable Over the control of the contr		
Materials: Tubing(Rope									
Depth to Water at Time of Sampling: NM Field Filtered? Yes & No Sulfate:mg/L  Sample ID: MW-3 Sample Time: 312 418 # of Containers: 12									
1	Sample ID: MW-5 Sample Time: 512 438 # of Containers: []  Duplicate Sample Collected?   Yes   KNo   ID:   MW-5   Alkalinity:   mg/L								
5. COM	MENTS							<u> </u>	
									· <del></del> · · · · · · · · · · · · · · · · · ·
I		· · · · · · · · · · · · · · · ·							÷ .
Note: Include	comments such	as well con	dition, odor,	presence of N	APL, or other	items not on th	he field data she	eet.	

Signature



WELL ID: MW-4

1. PROJECT INF	OBMAT	ION						
			017		Date: 3-11-	^3		Time: 14:34
Project Number: 128	30	Task Numi	beri <u>U \ \</u>					Time: 11 - 21
						6.67		
Project Location: 1	1982				Weather:	WINC	24	
2. WELL DATA								
Casing Diameter:	2 inch	es	Type: CrPV	C 🗆 Stainle	ss 🛚 Galv. S	teel 🔾 Teflon	0 Cl Other:	
Screen Diameter:	2 inch	es	Type: Pv	C 🗆 Stainle	ss 🗆 Galv. S	teel 🗆 Teflon	0 ther:	
Total Depth of Well:_	2.82 fee	t	From: 🗷 To	op of Well Cas	ing (TOC)	Top of Prote	ctive Casing 🚨	Other:
Depth to Static Water:	59.41	eet	From: 🗷 To	op of Well Cas	ing (TOC)	Top of Prote	ctive Casing 🚨	Other:
Depth to Product:	feet		From: 🙀 To	op of Well Cas	sing (TOC)	☐ Top of Prote	ctive Casing 🚨	Other:
Length of Water Colur	nn: 3.41	feet	Well Volume	1.705	_ gai		erval (from GS): h well = 0.167 gal	
3. PURGE DATA				<u></u>				
G Ba	iler, Size: 🚄					Submersible P		
	C Staint	p 🖸 Perista ess 🗘 PV(		nertial Lift Pun Other:	np 🗅 Other: _		<del></del>	Equipment Model(s)
Materials: Pump/Baile	Dedic	ated 🗅 Prep	pared Off-Site	☐ Field Clea			1	3 <u>t</u>
Materials: Rope/Tubin	g 🖾 Polye	thylene 🗅 . ated 🗀 Pre	Polypropylene epared Off-Site	☐ Teflon® ☐ Field Cle	Other: 1	posable	- 2.	
Was well purged dry?		O No	•		gal/i	•	<del></del>	
Time Cum Gallon	s <sub>pH</sub>	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	3 Other:	Comments
1445 1	8.16	17.74	1335	13:8	7.61	-		
1454 )	2,87	17.95		35.7	8.27	-		
	7.0		1310	37. '	0-6-1			
						-		
		<u> </u>		<u> </u>			<del></del>	
			1					
	<del>- </del>							
	-							
	<del></del>						·	
			,					
4. SAMPLING D	ΔΤΑ	<u> </u>					Geor	hemical Analyses
Mothod(s). G Bailer,	Size:				mp □4"Sut	mersible Pump	,	
Perista	ltic Pump 🛚	Inertial Lift F	ump 🔾 Other	·		·	Ferro	us Iron: mg/L
Materials: Pump/Baile	Dedic	ated 🗅 Pre		☐ Field Clea			DO:	mg/L
Dedicated   Prepared Off-Site   Field Cleaned   Disposable   DO:   mg/L								re: mg/L
Don't to Water at Time of Sampling: MM Field Cleaned M Disposable Indiate								
Depth to Water at Time of Sampling: NN Field Filtered? □ Yes X No Sulfate:mg/L  Sample ID: MU-Y Sample Time: 312-02 9:40 # of Containers: 1(								te: mg/L
Duplicate Sample Collected?								
5. COMMENTS	1.501		6	60610		/		
	WILL	<b>.</b> ₩	(700D	COUL	1 (10)			
<b></b>								
Note: Include comments suc	h as well con	dition, odor,	presence of N	APL, or other	items not on ti	he field data sh	eet.	····

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

Signature Signature

# BROWN AND CALDWELL:

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-5

4 DDO	ECT INFOR	DRAATI	ON				<del></del>		1		
			OIN Task Numb	DI7		2/11	152_	-	rime: 13:15		
Project N Client:	lumber: 1283	Service	i ask Nume S	er: <u></u>	_	Personnel: (	GAM	<del></del>	ime: 1/.//-/		
	ocation:	Hobbas			<del></del>	Weather: IMM dx					
2. WELL							Ville				
<u> </u>		inche		Type: p	C D Stainles		eel 🖸 Teflon®	D Other:			
- · ·	Casing Diameter: inches  Screen Diameter: inches										
L	pth of Well: 64			Type: 17 PVC   Stainless   Galv. Steel   Terlon®   Other:     From: 17 Top of Well Casing (TOC)   Top of Protective Casing   Other:							
	Static Water:			From: Ø Top of Well Casing (TOC) D Top of Protective Casing D Other:							
	Product:	feet		From: 🗘 To	op of Well Casi	ng (TOC)	Top of Protect	tive Casing Q O	ther:		
Length o	f Water Column:	3.38	feet	Well Volume	0.54	_ gal		erval (from GS):	<del></del>		
0.000	OF DATA					<del></del>	Note: 2-inc	h well = 0.167 gaV	t 4-inch well = 0.667 gai/ft		
1	SE DATA	, Size: <u>1</u>	Q Bladde	erPump Q:2"	Submersible P	Pump □ 4"S	iubmersible Pun	np			
Purge M	ethod: Centri	fugal Pump	☐ Perista	ttic Pump 🛭 Ir	nertial Lift Pump			<u>-</u>	Equipment Model(s)		
Material	s; Pump(Baile)			Teflon® ared Off-Site	☐ Field Clear	red 😾 Dispo	sable	1	51-61D		
Material	Rope/Tubing	☐ Polyeti	hylene □ll ted □Pre	Polypropylene pared Off-Site	☐ Teflon® X	Other: NV	bosable	2			
Was we	I purged dry?	Ø Yes		•	g Rate:	_	'min				
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	3 Other:	Comments		
13:10	I.O	8.18	1871	1111.D	47.5	6.28					
1570	1.0	0.10	10-11	1111.0	11.1.1	0.20					
	ļ										
	71								-		
	<u> </u>				<u> </u>						
<b></b>		<del></del>	<del>                                     </del>		<del> </del>		-				
		<u> </u>		1	<u> </u>	1	<u> </u>				
4. SAM	PLING DAT	1	□ Bladder D	uma Dio≉c	hmoreible D.	m (1) 47 6×4×	mersible Pump	Geoc	hemical Analyses		
Method	(s): Peristaltic			ump CIOther			mersible Pump	Ferro	us Iron:Omg/L		
Materia	ls: Pump/Bailer	☐ Stainl		C	Other: Field Clea	ned Disp	osable	DO:	_4mg/L		
Materia	ls: Tubing#Rope	Q Polye	thylene	Polypropylene epared Off-Site	☐ Teflon®	OtherU		Nitra	te:mg/L		
1				chaien Ou-Olf							
Depth to Water at Time of Sampling: NM Field Filtered?   Yes No Sulfate: mg/L Sample ID: MW 5 Sample Time: 3 · 12 · D2 9 · 15 # of Containers:						te: mg/L					
1	Sample ID: 1/(1/1)   Sample Time: 5 12 02 9 19 # of Containers: 11  Duplicate Sample Collected?						inity: /Dmg/L				
5. CON	IMENTS	W	ell in g	ood cond	ution						
	·		C	)			·-·				
Note: Include	e comments such a	s well condi	tion, odor, pr	esence of NAF	L, or other iten	ns not on the fi	eld data sheet				
							7)	. ///	·		

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

Sidwalure Mole

## BROWN ARD CALDWELL

.

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MN-7

1. PROJECT INFOR	NAATIC	781								
* =			กเว		_ 1	.11.07		Time: 15:14		
Project Number: 12837			er: <u>VII</u>		Date:5	11 02		Time: 1 ) 1 1		
	ervier				Personnel:					
	bolds,	NW/		- 	Weather:	MINAY				
2. WELL DATA										
Casing Diameter: 1	inches		Type: K PV	C C Stainles	s Galv. Ste	el 🗆 Teflon®	Other:			
Screen Diameter: 2	inche	6	Type: Stainless Galv, Steel GTeflon® G Other:							
Total Depth of Well: 61.5	feet		From: A To	p of Well Casir	ng (TOC)	Top of Protect	lve Casing 🔘 O	ther:		
Depth to Static Water: 60	03_fee	et	From: 🗯 To	p of Well Casi	ng (TOC)	Top of Protect	ive Casing 🚨 🔾	Other:		
Depth to Product:	feet					Top of Protect	live Casing 🔾 C	Other:		
Length of Water Column:_	1.47	feat	Well Volume:	0.14	gal ·		erval (from GS): th well = 0.167 gal			
3. PURGE DATA	0									
Purge Method: Centrifi	Size:		erPump 🔾 2" ticPump 🔾 In			ubmersible Pun	np .	F		
Materials: Pump/Bailer			∠ Teflon®	•				Equipment Model(s)		
		•	ared Off-Site	☐ Field Clear			1. <u>X</u> S	TU(U		
Materials: Rope Tubing	☐ Dedicat	yiene Qir sed DiPre	pared Off-Site	☐ Field Cle	aned S Disp	osable	2			
Was well purged dry?	Ø Yes	C) No	Pumpin	g Rate:		min	3.			
Time Cum. Gallons Removed	рН	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments		
15:29 0.25	8.0A	19,55	1460	19.7	14.15					
	$\overline{}$						<del></del>			
	$\rightarrow$									
	1									
N.		<del>_</del>					<del></del>			
					<del>                                     </del>					
					<u> </u>	ļ				
4. SAMPLING DAT	A						Geo	chemical Analyses		
Method(s): Bailer, Size	: 1		ump 🖸 2" Sul ump 🔾 Other:		np 🖸 4" Subr	mersible Pump	Fern	ous Iron: mg/L		
Materials: Pump/Bailer		ited O Pre	pared Off-Site	Other:_ Field Clea	/	1 4/1	DO:	mg/L		
Materials: Tubing/Rope	☐ Polyeti ☐ Dedica	ted OPr	Polypropylene epared Off-Site	☐ Teflon®	Or OtherN eaned M Dis	y ( ) v) posable	Nitra	ate:mg/L		
Depth to Water at Time of Sampling: NM Field Filtered? Yes X No Sulfate: mg/L Sample ID: NW-7 Sample Time: 3:12:02 10:34 # of Containers: 4										
Duplicate Sample Collect	 ed?		No   ID:	~	# UT CONTAIL	ners:	Alka	linity: mg/L		
E COMMENTO O	1. 1.3	0.45		10 1.11	<b>A</b> = 11.5					
5. COMMENTS	runner	- Kind u	nissing, t	ye wolt?	gone			<del> </del>		
		U	•	'	<i>a</i>					
Note: Include comments such as	i i i i i i i i i i i i i i i i i i i									

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

Signature Signature

## BROWNAND CALDWELL

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW-B

4 000	ECT INFO	DAAATI	ON									
				617		1	.11. ก7		1511A			
-	lumber: 1282	•	Fask Numb	er: U	_		·11·02 CG, AN	<del></del>	Time:			
Client:		envilles Holdus				<del></del>	an ly					
Project L		יושעון				Weather:	WINAT					
2. WELL	DATA											
Casing D	liameter:	inche	·s	Type: 🛕 PV	C O Stainle	ss 🗅 Galv. Ste	el C Teflon®	Other:				
L	Diameter: 2	inche		Type: A PV	Type: A PVC Stainless G Galv. Steel G Teffon® G Other:							
	pth of Well: 62		[	From: Si Top of Well Casing (TOC) D Top of Protective Casing D Other								
Depth to	Static Water:	9.94_fe		From: Q Top of Well Casing (TOC)								
	Product:	feet					·		Other:			
	f Water Column:	2.26	feet	Well Volume	:_ <i>U</i> .36_	_ gal		erval (from GS): ch well = 0.167 gal				
3. PURC	SE DATA											
Purge M		, Size: ifugal Pump		erPump □ 2" HicPump □ Ir			ubmersible Pur	mp 	Equipment Model(s)			
Materials	s: Pump/Bailer		ss DPVC	Teflon®		ned 🖸 Dispo	and a	. 🗸	(1-/4/1)			
	s Rope/Tubing					Other:		1	PI Q[ D			
7		D Dedica	ted DPre	pared Off-Site	C) Field Cle	aned (A Disp	osable	2				
Was wel	I purged dry?	Æ Yes	Q No		ng Rate:		min	3				
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments			
15:04	0.5	13.01	18.48	1506	11.5	5.79						
-								_				
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<u> </u>		ļ		·	<u> </u>							
	7:								•			
		1 .	-						<del> </del>			
4 6 4 4	DI INO DA	<u> </u>			<u> </u>							
4. SAM	PLING DA		D Bladder D		ibmossible Du	mp 🖸 4" Subr	marrible Duran	Geor	chemical Analyses			
Method	(s): D Bailer, Si D Peristaltic			ump D Other		mp U 4" Subr	nersible Pump	Fern	ous Iron: mg/L			
Material	s: Pump/Bailer		ess DPV	C 2 Teflon	Other:_ Field Cle	aned 🔀 Disp	nsable	DO:	mg/L			
Material	s: Tubing/Rope	☐ Polye	thylene 🔾	Polypropylene	e 🗅 Teflon®	& Other:/1	V/M	Nitra				
Denth to	Death to Water at Time of Sampling: AM Field Filtered? Dives 58 No.											
в .	Sample ID: MW 8 Sample Time: 3-12-02 10:/9 # of Containers: 4											
1	Duplicate Sample Collected?											
5 COM	IMENTS		0001	المدر	CAA AAA	de Oudalano						
J. CON	HAICIAIO		replace	a wer (	cap, need	ds fullber	uly					
	المناف المستسران			-								
Note: Include	comments such a	s well condi	tion, odor, pi	esence of NAF	L, or other ite	ms not on the fie	eld data sheet.	• • • • • • • • • • • • • • • • • • • •				

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

Signature Monda Morto



WELL ID: MW-9

1. PROJECT INFORMATION							
Project Number: 12932 Task Number: Date: 3-12-62 Time: 7:60							
Client: 35 Personnel: CG, AM							
Client: 35  Personnel: CG, A M  Project Location: Habb 5  Weather: 50 < wind a							
2. WELL DATA							
Casing Diameter: inches Type: □ PVC □ Stainless □ Galv. Steel □ Teflon® □ Other:							
Screen Diameter: inches Type: DPVC D Stainless D Galv. Steel D Teflon® D Other:							
Total Depth of Well: 61,65 feet From: Top of Well Casing (TOC) Top of Protective Casing Other:							
Depth to Static Water: 53.96 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: 2.69 feet Well Volume: 1.35 gal Screened Interval (from GS): WSXX feet							
Note: 2-inch well ≈ 0.167 gal/ft 4-inch well ≈ 0.667 gal/							
3. PURGE DATA  Bladder Pump							
Purge Method: Pump Peristaltic Pump I Inertial Lift Pump Other: Equipment Model(s)							
Materials: Pump/Bailgr							
Materials: Rope/Tubing  Polyethylene  Polypropylene  Teflon®  Other:							
Upericated □ Prepared Off-Site □ Field Cleaned to Disposable 2.  Was well purged dry? To Yes □ No Pumping Rate: gal/min							
Cum Gallons Spec Dissolved Other							
Time Removed pH Temp Cond. Eh Oxygen Turbidity Comments							
4. SAMPLING DATA Geochemical Analyses							
Method(s):    Method(s)   Meth							
Materials: Pump/Bailer							
Materials. Further Dedicated □ Prepared Off-Site □ Field Cleaned □ Disposable □ Do: □ mg/L							
Materials: Tubing/Rope							
Depth to Water at Time of Sampling: NM Field Filtered? Yes No Sulfate:mg/L							
Sample ID: MW-9 Sample Time 3:45 312 # of Containers: 4							
Duplicate Sample Collected?   Yes X No ID:							
5. COMMENTS NOT Enough water to TAKE Rading							
Note toolude compacts and so well so with a size of the size of th							
Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.							

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

# BROWN AND. CALDWELL

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW10

A PPO I	CT INFO	DAAATI	ON		***********						
I. PROJE		יו בעוצור לי	OIV	017		Date: 3 .	1.67		Time: 16.07		
Project Nu Client:	mber: 123	Service	i ask Numb	er:		Personnel:		· · · · · ·	Time: 10.07		
-		Holebs		<del></del>			MINAY	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
	cation:	Minas	+ 10 1/1			Weather:	willay				
2. WELL	DATA										
Casing Dia	ameter: Z	inche	:S	Type: 10 PV	C O Stainle	ss 🗅 Galv. St	eel 🔾 Teflon®	Other:			
Screen Dia		inche	88	Type: 12 PVC D Stainless D Galv. Steel D Teffon® D Other:							
	th of Well: 62			From: 55 Top of Well Casing (TOC) Q Top of Protective Casing Q Other:							
Depth to S	Static Water. 60	). 69fe	et	From: 😉 To	op of Well Casi	ng (TOC)	Top of Protect	tive Casing CO	ther		
Depth to F		feet					Top of Protec	<u>_</u>	Other:		
Length of	Water Column:	1.51	feet	Well Volume	: 0.21	_ gal		erval (from GS): ch well = 0.167 gail			
3. PURG		0							-		
Purge Me	thod: <b>©</b> Bailer	, Size: ifugal Pump	☐ Bladde	erPump ©12* HicPump ©11	' Submersible i nertial Lift Pum	Pump 🚨 4" S p 🚨 Other:	Submersible Pur	np	Equipment Model(x)		
Materials:	Pump/Bailer	☐ Stainle	ss D PVC	¥Zi Teflon€	Other				Equipment Model(s)		
	$\overline{}$		-			ned 🔎 Dispo Gr Other: 🚹	.1	1. <u>XS/</u>	· 010		
Materials:	Robe/Tubing					aned X Disp		2			
Was well	purged dry?	₩ Yes	□ No	Pumpir	g Rate:	gal	/min	3			
Time	Cum. Gallons Removed	рΗ	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments		
16:12	0.3	7.23	18.68	3988	-102.8	2.73			purnle		
									1 - 1 - 1		
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-						<del> </del>					
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	<b>1</b> 2								•		
				<del>                                     </del>							
	<del> </del>	<u> </u>	ļ		<del> </del>		<del> </del>				
4. SAMP	LING DAT	7					<del>-</del>	Geoc	hemical Analyses		
Method(s	): Bailer, Siz			ump 🗘 2" Su ump 🗘 Other		np 🖸 4" Subi	mersible Pump	Ferro	ous Iron: mg/L		
Materials	: Pump/gaile			C / Teflon							
ļ	: Tubing/Rope	☐ Polye	thylene 🚨	pared Off-Site Polypropylene	☐ Teflon®	Other.	1.	DO:	mg/L		
ı	- 0		4	epared Off-Site			sposable	Nitra	te:mg/L		
Depth to Water at Time of Sampling: NN Field Filtered? D Yes No Sulfate: mg/L  Sample ID: MW/U Sample Time 3'12'02 11'07 # of Containers: 4											
1	D: MW1	U	Sample T	ime <u>5'16'</u> C	11.01	# of Contai	ners: 4	. Alkal	linity:		
Duplicate	Sample Collec	ted?	O Yes D	No ID:				Aika	linity: mg/L		
5. COM	MENTS	well 1	n grod	condute	on						
		······································	1								
Note: Include o	comments such a	s well condi	lion, odor, pr	esence of NAF	L, or other iter	ns not on the fi	eld data sheet.				

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

Omanda Monto



WELL ID: MW- HA

1. PROJECT INFORMATION						
Project Number: 12832 Task Num	nber: 017	_	Date: 3-1	1-02		Time: 12
Client: BS				C4. F		
Project Location: 11 deb 5				~~ P4		
2. WELL DATA						
	Type: (P)	C D Stainle	es D Calv S	teel 🗆 Teflon®	n Cl Other	
Casing Diameter: inches				teel 🖸 Teflon®		
Screen Diameter:inches					ctive Casing 🚨	Other
Total Depth of Well: <u>43</u> , 83 feet	·				ctive Casing   ctive Casing	
Depth to Static Water: 61.42 feet						
Depth to Product:feet  Length of Water Column: 24(feet		: 1.20			ctive Casing	Chalf
Length of yvater Column:	vveii volume	:_!·ao	_ gai		erval (from GS): h well = 0.167 gai	
3. PURGE DATA						
Bailer, Size: 2 G Blad	der Pump 🖸 2				ump	
entinugal Pump Li Pens	•		-		<del></del>	Equipment Model(s)
Materials: Pump Bailer	epared Off-Site	☐ Field Clea	ned Disp	osable	1	3C
Materials: Rope Tubing	Polypropylene	☐ Teflon® ☐ Field Cle	Other: W	<u>∖\vm</u> oosable	. 2	
Was well purged dry? Yes D No		ig Rate:	• •		2	
Cum Gallons	Spec.		Dissolved		3	
Time Removed pH Temp	Cond.	Eh	Oxygen	Turbidity		Comments
7.45 16.97	4852	-41.0	6.27			
	5253					
11.53 (.0)	12/0	(b). C	9.02			
	<del>-  </del>					
	<u> </u>					
					<del></del>	
		<del> </del>		<del> </del>		
	<del>                                     </del>		ļ			
LA CAMPUNIC DATA						
4. SAMPLING DATA	D C. 811 D.					hemical Analyses
Method(s): ☑ Bailer, Size: ☑ □ Bladder □ Peristaltic Pump □ Inertial Lift	Pump D Other	ibmersible Pui	mp ຝ 4"Sub	omersible Pump	Ferro	ous Iron: 8.5 mg/L
Materials: Pump/Bailer	-	® Other:	<b>X</b> n:		DO:	
Materials Tubing/Rona Dedicated Pr	•		- · · · - · ·			
Dedicated G		e 🗆 Field Cl	eaned 🛇 Di	sposable	Nitra	te: mg/L
Depth to Water at Time of Sampling: NM			d? 🛭 Yes	•	Sulfa	ite:mg/L
Sample ID: MW-IIA Sample	Time <b>50</b> 0	2 1148	# of Contain	ners:	Δlkai	inity: 140 mg/L
Duplicate Sample Collected?   Yes	No ID:		-		Airdi	mmymyr.
5. COMMENTS WELL I	. ) Amon	2D (	\\ \cap \cap \\ \tag{-7}	T~~ /		
			ا سایپ ۱۰۰۰	ب ت		
					-	
Note: Include comments such as well condition, odo	, presence of N	IAPL, or other	items not on ti	he field data sh	eet.	· · · · · · · · · · · · · · · · · · ·

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

Signature



WELL ID: MW12

1. PROJECT INFORMATION
Project Number: 12832 Task Number: Date: 3-11-02 Time: 1736
Client: 35 Personnel: Co, AM
Project Location: Wildo S Weather: WIND Y
2. WELL DATA
Depth to Static Water: Ye 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:
CONIC
Length of Water Column:feet Well Volume: gal Screened Interval (from GS): <u>}   'V'4</u> Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667
3. PURGE DATA
□ Bailer, Size: □ □ Bladder Pump □ 2" Submersible Pump □ 4" Submersible Pump Purge Method: □ Contributed Pump □ Registratio Pump □ Install It Russon □ Others
Centingal Fullip di Feristatic Fullip di Metial Litt Fullip di Otter. Equipment Model(s)
Materials: Pump/Bailer Dedicated Prepared Off-Site Field Cleaned Disposable 1.
Materials: Rope/Tubing
Was well purged dry? ☐ Yes ☐ No Pumping Rate: gal/min
Cum Gallons Spec Dissolved Other
Time Removed pH Temp Cond. Eh Oxygen Turbidity Comments
774
4. SAMPLING DATA  Geochemical Analyses
□ Bailer Size: □ Bladder Pump □ 2" Submersible Pump □ 4" Submersible Pump
Peristaltic Pump   Inertial Lift Pump   Other: mg/L
Materials: Pump/Bailer
Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other:
Dedicated Prepared Off-Site Field Cleaned Disposable
Depth to Water at Time of Sampling: Field Filtered?  Yes X No Sulfate: mg/l
Sample ID: Sample Time: # of Containers: Alkalinity: mg/L
Duplicate Sample Collected?   Yes A No ID:  """""""""""""""""""""""""""""""""""
5. COMMENTS
Note: Include comments such as well condition, odor, presence of NAPL, or other items not on the field data sheet.
Cons
FORM GW-1 (Rev 6/8/99 - wah) Signature



WELL ID: MW-120

1. PROJ	PROJECT INFORMATION											
Project N	umber: 128°	32_	Task Numb	per:	7	Date: 3-11	-02	<u></u>	Time: <u>[745</u>			
Client:	35	<u>.</u>				Personnel:	CG, A	N				
Project L	ocation: Ho	do 5	·			Weather:	Cold,	N NENSY	,			
2. WELL												
Casing D	iameter:	inche	95	Type: □Pv	/C □ Stainle	ss 🛭 Galv. S	teel 🔾 Teflon®	Other:				
Screen D	iameter:	inche	es	Type: 🗗 PV	/C □ Stainle	ss 🖸 Galv. S	teel 🗆 Teflon®	Other:				
Total De	oth of Well: 8	7.58fee	t	From: to Ti	op of Well Cas	sing (TOC)	Top of Protec	ctive Casing 🔲 🤇	Other:			
Depth to	Static Water	.61_f						ctive Casing 🔲 🤇				
	Product:							ctive Casing O				
Length of Water Column: 25.77 feet Well Volume: 13.0 gal Screened Interval (from GS): 71.5 - 87.5 Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft												
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft  3. PURGE DATA												
Purge M	ethod: D Centr	r, Size: <u>}</u> rifugal Pum	_ □ Bladd	erPump ☐ 2 litic Pump ☐ I	" Submersible Inertial Lift Pur	Pump 🗆 4"	Submersible P	ump	Equipment Model(s)			
Materials	: Pump/Baile					aned ADisp			Equipment Model(s)			
		☐ Polyet	hylene 🗀 l	Polypropylene	☐ Teflon®	Other: N	ulon					
	Rope/Tubing	☐ Dedica	ated 🗅 Pre	pared Off-Site	Field Cle	aned Dis	posable	2				
Was wel	purged dry?	☐ Yes	Q No		ng Rate:	gal/i	min	3				
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments			
1753		8.24	17.5%	P60	-48.5	327						
1756	3	7.87	17.57	1114	~u.	4.57						
1305	4	7.72	17.66	1093	-53.4	2.96						
1809	6		17.73	1087	-64.0	3.20						
1815	<u>8</u>	7.92		1084	-19.Le	445						
1831	9	2. 29	17.71	1086	-51.3	3.17						
1824	Ŋ	7.79	17.cel	1097	-18.8	3.66						
१८८१	12	1.11	17.57	1091	-67.4	3.54						
4. SAMI	PLING DA	TA	<u> </u>				<u> </u>	Geoc	nemical Analyses			
Method(	Bailer, Si					mp 🛛 4" Sut	omersible Pump	) Farror	us Iron: 4.9 mg/L			
· ·	CI Peristaltic	•	Inertial Lift P ess □ PV(	ump 🖸 Other	r: 18 □ Other:			reno	720 mg/L			
	s: Pump/Bailer	□ Dedic	ated 🗅 Prep	pared Off-Site	☐ Field Cle	•	posable	DO:	mg/L			
Materials	: Tubing Rope		ated 🗅 Pr	epared Off-Sit	e □ Field Cl	Other: NY eaned Di	sposable	– Nitrati	e: mg/L			
	Water at Time	•	·			ed? 🗅 Yes		Sulfat	e: mg/L			
Sample	D: MW-1	ሃን	Sample T	we: <b>/ጛ,ጛ</b> ຼ	1 70-02	# of Contain	ners: 14	Δlkali	nity: SC mail			
Duplicate Sample Collected? ☐ Yes ♥ No ID: Mg/L												
5. COM	5. COMMENTS											
Note: Include	comments such	as well con	dition, odor,	presence of N	IAPL, or other	items not on t	he field data sh	eet.				
								$\sim$				

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

Signature Signature



WELL ID: MUt?

1. PROJECT INFORM	ATION										
_		0		н.	1 21		1474				
Project Number: 1273 2	_ Task Num	ber: Oll	_	Date: 4304	day 3-16-	<del>U</del>	Time: 1534				
Client: 35											
Project Location: Hobb	<u> </u>			Weather:	wind	Ψ					
2. WELL DATA											
Casing Diameter:	nches	Type: 🗘 🕏 🔾	/C 🗆 Stainle	ss 🔾 Galv. Si	leel 🗆 Teflon®	Other:					
Screen Diameter: 2	inches	Type: p	C 🗆 Stainle	ss 🖸 Galv. Si	teel □ Teflon€	Other:					
Total Depth of Well: 66.35	feet	From:	op of Well Cas	sing (TOC)	Top of Protec	ctive Casing 🚨 🤇	Other				
Depth to Static Water: 60.9	1 feet	From: 🔾 T	op of Well Cas	sing (TOC)	Top of Protei	ctive Casing 🔘 🤇	Other:				
	et				Top of Prote	ctive Casing 🔘					
Length of Water Column: 5.4	feet	Well Volume	2·7	_ gal		erval (from GS): h well = 0.167 gal/					
3. PURGE DATA	2										
Purge Method: G Centrifical	— ☐ Blade	der Pump 🗓 2	" Submersible	Pump Q 4"	Submersible P	ump					
5 ( , ) os	tainless 🗆 PV	C X Teflone	D C) Other:				Equipment Model(s)				
	edicated 🛭 Pre olyethylene 🗀				1	1	<u>L</u>				
Materials: Rope/Tubing	edicated 🖸 Pr	epared Off-Site	e ⊡ Field Cle	eaned <b>S</b> Dis	posable	2					
Was well purged dry?	Yes No	Pumpir	ng Rate:	gal/r	min	3.					
Time Cum. Gallons ph Removed ph	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments				
1544 0.5 7.	7 17.85	1479	- 54.7	3.76	-						
1550 (.2 7.	1 18.18	1452	-33.5	3.72	_						
	3 6.13		45.9	1	_						
	10	1					-				
			<del> </del>				· · · · · · · · · · · · · · · · · · ·				
	<del></del>						-				
·											
	<del>-  </del>	<del> </del>									
			ļ								
						<u> </u>					
4. SAMPLING DATA						Geoc	nemical Analyses				
Method(s): ☐ Bailer, Size: ☐				mp 🗆 4" Sut	mersible Pum	Ferro	us Iron: mg/L				
Materials: Pump/Bailer Q S	tainless 🗆 PV	C XTeflon	® D Other:_			DO:	mg/L				
OF	edicated ☐ Pre olyethylene ☐	I Polypropyleni	e 🗘 Teflon®	Other:	ng on	50.	mg/L				
Waterials. Tubing/Rope	edicated DP	repared Off-Sit	le 🔾 Field C	leaned XDi	sposable	Nitrat	e:mg/L				
Depth to Water at Time of Sar			Field Filtere	ed? 🔾 Yes	⊠ No	Sulfai	te: mg/L				
Sample ID: MW-I3		ime:/0 <b>4</b>	3-12	# of Contain	ners:	Alkali	nity: mg/L				
Duplicate Sample Collected?	□ Yes 🔀	No ID:				,					
5. COMMENTS , July	5. COMMENTS NO BOLTS										
Note: Include comments such as well	condition, odor,	presence of N	IAPL, or other	items not on t	he field data sh	eet.					

Signature

## BROWN AND CALDWELL

.

THE STATE OF

## **GROUNDWATER SAMPLING FIELD DATA SHEET**

WELL ID: MW14

	== .									
		ECT INFOR					2//	11/10		
	•	ımber: 128.		Fask Numl	per: <u>0/7</u>		Date: <u>3//</u>	1/04	1	Fime: 14:51
С	lient:		ervices	1111			Personnel:		<del></del>	
P	roject Lo	cation:	40005)	10101			Weather:	ninay		
2. V	VELL	DATA								
C	asing Di	ameter: Z	inche	:8	Type: 5 PV	C D Stainle:	ss 🗆 Galv. Ste	el 🗆 Teflon®	D Other:	
		B1170101	inche		Type: SYPV	C O Stainle	ss 🖸 Galv, Str	el D Tefion®	C) Other:	
Ţ	otal Dep	th of Well: 69.	ZO feet	· · · · · · · · · · · · · · · · · · ·		• • • • • • • • • • • • • • • • • • • •	ng (TOC) 🚨			her
	epth to	Static Water: <u>62</u>	.70 fe	et	From: 🗷 To	op of Well Casi	ng (TOC) 🗔	Top of Protect	live Casing O	ther:
		Product:	feet		l		ing (TOC)			
١	ength of	Water Column:	6.50	feel	Well Volume	: <u>[.07</u>	gal ·		erval (from GS): th well = 0.167 gab	
3. F	PURG	E DATA	2	<del></del>			•			
P	urge Me		, Size: ifugal Pump				Pump 🚨 4" S p 🗇 Other:		mp	Equipment Model(s)
,	Materials	: Pump Bailer		ss DPV	S Ex Teflon © pared Off-Site	O Other:	ned & Dispo	e able	. \	5-610
Ι.	Antoriala	(Rope/Tubing	□ Polyeti	nylene 🖸	Polypropylene	☐ Teflon®	Other Ny	1/on	1	71 410
			☐ Dedica	ted QPn	epared Off-Site	☐ Field Cle	aned 🔎 Disp	osable	2	
L <sub>v</sub>	Vas well	purged dry?	₩ Yes	() No		ng Rate:	Uag Ual	min	3	
	ime	Cum. Gallons Removed	рН	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other.	Comments
/	7:04	0.6	7.41	17.49	1819	54.0	6.40			
	/				,					
<u> </u>										
┢─		<u> </u>					<del> </del>			
-			[							
<u> </u>		<b>T</b> 2	ļ	<u> </u>	-		<del> </del>			
<u> </u>										•
					1					
	SAME	PLING DAT	ΓΔ		<u> </u>	<del></del>			Genc	hernical Analyses
Į		V7 Bailer Si	7	🔾 Bladder F	oump O:2"Sı	ubmersible Pur	mp 1014" Subr	nersible Pump	9000	- CIMON ANDIYSCS
	Method(	Peristant	. 1		omp Other		<del></del>		Ferro	ous Iron: mg/L
1	Materials	s: Pump/Bailer	□ Stainl □ Dedic		epared Off-Site	Other:_ I Field Cle	aned <b>25</b> Disp	osable	DO:	mg/L
	Materials	s: Tubing/Rope		ated DP	Polypropylene repared Off-Sit			posable	Nitra	te:mg/L
	Depth to	Water at Time	of Samplin	g:_ <i>V</i> M  Sample	 Fi==: Z117.	Field Filter	ed? D Yes	{	Sulfa	ite:mg/L
		e Sample Collec				<del></del>	# of Contail	ners	Alkal	inity: mg/L
<u>L</u>			.icu :	☐ Yes 18	( No ID:_					
<b>[</b> 5.	COM	MENTS		. <del>.</del> .						
										to the second of
<b>.</b>	، د میرسو -فررانجمولون	nemonts such a	n woll	lion oder -	menne of NA	Ol or other te-	ma nat en the E	مداعد وقوام امار		
rvote	: include	comments such a	a well condi	non, vaor, p	ESEILE OF IVAL	L, or other ite	ins not on the lit	eru data sneet.		

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

Amanda Morth



WELL ID: MW-15

1. PROJECT INFORMATION										
Project Number: 12832 Task Num	ber: 0/7	Date: 3-1	-02	Time: 1624	_					
Client: 85		Personnel:(								
Project Location: Itold 5	<del></del>	Weather:	# WIND	<b>T</b>	_					
2. WELL DATA										
Casing Diameter: 2 inches	Type: PVC D Stainle	ss 🗆 Galv. Ste	el 🗆 Teflon® 🗅 Ot	ther:						
Screen Diameter: 2 inches	Type: PVC Stainle	ss 🛘 Galv. Ste	eel 🗆 Teflon® 🗅 Ot	ther:						
Total Depth of Well: 67. of feet	From: Top of Well Cas	ing (TOC)	Top of Protective Ca	asing Other:						
Depth to Static Water: 61.65 feet	From: Top of Well Cas									
Depth to Product:feet	From: Top of Well Cas									
Length of Water Column: 5,35 feet	Well Volume: 2.63	gai S	Screened Interval (fr Note: 2-inch well =		.667 gal/ft					
3. PURGE DATA										
Purge Method: Bailer, Size: 2										
Gentingal Fully Grens	C Tefion® D Other:			Equipment Mode	el(s)					
Materials: Pumphalier Dedicated Dere	epared Off-Site			- 13t						
□ Dedicated □ Po	epared Off-Site 🖸 Field Cle	eaned Disp	stable 2							
Was well purged dry? Yes No	Pumping Rate:	gal/m	iin3	<b>J.</b>						
Time Cum. Gallons pH Temp	Spec. Cond.	Dissolved Oxygen	Turbidity Ot	ther: Comments	s					
14380.75 8.51 17.55		6.22								
1643 2 774 17.04		5.85								
	1.00	1.8								
	<del>                                     </del>									
					····					
		-								
4. SAMPLING DATA	Dump D 2" Cubmanitie C		novejble D	Geochemical Analyses	ı					
Method(s): Bailer, Size: D D Bladder  Peristaltic Pump D Inertial Lift	•		nersible Pump	Ferrous Iron:	ng/L					
	C SXTeflon® C Other:_ epared Off-Site C Field Cle	aned Dispo	osable	DO:	mg/L					
Materials: Tubing/Rone © Polyethylene ©	I Polypropylene ☐ Teflon® repared Off-Site ☐ Field Cl	Other: N	ylon	Nitrate:	mg/L					
Depth to Water at Time of Sampling: N	<b>\</b>	_ ` `								
	Sulfate:mg/L									
Duplicate Sample Collected?										
5. COMMENTS										
					-					
			en y , godin		-					
Note: Include comments such as well condition, odor	, presence of NAPL, or other	items not on the	e field data sheet.							

Cory =

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



WELL ID: 64-4

1. PROJECT INFORMATION Project Number: 1283 Task Num Client: 85 Project Location: 4635		Date: 3 - Personnel: (	12-00 (6., f	m_	Time: L. D. pM
<u> </u>					
2. WELL DATA  Casing Diameter: inches	Type: PVC D Stainle				
Screen Diameter:inches	<del> </del>				
Total Depth of Well: CL. 50 feet  Depth to Static Water: Dex feet	From: Top of Well Cas				
Depth to Product: feet	From: Top of Well Ca	sing (TOC)	Top of Protec	tive Casing 🔲 (	Other:
Length of Water Column:feet	Well Volume:	_ gal		rval (from GS):_ well = 0.167 gal/	
Materials: Pump/Bailer		np Other:aned Disp Other: caned Dis	osable posable	1	Equipment Model(s)
Time Cum. Gallons pH Temp	Spec. Eh	Dissolved Oxygen	Turbidity	Other:	Comments
Materials: Furnip/Ballel    Dedicated   Pre	Pump □ Other: C □ Teflon® □ Other: _ pared Off-Site □ Field Cle I Polypropylene □ Teflon® repared Off-Site □ Field C	aned Display D	sposable  No		te:mg/L
5. COMMENTS  Note: Include comments such as well condition, odor,	presence of NAPL, or other	items not on ti	he field data she	et.	

Signature

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



## APPENDIX B

**Laboratory Analytical Reports** 



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

#### **Brown & Caldwell**

## Certificate of Analysis Number:

02030430

Report To:

Brown & Caldwell

Rick Rexroad 1415 Louisiana

Suite 2509 Houston

ΤX

77002-

ph: (713) 759-0999

Site Address:

fax: (713) 308-3886

PO Number:

**Project Name:** 

State:

Site:

**New Mexico** 

Hobbs, NM

BJ Hobbs 12832-07

State Cert. No.:

Date Reported:

3/25/02

## This Report Contains A Total Of 33 Pages

**Excluding This Page** 

And

Chain Of Custody



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

# Case Narrative for: Brown & Caldwell

#### **Certificate of Analysis Number:**

#### 02030430

Report To:

Brown & Caldwell

Rick Rexroad

1415 Louisiana

**Suite 2509** 

Houston

ΤX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

Project Name:

BJ Hobbs 12832-07

Site:

Hobbs, NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported: 3/25/02

Matrix spike (MS) and matrix spike duplicate (MSD) samples are chosen and tested at random from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. Since the MS and MSD are chosen at random from an analytical batch, the sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The Laboratory Control Sample (LCS) and the Method Blank (MB) are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

Any other exceptions associated with this report will be footnoted in the analytical result page(s) or the quality control summary page(s).

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

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

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

Sonia West

Senior Project Manager

3/25/02

Date



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

#### **Brown & Caldwell**

#### **Certificate of Analysis Number:**

#### 02030430

Report To:

Fax To:

**Brown & Caldwell** 

**Rick Rexroad** 

1415 Louisiana

Suite 2509

Houston

ΤX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

Brown & Caldwell

Rick Rexroad

fax: (713) 308-3886

Project Name:

BJ Hobbs 12832-07

Site:

Hobbs, NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported:

3/25/02

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COCID	HOLD	

MW-1	02030430-01	Water	3/12/02 8:44:00 AM	3/13/02 10:00:00 AM	169963	
MW-1 MW-3 MW-4	02030430-02	Water	3/12/02 9:18:00 AM	3/13/02 10:00:00 AM	169963	
MW-4	02030430-03	Water	3/12/02 9:40:00 AM	3/13/02 10:00:00 AM	169963	
Trip Blank 3/12/02	02030430-04	Water	3/12/02	3/13/02 10:00:00 AM	169963	

Sonia West Senior Project Manager

3/25/02

Date

Joel Grice Laboratory Director

Ted Yen
Quality Assurance Officer

3/25/02 11:29:10 AM



Client Sample ID MW-1

#### **HOUSTON LABORATORY**

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

**SPL Sample ID:** 

02030430-01

Site: Hobbs, NM Analyses/Method Result Rep.Limit Dil. Factor QUAL Date Analyzed Analyst Seq. # **ALKALINITY, BICARBONATE** MCL M2320 B Units: mg/L Alkalinity, Bicarbonate 230 2 03/15/02 15:30 SN 1070464 **ALKALINITY, CARBONATE** MCL M2320 B Units: mg/L Alkalinity, Carbonate ND 2 03/15/02 15:30 SN 1070522 **CHLORIDE, TOTAL** MCL E325.3 Units: mg/L Chloride 177 5 5 03/18/02 14:30 CV 1064797 **DIESEL RANGE ORGANICS** MCL SW8015B Units: mg/L Diesel Range Organics ND 0.2 1068842 03/19/02 7:00 Surr: n-Pentacosane 92.6 18-120 1 03/19/02 7:00 AR 1068842 Prep Date Prep Method Prep Initials SW3510B 03/14/2002 12:11 KL **FLUORIDE-IC** Units: mg/L MCL E300 Fluoride 1.2 0.1 03/13/02 11:55 1067979

Collected: 03/12/2002 8:44

GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organics	ND		0.1		1	03/15/02 5:08	DL	1062097
Surr: 1,4-Difluorobenzene	101	%	74-121		1	03/15/02 5:08	DL	1062097
Surr: 4-Bromofluorobenzene	96.0	%	55-150		1	03/15/02 5:08	DL	1062097
HARDNESS, TOTAL (TITRIMETRI	C, EDTA)			MCL	E130.2	Units: m	g/L	
Hardness (As CaCO3)	420		25		5	03/19/02 11:45	CV	1068413
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: m	g/L	
Ethane	ND		0.0025		1	03/22/02 11:04	ER	1070786
Ethylene	ND		0.0032		1	03/22/02 11:04	ER	1070786
Methane	0.007		0.0012		1	03/22/02 11:04	ER	1070786
MERCURY, TOTAL				MCL	SW7470A	Units: m	g/L	
Mercury	ND		0.0002		1	03/15/02 12:50	RT	1063735

METALS BY METHOD	6010B, TOTAL		MCL	SW6010B	Units: m	g/L	
Arsenic	0.00939	0.005		1	03/15/02 2:12	JS	1062857
Lead	ND	0.005		1	03/15/02 2:12	JS	1062857
Selenium	0.00549	0.005		1	03/15/02 2:12	JS	1062857
Barium	0.06	0.005		1	03/19/02 4:04	NS	1068539
Cadmium	ND	0.005		1	03/19/02 4:04	NS	1068539
Calcium	112	0.1		1	03/21/02 2:12	NS	1069154
Chromium	ND	0.01		1	03/19/02 4:04	NS	1068539

Prep Initials

R\_T

Qualifiers:

Prep Method

SW7470A

Prep Date

03/15/2002 9:30

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



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

Client Sample ID MW	-1		Collec	cted: 0	3/12/2002	8:44	SPL Sample	<b>D</b> : 020	30430-01
			Site:	Hol	bs, NM				
Analyses/Method	Result	Rep.	Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	27.3		0.1		1		03/19/02 4:04	NS	1068539
Potassium	2.82		2		1		03/19/02 4:04	NS	1068539
Silver	ND	0	.01		1		03/19/02 4:04	NS	1068539
Sodium	147		0.5		1		03/19/02 4:04	NS	1068539
Prep Method	Prep Date	Pre	<u>Initials</u>						
SW3010A	03/14/2002 7:30	MW							
NITROGEN, NITRATE	(AS N)			MCL		E300	Units: m	ıg/L	
Nitrogen, Nitrate (As N)	5.7		0.1		1		03/13/02 11:55	ES	1064693
POLYNUCLEAR AROI	MATIC HYDROCARE	ONS		MCL	SV	V8310	Units: u	g/L	
Acenaphthene	ND		0.1		1		03/18/02 19:21	YN	1065582
Acenaphthylene	ND		0.1		1		03/18/02 19:21	YN	1065582
Anthracene	ND		0.1		1		03/18/02 19:21	YN	1065582
Benz(a)anthracene	ND		0.1		1		03/18/02 19:21	YN	1065582
Benzo(a)pyrene	ND		0.1		1		03/18/02 19:21	YN	1065582
Benzo(b)fluoranthene	ND		0.1		1		03/18/02 19:21	YN	1065582
Benzo(g,h,i)perylene	ND		0.1		1		03/18/02 19:21	YN	1065582
Benzo(k)fluoranthene	ND		0.1		1		03/18/02 19:21	YN	1065582
Chrysene	ND		0.1	7	1		03/18/02 19:21	YN	1065582
Dibenzo(a,h)anthracene	ND		0.1		1		03/18/02 19:21	YN	1065582
Fluoranthene	ND		0.1		1		03/18/02 19:21	YN	1065582
Fluorene	ND		0.1	_	1		03/18/02 19:21	YN	1065582
Indeno(1,2,3-cd)pyrene	. ND	1	0.1		1		03/18/02 19:21	YN	1065582
Naphthalene	ND		0.1		1		03/18/02 19:21	YN	1065582
Phenanthrene	ND		0.1		1		03/18/02 19:21	YN	1065582
Pyrene	ND		0.1		1		03/18/02 19:21	YN	1065582
Surr: 1-Fluoronaphtha	lene 52.7	% 15-	·96		1		03/18/02 19:21	YN	1065582
Surr: Phenanthrene-d	10 55.5	% 33-1	08		1		03/18/02 19:21	YN	1065582
Prep Method	Prep Date	Prep	<u>Initials</u>						
SW3510B	03/15/2002 15:01	DB							
PURGEABLE AROMA	TICS			MCL	SW8	021B	Units: ug	g/L	
Benzene	ND		1		1		03/15/02 5:08	DL	1062039
Ethylbenzene	ND		1		1		03/15/02 5:08	DL	1062039
Toluene	ND		1		1	- market	03/15/02 5:08	DL	1062039
Xylenes,Total	ND	-	1		1		03/15/02 5:08	DL	1062039
Surr: 4-Bromofluorobe	enzene 103	% 48-1	56		1		03/15/02 5:08	DL	1062039
Surr: 1,4-Difluorobenz	ene 102	% 72-1	37		1		03/15/02 5:08	DL	1062039

Sulfate	190	4	20	03/14/02 11:34	ES	1068042

MCL

Qualifiers:

SULFATE

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)

Units: mg/L

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

E300



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

Client Sample ID MW-3 Collected: 03/12/2002 9:18 02030430-02 SPL Sample ID:

				Site	: Hoi	obs, NM				
Analyses/Method		Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICA	RBONATE				MCL	M2:	320 B	Units: m	g/L	
Alkalinity, Bicarbona	ite	230		2		1		03/15/02 15:30	SN	1070465
ALKALINITY, CAR					MCL	M23	320 B	Units: m	g/L	
Alkalinity, Carbonate	)	ND		2		1		03/15/02 15:30	SN	1070523
CHLORIDE, TOTAL	-				MCL	E	325.3	Units: m	g/L	
Chloride		172		2		2		03/18/02 14:30	CV	1064800
DIESEL RANGE OF	RGANICS				MCL	SW8	015B	Units: m	g/L	
Diesel Range Organ	ics	ND		0.2		1	,	03/19/02 7:37	AR	1068843
Surr: n-Pentacosa	ane	98.2	%	18-120		1		03/19/02 7:37	AR	1068843
Prep Method	Prep Date			Prep Initials						
SW3510B	03/14/2002	12:11		KL						
FLUORIDE-IC					MCL		E300	Units: m	a/L	
Fluoride		1.4		0.1		1			ES ES	1067980
GASOLINE RANGE	ORGANICS			navrw	MCL	SW8	015B	Units: m	a/L	
Gasoline Range Org		ND		0.1		1	0.00	03/15/02 4:43	DL.	1062093
Surr: 1.4-Difluoro		101	%	74-121		1	<del></del>	03/15/02 4:43	DL	1062093
Surr: 4-Bromofluo	robenzene	96.0	%	55-150		1		03/15/02 4:43	DL	1062093
HARDNESS, TOTA	L (TITRIMETRI	C. EDTA)			MCL	E	130.2	Units: m	g/L	
Hardness (As CaCO		420		25		5		03/19/02 11:45	CV	1068414
HEADSPACE GAS	ANALYSIS				MCL	RS	K147	Units: m	g/L	
Ethane		ND		0.0025	•	1		03/22/02 11:15	ER	1070788
Ethylene		ND		0.0032		1		03/22/02 11:15	ER	1070788
Methane		ND		0.0012		1		03/22/02 11:15	ER	1070788
MERCURY, TOTAL					MCL	SW7	470A	Units: m	g/L	
Mercury		ND		0.0002		1		03/15/02 12:50	•	1063736
Prep Method	Prep Date			Prep Initials						
SW7470A	03/15/2002 9	9:30		R_T						
METALS BY METH	OD 6010B. TO	ΓAL			MCL	SW6	010B	Units: m	n/L	
Arsenic		0.00889		0.005		1		03/15/02 2:19	JS	1062858
Lead		ND		0.005		1		03/15/02 2:19	JS	1062858
Selenium	1	0.00625		0.005		1		03/15/02 2:19	JS	1062858
Barium		0.0797		0.005		1		03/19/02 4:10	NS	1068540
Cadmium	:	ND		0.005		1		03/19/02 4:10	NS	1068540

Qualifiers:

Chromium

Calcium

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

121

ND

0.1

0.01

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

03/21/02 2:18

03/19/02 4:10 NS

NS

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

1

1

1069155



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE

HOUSTON, TX 77054 (713) 660-0901

Client Sample ID MW-3 Collected: 03/12/2002 9:18 SPL Sample ID: 02030430-02

		Si	te: Hol	obs, NM				
Analyses/Method	Result	Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	20.7	0.1		1		03/19/02 4:10	NS	1068540
Potassium	4.05	2		1		03/19/02 4:10	NS	1068540
Silver	ND	0.01		1		03/19/02 4:10	NS	1068540
Sodium	133	0.5		1		03/19/02 4:10	NS	1068540
Prep Method	Prep Date	Prep Initial	<u>s</u>					
SW3010A	03/14/2002 7:30	MW						
NITROGEN, NITRATE	(AS N)		MCL		E300	Units: m	g/L	
Nitrogen, Nitrate (As N)	3.86	0.1		1		03/13/02 11:55	ES	1064694
POLYNUCLEAR ARO	MATIC HYDROCARB	ONS	MCL	SW	/8310	Units: uç	<sub>3</sub> /L	
Acenaphthene	ND	0.11		1		03/18/02 19:59	YN	1065583
Acenaphthylene	ND	0.11		1		03/18/02 19:59	YN	1065583
Anthracene	ND	0.11		1		03/18/02 19:59	YN	1065583
Benz(a)anthracene	ND	0.11		1		03/18/02 19:59	YN	1065583
Benzo(a)pyrene	ND	0.11		1		03/18/02 19:59	YN	1065583
Benzo(b)fluoranthene	ND	0.11		1		03/18/02 19:59	YN	1065583
Benzo(g,h,i)perylene	ND	0.11		1		03/18/02 19:59	YN	1065583
Benzo(k)fluoranthene	ND	0.11		1		03/18/02 19:59	YN	1065583
Chrysene	ND	0.11		1		03/18/02 19:59	YN	1065583
Dibenzo(a,h)anthracene	ND ND	0.11		1		03/18/02 19:59	YN	1065583
Fluoranthene	ND	0.11		1		03/18/02 19:59	YN	1065583
Fluorene	ND	0.11		1		03/18/02 19:59	YN	1065583
Indeno(1,2,3-cd)pyrene	ND	0.11		1		03/18/02 19:59	YN	1065583
Naphthalene	ND	0.11		1	-	03/18/02 19:59	YN	1065583
Phenanthrene	ND	0.11		1		03/18/02 19:59	YN	1065583
Pyrene	ND	0.11		1		03/18/02 19:59	YN	1065583
Surr: 1-Fluoronaphtha	alene 66.5	% 15-96		1		03/18/02 19:59 YN		1065583
Surr: Phenanthrene-c	110 67.1	% 33-108		1		03/18/02 19:59	YN	1065583
Prep Method	Prep Date	Prep Initial	<u>s</u>					
SW3510B	03/15/2002 15:01	DB						

JRGEABLE AROMATICS				MCL	SW8021B	Units: ug/L		
Benzene	ND		1		1	03/15/02 4:43	DL	1062038
Ethylbenzene	ND		1		1	03/15/02 4:43	DL	1062038
Toluene	ND		1		1	03/15/02 4:43	DL	1062038
Xylenes,Total	ND		1		1	03/15/02 4:43	DL	1062038
Surr: 4-Bromofluorobenzene	102	%	48-156		1	03/15/02 4:43	DL	1062038
Surr: 1,4-Difluorobenzene	100	%	72-137		1	03/15/02 4:43	DL	1062038

SULFATE			MCL	E300	Units: mg	<sub>J</sub> /L	
Sulfate	150	2		10	03/14/02 11:34	ES	1068045

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



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

Client Sample ID MW-4 Collected: 03/12/2002 9:40 SPL Sample ID: 02030430-03

				Site	e: Hot	obs, NM			-
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICAF	RBONATE				MCL	M2320 B	Units: m	a/L	
Alkalinity, Bicarbonate		210		2		1	03/15/02 15:30		107046
ALKALINITY, CARB	ONATE				MCL	M2320 B	Units: m	q/L	
Alkalinity, Carbonate		ND		2		1	03/15/02 15:30		107052
CHLORIDE, TOTAL					MCL	E325.3	Units: mg/L		****
Chloride		183		2		2	03/18/02 14:30	CV	106480
DIESEL RANGE OR	GANICS				MCL	SW8015B	Units: m	g/L	o er er
Diesel Range Organic	cs	ND		0.2		1	03/19/02 8:13		106884
Surr: n-Pentacosar	ne	93.8	%	18-120		1	03/19/02 8:13	AR	1068844
Prep Method	Prep Date			Prep Initials	]				
SW3510B	03/14/2002 1	2:11		KL	]				
FLUORIDE-IC					MCL	E300	Units: m	a/L	
Fluoride		1.2		0.1		1	03/13/02 11:55		1067986
GASOLINE RANGE	ORGANICS				MCL	SW8015B	Units: m	a/L	
Gasoline Range Orga		ND		0.1		1	03/15/02 4:17	DL	1062090
Surr: 1,4-Difluorobe		102	%	74-121		1	03/15/02 4:17	DL	1062090
Surr: 4-Bromofluoro	obenzene	96.3	%	55-150		1	03/15/02 4:17	DL	1062090
HARDNESS, TOTAL	. (TITRIMETRI	C. EDTA)			MCL	E130.2	Units: m	a/L	
Hardness (As CaCO3		450		25		5	03/19/02 11:45		1068418
HEADSPACE GAS A	ANALYSIS				MCL	RSK147	Units: m	g/L	
Ethane		ND		0.0025		1	03/22/02 11:25	<del>-</del>	1070983
Ethylene		ND		0.0032		1	03/22/02 11:25	ER	1070983
Methane		0.0024		0.0012		1	03/22/02 11:25	ER	1070983
MERCURY, TOTAL					MCL	SW7470A	Units: m	g/L	
Mercury		ND		0.0002		1	03/15/02 12:50		1063737
Prep Method	Prep Date	······································		Prep Initials	]				
SW7470A	03/15/2002 9	1:30		R_T					
METALS BY METHO	DD 6010B, TO	TΔL			MCL	SW6010B	Units: m	α/L	
Arsenic	, <u>, , , , , , , , , , , , , , , , , , </u>	0.0101		0.005		1	03/15/02 2:44	JS	1062862
Lead	•	ND		0.005		1	03/15/02 2:44	JS	1062862
Selenium	1	ND		0.005		1	03/15/02 2:44	JS	1062862
Barium	<del>-</del>	0.0805		0.005		1	03/19/02 4:17	NS	1068541
Cadmium	· · · · · · · · · · · · · · · · · · ·	ND		0.005		1	03/19/02 4:17	NS	1068541
Calcium	1	130		0.1		1	03/21/02 2:25	NS	1069156
01 1	<u>\</u>						00/40/00 4.47		1000511

Qualifiers:

Chromium

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

ND

0.01

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

03/19/02 4:17 NS

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference



#### **HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

Client Sample ID MW	Client Sample ID MW-4			Colle	cted:	03/12/2002	9:40	SPL Sample I	<b>D</b> : 020	02030430-03	
				Site	: Ho	bbs, NM					
Analyses/Method		- Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #	
Magnesium		20.7		0.1		1		03/19/02 4:17	NS	106854	
Potassium	·	2.79		2		1		03/19/02 4:17	NS	106854	
Silver		ND		0.01		1		03/19/02 4:17	NS	106854	
Sodium		128		0.5		1		03/19/02 4:17	NS	106854	
Drop Mothod	Prep Date			Prep Initials							
Prep Method SW3010A	03/14/2002 7:30			MW							
				INIAA							
NITROGEN, NITRATE	(AS N)				MCL		E300	Units: m			
Nitrogen, Nitrate (As N)		8.55		0.1		1		03/13/02 11:55	ES	1064697	
POLYNUCLEAR ARO	MATIC HYDRO	CARB	ONS		MCL	SV	V8310	Units: uç	a/L		
Acenaphthene		ND	***************************************	0.1	**	1		03/18/02 16:49	YN	1065581	
Acenaphthylene		ND		0.1		1		03/18/02 16:49	YN	106558	
Anthracene		ND		0.1		1		03/18/02 16:49	YN	106558	
Benz(a)anthracene		ND		0.1		1		03/18/02 16:49	YN	1065581	
Benzo(a)pyrene		ND		0.1		1		03/18/02 16:49	YN	1065581	
Benzo(b)fluoranthene		ND		0.1		1		03/18/02 16:49	YN	106558	
Benzo(g,h,i)perylene		ND		0.1		1		03/18/02 16:49	YN .	1065581	
Benzo(k)fluoranthene		ND		0.1		1		03/18/02 16:49	YN	1065581	
Chrysene		ND		0.1		1		03/18/02 16:49	YN	1065581	
Dibenzo(a,h)anthracene		ND		0.1		1		03/18/02 16:49	YN	1065581	
Fluoranthene		ND		0.1		1		03/18/02 16:49	YN	1065581	
Fluorene		ND		0.1		1		03/18/02 16:49	YN	1065581	
Indeno(1,2,3-cd)pyrene		ND		0.1	***************************************	1		03/18/02 16:49	YN	1065581	
Naphthalene		ND		0.1		1		03/18/02 16:49	YN	1065581	
Phenanthrene		ND		0.1		1		03/18/02 16:49	YN	1065581	
Pyrene		ND		0.1		1		03/18/02 16:49	YN	1065581	
Surr: 1-Fluoronaphtha	lene	56.2	%	15-96		1		03/18/02 16:49	YN	1065581	
Surr: Phenanthrene-d	10	58.3	%	33-108		1		03/18/02 16:49	YN.	1065581	
Prep Method	Prep Date			Prep Initials							
SW3510B	03/15/2002 15:0	1		DB							
PURGEABLE AROMA	TICS				MCL	SW8	021B	Units: ug	1/1		
Benzene		ND		1	711.OE	1	<u> </u>	03/15/02 4:17		1062037	
Ethylbenzene		ND		1		1		03/15/02 4:17	DL	1062037	
Toluene		ND		1		1		03/15/02 4:17	DL	1062037	
Xylenes, Total		ND		1		1		03/15/02 4:17	DL	1062037	
Surr: 4-Bromofluorobe	enzene	103	%	48-156		1		03/15/02 4:17	DL	1062037	
Surr: 1,4-Difluorobenz	ene	101	%	72-137		1		03/15/02 4:17	DL	1062037	

Qualifiers:

SULFATE

Sulfate

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

160

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

Units: mg/L

03/14/02 11:34 ES

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

10

E300

MCL



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

Client Sample ID Trip Blank 3/12/02

Collected: 03/12/2002 0:00

SPL Sample ID:

02030430-04

Site:	Hobbs,	NM
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Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
GASOLINE RANGE ORGANICS				MCL SW8015B Units: mg/L			g/L		
Gasoline Range Organics	ND		0.1		1		03/15/02 1:20	DL	1062073
Surr: 1,4-Difluorobenzene	96.7	%	74-121		1		03/15/02 1:20	DL	1062073
Surr: 4-Bromofluorobenzene	95.0	%	55-150		1		03/15/02 1:20	DL	1062073
PURGEABLE AROMATICS				MCL	SW8	021B	Units: ug	1/L.	
Benzene	ND		1		1		03/15/02 1:20	DL	1062030
Ethylbenzene	ND		1		1		03/15/02 1:20	DL	1062030
Toluene	ND		1		1		03/15/02 1:20	DL	1062030
Xylenes,Total	ND		1		1		03/15/02 1:20	DL	1062030
Surr: 4-Bromofluorobenzene	101	%	48-156		1		03/15/02 1:20	DL	1062030
Surr: 1,4-Difluorobenzene	102	%	72-137	1,7***	1		03/15/02 1:20	DL	1062030

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



8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

#### **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis:

RunID:

**Diesel Range Organics** 

Method: SW8015B WorkOrder:

02030430

Lab Batch ID:

18664

**Method Blank** 

HP\_T\_020318B-1068833

Units:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

03/18/2002 20:02

Analyst:

AR

02030430-01B

MW-1

Preparation Date:

03/14/2002 12:11

Prep By: KL

Method SW3510B 02030430-02B MW-3

02030430-03B

MW-4

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20
Surr: n-Pentacosane	70.2	18-120

#### **Laboratory Control Sample (LCS)**

RunID:

HP\_T\_020318B-1068834

Units:

mg/L

Analysis Date: Preparation Date:

03/18/2002 20:38 03/14/2002 12:11

Analyst: AR Prep By: KL

Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	1.7	66	21	175

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

Sample Spiked:

02030441-02

RunID:

HP\_T\_020318B-1068836

Units:

mg/L

Analysis Date:

03/18/2002 22:28

Analyst: AR

Preparation Date:

03/14/2002 12:11

Prep By:

Method

41	Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
	el Range Organics	0.078	5	3.4	66.2	5	3.4	66.0	0.248	39	13	130

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:38:24 AM



**HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

#### **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis:

Analysis Date:

**Headspace Gas Analysis** 

Method: **RSK147**  WorkOrder:

Samples in Analytical Batch:

02030430

Lab Batch ID:

R55822

**Method Blank** 

RunID:

VARC\_020322A-1070780

03/22/2002 9:34

Units:

Analyst: ER

mg/L

Lab Sample ID

Client Sample ID

02030430-01G

MW-1

02030430-02G 02030430-03G MW-3

0200	UTU

MW-4

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

#### Sample Duplicate

Original Sample:

02030428-03

VARC\_020322A-1070784

Units:

mg/L

Analysis Date:

RunID:

03/22/2002 10:52

ER Analyst:

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	0.0044	0.0049	11	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

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.

3/25/02 11:38:49 AM



HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis:

**Purgeable Aromatics** 

Method: SW8021B

WorkOrder:

Samples in Analytical Batch:

02030430

Lab Batch ID:

R55390

Method Blank

RunID: Analysis Date: HP\_U\_020314A-1062017

03/14/2002 17:18

Surr: 4-Bromofluorobenzene

Units: Analyst:

ug/L DL

Lab Sample ID

Client Sample ID

Trip Blank 3/12/02

02030430-01A 02030430-02A MW-1 MW-3

02030430-03A

MW-4

02030430-04A

VIVV-4

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	99.0	72-130

# **Laboratory Control Sample (LCS)**

RunID:

HP\_U\_020314A-1062016

70-130

Units:

ug/L

Analysis Date:

03/14/2002 16:27

100.5

Analyst: DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	48	97	70	130
Ethylbenzene	50	50	99	70	130
Toluene	50	49	98	70	130
Xylenes,Total	150	`146	97	70	130

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

Sample Spiked:

02030425-01

RunID:

HP\_U\_020314A-1062018

Units:

ug/L

Analysis Date:

03/14/2002 17:43

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
enzene		ND	20	19	92.9	20	19	95.7	3.01	21	32	164
thylbenzer	16	ND	20	19	93.8	20	19	96.4	2.76	19	52	142
Toluene		ND	20	19	93.9	20	19	97.4	3.61	20	38	159
(ylenes,Tot	al	ND	60	56	93.3	60	57	95.0	1.77	18	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:39:10 AM



**HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis:

**Gasoline Range Organics** 

Method: SW8015B WorkOrder:

02030430

Lab Batch ID:

R55392

Method Blank

RunID:

Analysis Date:

HP\_U\_020314B-1062062 03/14/2002 17:18

Units: Analyst: mg/L

DL

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02030430-01A

MW-1

02030430-02A

MW-3

02030430-03A

MW-4

02030430-04A

Trip Blank 3/12/02

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	103.0	74-121
Surr: 4-Bromofluorobenzene	96.3	55-150

# **Laboratory Control Sample (LCS)**

RunID:

HP\_U\_020314B-1062061

Units:

mg/L

Analysis Date:

03/14/2002 16:52

Analyst:

DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.72	72	70	130

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

Sample Spiked:

02030425-02

RunID:

HP\_U\_020314B-1062063

Units:

mg/L DL

Analysis Date:

03/14/2002 18:33

Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	ND	0.9	0.88	98.2	0.9	0.88	98.3	0.0904	36	36	160

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:39:31 AM



# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis:

RunID:

Polynuclear Aromatic Hydrocarbons

Method:

WorkOrder:

02030430

Lab Batch ID:

18700

**Method Blank** 

2 020318A-1065578

Units:

Lab Sample ID 02030430-01C

Samples in Analytical Batch:

**Client Sample ID** 

Analysis Date:
Preparation Date: 03/15/2002 15:01

03/18/2002 13:38

ΥN Analyst: Prep By: DB

ug/L

Method SW3510B 02030430-02C MW-1 MW-3

02030430-03C

MW-4

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	74.5	15-96
Surr: Phenanthrene-d10	74.8	33-108

# **Laboratory Control Sample (LCS)**

RunID:

2\_020318A-1065579

Units:

ug/L

Analysis Date:

03/18/2002 14:16

Analyst: ΥN

Preparation Date: 03/15/2002 15:01

DΒ Prep By: Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Acenaphthene	0.5	0.34	68	45	97
Acenaphthylene	0.5	0.37	73	42	122
Anthracene	0.5	0.32	64	42	106
Benz(a)anthracene	0.5	0.36	72	49	119
Benzo(a)pyrene	0.5	0.35	69	54	105
Benzo(b)fluoranthene	0.5	0.36	73	48	127
Benzo(g,h,i)perylene	0.5	0.38	77	39	107
Benzo(k)fluoranthene	0.5	0.36	71	53	119
Chrysene	0.5	0.34	68	51	144
Dibenzo(a,h)anthracene	0.5	0.39	78	40	114
Fluoranthene	0.5	0.34	68	45	126
Fluorene	0.5	0.34	69	46	107
Indeno(1,2,3-cd)pyrene	0.5	0.39	77	45	109

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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

3/25/02 11:39:52 AM



# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis: Method:

Polynuclear Aromatic Hydrocarbons

SW8310

WorkOrder:

02030430

Lab Batch ID:

18700

# **Laboratory Control Sample (LCS)**

RunID:

2\_020318A-1065579

Units: ug/L

Analysis Date: 03/18/2002 14:16 Analyst: ΥN

Preparation Date: 03/15/2002 15:01

Prep By: DB

Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Naphthalene	0.5	0.33	66	44	90
Phenanthrene	0.5	0.35	69	47	128
Pyrene	0.5	0.35	70	51	135

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

Sample Spiked:

RunID:

02030427-01

2\_020318A-1065586

Units: ug/L Analyst: ΥN

Analysis Date:

03/18/2002 21:53 Preparation Date: 03/15/2002 15:01

Prep By: DB 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
Acenaphthene	ND	0.5	0.25	49.3	0.5	0.23	45.4	8.21	30	1	124
Acenaphthylene	ND	0.5	0.25	50.7	0.5	0.23	46.5	8.79	30	1	139
Anthracene	ND	0.5	0.24	47.3	0.5	0.22	44.2	6.81	30	1	126
Benz(a)anthracene	ND	0.5	0.28	56.4	0.5	0.27	53.4	5.43	30	12	135
Benzo(a)pyrene	ND	0.5	0.27	54.4	0.5	0.26	51.4	5.65	30	1	128
Benzo(b)fluoranthene	ND	0.5	0.28	57.0	0.5	0.27	53.9	5.51	30	6	150
Benzo(g,h,i)perylene	ND	0.5	0.3	59.3	0.5	0.28	55.8	6.05	30	1	116
Benzo(k)fluoranthene	ND	0.5	0.28	56.2	0.5	0.27	53.1	5.68	30	5	159
Chrysene	ND	0.5	0.27	53.5	0.5	0.25	50.4	5.92	30	1	199
Dibenzo(a,h)anthracene	ND	0.5	0.31	61.2	0.5	0.29	57.8	5.71	30	1	110
Fluoranthene	ND	0.5	0.26	52.1	0.5	0.25	49.1	6.01	30	14	123
Fluorene	ND	0.5	0.26	51.0	0.5	0.24	47.2	7.75	30	1	142
Indeno(1,2,3-cd)pyrene	ND	0.5	0.29	57.0	0.5	0.27	53.5	6.46	30	1	116
Naphthalene	ND	0.5	0.24	47.4	0.5	0.22	44.1	7.22	30	1	122
Phenanthrene	ND	0.5	0.26	51.1	0.5	0.24	47.7	6.81	30	1	155
Pyrene	ND	0.5	0.28	56.4	0.5	0.27	53.1	5.98	30	1	140

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:39:52 AM



8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis:

RunID:

Metals by Method 6010B, Total

SW6010B Method:

WorkOrder:

02030430

Lab Batch ID:

18657

**Method Blank** 

TJA\_020318F-1068520

Units:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

03/19/2002 1:59

Analyst:

NS

02030430-01D 02030430-02D MW-1

Preparation Date: 03/14/2002 7:30

Prep By: MW Method SW3010A

MW-3

02030430-03D

MW-4

Analyte	Result	Rep Limit		
Barium	ND	0.005		
Cadmium	ND ND	0.005		
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\_020318F-1068521

Units:

mg/L

Analysis Date:

03/19/2002 2:05

NS Analyst:

Preparation Date: 03/14/2002 7:30 Prep By: MW Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Barium	1	0.895	90	80	120
Cadmium	1	0.957	96	80	120
Chromium	1	0.999	100	80	120
Magnesium	1	0.974	97	80	120
Potassium	10	10.1	101	80	120
Silver	1	0.971	97	80	120
Sodium	1	0.958	96	80	120

#### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked:

02030442-05

RunID:

TJA\_020318F-1068526

Units:

mg/L

Analysis Date: Preparation Date:

03/19/2002 2:36 03/14/2002 7:30

Analyst:

NS Prep By:

Method

	Analyte	Sample Result	PDS Spike Added	PDS Result	PDS % Recovery	PDSD Spike Added	PDSD Result	PDSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Magnesium		69.3	1	71.1	171 *	1	70	64.1 *	91.2 *	20	75	125
Potassium		57.5	10	69.3	118	10	68.9	114	3.2	20	75	125
Sodium		125	1	125	34.2 *	1	121	-340 *	245 *	20	75	125

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

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:40:13 AM



# **Brown & Caldwell** BJ Hobbs 12832-07

Analysis: Method:

Metals by Method 6010B, Total

SW6010B

WorkOrder: Lab Batch ID: 02030430

18657

Sample Spiked:

02030442-05

TJA\_020318F-1068523

mg/L

RunID: Analysis Date:

03/19/2002 2:17

Units: NS Analyst:

Preparation Date:

03/14/2002 7:30

Prep By: MW 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	1.06	84.8	1	1.14	92.5	8.59	20	75	125
Barium Cadmium	ND	1	0.914	91.4	1	0.941	94.1	2.89	20	75	125
Chromium	ND	1	0.918	91.8	1	0.963	96.3	4.75	20	75	125
Magnesium	69	1	63.2	-618 *	1	67.3	-204 *	101 *	20	75	125
Magnesium Potassium	58	10	64.8	72.7 *	10	67.1	96.2	27.9 *	20	75	125
Silver	ND	1	0.946	94.6	1	0.965	96.5	1.99	20	75	125
Sodium	120	1	113	-1160 *	1	123	-225 *	135 *	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:40:13 AM



# **Brown & Caldwell** BJ Hobbs 12832-07

Analysis:

RunID:

Metals by Method 6010B, Total

Method: SW6010B WorkOrder:

Samples in Analytical Batch:

02030430

Lab Batch iD:

18657-T

Method Blank

TJAT\_020314B-1062837

Units:

Lab Sample ID

Client Sample ID

Analysis Date:

03/14/2002 23:57

Analyst:

02030430-01D

JS

mg/L

02030430-02D

MW-1

Preparation Date:

03/14/2002 7:30

Prep By: MW Method SW3010A

MW-3

02030430-03D

MW-4

Analyte	Result	Rep Limit
Arsenic	. ND	0.005
Lead	ND	0.005
Selenium	ND ND	0.005

# Laboratory Control Sample (LCS)

RunID:

TJAT\_020314B-1062838

Units: mg/L

Analysis Date:

03/15/2002 0:03

Analyst: JS

Preparation Date:

03/14/2002 7:30

Prep By:

MW Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Arsenic	1	0.995	99	80	120
Lead	1	0.978	98	80	120
Selenium	1	1.01	101	80	120

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

Sample Spiked:

02030442-05

RunID:

TJAT\_020314B-1062840

Units:

Analysis Date:

03/15/2002 0:17

mg/L Analyst: JS

Preparation Date:

03/14/2002 7:30

Prep By: MW 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 ead	0.014	1	0.997	98.3	1	1.03	101	3.16	20	75	125
Lead	, ND	1	0.907	90.4	1	0.949	94.6	4.48	20	75	125
Selenium	ND	1	0.991	99.1	1	1.03	103	4.31	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:40:38 AM



# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis: Method:

RunID:

Metals by Method 6010B, Total

SW6010B

WorkOrder:

02030430

Lab Batch ID:

18657A

**Method Blank** 

TJA\_020320D-1069137

Units:

Lab Sample ID

Client Sample ID

Analysis Date:

03/21/2002 0:15

Analyst:

mg/L NS

02030430-01D

MW-1

Preparation Date:

03/14/2002 7:30

Prep By: MW Method SW3010A

02030430-02D

Samples in Analytical Batch:

MW-3

02030430-03D

MW-4

Analyte	Result	Rep Limit
Calcium	ND	0.1
Sodium	ND	0.5

# Laboratory Control Sample (LCS)

RunID:

TJA\_020320D-1069138

Units:

mg/L

Analysis Date:

03/21/2002 0:21

Analyst: NS

Preparation Date: 03/14/2002 7:30 Prep By: MW Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Calcium	1	0.965	96	80	120
Sodium	1	1.04	104	80	120

# Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked:

02030442-05

RunID:

TJA\_020320D-1069143

Units:

mg/L

Analysis Date:

03/21/2002 0:52

Analyst:

NS

Preparation Date:

03/14/2002 7:30

Prep By:

Method

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	145	1	145	-6.6 *	1	143	-190 *	187 *	20	75	125
Sodium	126	1	124	-210 *	1	125	-110 *	66.7 *	20	75	125

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

Sample Spiked:

02030442-05

RunID:

TJA\_020320D-1069140

Units:

mg/L

Analysis Date:

03/21/2002 0:34

NS Analyst:

03/14/2002 7:30 Preparation Date: Prep By: MW 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	
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Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:41:01 AM



# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis: Method:

Metals by Method 6010B, Total

SW6010B

WorkOrder:

02030430

Lab Batch ID:

18657A

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

Sample Spiked:

02030442-05

RunID:

TJA\_020320D-1069140

Units:

mg/L

Analysis Date:

03/21/2002 0:34

NS Analyst:

Preparation Date: 03/14/2002 7:30

Prep By: MW 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	140	1	137	-757 *	1	139	-539 *	33.6 *	20	75	125
Sodium	130	1	118	-722 *	1	119	-703 *	2.62	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:41:01 AM



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

# **Brown & Caldwell** BJ Hobbs 12832-07

Analysis: Method:

RunID:

Mercury, Total SW7470A

WorkOrder:

02030430

Lab Batch ID:

18720

**Method Blank** 

HGL\_020315B-1063715 Units: mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

03/15/2002 12:50

Analyst:

R\_T

02030430-01D

MW-1

Preparation Date:

02030430-02D

MW-3

03/15/2002 9:30

Analyte

Prep By: R\_T Method SW7470A

02030430-03D

MW-4

Mercury

Result | Rep Limit ND 0.0002

# **Laboratory Control Sample (LCS)**

RunID:

HGL\_020315B-1063717

Units:

mg/L

Analysis Date:

03/15/2002 12:50

Analyst: R\_T

Preparation Date:

03/15/2002 9:30

Prep By: R\_T Method SW7470A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Mercury	0.002	0.00212	106	80	120

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

Sample Spiked:

02030325-01

HGL\_020315B-1063719

Units:

Analysis Date:

RuniD:

03/15/2002 12:50

mg/L R\_T Analyst:

Preparation Date:

03/15/2002 9:30

Prep By: R\_T 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
М	ercury	ND	0.002	0.00202	101	0.002	0.0022	110	8.53	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:41:22 AM



# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis:

Nitrogen, Nitrate (As N)

Method:

E300

WorkOrder: Lab Batch ID: 02030430 R55540

Samples in Analytical Batch:

RunID:

WET\_020313S-1064679

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

03/13/2002 11:55

ES Analyst:

02030430-01F

MW-1

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

Method Blank

**Laboratory Control Sample (LCS)** 

RunID:

WET\_020313S-1064680

Units:

mg/L.

Analysis Date:

03/13/2002 11:55

Analyst:

ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit	
Nitrogen, Nitrate (As N)	10	9.46	95	90	110	

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

Sample Spiked:

02030425-01

RunID:

WET\_020313S-1064682

Units:

mg/L ES

Analysis Date:

03/13/2002 11:55

Analyst:

Sample Analyte MS MS MS % MSD MSD MSD % RPD RPD Low High Result Spike Result Recovery Spike Result Recovery Limit Limit Limit Added Added Vitrogen, Nitrate (As N) 3.0 10 12.6 95.9 10 12.6 95.7 0.271 20 76 124

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:41:44 AM



# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis:

RunID:

Analysis Date:

Nitrogen, Nitrate (As N)

Method:

E300

WorkOrder:

02030430

Lab Batch ID:

R55540A

**Method Blank** 

WET\_020313S-1064679

03/13/2002 11:55

Units: Analyst: mg/L

ES

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02030430-02F

MW-3

02030430-03F

MW-4

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

**Laboratory Control Sample (LCS)** 

RunID:

WET\_020313S-1064680

Units:

mg/L

Analysis Date:

03/13/2002 11:55

Analyst: ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit	
Nitrogen, Nitrate (As N)	10	9.46	95	90	110	

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

Sample Spiked:

02030430-02

RunID:

WET\_020313S-1064695

Units: mg/L

Analysis Date:

03/13/2002 11:55

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)	3.9	10	13.5	96.7	10	13.4	95.4	1.36	20	76	124

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference 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.

3/25/02 11:42:08 AM



# **HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE

HOUSTON, TX 77054 (713) 660-0901

# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis:

RunID:

Chloride, Total

Method:

E325.3

WorkOrder:

02030430

Lab Batch iD:

R55542A

Method Blank

WET\_020318L-1064782

Units:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

03/18/2002 14:30

CV Analyst:

02030430-01E 02030430-02E

MW-1

MW-3

02030430-03E

MW-4

Analyte	Result	Rep Limit
Chloride	ND	1.0

**Laboratory Control Sample (LCS)** 

RunID:

WET\_020318L-1064784

Units:

mg/L

Analysis Date:

03/18/2002 14:30

Analyst:

CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Chloride	143	141	99	90	110

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

Sample Spiked:

02030430-01

RunID:

WET\_020318L-1064798

Units:

mg/L

Analysis Date:

03/18/2002 14:30

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		180	250	426	99.9	250	431	102	1.71	20	85	115

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:42:29 AM



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

# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis: Method:

RunID:

Fluoride-IC

E300

WorkOrder:

02030430

Lab Batch ID:

R55674

**Method Blank** 

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

WET\_020313T-1067964

Units: Analyst:

02030430-01F

MW-1

03/13/2002 11:55

ES

Analyte	Result	Rep Limit
Fluoride	ND	0.10

**Laboratory Control Sample (LCS)** 

RunID:

WET\_020313T-1067965

Units:

mg/L

Analysis Date:

03/13/2002 11:55

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:

02030425-01

RunID:

WET\_020313T-1067967

Units:

mg/L

Analysis Date:

03/13/2002 11:55

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	1.4	10	9.8	84.1	10	9.7	82.4	1.97	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:42:52 AM





# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis: Method:

Fluoride-IC

E300

WorkOrder:

02030430

Method Blank

Lab Batch ID:

R55674A

RunID:

WET\_020313T-1067964

Units:

mg/L ES

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

03/13/2002 11:55

Analyst:

02030430-02F

MW-3

02030430-03F

MW-4

Result Rep Limit Analyte ND 0.10 Fluoride

# **Laboratory Control Sample (LCS)**

RunID:

WET\_020313T-1067965

Units:

mg/L

Analysis Date:

03/13/2002 11:55

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:

02030430-02

RunID:

WET\_020313T-1067981

Units:

mg/L

Analysis Date:

03/13/2002 11:55

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
200	Fluoride	1.4	10	9.5	81.0	10	9.4	80.1	1.18	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:43:15 AM



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

# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis: Method:

Sulfate

E300

WorkOrder:

02030430

Lab Batch ID:

R55679A

**Method Blank** 

RuniD:

Analysis Date:

WET\_020314S-1068028 03/14/2002 11:34

Units:

Analyst: ES

mg/L

Lab Sample ID

**Client Sample ID** 

02030430-01F 02030430-02F

Samples in Analytical Batch:

MW-1 MW-3

02030430-03F

MW-4

Analyte	Result	Rep Limit
Sulfate	ND	0.20

# **Laboratory Control Sample (LCS)**

RunID:

WET\_020314S-1068029

Units:

mg/L

Analysis Date:

03/14/2002 11:34

Analyst: ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sulfate	10	9.9	99	90	110

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

Sample Spiked:

02030430-01

RunID:

WET\_020314S-1068043

Units:

mg/L ES

Analysis Date:

03/14/2002 11:34

Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Sulfate	190	200	390	99.2	200	390	99.5	0.262	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:43:39 AM



# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis:

Hardness, Total (Titrimetric, EDTA)

Method:

E130.2

WorkOrder:

02030430

Lab Batch ID:

R55701

Method Blank

RunID:

WET\_020319U-1068403

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

03/19/2002 11:45

Analyst: CV

02030430-01D

Samples in Analytical Batch:

MW-1

02030430-02D

MW-3

02030430-03D

MW-4

Analyte	Res	ult	Rep Limit
Hardness (As CaCO3)	,	ND	5.0

# **Laboratory Control Sample (LCS)**

RunID:

WET\_020319U-1068405

Units:

mg/L

Analysis Date:

03/19/2002 11:45

Analyst:

CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Hardness (As CaCO3)	202	200	101	94	108

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

Sample Spiked:

02030425-01

RunID:

WET\_020319U-1068407

Units:

mg/L

Analysis Date:

03/19/2002 11:45

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)	420	500	920	100	500	920	100	0	20	81	111

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:44:03 AM



# **Brown & Caldwell**

BJ Hobbs 12832-07

Analysis:

RunID:

Alkalinity, Bicarbonate

Method:

Analysis Date:

M2320 B

WorkOrder:

02030430

Lab Batch ID:

R55803A

Method Blank

WET\_020315S-1070451 03/15/2002 15:30 Units: Analyst: mg/L SN

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02030430-01E

MW-1

02030430-02E

MW-3

02030430-03E

MW-4

	Analyte	Result	Rep Limit
-	Alkalinity, Bicarbonate	ND	2.0

**Laboratory Control Sample (LCS)** 

RunID:

WET\_020315S-1070453

Units:

mg/L

Analysis Date:

03/15/2002 15:30

Analyst:

t: SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Alkalinity, Bicarbonate	80.3	80	100	90	110

# **Sample Duplicate**

Original Sample:

02030430-03

RuniD:

WET\_020315S-1070466

Units: mg/L

Analysis Date:

03/15/2002 15:30

Analyst: SN

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Bicarbonate	210	210	0	20

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:44:27 AM



8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

# Brown & Caldwell

Analysis:

Alkalinity, Carbonate

Method: M2320 B

BJ Hobbs 12832-07

WorkOrder:

02030430

Lab Batch ID:

R55804A

Method Blank

RunID: Analysis Date: WET\_020315T-1070509 03/15/2002 15:30 Units: Analyst:

mg/L

Lab Sample ID

Client Sample ID

02030430-01E

02030430-02E

Samples in Analytical Batch:

MW-1 MW-3

02030430-03E

MW-4

Analyte	Result	Rep Limit
Alkalinity, Carbonate	ND	2.0

**Laboratory Control Sample (LCS)** 

RunID:

WET\_020315T-1070511

Units:

mg/L

Analysis Date:

03/15/2002 15:30

Analyst:

SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Alkalinity, Carbonate	80.3	80	100	90	110

#### Sample Duplicate

Original Sample:

02030430-03

RunID:

WET\_020315T-1070524

Units:

mg/L

Analysis Date:

03/15/2002 15:30

Analyst: SN

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Carbonate	ND	ND	0	20

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference

ank D-

J - Estimated value between MDL and PQL

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.

3/25/02 11:44:50 AM

# Sample Receipt Checklist And Chain of Custody



# **HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

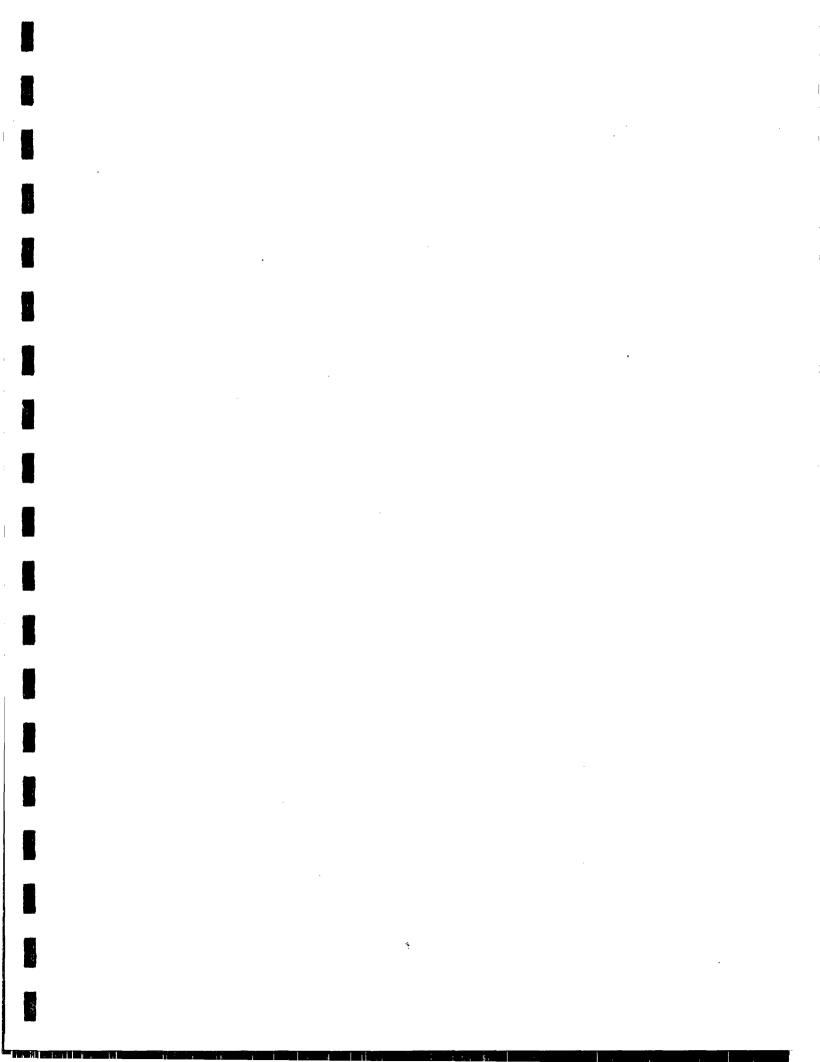
(713) 660-0901

# Sample Receipt Checklist

Workorder: 02030430		Receiv	red By:	DS
Date and Time Received: 3/13/02 10:00:00 AM		Carrie	name:	FedEx
Temperature: 4		Chilled	l by:	Water Ice
1. Shipping container/cooler in good condition?	Yes 🗹	No 🗌	Not Prese	ent 🗌
2. Custody seals intact on shippping container/cooler?	Yes 🗹	No 🗆	Not Prese	ent 🗌
3. Custody seals intact on sample bottles?	Yes	No 🗌	Not Prese	ent 🗹
4. Chain of custody present?	Yes 🗹	No 🗆		
5. Chain of custody signed when relinquished and received?	Yes 🗹	No 🗌		
6. Chain of custody agrees with sample labels?	Yes 🗹	No 🗌		
7. Samples in proper container/bottle?	Yes 🗹	No 🗌		
8. Sample containers intact?	Yes 🗹	No 🗌		
9. Sufficient sample volume for indicated test?	Yes 🗹	No 🗌		
0. All samples received within holding time?	Yes 🗹	No 🗌		
1. Container/Temp Blank temperature in compliance?	Yes 🔽	No 🗌		
2. Water - VOA vials have zero headspace?	Yes 🗹	No 🗌	Not Applic	cable
3. Water - pH acceptable upon receipt?	Yes 🗹	No 🗌	Not Applie	cable 🗌
		34113		
SPL Representative:	Contact Date 8	& Time:		
Client Name Contacted:				
Non Conformance Issues:				
Client Instructions:				

	\(\rightarrow\)	48hr	24hr [		Req		Client/Consu						Trob	*	M	M	M	Client Name: Address/Phone: Client Contact: Project Name: Project Number: Project Location: Invoice To: SAN
8880 Interchange Drive, Houston, TX 77054 (713) 660-0901 4		Standard [2]	) 72hr []		Requested TAT		Client/Consultant Remarks:					Ì	90 Blank-1 312/02		MW-4	MW-3	MW-1	Brown Brown
e, Houston, 17	5. Relinquished by:		1. Relinquished by Sampler		Special Reporting Requirements								,,1		3/12/02	412/02	3/12/02	ATTE AUGUST AUGU
9684 (71	Ьу	by:	5	Standard QC /\(\frac{1}{2}\)	ng Requiremen										9.45	91.18	146	
3) 660-0901 6) 9(33)777			METH	Level 3 QC	ts Fax Results		La								>	×	X	SPJ grab 3
				8	alle 2	1	Laboratory remarks:		/						VAY DAY	W PAN &	WIFAV	W=water S=soil SL=sludge O=other:  P=plastic A=amber glass b G=glass V=vial  SPL A Chain of C
	3/13/07	date	3/12/12	Level 4 QC	Raw Data		rks:								3	_	901	1=1 liter 4=4oz 40=vial & to dy 1=HCl 2=HNO3 P
	1000)	time	time		Special										1,2 11	12 12	1,2 11	1=HCl 2=HNO3 PC RC OF CONTROL OF
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tery Park	Received by Lab	4. Received by:	Received by		Special Detection Limits (specify):										メ	X	X	PAHS 8310  RCR A Metals 305Vicain 6
way, Scot	Laboratory:	"			(y):										X	メン	×	RCRA metals 305Vicalion Chioride 325-3
tt, LA 705						Temp:	Intact?			S					^ <u> </u>	$\sim$	×   ×	Without Sulfate fluoride 300.0
Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775			:	SE SE	PM revie	p: 4	(D 20	,						•	X	$\times$	×	4500-W2-D
8) 237-4775 [ <u> </u>					(initial):	0	Y								XX	X	X	Total Calos Hardness 130.1 methaneletnylenel Ethene Rsk sop
	<b>L</b>			L				<u> </u>	ļ	<u> </u>	<u> </u>	<u> </u>	<u> </u>					175/147

1 1 h





# **Brown & Caldwell**

# Certificate of Analysis Number:

# 02030425

Report To:

Brown & Caldwell

Rick Rexroad 1415 Louisiana

Suite 2509

Houston

ΤX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

**Project Name:** 

BJ Hobbs 12832-017

Site:

Hobbs,NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

**Date Reported:** 

3/25/02

This Report Contains A Total Of 29 Pages

**Excluding This Page** 

And

Chain Of Custody



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

# Case Narrative for: Brown & Caldwell

# **Certificate of Analysis Number:**

# 02030425

Report To:

Brown & Caldwell

Rick Rexroad

1415 Louisiana

**Suite 2509** 

Houston TX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

**Project Name:** 

BJ Hobbs 12832-017

Site:

Hobbs,NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported:

3/25/02

Matrix spike (MS) and matrix spike duplicate (MSD) samples are chosen and tested at random from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. Since the MS and MSD are chosen at random from an analytical batch, the sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The Laboratory Control Sample (LCS) and the Method Blank (MB) are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

Any other 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

Sonia West Senior Project Manager 3/25/02

Date



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

BJ Hobbs 12832-017

# **Brown & Caldwell**

# **Certificate of Analysis Number:**

# 02030425

Report To:

Fax To:

Brown & Caldwell

**Rick Rexroad** 

1415 Louisiana

**Suite 2509** 

Houston

TX

77002-

ph: (713) 759-0999 Brown & Caldwell

Rick Rexroad

fax: (713) 308-3886

fax: (713) 308-3886

PO Number: State:

**Project Name:** 

Site Address:

Site:

**New Mexico** 

Hobbs,NM

State Cert. No.:

**Date Reported:** 3/25/02

Client Sample ID Lab Sample ID Matrix **Date Collected Date Received** COC ID HOLD

MW-5	02030425-01	Water	3/12/02 8:15:00 AM	3/13/02 10:00:00 AM	169961	
MW-5 MW-7	02030425-02	Water	3/12/02 10:34:00 AM	3/13/02 10:00:00 AM	169961	
MW-8	02030425-03	Water	3/12/02 10:19:00 AM	3/13/02 10:00:00 AM	169961	
Trip Blank-2	02030425-04	Water	3/12/02	3/13/02 10:00:00 AM	169961	

Tona West Sonia West

Senior Project Manager

3/25/02

Date

Joel Grice Laboratory Director

Ted Yen

Quality Assurance Officer



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

Client Sample ID MW-5 Collected: 03/12/2002 8:15 SPL Sample ID: 02030425-01

Circuit Campio 12									
				Site	: Hol	bbs,NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICAI	RBONATE	:			MCL	M2320 B	Units: m	a/L	
Alkalinity, Bicarbonat		260		2		1		SN	107045
ALKALINITY, CARE	ONATE				MCL	M2320 B	Units: m	a/L	
Alkalinity, Carbonate		ND		2		1	03/15/02 15:30	SN	107051
CHLORIDE, TOTAL					MCL	E325.3	Units: m	a/L	
Chloride		127		2		2	03/14/02 11:00	<u> </u>	106139
DIESEL RANGE OR	GANICS				MCL	SW8015B	Units: m	a/L	
Diesel Range Organi		ND		0.24		1	03/19/02 4:34	AR	106883
Surr: n-Pentacosar	ne	80.5	%	18-120		1	03/19/02 4:34	AR	106883
Prep Method	Prep D	ato		Prep Initials		,			
SW3510B		2002 12:11		KL					
FLUORIDE-IC Fluoride		1.4		0.1	MCL	E300	Units: m 03/13/02 11:55		106796
Fluoride		1.4		0.1			03/13/02 11.55	E0	100790
GASOLINE RANGE	ORGANIC	cs			MCL	SW8015B	Units: m	g/L	
Gasoline Range Orga	anics	ND		0.1		1	03/14/02 22:22	DL	106207
Surr: 1,4-Difluorob	enzene	101	%	74-121		1	03/14/02 22:22	DL	106207
Surr: 4-Bromofluor	obenzene	96.3	%	55-150		1	03/14/02 22:22	DL	106207
HARDNESS, TOTAL	(TITRIME	ETRIC, EDTA)			MCL	E130.2	Units: m	g/L	
Hardness (As CaCO3	3)	420		50		10	03/19/02 11:45	CV	1068406
HEADSPACE GAS	ANALYSIS	}			MCL	RSK147	Units: m	g/L	
Ethane		ND		0.0025		1	03/22/02 10:12	ER	1070781
Ethylene		ND		0.0032		1	03/22/02 10:12	ER	1070781
Methane		ND		0.0012		1	03/22/02 10:12	ER	1070781
MERCURY, TOTAL					MCL	SW7470A	Units: m	g/L	
Mercury		0.000243		0.0002		1	03/15/02 12:50		1063730
Prep Method	Prep Da	ate		Prep Initials					
SW7470A		002 9:30		R_T					
METALS BY METHO	DD 6010B.	TOTAL			MCL	SW6010B	Units: m	n/L	
Arsenic		0.0104		0.005		1	03/15/02 1:41	JS	1062852
Lead	1	ND		0.005		1	03/15/02 1:41	JS	1062852
Selenium		0.00558		0.005		1	03/15/02 1:41	JS	1062852
Barium		0.0524		0.005		1	03/19/02 3:33	NS	1068534
Cadmium	<u> </u>	ND		0.005		1	03/19/02 3:33	NS	1068534
Calcium		143		0.1		1	03/21/02 1:06	NS	1069145
<u> </u>		110					00/10/00 0 00		

Qualifiers:

Chromium

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

ND

0.01

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

03/19/02 3:33 NS

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

1068534



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

Client Sample ID MW-5 Collected: 03/12/2002		03/12/2002 8	3:15	SPL Sample I	<b>D</b> : 0	2030425-01		
		Si	ite: Ho	bbs,NM				
Analyses/Method	Result	Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Anal	yst Seq. #
Magnesium	13	0.1	·····	1		03/19/02 3:33	NS	1068534
Potassium	3.55	2		1		03/19/02 3:33	NS	1068534
Silver	ND	0.01	710.1	1	2 17.0	03/19/02 3:33	NS	1068534
Sodium	145	0.5		1		03/19/02 3:33	NS	1068534
Prep Method	Prep Date	Prep Initia	İs					
SW3010A	03/14/2002 7:30	MW						
NITROGEN, NITRATE	(AS N)		MCL		E300	Units: mg/L		
Nitrogen, Nitrate (As N)	2.98	0.1		1		03/13/02 11:55	ES	1064681
POLYNUCLEAR ARO	MATIC HYDROCARB	ONS	MCL	SW	8310	Units: ug	n/l	
Acenaphthene	ND	0.1		1		03/18/02 20:37	YN	1065584
Acenaphthylene	ND	0.1		1		03/18/02 20:37	YN	1065584
Anthracene	ND	0.1		1		03/18/02 20:37	YN	1065584
Benz(a)anthracene	ND	0.1		1		03/18/02 20:37	YN	1065584
Benzo(a)pyrene	ND	0.1		1		03/18/02 20:37	ΥN	1065584
Benzo(b)fluoranthene	ND	0.1		1		03/18/02 20:37	YN	1065584
Benzo(g,h,i)perylene	ND	0.1		1	•	03/18/02 20:37	YN	1065584
Benzo(k)fluoranthene	ND	0.1		1		03/18/02 20:37	YN	1065584
Chrysene	ND	0.1		1		03/18/02 20:37	YN	1065584
Dibenzo(a,h)anthracene	ND ND	0.1		1		03/18/02 20:37	YN	1065584
Fluoranthene	ND	0.1		1		03/18/02 20:37	YN	1065584
Fluorene	ND	0.1		1		03/18/02 20:37	YN	1065584
Indeno(1,2,3-cd)pyrene	ND	0.1		1		03/18/02 20:37	YN	1065584
Naphthalene	ND	0.1		1		03/18/02 20:37	YN	1065584
Phenanthrene	ND	0.1	-77-3-1	1		03/18/02 20:37	YN	1065584
Pyrene	ND	0.1		1		03/18/02 20:37	YN	1065584
Surr: 1-Fluoronaphtha	alene 73.3	% 15-96		1		03/18/02 20:37	YN	1065584
Surr: Phenanthrene-c	110 73.8	% 33-108		1		03/18/02 20:37	YN.	1065584
Prep Method	Prep Date	Prep Initial	s					
SW3510B	03/15/2002 15:01	DB		•				
PURGEABLE AROMA	TICS		MCL	SW8	021B	Units: ug	1/L	
Benzene	ND	1		1		03/14/02 22:22	DL	1062026
Ethylbenzene	ND	1	4.1.	1		03/14/02 22:22	DL	1062026
Toluene	ND	<u></u>			****	03/14/02 22:22	DL	1062026
Xylenes,Total	ND	1		<u></u>		03/14/02 22:22	DL	1062026
		0/ 10 150		<u>-</u>		20111100 00 00		

PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/L	
Benzene	ND		1		1	03/14/02 22:22	DL	1062026
Ethylbenzene	ND		1		1	03/14/02 22:22	DL	1062026
Toluene	ND		1		1	03/14/02 22:22	DL	1062026
Xylenes,Total	ND		1		1	03/14/02 22:22	DL	1062026
Surr: 4-Bromofluorobenzene	103	%	48-156		1	03/14/02 22:22	DL	1062026
Surr: 1,4-Difluorobenzene	99.6	%	72-137		1	03/14/02 22:22	DL	1062026
SULFATE				MCL	E300	Units: mo	1/L	
Sulfate	120		4		20	03/14/02 11:34	ES	1068030

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



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

Client Sample ID MW-7

Collected: 03/12/2002 10:34

SPL Sample ID:

02030425-02

Site:	Hobbs,	NM
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			310	e. Hot	JDS,IVIVI				
Analyses/Method	Result		Rep.Limit		Dil. Factor QU	AL Dat	e Analyzed	Analyst	Seq. #
ALKALINITY, BICARBONATE				MCL	M2320	В	Units: m	ıg/L	
Alkalinity, Bicarbonate	260		2		1	03/	15/02 15:30	SN	1070456
ALKALINITY, CARBONATE				MCL	M2320	B	Units: m	ıg/L	
Alkalinity, Carbonate	ND		2		1	03/	15/02 15:30		1070514
CHLORIDE, TOTAL				MCL	E325	.3	Units: m	ıq/L	
Chloride	188		2		2	03/	14/02 11:00	CV	1061398
FLUORIDE-IC				MCL	E30	00	Units: m	ıg/L	
Fluoride	1.3		0.1		1	03/	13/02 11:55	ES	1067970
GASOLINE RANGE ORGANICS				MCL	SW8015	В	Units: m	ıq/L	
Gasoline Range Organics	ND		0.1		1	03/	14/02 21:57	DL	1062070
Surr: 1,4-Difluorobenzene	101	%	74-121		1	03/	14/02 21:57	DL	1062070
Surr: 4-Bromofluorobenzene	96.0	%	55-150		1	03/	14/02 21:57	DL	1062070
NITROGEN, NITRATE (AS N)				MCL	E30	0	Units: m	g/L	
Nitrogen, Nitrate (As N)	3.23		0.1		1	03/	13/02 11:55	ES	1064684
PURGEABLE AROMATICS				MCL	SW8021	В	Units: ug	g/L	
Benzene	ND		1		1	03/	14/02 21:57	DL	1062025
Ethylbenzene	ND		1	,	1	03/	14/02 21:57	DL	1062025
Toluene	ND		1		1	03/	14/02 21:57	DL	1062025
Xylenes,Total	ND		1		1	03/	14/02 21:57	DL	1062025
Surr: 4-Bromofluorobenzene	102	%	48-156		1	03/	14/02 21:57	DL	1062025
Surr: 1,4-Difluorobenzene	101	%	72-137		1	03/	14/02 21:57	DL	1062025
SULFATE				MCL	E30	0	Units: m	g/L	
Sulfate	240		4		20	03/	14/02 11:34	ES	1068033

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



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

Client Sample ID MW-8 Collected: 03/12/2002 10:19 SPL Sample ID: 02030425-03

				Site	: Hob	obs,NM				
Analyses/Method		Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
ALKALINITY, BICA	RBONATE				MCL	M23	320 B	Units: m	g/L	
Alkalinity, Bicarbonat	е	340		2		1		03/15/02 15:30	SN	1070457
ALKALINITY, CARE	BONATE				MCL	M23	320 B	Units: m	g/L	
Alkalinity, Carbonate		ND		2		1		03/15/02 15:30	SN	1070515
CHLORIDE, TOTAL				/***	MCL	E	325.3	Units: m	g/L	
Chloride		241		5		5		03/14/02 11:00	CV	1061403
DIESEL RANGE OR	GANICS				MCL	SW8	015B	Units: m	q/L	
Diesel Range Organi	cs	0.38		0.25		1		03/19/02 5:10	AR	1068839
Surr: n-Pentacosa	ne	102	%	18-120		1		03/19/02 5:10	AR	1068839
Prep Method	Prep Date			Prep Initials						
SW3510B	03/14/2002 1	2:11		KL						
FLUORIDE-IC					MCL		E300	Units: m	g/L	
Fluoride		1.1		0.1		1		03/13/02 11:55	ES	1067971
GASOLINE RANGE	ORGANICS				MCL	SW8	015B	Units: m	g/L	
Gasoline Range Orga	nics	ND		0.1		1		03/14/02 21:31	DL	1062069
Surr: 1,4-Difluorob	enzene	101	%	74-121		1	-	03/14/02 21:31	DL	1062069
Surr: 4-Bromofluor	obenzene	96.3	%	55-150		1		03/14/02 21:31	DL	1062069
NUTDOOFN NUTDAT	-				1101		<b></b>	11-24	//	

GAGGENTE MANGE GRIGARINGS				1110	01100100	Omito. m	9-	
Gasoline Range Organics	ND		0.1		1	03/14/02 21:31	DL	1062069
Surr: 1,4-Difluorobenzene	101	%	74-121		1	03/14/02 21:31	DL	1062069
Surr: 4-Bromofluorobenzene	96.3	%	55-150		1	03/14/02 21:31	DL	1062069
NITROGEN, NITRATE (AS N)				MCL	E300	Units: m	g/L	
Nitrogen, Nitrate (As N)	0.607		0.1		1	03/13/02 11:55	ES	1064685
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	g/L	
Benzene	ND		1		1	03/14/02 21:31	DL	1062024
Ethylbenzene	ND		1		1	03/14/02 21:31	DL	1062024
Toluene	ND		1		1	03/14/02 21:31	DL	1062024
Xylenes,Total	ND		1		1	03/14/02 21:31	DL.	1062024
Surr: 4-Bromofluorobenzene	102	%	48-156		1	03/14/02 21:31	DL	1062024
Surr: 1,4-Difluorobenzene	99.1	%	72-137		1	03/14/02 21:31	DL	1062024
SULFATE		= ==		MCL	E300	Units: m	g/L	
Sulfate	250		4		20	03/14/02 11:34	ES	1068034

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



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

Client Sample ID Trip Blank-2 Collected: 03/12/2002 0:00 SPL Sample ID: 02030425-04

Site: Hobbs,NM

Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organics	ND		0.1		1	03/14/02 21:06	DL	1062068
Surr: 1,4-Difluorobenzene	101	%	74-121		1	03/14/02 21:06	DL	1062068
Surr: 4-Bromofluorobenzene	95.7	%	55-150		1	03/14/02 21:06	DL	1062068
PURGEABLE AROMATICS				MCL	SW8021B	Units: uç	3/L	
Benzene	ND		1		1	03/14/02 21:06	DL	1062023
Ethylbenzene	ND		1		1	03/14/02 21:06	DL	1062023
Toluene	ND		1		1	03/14/02 21:06	DL	1062023
Xylenes,Total	ND		1		1	03/14/02 21:06	DL	1062023
Surr: 4-Bromofluorobenzene	102	%	48-156		1	03/14/02 21:06	DL	1062023
Surr: 1,4-Difluorobenzene	98.0	%	72-137		1	03/14/02 21:06	DL	1062023

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

# Quality Control Documentation



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

# **Brown & Caldwell** BJ Hobbs 12832-017

Analysis:

**Diesel Range Organics** 

Method:

SW8015B

Samples in Analytical Batch:

WorkOrder:

02030425

Lab Batch ID:

18664

Method Blank

RunID:

HP\_T\_020318B-1068833

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date: Preparation Date:

03/18/2002 20:02 03/14/2002 12:11

Analyst: AR Prep By: KL

Method SW3510B

02030425-01B 02030425-03B

MW-5

MW-8

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20
Surr: n-Pentacosane	70.2	18-120

#### **Laboratory Control Sample (LCS)**

RunID:

HP\_T\_020318B-1068834

Units:

mg/L

Analysis Date:

03/18/2002 20:38

Analyst: AR

Preparation Date: 03/14/2002 12:11

Prep By: KL

Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	1.7	66	21	175

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

Sample Spiked:

02030441-02

RunID:

HP\_T\_020318B-1068836

Units:

mg/L

Analysis Date:

03/18/2002 22:28

AR Analyst:

Preparation Date:

03/14/2002 12:11

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	0.078	5	3.4	66.2	5	3.4	66.0	0.248	39	13	130

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 10:51:44 AM



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

# **Brown & Caldwell** BJ Hobbs 12832-017

Analysis:

Headspace Gas Analysis

VARC\_020322A-1070780

Method:

RunID:

**RSK147** 

WorkOrder:

02030425

Lab Batch ID:

R55822

Method Blank

Units: mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

03/22/2002 9:34

Analyst: ER

02030425-01G

Samples in Analytical Batch:

MW-5

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

# Sample Duplicate

Original Sample:

02030428-03

RunID:

VARC\_020322A-1070784

Units:

mg/L

Analysis Date:

03/22/2002 10:52

ER Analyst:

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	0.0044	0.0049	11	50
Propane	ND	ND	0	50
Propylene	ND	ND	0	50

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 10:52:07 AM



# **Brown & Caldwell** BJ Hobbs 12832-017

Analysis:

**Purgeable Aromatics** 

SW8021B Method:

WorkOrder:

Samples in Analytical Batch:

02030425

Lab Batch ID:

R55390

Method Blank

RuniD:

Analysis Date:

HP\_U\_020314A-1062017

Units:

Analyte

ug/L

Lab Sample ID

Client Sample ID

03/14/2002 17:18

Analyst: DL 02030425-01A 02030425-02A

MW-5

MW-7

02030425-03A

MW-8

02030425-04A

Trip Blank-2

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	99.0	72-130	
Surr: 4-Bromofluorobenzene	100.5	70-130	

#### **Laboratory Control Sample (LCS)**

RunID:

HP\_U\_020314A-1062016

Units:

ug/L

Analysis Date:

03/14/2002 16:27

Analyst: DL

Spike Result Percent Lower Upper Added Recovery Limit Limit 50 48 97 70

130 Benzene 70 Ethylbenzene 50 50 99 130 Toluene 50 49 70 130 98 Xylenes,Total 150 146 97 70 130

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

Sample Spiked:

02030425-01

RunID:

HP\_U\_020314A-1062018

Units:

ug/L DL

Analysis Date:

03/14/2002 17:43

Analyst:

Analyte Sample MS MS MS % MSD MSD MSD % **RPD** RPD Low High Result Spike Result Recovery Spike Result Recovery Limit Limit Limit Added Added Benzene ND 20 19 92.9 20 19 95.7 3.01 21 32 164 Ethylbenzene ND 20 19 93.8 20 19 96.4 2.76 19 52 142 20 20 97.4 ND 19 93.9 19 3.61 20 38 Toluene 159 ND 60 56 95.0 ylenes,Total 93.3 60 57 1.77 18 53 144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 10:52:32 AM



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

#### **Brown & Caldwell** BJ Hobbs 12832-017

Analysis:

RunID:

**Gasoline Range Organics** 

Method:

Analysis Date:

SW8015B

WorkOrder:

02030425

Lab Batch ID:

R55392

Method Blank

HP\_U\_020314B-1062062

03/14/2002 17:18

Units:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analyst: DL

02030425-01A

MW-5

02030425-02A

MW-7

02030425-03A

MW-8

02030425-04A

Trip Blank-2

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr. 1,4-Difluorobenzene	103.0	74-121
Surr: 4-Bromofluorobenzene	96.3	55-150

#### **Laboratory Control Sample (LCS)**

RunID:

HP\_U\_020314B-1062061

Units:

mg/L

Analysis Date:

03/14/2002 16:52

Analyst:

DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.72	72	70	130

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

Sample Spiked:

02030425-02

RunID:

HP\_U\_020314B-1062063

Units: mg/L

Analysis Date:

03/14/2002 18:33

Analyst: DL

MS MS MSD High Sample MS % MSD MSD % RPD RPD Low Analyte Result Spike Result Recovery Spike Result Recovery Limit Limit Limit Added Added ND 98.3 Gasoline Range Organics 0.9 0.88 98.2 0.9 0.88 0.0904 36 36 160

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 10:52:57 AM



#### **HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

# **Brown & Caldwell**

Analysis:

**Polynuclear Aromatic Hydrocarbons** 

Method:

RunID:

SW8310

BJ Hobbs 12832-017

WorkOrder:

02030425

Lab Batch ID:

18700

Method Blank

2\_020318A-1065578

Units:

ug/L

Lab Sample ID 02030425-01C

Samples in Analytical Batch:

Client Sample ID

Analysis Date: Preparation Date: 03/18/2002 13:38

03/15/2002 15:01

Analyst: ΥN Prep By: DB

Method SW3510B

MW-5

Analyte	Result	Rep Limit
Acenaphthene	ND	0.10
Acenaphthylene	ND	0.10
Anthracene	ND	0.10
Benz(a)anthracene	ND 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	74.5	15-96
Surr: Phenanthrene-d10	74.8	33-108

#### **Laboratory Control Sample (LCS)**

RunID:

2\_020318A-1065579

Units:

ug/L

Analysis Date:

03/18/2002 14:16

Analyst: ΥN

Preparation Date:

03/15/2002 15:01

Prep By: DB

Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Acenaphthene	0.5	0.34	68	45	97
Acenaphthylene	0.5	0.37	73	42	122
Anthracene	0.5	0.32	64	42	106
Benz(a)anthracene	0.5	0.36	72	49	119
Benzo(a)pyrene	0.5	0.35	69	54	105
Benzo(b)fluoranthene	0.5	0.36	73	48	127
Benzo(g,h,i)perylene	0.5	0.38	77	39	107
Benzo(k)fluoranthene	0.5	0.36	71	53	119
Chrysene	0.5	0.34	68	51	144
Dibenzo(a,h)anthracene	0.5	0.39	78	40	114
Fluoranthene	0.5	0.34	68	45	126
Fluorene	0.5	0.34	69	46	107
Indeno(1,2,3-cd)pyrene	0.5	0.39	77	45	109

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference

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.



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

# Brown & Caldwell BJ Hobbs 12832-017

Analysis: Method: Polynuclear Aromatic Hydrocarbons

SW8310

WorkOrder:

02030425

Lab Batch ID:

18700

#### Laboratory Control Sample (LCS)

RuniD:

2\_020318A-1065579

Units:

ug/L

Analysis Date:

03/18/2002 14:16

Analyst: YN

Preparation Date: 03/15/2002 15:01

Prep By: DB

Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Naphthalene	0.5	0.33	66	44	90
Phenanthrene	0.5	0.35	69	47	128
Pyrene	0.5	0.35	70	51	135

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

Sample Spiked:

02030427-01

2\_020318A-1065586

6

Units: ug/L

Analysis Date:

Preparation Date:

RunID:

03/18/2002 21:53 03/15/2002 15:01 Analyst: YN

Prep By: DB 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
Acenaphthene	ND	0.5	0.25	49.3	0.5	0.23	45.4	8.21	30	1	124
Acenaphthylene	ND	0.5	0.25	50.7	0.5	0.23	46.5	8.79	30	1	139
Anthracene	ND	0.5	0.24	47.3	0.5	0.22	44.2	6.81	30	1	126
Benz(a)anthracene	ND	0.5	0.28	56.4	0.5	0.27	53.4	5.43	30	12	135
Benzo(a)pyrene	ND	0.5	0.27	54.4	0.5	0.26	51.4	5.65	30	1	128
Benzo(b)fluoranthene	ND	0.5	0.28	57.0	0.5	0.27	53.9	5.51	30	6	150
Benzo(g,h,i)perylene	ND	0.5	0.3	59.3	0.5	0.28	55.8	6.05	30	1	116
Benzo(k)fluoranthene	ND	0.5	0.28	56.2	0.5	0.27	53.1	5.68	30	5	159
Chrysene	ND	0.5	0.27	53.5	0.5	0.25	50.4	5.92	30	1	199
Dibenzo(a,h)anthracene	ND	0.5	0.31	61.2	0.5	0.29	57.8	5.71	30	1	110
Fluoranthene	ND	0.5	0.26	52.1	0.5	0.25	49.1	6.01	30	14	123
Fluorene	ND	0.5	0.26	51.0	0.5	0.24	47.2	7.75	30	1	142
Indeno(1,2,3-cd)pyrene	ND	0.5	0.29	57.0	0.5	0.27	53.5	6.46	30	1	116
Naphthalene	ND	0.5	0.24	47.4	0.5	0.22	44.1	7.22	30	1	122
Phenanthrene	ND	0.5	0.26	51.1	0.5	0.24	47.7	6.81	30	1	155
Pyrene	ND	0.5	0.28	56.4	0.5	0.27	53.1	5.98	30	1	140

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 10:53:19 AM



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

#### **Brown & Caldwell** BJ Hobbs 12832-017

Analysis:

RuniD:

Metals by Method 6010B, Total

Method: SW6010B WorkOrder:

Samples in Analytical Batch:

02030425

Lab Batch ID:

18657

Method Blank

TJA\_020318F-1068520

Units: mg/L

NS

Lab Sample ID

Client Sample ID

Analysis Date:

03/19/2002 1:59

Analyst:

02030425-01D

MW-5

Preparation Date:

03/14/2002 7:30

Prep By: MW Method SW3010A

Analyte	Result	Rep Limit
Barium	ND	0.005
Cadmium	ND	0.005
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\_020318F-1068521

Units:

mg/L

Analysis Date:

03/19/2002 2:05

Analyst: NS

Preparation Date: 03/14/2002 7:30 Prep By: MW Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Barium	1	0.895	90	80	120
Cadmium	1	0.957	96	80	120
Chromium	1	0.999	100	80	120
Magnesium	1	0.974	97	80	120
Potassium	10	10.1	101	80	120
Silver	1	0.971	97	80	120
Sodium	1	0.958	96	80	120

#### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked:

02030442-05

RunID:

TJA\_020318F-1068526

Units:

mg/L

Analysis Date:

03/19/2002 2:36

Analyst:

NS

reparation Date:

03/14/2002 7:30

Prep By:

Method

Analyte	Sample Result	PDS Spike Added	PDS Result	PDS % Recovery	PDSD Spike Added	PDSD Result	PDSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Magnesium	69.3	1	71.1	171 *	1	70	64.1 *	91.2 *	20	75	125
otassium	57.5	10	69.3	118	10	68.9	114	3.2	20	75	125
Sodium	125	1	125	34.2 *	1	121	-340 *	245 *	20	75	125

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

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 10:53:39 AM



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

#### **Brown & Caldwell** BJ Hobbs 12832-017

Analysis:

Metals by Method 6010B, Total

RunID:

SW6010B Method:

WorkOrder:

02030425

Lab Batch ID:

18657

Sample Spiked:

02030442-05

TJA\_020318F-1068523

Units:

mg/L

Analysis Date:

03/19/2002 2:17

Analyst: NS

Preparation Date:

03/14/2002 7:30

Prep By: MW 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	1.06	84.8	1	1.14	92.5	8.59	20	75	125
Cadmium	ND	1	0.914	91.4	1	0.941	94.1	2.89	20	75	125
Chromium	ND	1	0.918	91.8	1	0.963	96.3	4.75	20	75	125
Magnesium	69	1	63.2	-618 *	1	67.3	-204 *	101 *	20	75	125
Potassium	58	10	64.8	72.7 *	10	67.1	96.2	27.9 *	20	75	125
Silver	ND	1	0.946	94.6	1	0.965	96.5	1.99	20	75	125
Sodium	120	1	113	-1160 *	1	123	-225 *	135 *	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

J - Estimated value between MDL and PQL

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

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.

3/25/02 10:53:39 AM



## HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

#### **Brown & Caldwell** BJ Hobbs 12832-017

Analysis:

RunID:

Metals by Method 6010B, Total

SW6010B Method:

WorkOrder:

Samples in Analytical Batch:

02030425

Lab Batch ID:

18657-T

Method Blank

TJAT\_020314B-1062837

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

03/14/2002 23:57

Analyst:

JS

02030425-01D

MW-5

Preparation Date:

03/14/2002 7:30

Prep By: MW Method SW3010A

Analyte	Result	Rep Limit
Arsenic	ND	0.005
Lead	ND	0.005
Selenium	ND	0.005

Preparation Date:

#### **Laboratory Control Sample (LCS)**

RunID:

TJAT\_020314B-1062838

Units: mg/L

Analysis Date:

03/15/2002 0:03 03/14/2002 7:30 Analyst: JS Prep By:

MW Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Arsenic	1	0.995	99	80	120
Lead	1	0.978	98	80	120
Selenium	1	1.01	101	80	120

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

Sample Spiked:

02030442-05

RunID:

TJAT\_020314B-1062840

Units:

Analysis Date:

03/15/2002 0:17

mg/L Analyst: JS

Preparation Date:

03/14/2002 7:30

Prep By: MW 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
rsenic	0.014	1,	0.997	98.3	1	1.03	101	3.16	20	75	125
ead	, ND	1	0.907	90.4	1	0.949	94.6	4.48	20	75	125
Selenium	ND	1	0.991	99.1	1	1.03	103	4.31	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 10:54:01 AM



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

#### **Brown & Caldwell** BJ Hobbs 12832-017

Analysis:

RunID:

Metals by Method 6010B, Total

SW6010B Method:

WorkOrder:

02030425

Lab Batch ID:

18657A

**Method Blank** 

TJA\_020320D-1069137

Units:

mg/L

NS

Lab Sample ID

Client Sample ID

Analysis Date:

03/21/2002 0:15

Analyst:

02030425-01D

MW-5

Preparation Date:

03/14/2002 7:30

Prep By:

MW Method SW3010A

Samples in Analytical Batch:

Result | Rep Limit Analyte Calcium ND 0.1 ND Sodium 0.5

#### **Laboratory Control Sample (LCS)**

RunID:

TJA\_020320D-1069138

Units:

mg/L

Analysis Date:

03/21/2002 0:21

Analyst: NS

Preparation Date: 03/14/2002 7:30

Prep By: MW Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Calcium	1	0.965	96	80	120
Sodium	1	1.04	104	80	120

#### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked:

02030442-05

RunID: Analysis Date: TJA\_020320D-1069143

Units:

mg/L

03/21/2002 0:52

Analyst: NS

Preparation Date: 03/14/2002 7:30 Prep By:

Method

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	145	1	145	-6.6 *	1	143	-190 *	187 *	20	75	125
Sodium	126	1	124	-210 *	1	125	-110 *	66.7 *	20	75	125

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

Sample Spiked:

02030442-05

TJA\_020320D-1069140

Units: mg/L

Analysis Date:

RunID:

03/21/2002 0:34

Analyst: NS

Preparation Date:

03/14/2002 7:30

Prep By: MW Method SW3010A

Analyte	Sample	MS	MS	MS %	MSD	MSD	MSD %	RPD	RPD	Low	High
	Result	Spike Added	Result	Recovery	Spike Added	Result	Recovery		Limit	Limit	Limit
		l :									

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 10:54:21 AM



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

# **Brown & Caldwell**

Analysis:

Metals by Method 6010B, Total

Method: SW6010B BJ Hobbs 12832-017

WorkOrder:

02030425

Lab Batch ID:

18657A

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

Sample Spiked:

02030442-05

RunID:

TJA\_020320D-1069140

Units:

mg/L

Analysis Date:

03/21/2002 0:34

NS Analyst:

Preparation Date:

03/14/2002 7:30

Prep By: MW 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	140	1	137	-757 *	1	139	-539 *	33.6 *	20	75	125
Sodium	130	1	118	-722 *	1	119	-703 *	2.62	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

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.

3/25/02 10:54:21 AM



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

#### **Brown & Caldwell** BJ Hobbs 12832-017

Analysis:

RunID:

Mercury, Total

SW7470A Method:

Samples in Analytical Batch:

WorkOrder:

02030425

Lab Batch ID:

18720

Method Blank

HGL\_020315B-1063715

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

03/15/2002 12:50

Analyst:

02030425-01D

MW-5

Preparation Date:

03/15/2002 9:30

R\_T

Prep By: R\_T Method SW7470A

Analyte	Result	Rep Limit
Mercury	ND	0.0002

#### **Laboratory Control Sample (LCS)**

RunID:

HGL\_020315B-1063717

Units:

mg/L

Analysis Date: Preparation Date:

03/15/2002 12:50 03/15/2002 9:30

Analyst:  $R_T$ 

Prep By: R\_T Method SW7470A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Mercury	0.002	0.00212	106	80	120

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

Sample Spiked:

02030325-01

RunID:

HGL\_020315B-1063719

Units:

Analysis Date:

03/15/2002 12:50

mg/L R\_T Analyst:

Preparation Date: 03/15/2002 9:30 Prep By: R\_T 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	0.00202	101	0.002	0.0022	110	8.53	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 10:54:45 AM



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

# Brown & Caldwell

Analysis:

Chloride, Total

Method:

E325.3

BJ Hobbs 12832-017

WorkOrder:

02030425

Lab Batch ID:

R55362

Method Blank

RunID:

WET\_020314A-1061384

Units:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

03/14/2002 11:00

Analyst: CV

02030425-01E

MW-5

02030425-02E

MW-7

02030425-03E

MW-8

Analyte	Result	Rep Limit
Chloride	ND	1.0

#### Laboratory Control Sample (LCS)

RunID:

WET\_020314A-1061386

Units:

mg/L

Analysis Date:

03/14/2002 11:00

Analyst:

CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Chloride	143	140	98	90	110

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

Sample Spiked:

02030254-01

RunID:

WET\_020314A-1061388

Units:

: mg/L

Analysis Date:

03/14/2002 11:00

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	6.9	50	56	98.2	50	56.9	99.9	1.74	20	85	115

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference

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.

3/25/02 10:55:08 AM



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

#### **Brown & Caldwell** BJ Hobbs 12832-017

Analysis:

Nitrogen, Nitrate (As N)

Method:

E300

WorkOrder:

02030425

Lab Batch ID:

R55540

Method Blank

RunID:

WET\_020313S-1064679

Units:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Analysis Date:

03/13/2002 11:55

Analyst: ES

02030425-01E

Client Sample ID MW-5

02030425-02E

MW-7

02030425-03E

8-WM

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

#### Laboratory Control Sample (LCS)

RunID:

WET\_020313S-1064680

Units:

mg/L

Analysis Date:

03/13/2002 11:55

Analyst: ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.46	95	90	110

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

Sample Spiked:

02030425-01

RunID:

WET\_020313S-1064682

Units:

mg/L ES

Analysis Date:

03/13/2002 11:55

Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	
Nitrogen, Nitrate (As N)	3.0	10	12.6	95.9	10	12.6	95.7	0.271	20	76	124	

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 10:55:31 AM



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

#### **Brown & Caldwell** BJ Hobbs 12832-017

Analysis: Method:

RunID:

Analysis Date:

Fluoride-IC

E300

WorkOrder:

02030425

Lab Batch ID:

R55674

Method Blank

WET\_020313T-1067964

03/13/2002 11:55

Units:

Analyst:

mg/L ES

Lab Sample ID

Samples in Analytical Batch:

**Client Sample ID** 

02030425-01E

MW-5

02030425-02E

MW-7

02030425-03E

MW-8

Analyte	Result	Rep Limit
Fluoride	ND	0.10

#### Laboratory Control Sample (LCS)

RuniD:

WET\_020313T-1067965

Units:

mg/L

Analysis Date:

03/13/2002 11:55

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:

02030425-01

RunID:

WET\_020313T-1067967

Units:

mg/L

Analysis Date:

03/13/2002 11:55

ES Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Fluoride	1.4	10	9.8	84.1	10	9.7	82.4	1.97		80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference

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.

3/25/02 10:55:53 AM



**HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

#### **Brown & Caldwell** BJ Hobbs 12832-017

Analysis: Method:

Sulfate

E300

WorkOrder:

02030425

Lab Batch ID:

R55679

Method Blank

RunID: Analysis Date: WET\_020314S-1068028

Units:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

03/14/2002 11:34

Analyst: ES

02030425-01E

MW-5

02030425-02E

MW-7

02030425-03E

MW-8

Analyte	Result	Rep Limit
Sulfate	ND	0.20

#### **Laboratory Control Sample (LCS)**

RunID:

WET\_020314S-1068029

Units:

mg/L

Analysis Date: 03/14/2002 11:34 Analyst: ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sulfate	10	9.9	99	90	110

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

Sample Spiked:

02030425-01

RunID:

WET\_020314S-1068031

Units:

mg/L

Analysis Date:

03/14/2002 11:34

ES Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Sulfate	120	200	310	94.9	200	310	94.1	0.809	20		120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 10:56:14 AM



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

# **Brown & Caldwell**

BJ Hobbs 12832-017

Analysis:

RunID:

Hardness, Total (Titrimetric, EDTA)

Method:

E130.2

WorkOrder:

02030425

Lab Batch ID:

R55701

Method Blank

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

WET\_020319U-1068403

Analyst:

Units:

03/19/2002 11:45

CV

02030425-01D

MW-5

Analyte	Result	Rep Limit
Hardness (As CaCO3)	ND	5.0

#### Laboratory Control Sample (LCS)

RunID:

WET\_020319U-1068405

Units:

mg/L

Analysis Date:

03/19/2002 11:45

Analyst:

CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Hardness (As CaCO3)	202	200	101	94	108

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

Sample Spiked:

02030425-01

RunID:

WET\_020319U-1068407

Units:

mg/L

Analysis Date:

03/19/2002 11:45

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)	420	500	920	100	500	920	100	0	20	81	111

Qualifiers:

ND/U - Not Detected at the Reporting Limit

J - Estimated value between MDL and PQL

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

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.

3/25/02 10:56:34 AM



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

#### **Brown & Caldwell** BJ Hobbs 12832-017

Analysis:

RunID:

Alkalinity, Bicarbonate

Method:

Analysis Date:

M2320 B

WorkOrder:

02030425

Lab Batch ID:

R55803

**Method Blank** 

WET\_020315S-1070451

03/15/2002 15:30

Units: Analyst:

mg/L SN

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02030425-01F

MW-5

02030425-02E

MW-7

02030425-03E

**MW-8** 

Analyte	Result	Rep Limit
Alkalinity, Bicarbonate	ND	2.0

#### **Laboratory Control Sample (LCS)**

RunID:

Analysis Date:

WET\_020315S-1070453

Units:

mg/L

03/15/2002 15:30

Analyst:

SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Alkalinity, Bicarbonate	80.3	80	100	90	110

#### Sample Duplicate

Original Sample:

02030425-01

RunID:

WET\_020315S-1070454

Units:

mg/L

Analysis Date:

03/15/2002 15:30

Analyst: SN

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Bicarbonate	260	260	0	20

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference

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.

3/25/02 10:56:54 AM



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

# Brown & Caldwell BJ Hobbs 12832-017

Analysis:

Alkalinity, Carbonate

Method:

M2320 B

3J MODDS 12832-U17

WorkOrder:

02030425

Lab Batch ID:

R55804

Method Blank

RunID:

Analysis Date:

WET\_020315T-1070509 03/15/2002 15:30 Units: Analyst:

mg/L SN

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02030425-01F

MW-5

02030425-02E

MW-7

02030425-03E

MW-8

Analyte	Result	Rep Limit
Alkalinity, Carbonate	ND	2.0

#### **Laboratory Control Sample (LCS)**

RunID:

WET\_020315T-1070511

Units:

mg/L

Analysis Date:

03/15/2002 15:30

Analyst:

SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Alkalinity, Carbonate	80.3	80	100	90	110

#### **Sample Duplicate**

Original Sample:

02030425-01

RunID:

WET\_020315T-1070512

Units: mg/L

Analysis Date:

03/15/2002 15:30

Analyst: SN

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Carbonate	ND	ND	0	20

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference

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.

3/25/02 10:57:17 AM

# Sample Receipt Checklist And Chain of Custody

\* " Z



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

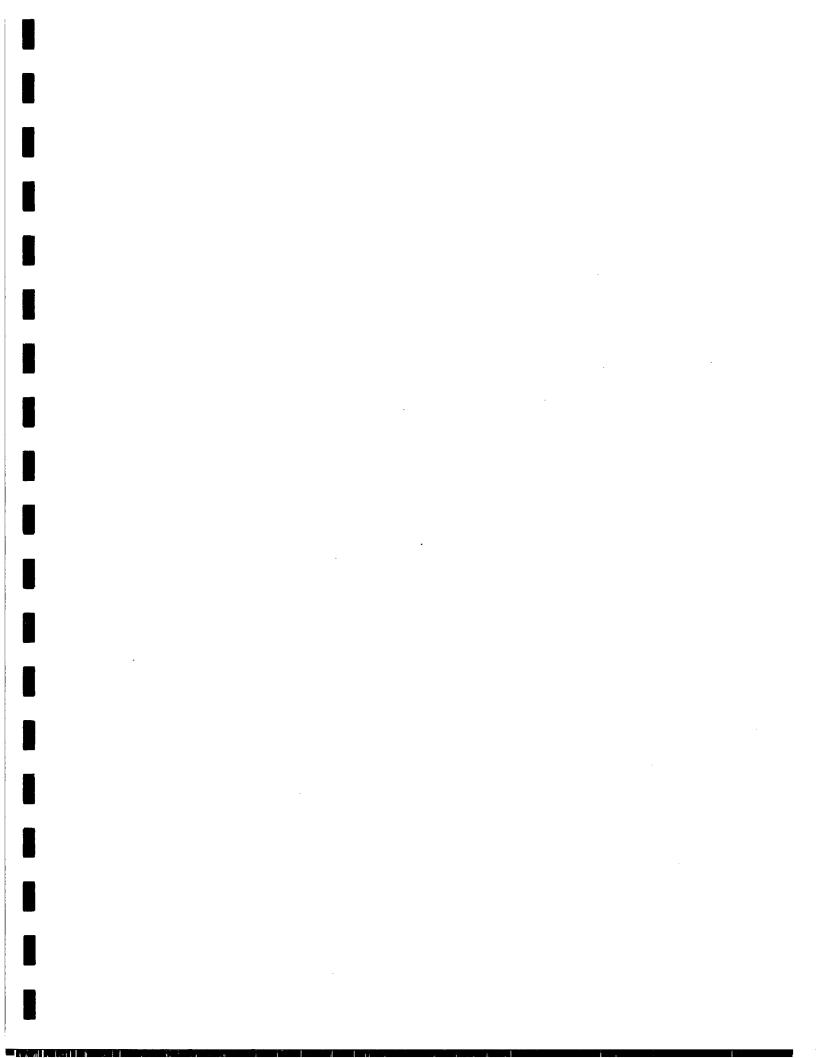
## Sample Receipt Checklist

1 11 1

w	orkorder:	02030425		Receive	ed By:	RE	
Da	ate and Time Received:	3/13/02 10:00:00 AM		Carrier	name:	FedEx	
Те	emperature:	4		Chilled	by:	Water Ice	
1.	Shipping container/co	poler in good condition?	Yes 🗹	No 🗌	Not Prese	ent 🗌	
2.	Custody seals intact of	on shippping container/cooler?	Yes 🗹	No 🗀	Not Prese	ent 🗌	
3.	Custody seals intact of	on sample bottles?	Yes	No 🗌	Not Prese	ent 🗹	
4.	Chain of custody pres	eent?	Yes 🗹	No 🗌			
5.	Chain of custody sign	ed when relinquished and received?	Yes 🗹	No 🗌			
6.	Chain of custody agre	ees with sample labels?	Yes 🗹	No 🗌			
7.	Samples in proper co	ntainer/bottle?	Yes 🗹	No 🗌			
8.	Sample containers int	act?	Yes 🗹	No 🗌			
9.	Sufficient sample volu	ume for indicated test?	Yes 🗹	No 🗌			
10.	All samples received v	within holding time?	Yes 🗹	No 🗌			
11.	Container/Temp Blank	temperature in compliance?	Yes 🗹	No 🗌			
12.	Water - VOA vials have	e zero headspace?	Yes 🗹	No 🗔	Not Applic	cable 🗌	
13.	Water - pH acceptable	upon receipt?	Yes 🗹	No 🗌	Not Applic	cable 🗌	
	SPL Representativ		Contact Date	& Time:			
	Non Conformance Issues:						
	Client Instructions:						

175/147

4 \*\* \*







#### **Brown & Caldwell**

#### **Certificate of Analysis Number:**

#### 02030428

Report To:

Brown & Caldwell

Rick Rexroad 1415 Louisiana Suite 2509

Houston

ΤX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

**Project Name:** 

BJ Hobbs- 12832-017

Site:

Hobbs, NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported:

4/3/02

# This Report Contains A Total Of 30 Pages

**Excluding This Page** 

And

Chain Of Custody



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

# Case Narrative for: Brown & Caldwell

#### **Certificate of Analysis Number:**

#### 02030428

**Report To:** 

Brown & Caldwell

Rick Rexroad

1415 Louisiana Suite 2509

Houston

TX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

Project Name:

BJ Hobbs- 12832-017

Site:

Hobbs, NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported:

4/3/02

Matrix spike (MS) and matrix spike duplicate (MSD) samples are chosen and tested at random from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. Since the MS and MSD are chosen at random from an analytical batch, the sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The Laboratory Control Sample (LCS) and the Method Blank (MB) are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

Any other 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.

Apria West

4/3/02

Senior Project Manager

Date



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

#### **Brown & Caldwell**

#### **Certificate of Analysis Number:**

#### 02030428

Report To:

Fax To:

**Brown & Caldwell** 

**Rick Rexroad** 

1415 Louisiana **Suite 2509** 

Houston

TX 77002-

ph: (713) 759-0999

fax: (713) 308-3886

Brown & Caldwell

Rick Rexroad

fax: (713) 308-3886

Project Name:

BJ Hobbs- 12832-017

Site:

Hobbs, NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

**Date Reported:** 

4/3/02

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD	

MW-9	02030428-01	Water	3/12/02 1:45:00 PM	3/13/02 10:00:00 AM	169962	
MW-10	02030428-02	Water	3/12/02 11:07:00 AM	3/13/02 10:00:00 AM	169962	
MW-11A	02030428-03	Water	3/12/02 11:48:00 AM	3/13/02 10:00:00 AM	169962	
Trip Blank-3	02030428-04	Water	3/12/02	3/13/02 10:00:00 AM	169962	

Somiallist Sonia West

4/3/02

Date

Senior Project Manager

Joel Grice Laboratory Director

Ted Yen Quality Assurance Officer



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

						(713) 000-090	1	
Client Sample ID MW	-9		Col	lected: 0	03/12/2002 13:45	SPL Sample II	D: 0200	30428-01
			Sit	e: Hob	obs, NM			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARB	ONATE			MCL	M2320 B	Units: m	g/L	
Alkalinity, Bicarbonate	260		2		1	03/15/02 15:30	SN	1070460
ALKALINITY, CARBOI	NATE			MCL	M2320 B	Units: mg	g/L	
Alkalinity, Carbonate	ND		2		1	03/15/02 15:30	SN	1070518
CHLORIDE, TOTAL				MCL	E325.3	Units: mg	g/L	
Chloride	110		2		2	03/18/02 14:30		1064793
DIESEL RANGE ORGA	ANICS			MCL	SW8015B	Units: mg	g/L	
Diesel Range Organics	0.37		0.26		1	03/18/02 13:20	AM	1068848
Surr: n-Pentacosane	86.6	%	18-120		1	03/18/02 13:20	AM	1068848
Prep Method	Prep Date		Prep Initials					
SW3510B	03/14/2002 12:18		KL					
FLUORIDE-IC				MCL	E300	Units: mg		
Fluoride	1.5		0.1		1		ES	1067976
GASOLINE RANGE O	RGANICS			MCL	SW8015B	Units: mg	q/L	
Gasoline Range Organic	s ND		0.1		1	03/15/02 3:01	DL	1062080
Surr: 1,4-Difluorobenz	zene 102	%	74-121		1 .	03/15/02 3:01	DL	1062080
Surr: 4-Bromofluorobe	enzene 100	%	55-150		1	03/15/02 3:01	DL	1062080
NITROGEN, NITRATE	(AS N)			MCL	E300	Units: mg	g/L	
Nitrogen, Nitrate (As N)	6.34		0.1		1	03/13/02 11:55	ES	1064690
PURGEABLE AROMA	TICS			MCL	SW8021B	Units: ug	/L	
Benzene	1		1		1	03/15/02 3:01	DL	1062034
Ethylbenzene	ND		1		1	03/15/02 3:01	DL	1062034
Toluene	ND		1		1	03/15/02 3:01	DL	1062034
Xylenes,Total	ND		1		1	03/15/02 3:01	DL	1062034
Surr: 4-Bromofluorobe	enzene 104	%	48-156		1	03/15/02 3:01	DL	1062034
Surr: 1,4-Difluorobenz	ene 99.3	%	72-137		1	03/15/02 3:01	DL	1062034

MCL

2

Qualifiers:

SULFATE

Sulfate

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

130

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

Units: mg/L

03/14/02 11:34 ES

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

E300

10

1068039



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

Client Sample ID MW-10 Collected: 03/12/2002 11:07 SPL Sample ID: 02030428-02

Cheft Sample is with	10			cicu.	70/12/2002 11.07	Of E Gample I	<b>D.</b> 0200	0-720-02
			Site	: Hol	bbs, NM			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARE	BONATE			MCL	M2320 B	Units: m	α/L	
Alkalinity, Bicarbonate	784		2		1	03/15/02 15:30		107046
ALKALINITY, CARBO	NATE			MCL	M2320 B	Unita: m	~/l	-
Alkalinity, Carbonate	ND		2	WICL	1	Units: m 03/15/02 15:30	SN	1070519
Aikairiity, Garbonate								1070313
CHLORIDE, TOTAL				MCL	E325.3	Units: m		
Chloride	861		10		10	03/18/02 14:30	CV	106479
DIESEL RANGE ORG	ANICS			MCL	SW8015B	Units: m	a/L	
Diesel Range Organics			1		5	03/18/02 13:57	AM	1068849
Surr: n-Pentacosane	144 MI	%	18-120		5 *	03/18/02 13:57	AM	1068849
Prep Method	Prep Date		Prep Initials					
SW3510B	03/14/2002 12:18		KL			and the second s	<b>48.</b>	,
FLUORIDE-IC				MCL	E300	Units: m	g/L	
Fluoride	1.8		0.1		1	03/13/02 11:55	ES	1067977
GASOLINE RANGE O	RGANICS			MCL	SW8015B	Units: m	a/l	
Gasoline Range Organi			0.1		1	03/15/02 2:36	DL DL	1062077
Surr: 1,4-Difluoroben		%	74-121		1	03/15/02 2:36	DL	1062077
Surr: 4-Bromofluorob	enzene 96.7	%	55-150		1	03/15/02 2:36	DL	1062077
HARDNESS, TOTAL (	TITRIMETRIC EDTA)			MCL	E130.2	Units: m	a/l	
Hardness (As CaCO3)	1200		120		25	03/19/02 11:45		1068411
MERCURY, TOTAL				MCL	SW7470A	Units: m	~/I	
Mercury	ND		0.0002	WICL	1 SW1470A	03/15/02 12:50		1063733
Wichcary			0.0002			00/10/02 12:00	'''	
Prep Method	Prep Date		Prep Initials					
SW7470A	03/15/2002 9:30		R_T					
METALS BY METHOD	0 6010B. TOTAL			MCL	SW6010B	Units: m	a/L	
Arsenic	0.286		0.005		1	03/15/02 2:00	JS	1062855
Lead	0.0234		0.005		1	03/15/02 2:00	JS	1062855
Selenium	ND		0.005		1	03/15/02 2:00	JS	1062855
Barium	0.294		0.005		1	03/19/02 3:52	NS	1068537
Cadmium	ND		0.005		1	03/19/02 3:52	NS	1068537
Calcium	303		0.1		1	03/21/02 1:44	NS	1069150
Chromium	0.0246		0.01		1	03/19/02 3:52	NS	1068537
Magnesium	97.6		0.1		1	03/19/02 3:52	NS	1068537
Potassium	18.8		2		1	03/19/02 3:52	NS	1068537
Silver	ND		0.01		1	03/19/02 3:52	NS	1068537
Cadium	EO4		4		0	02/21/02 1:52	NIC	1000151

Qualifiers:

Sodium

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

584

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

03/21/02 1:52 NS

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

1069151



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

03/14/02 11:34 ES

1068040

Client Sample ID MW-10	Collected: 03/12/2002 11:07	SPL Sample ID: 02030428-02

Client Sample ID MW	7-10			Colle	ctea: (	J3/12/2002 11:07	SPL Sample II	<b>)</b> ; 0203	30428-02
_				Site:	Hol	obs, NM			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
Prep Method	Prep Date			Prep Initials					
SW3010A	03/14/2002 7:30	)		MW					
NITROGEN, NITRATE	(AS N)				MCL	E300	Units: m	g/L	
Nitrogen, Nitrate (As N)	)	ND		0.1		1	03/13/02 11:55	ES	1064691
PURGEABLE AROMA	ATICS				MCL	SW8021B	Units: ug	/L	
Benzene		ND		1		1	03/15/02 2:36	DL.	1062033
Ethylbenzene		ND		1		1	03/15/02 2:36	DL	1062033
Toluene		ND		1		1	03/15/02 2:36	DL	1062033
Xylenes,Total		ND		1		1	03/15/02 2:36	DL	1062033
Surr: 4-Bromofluorob	enzene	104	%	48-156		1	03/15/02 2:36	DL	1062033
Surr: 1,4-Difluoroben	zene	99.4	%	72-137		1	03/15/02 2:36	DL	1062033
SULFATE					MCL	E300	Units: m	g/L	

4

Sulfate

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

230

- \* 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

20



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

Client Sample ID MW	-11A	·	Colle	cted: 0	03/12/2002 11:48	SPL Sample I	<b>D:</b> 0203	30428-03
			Site	: Hol	obs, NM			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
ALKALINITY, BICARB	ONATE			MCL	M2320 B	Units: m	g/L	
Alkalinity, Bicarbonate	520		2		1	03/15/02 15:30	SN	1070462
ALKALINITY, CARBOI	NATE			MCL	M2320 B	Units: m	g/L	
Alkalinity, Carbonate	ND		2		1	03/15/02 15:30		1070520
CHLORIDE, TOTAL				MCL	E325.3	Units: m	g/L	
Chloride	1230		25		25	03/18/02 14:30	CV	1064796
DIESEL RANGE ORGA	ANICS			MCL	SW8015B	Units: m	g/L	
Diesel Range Organics	1.6		1		5	03/18/02 14:33	AM	1068850
Surr: n-Pentacosane	127 MI	%	18-120		5 *	03/18/02 14:33	AM	1068850
Prep Method	Prep Date		Prep Initials					
SW3510B	03/14/2002 12:18		KL					
FLUORIDE-IC				MCL	E300	Units: m	a/L	
Fluoride	2.1		0.1		1	03/13/02 11:55	ES ES	1067978
GASOLINE RANGE OF	RGANICS		/	MCL	SW8015B	Units: m	a/L	
Gasoline Range Organic			0.1		1	03/15/02 2:10	DL DL	1062075
Surr: 1,4-Difluorobenz	ene 100	%	74-121		1	03/15/02 2:10	DL	1062075
Surr: 4-Bromofluorobe	enzene 93.3	%	55-150		1	03/15/02 2:10	DL	1062075
HARDNESS, TOTAL (T	TITRIMETRIC, EDTA)			MCL	E130.2	Units: m	g/L	
Hardness (As CaCO3)	1400		120		25	03/19/02 11:45	CV	1068412
HEADSPACE GAS AN	ALYSIS			MCL	RSK147	Units: m	g/L	
Ethane	ND		0.0025		1	03/22/02 10:52	ER	1070784
Ethylene	ND		0.0032		11	03/22/02 10:52	ER	1070784
Methane	0.0044		0.0012		1	03/22/02 10:52	ER	1070784
MERCURY, TOTAL				MCL	SW7470A	Units: m	g/L	
Mercury	ND		0.0002		1	03/15/02 12:50	R_T	1063734
Prep Method	Prep Date		Prep Initials					
SW7470A	03/15/2002 9:30		R_T					
METALS BY METHOD	6010B, TOTAL			MCL	SW6010B	Units: m	a/L	
Arsenic	0.086		0.005		1	03/15/02 2:06	JS	1062856
Lead	ND		0.005		1	03/15/02 2:06	JS	1062856
Selenium	ND		0.005		1	03/15/02 2:06	JS	1062856
Barium	0.348		0.005		1	03/19/02 3:58	NS	1068538
Cadmium	ND		0.005		1	03/19/02 3:58	NS	1068538
Calcium	330		0.1		1	03/21/02 1:58	NS	1069152
Chromium	0.023		0.01		1	03/19/02 3:58	NS	1068538

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



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

Client Sample ID MW-	11A		Colle	cted: 0	3/12/2002 1	1:48	SPL Sample ID: 02030428-03		
		_	Site	Hob	bs, NM				
Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	103		0.1		1		03/19/02 3:58	NS	106853
Potassium	41.5		2		1		03/19/02 3:58	NS	106853
Silver	ND		0.01		1		03/19/02 3:58	NS	106853
Sodium	660		1		2		03/21/02 2:06	NS	106915
Prep Method	Prep Date		Prep Initials						
SW3010A	03/14/2002 7:30		MW						
NITROGEN, NITRATE	(AS N)			MCL		E300	Units: m	g/L	
Nitrogen, Nitrate (As N)	ND		0.1		1			ES	106469
POLYNUCLEAR ARON	OLYNUCLEAR AROMATIC HYDROCARBON			MCL	SW	B310	Units: uç	<sub>3</sub> /L	
Acenaphthene	ND		0.1		1		03/18/02 23:09	YN	106559
Acenaphthylene	1.1		0.1		1		03/18/02 23:09	YN	106559
Anthracene	ND		0.1		1		03/18/02 23:09	YN	106559
Benz(a)anthracene	ND		0.1		1		03/18/02 23:09	YN	106559
Benzo(a)pyrene	ND		0.1		1		03/18/02 23:09	YN	106559
Benzo(b)fluoranthene	ND		0.1		1		03/18/02 23:09	YN	106559
Benzo(g,h,i)perylene	ND		0.1		. 1		03/18/02 23:09	YN	106559
Benzo(k)fluoranthene	ND		0.1		1		03/18/02 23:09	YN	106559
Chrysene	ND		0.1		1		03/18/02 23:09	YN	106559
Dibenzo(a,h)anthracene	ND		0.1		1		03/18/02 23:09	YN	106559
Fluoranthene	ND		0.1		1		03/18/02 23:09	YN	106559
Fluorene	0.1		0.1		1		03/18/02 23:09	YN	106559
Indeno(1,2,3-cd)pyrene	ND		0.1		1		03/18/02 23:09	YN	106559
Naphthalene	0.14		0.1		1		03/18/02 23:09	YN	106559
Phenanthrene	ND		0.1		1		03/18/02 23:09	YN	1065590
Pyrene	ND		0.1		1		03/18/02 23:09	YN	106559
Surr: 1-Fluoronaphthal	ene 80.7	%	15-96		1		03/18/02 23:09	YN	1065590
Surr: Phenanthrene-d1		%	33-108		1		03/18/02 23:09	YN	1065590
Prep Method	Prep Date		Prep Initials						
SW3510B	03/15/2002 15:01		DB						
PURGEABLE AROMAT	ics			MCL	SW80	21B	Units: ug	/L	
Benzene	1.8		1		1		03/15/02 2:10	DL	1062032
Ethylbenzene	ND		1		1		03/15/02 2:10	DL	1062032
Toluene	ND		1		1		03/15/02 2:10	DL	1062032
Xylenes,Total	1	_	1		1		03/15/02 2:10	DL	1062032
Surr: 4-Bromofluorobe	nzene 106	%	48-156		1		03/15/02 2:10	DL	1062032
Surr: 1,4-Difluorobenze		%	72-137		1		03/15/02 2:10	DL	1062032
SULFATE	1			MCL	E	300	Units: m	g/L	
Sulfate	350		4		20		03/14/02 11:34	ES	1068041

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



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

Client Sample ID Trip Blank-3

Collected: 03/12/2002 0:00

SPL Sample ID:

02030428-04

Site: Hobbs, NM	Site:	Hol	obs.	NM
-----------------	-------	-----	------	----

Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organics	ND		0.1		1	03/15/02 1:45	DL	1062074
Surr: 1,4-Difluorobenzene	101	%	74-121		1	03/15/02 1:45	DL	1062074
Surr: 4-Bromofluorobenzene	95.7	%	55-150		1	03/15/02 1:45	DL	1062074
PURGEABLE AROMATICS			***************************************	MCL	SW8021B	Units: ug/L		
Benzene	ND		1		1	03/15/02 1:45	DL	1062031
Ethylbenzene	ND		1		1	03/15/02 1:45	DL	1062031
Toluene	ND		1		1	03/15/02 1:45	DL	1062031
Xylenes,Total	ND		1		1	03/15/02 1:45	DL	1062031
Surr: 4-Bromofluorobenzene	102	%	48-156		1	03/15/02 1:45	DL	1062031
Surr: 1,4-Difluorobenzene	98.9	%	72-137		1	03/15/02 1:45	DL	1062031

ND/U - Not Detected at the Reporting Limit

 $\ensuremath{\mathsf{B}}$  - 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



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

#### **Brown & Caldwell** BJ Hobbs- 12832-017

Analysis:

RunID:

**Diesel Range Organics** 

Method: SW8015B WorkOrder:

02030428

Lab Batch ID:

Samples in Analytical Batch:

18665

Method Blank

HP\_B\_020318C-1068846

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date: Preparation Date:

03/18/2002 12:07 03/14/2002 12:18 Analyst: ΑM ΚL Prep By:

Method SW3510B

02030428-01B 02030428-02B

MW-9 MW-10

02030428-03B

MW-11A

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20
Surr: n-Pentacosane	73.2	18-120

#### **Laboratory Control Sample (LCS)**

RunID:

HP\_B\_020318C-1068847

Units:

mg/L

Analysis Date:

03/18/2002 12:44

Analyst: AM

Preparation Date: 03/14/2002 12:18 Prep By: KL

Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	2.1	84	21	175

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

Sample Spiked:

02030428-03

RunID:

HP\_B\_020318C-1068851

Units:

mg/L

Analysis Date:

03/18/2002 15:10

Analyst: ΑM

Preparation Date:

03/14/2002 12:18

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	ND	5	5.2	71.4	5	5.2	71.9	0.684	39	13	

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

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

D - Recovery Unreportable due to Dilution \* - Recovery Outside Advisable 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.

4/3/02 2:55:12 PM



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

#### **Brown & Caldwell** BJ Hobbs- 12832-017

Analysis:

**Headspace Gas Analysis** 

Method:

**RSK147** 

WorkOrder:

02030428

Lab Batch ID:

R55822

**Method Blank** 

Samples in Analytical Batch:

RunID:

VARC\_020322A-1070780 Units:

mg/L ER

Lab Sample ID

Client Sample ID

Analysis Date:

03/22/2002 9:34

Analyst:

02030428-03H

MW-11A

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

#### **Sample Duplicate**

Original Sample:

02030428-03

VARC\_020322A-1070784

Units:

mg/L

Analysis Date:

RunID:

03/22/2002 10:52

Analyst: ΕR

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	0.0044	0.0049	11	50
Propane	ND	ND	0	50
Propylene	ND	ND	0	50

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.



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

#### Brown & Caldwell BJ Hobbs- 12832-017

Analysis:

RunID:

Analysis Date:

**Purgeable Aromatics** 

Method:

SW8021B

WorkOrder:

Samples in Analytical Batch:

02030428

Lab Batch ID:

R55390

Method Blank

Н

HP\_U\_020314A-1062017

03/14/2002 17:18

Units:

Analyst:

ug/L

DL

Lab Sample ID

Client Sample ID

02030428-01A

MW-9

02030428-02A

MW-10

02030428-03A

MW-11A

02030428-04A

Trip Blank-3

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	99.0	72-130
Surr: 4-Bromofluorobenzene	100.5	70-130

#### **Laboratory Control Sample (LCS)**

RunID:

HP\_U\_020314A-1062016

Units:

ug/L

Analysis Date:

03/14/2002 16:27

Analyst:

DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	48	97	70	130
Ethylbenzene	50	50	99	70	130
Toluene	50	49	98	70	130
Xylenes,Total	150	146	97	70	130

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

Sample Spiked:

02030425-01

RunID: Analysis Date: HP\_U\_020314A-1062018

03/14/2002 17:43

Units:

Analyst:

s: ug/L

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	19	92.9	20	19	95.7	3.01	21	32	164
Ethylbenzene	ND	20	19	93.8	20	19	96.4	2.76	19	52	142
Toluene	ND	20	19	93.9	20	19	97.4	3.61	20	38	159
Xylenes,Total	ND	60	56	93.3	60	57	95.0	1.77	18	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

4/3/02 2:55:15 PM



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

### **Brown & Caldwell**

BJ Hobbs- 12832-017

Analysis:

**Gasoline Range Organics** 

Method:

SW8015B

WorkOrder:

02030428

Lab Batch ID:

R55392

Method Blank

RunID:

Analysis Date:

HP\_U\_020314B-1062062 03/14/2002 17:18

Units: Analyst: mg/L DL

Lab Sample ID

Client Sample ID

02030428-01A

02030428-02A

Samples in Analytical Batch:

MW-9

MW-10

02030428-03A

MW-11A

02030428-04A

Trip Blank-3

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	103.0	74-121
Surr: 4-Bromofluorobenzene	96.3	55-150

#### **Laboratory Control Sample (LCS)**

RunID:

HP\_U\_020314B-1062061

Units:

mg/L

Analysis Date:

03/14/2002 16:52

Analyst:

DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.72	72	70	130

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

Sample Spiked:

02030425-02

RunID:

HP\_U\_020314B-1062063

Units:

mg/L DL

Analysis Date:

03/14/2002 18:33

Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	ND	0.9	0.88	98.2	0.9	0.88	98.3	0.0904	36	36	160

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

4/3/02 2:55:16 PM



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

#### **Brown & Caldwell** BJ Hobbs- 12832-017

Analysis:

Polynuclear Aromatic Hydrocarbons

Method: SW8310 WorkOrder:

02030428

Lab Batch ID:

18700

**Method Blank** 

Samples in Analytical Batch:

RunID:

2\_020318A-1065578

Units:

ug/L

Lab Sample ID 02030428-03D

Client Sample ID

MW-11A

Analysis Date: Preparation Date:

Surr: 1-Fluoronaphthalene

Surr: Phenanthrene-d10

03/18/2002 13:38 03/15/2002 15:01

ΥN Analyst: Prep By:

DB Method SW3510B

Result Rep Limit Analyte Acenaphthene ND 0.10 Acenaphthylene ND 0.10 Anthracene ND 0.10 Benz(a)anthracene ND 0.10 ND 0.10 Benzo(a)pyrene Benzo(b)fluoranthene ND 0.10 ND 0.10 Benzo(g,h,i)perylene Benzo(k)fluoranthene ND 0.10 ND 0.10 Chrysene Dibenzo(a,h)anthracene ND 0.10 Fluoranthene ND 0.10 Fluorene ND 0.10 0.10 ND Indeno(1,2,3-cd)pyrene Naphthalene ND 0.10 0.10 Phenanthrene ND 0.10 ND Pyrene

#### Laboratory Control Sample (LCS)

15-96

33-108

RunID:

2\_020318A-1065579

74.5

74.8

Units:

ug/L

Analysis Date:

03/18/2002 14:16

Analyst: ΥN

Preparation Date: 03/15/2002 15:01

Prep By: DB Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Acenaphthene	0.5	0.34	68	45	97
Acenaphthylene	0.5	0.37	73	42	122
Anthracene	0.5	0.32	64	42	106
Benz(a)anthracene	0.5	0.36	72	49	119
Benzo(a)pyrene	0.5	0.35	69	54	105
Benzo(b)fluoranthene	0.5	0.36	73	48	127
Benzo(g,h,i)perylene	0.5	0.38	77	39	107
Benzo(k)fluoranthene	0.5	0.36	71	53	119
Chrysene	0.5	0.34	68	51	144
Dibenzo(a,h)anthracene	0.5	0.39	78	40	114
Fluoranthene	0.5	0.34	68	45	126
Fluorene	0.5	0.34	69	46	107
Indeno(1,2,3-cd)pyrene	0.5	0.39	77	45	109

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

4/3/02 2:55:17 PM



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

**Brown & Caldwell** BJ Hobbs- 12832-017

Analysis: Method:

Polynuclear Aromatic Hydrocarbons

SW8310

WorkOrder: Lab Batch ID: 02030428

18700

# Laboratory Control Sample (LCS)

RunID:

2\_020318A-1065579

Units:

ug/L

Analysis Date: Preparation Date: 03/18/2002 14:16 03/15/2002 15:01

Analyst: YN

Prep By: DB Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Naphthalene	0.5	0.33	66	44	90
Phenanthrene	0.5	0.35	69	47	128
Pyrene	0.5	0.35	70	51	135

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

Sample Spiked:

RunID:

02030427-01

2\_020318A-1065586

Units:

ug/L

Analysis Date: Preparation Date:

03/18/2002 21:53 03/15/2002 15:01

Analyst: ΥN

Prep By: DB 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
Acenaphthene	ND	0.5	0.25	49.3	0.5	0.23	45.4	8.21	30	1	124
Acenaphthylene	ND	0.5	0.25	50.7	0.5	0.23	46.5	8.79	30	1	139
Anthracene	ND	0.5	0.24	47.3	0.5	0.22	44.2	6.81	30	1	126
Benz(a)anthracene	ND	0.5	0.28	56.4	0.5	0.27	53.4	5.43	30	12	135
Benzo(a)pyrene	ND	0.5	0.27	54.4	0.5	0.26	51.4	5.65	30	1	128
Benzo(b)fluoranthene	ND	0.5	0.28	57.0	0.5	0.27	53.9	5.51	30	6	150
Benzo(g,h,i)perylene	ND	0.5	0.3	59.3	0.5	0.28	55.8	6.05	30	1	116
Benzo(k)fluoranthene	ND	0.5	0.28	56.2	0.5	0.27	53.1	5.68	30	5	159
Chrysene	ND	0.5	0.27	53.5	0.5	0.25	50.4	5.92	30	1	199
Dibenzo(a,h)anthracene	ND	0.5	0.31	61.2	0.5	0.29	57.8	5.71	30	1	110
Fluoranthene	ND	0.5	0.26	52.1	0.5	0.25	49.1	6.01	30	14	123
Fluorene	ND	0.5	0.26	51.0	0.5	0.24	47.2	7.75	30	1	142
Indeno(1,2,3-cd)pyrene	ND	0.5	0.29	57.0	0.5	0.27	53.5	6.46	30	1	116
Naphthalene	ND ND	0.5	0.24	47.4	0.5	0.22	44.1	7.22	30	1	122
Phenanthrene	ND	0.5	0.26	51.1	0.5	0.24	47.7	6.81	30	1	155
Pyrene	, ND	0.5	0.28	56.4	0.5	0.27	53.1	5.98	30	1	140

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

4/3/02 2:55:18 PM



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

# **Brown & Caldwell** BJ Hobbs- 12832-017

Analysis: Method:

Metals by Method 6010B, Total

SW6010B

WorkOrder:

02030428

Lab Batch ID:

18657

#### **Method Blank**

RunID:

TJA\_020318F-1068520

Units:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

03/19/2002 1:59

Analyst:

NS

02030428-02E

MW-10

Preparation Date:

03/14/2002 7:30

Prep By: MW Method SW3010A

02030428-03E

MW-11A

Analyte	Result	Rep Limit
Barium	ND	0.005
Cadmium	ND.	0.005
Chromium	ND	0.01
Magnesium	ND	0.1
Potassium	ND	2
Silver	ND	0.01

#### Laboratory Control Sample (LCS)

RuniD:

TJA\_020318F-1068521

Units:

mg/L

Analysis Date:

03/19/2002 2:05

Analyst: NS

Preparation Date: 03/14/2002 7:30 Prep By: MW Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Barium	1	0.895	90	80	120
Cadmium	1	0.957	96	80	120
Chromium	1	0.999	100	80	120
Magnesium	1	0.974	97	80	120
Potassium	10	10.1	101	80	120
Silver	1	0.971	97	80	120

#### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked:

02030442-05

RunID:

TJA\_020318F-1068526

Units:

mg/L

Analysis Date:

03/19/2002 2:36

Analyst:

NS

Preparation Date:

03/14/2002 7:30

Prep By:

Method

Analyte	Sample Result	PDS Spike Added	PDS Result	PDS % Recovery	PDSD Spike Added	PDSD Result	PDSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Magnesium	69.3	1	71.1	171 *	1	70	64.1 *	91.2 *	20	75	125
Potassium	57.5	10	69.3	118	10	68.9	114	3.2	20	75	125

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

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

4/3/02 2:55:19 PM



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

# **Brown & Caldwell** BJ Hobbs- 12832-017

Analysis: Method:

Metals by Method 6010B, Total

SW6010B

WorkOrder: Lab Batch ID: 02030428

18657

Sample Spiked: RunID:

02030442-05 TJA\_020318F-1068523

Units:

mg/L

Analysis Date:

03/19/2002 2:17

Preparation Date:

03/14/2002 7:30

Analyst: NS

Prep By: MW 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	1.06	84.8	1	1.14	92.5	8.59	20	75	125
Cadmium	ND	1	0.914	91.4	1	0.941	94.1	2.89	20	75	125
Chromium	ND	1	0.918	91.8	1	0.963	96.3	4.75	20	75	125
Magnesium	69	1	63.2	-618 *	1	67.3	-204 *	101 *	20	75	125
Potassium	58	10	64.8	72.7 *	10	67.1	96.2	27.9 *	20	75	125
Silver	ND	1	0.946	94.6	1	0.965	96.5	1.99	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

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

# **Brown & Caldwell** BJ Hobbs- 12832-017

Analysis:

Metals by Method 6010B, Total

Method:

SW6010B

WorkOrder: Lab Batch ID: 02030428 18657-T

**Method Blank** 

Samples in Analytical Batch:

RunID:

TJAT\_020314B-1062837

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

Preparation Date:

03/14/2002 23:57

03/14/2002 7:30

Analyst:

JS

02030428-02E Prep By: MW Method SW3010A

MW-10

02030428-03E

MW-11A

Analyte	Result	Rep Limit
Arsenic	ND	0.005
Lead	ND	0.005
Selenium	ND.	0.005

#### **Laboratory Control Sample (LCS)**

RunID:

TJAT\_020314B-1062838

Units: mg/L

Analysis Date:

03/15/2002 0:03

Analyst: JS

Preparation Date: 03/14/2002 7:30 Prep By: MW Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Arsenic	1	0.995	99	80	120
Lead	1	0.978	98	80	120
Selenium	1	1.01	101	80	120

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

Sample Spiked:

02030442-05

RunID:

TJAT\_020314B-1062840

Units:

mg/L

Analysis Date:

03/15/2002 0:17

Analyst: JS

Preparation Date: 03/14/2002 7:30 Prep By:

MW 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	0.014	1	0.997	98.3	1	1.03	101	3.16	20	75	125
Lead	ND	1	0.907	90.4	1	0.949	94.6	4.48	20	75	125
Selenium	ND	1	0.991	99.1	1	1.03	103	4.31	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

4/3/02 2:55:20 PM



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

# **Brown & Caldwell** BJ Hobbs- 12832-017

Analysis:

RunID:

Metals by Method 6010B, Total

Method: SW6010B WorkOrder:

Samples in Analytical Batch:

02030428

Lab Batch ID:

18657A

Method Blank

mg/L

Lab Sample ID

**Client Sample ID** 

Analysis Date:

TJA\_020320D-1069137

Units:

02030428-02E

03/21/2002 0:15

NS Analyst:

MW-10

02030428-03E

Preparation Date:

03/14/2002 7:30

Prep By:

MW Method SW3010A

MW-11A

	Analyte	Result	Rep Limit
Calcium		ND	0.1
Sodium		ND	0.5

## **Laboratory Control Sample (LCS)**

RunID:

TJA\_020320D-1069138

Units:

mg/L

Analysis Date:

Preparation Date:

03/21/2002 0:21

Analyst: NS

03/14/2002 7:30

Prep By: MW Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Calcium	1	0.965	96	80	120
Sodium	1	1.04	104	80	120

# Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked:

02030442-05

RunID:

TJA\_020320D-1069143

Units:

mg/L

03/21/2002 0:52

Analyst:

NS

Analysis Date: Preparation Date:

03/14/2002 7:30

Prep By:

Method

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	145	1	145	-6.6 *	1	143	-190 *	187 *	20	75	125
Sodium	126	1	124	-210 *	1	125	-110 *	66.7 *	20	75	125

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

Sample Spiked:

02030442-05

RunID:

TJA\_020320D-1069140

Units:

mg/L

Analysis Date:

03/21/2002 0:34

NS Analyst:

Preparation Date:

03/14/2002 7:30 Prep By: MW Method SW3010A

	Analyte	Sample	MS	MS	MS %	MSD	MSD	MSD %	RPD	RPD	Low	High
۲		Result	Spike	Result	Recovery	Spike	Result	Recovery		Limit	Limit	Limit
			Added			Added						
						1						

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

4/3/02 2:55:22 PM



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

# **Brown & Caldwell**

BJ Hobbs- 12832-017

Analysis: Method:

Metals by Method 6010B, Total

SW6010B

WorkOrder:

02030428

Lab Batch ID:

18657A

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

Sample Spiked:

02030442-05

RunID:

TJA\_020320D-1069140

Units:

mg/L

Analysis Date:

03/21/2002 0:34

Analyst: NS

Preparation Date: 03/14/2002 7:30

Prep By: MW 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	140	1	137	-757 *	1	139	-539 *	33.6 *	20	75	125
Sodium	130	1	118	-722 *	1	119	-703 *	2.62	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

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.

4/3/02 2:55:22 PM



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

# **Brown & Caldwell** BJ Hobbs- 12832-017

Analysis: Method:

Mercury, Total SW7470A

WorkOrder:

02030428

Lab Batch ID:

18720

**Method Blank** 

Samples in Analytical Batch:

RunID:

HGL\_020315B-1063715

Units:

mg/L

Lab Sample ID

Client Sample ID

Analysis Date:

03/15/2002 12:50

Analyst: R\_T 02030428-02E

MW-10

Preparation Date:

Mercury

03/15/2002 9:30

Prep By: R\_T Method SW7470A

0.0002

02030428-03E

MW-11A

Analyte Result Rep Limit

# **Laboratory Control Sample (LCS)**

RunID:

HGL\_020315B-1063717

ND

Units:

mg/L

Analysis Date:

03/15/2002 12:50

R\_T Analyst:

Preparation Date: 03/15/2002 9:30

Prep By: R\_T Method SW7470A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Mercury	0.002	0.00212	106		120

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

Sample Spiked:

02030325-01

RunID:

HGL\_020315B-1063719

Units:

mg/L

Analysis Date:

03/15/2002 12:50

Analyst: R\_T

Preparation Date: 03/15/2002 9:30 Prep By: R\_T 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	0.00202	101	0.002	0.0022	110	8.53	20	_	

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

4/3/02 2:55:23 PM



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

# **Brown & Caldwell** BJ Hobbs- 12832-017

Analysis:

Nitrogen, Nitrate (As N)

Method:

RunID:

Analysis Date:

E300

WorkOrder:

02030428

Lab Batch ID:

R55540

**Method Blank** 

WET\_020313S-1064679

03/13/2002 11:55

Units:

Analyst: ES

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02030428-01F

MW-9

02030428-02F

MW-10

02030428-03F

MW-11A

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

## **Laboratory Control Sample (LCS)**

RunID:

WET\_020313S-1064680

Units:

mg/L

Analysis Date:

03/13/2002 11:55

Analyst: ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.46		90	110

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

Sample Spiked:

02030425-01

RunID:

WET\_020313S-1064682

Units: mg/L

Analysis Date:

03/13/2002 11:55

ES Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Nitrogen, Nitrate (As N)	3.0	10	12.6	95.9	10	12.6	95.7	0.271	20	76	124

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference

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.

4/3/02 2:55:24 PM



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

Client Sample ID

02030428

R55542

# **Brown & Caldwell** BJ Hobbs- 12832-017

Analysis:

Chloride, Total

Method:

RunID:

Analysis Date:

E325.3

**Method Blank** WET\_020318L-1064782

03/18/2002 14:30

Units:

mg/L

CV Analyst:

Lab Sample ID

02030428-01F

02030428-02F

Samples in Analytical Batch:

02030428-03F

MW-10

MW-9

WorkOrder:

Lab Batch ID:

MW-11A

Analyte	Result	Rep Limit
Chloride	ND	1.0

#### **Laboratory Control Sample (LCS)**

RunID:

Analysis Date:

WET\_020318L-1064784

Units:

mg/L

03/18/2002 14:30

Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Chloride	143	141	99	90	110

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

Sample Spiked:

02030583-03

RunID:

WET\_020318L-1064788

Units:

Analysis Date:

03/18/2002 14:30

CVAnalyst:

mg/L

MSD MSD MSD % Sample MS MS MS % RPD RPD Analyte Low High Result Spike Result Recovery Spike Result Recovery Limit | Limit | Limit Added Added Chloride 690 1250 1940 99.9 1250 1940 99.9 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

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.

4/3/02 2:55:26 PM



**HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

# **Brown & Caldwell**

BJ Hobbs- 12832-017

Analysis:

RunID:

Fluoride-IC

03/13/2002 11:55

Method:

Analysis Date:

E300

WorkOrder:

02030428

Lab Batch ID:

R55674

Method Blank

WET\_020313T-1067964

Units:

Analyst: ES

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02030428-01F

MW-9

02030428-02F

MW-10

02030428-03F

MW-11A

Analyte	Result	Rep Limit
Fluoride	ND	0.10

# Laboratory Control Sample (LCS)

RunID:

WET\_020313T-1067965

Units:

mg/L

Analysis Date:

03/13/2002 11:55

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:

02030425-01

RunID:

WET\_020313T-1067967

Units:

mg/L

Analysis Date:

03/13/2002 11:55

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	1.4	10	9.8	84.1	10	9.7	82.4	1.97	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

4/3/02 2:55:27 PM



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

# Brown & Caldwell

BJ Hobbs- 12832-017

Analysis: Method:

RunID:

Analysis Date:

Sulfate

E300

3J HODDS- 12032-U1

WorkOrder:

02030428

Lab Batch ID:

R55679

Method Blank

WET\_020314S-1068028 03/14/2002 11:34 Units: Analyst: mg/L ES

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02030428-01F

MW-9

02030428-02F

MW-10

02030428-03F

MW-11A

	Analyte	Result	Rep Limit
Sulfate		ND	0.20

# **Laboratory Control Sample (LCS)**

RunID:

WET\_020314S-1068029

Units:

mg/L

Analysis Date:

03/14/2002 11:34

Analyst:

ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sulfate	10	9.9	99	90	110

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

Sample Spiked:

02030425-01

RunID:

WET\_020314S-1068031

Units:

mg/L

Analysis Date:

03/14/2002 11:34

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	120	200	310	94.9	200	310	94.1	0.809	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

4/3/02 2:55:28 PM



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

# **Brown & Caldwell** BJ Hobbs- 12832-017

Analysis:

RunID:

Hardness, Total (Titrimetric, EDTA)

Method:

E130.2

WorkOrder:

02030428

Lab Batch ID:

R55701

**Method Blank** 

mg/L CV

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

WET\_020319U-1068403 03/19/2002 11:45

Units: Analyst:

02030428-02E

MW-10

02030428-03E

MW-11A

Analyte Result Rep Limit Hardness (As CaCO3) ND 5.0

## **Laboratory Control Sample (LCS)**

RunID:

WET\_020319U-1068405

Units:

mg/L

Analysis Date:

03/19/2002 11:45

Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Hardness (As CaCO3)	202	200	101	94	108

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

Sample Spiked:

02030425-01

RunID:

WET\_020319U-1068407

Units: mg/L

Analysis Date:

03/19/2002 11:45

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)	420	500	920	100	500	920	100	0	20	81	111

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

4/3/02 2:55:30 PM



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

# **Brown & Caldwell** BJ Hobbs- 12832-017

Analysis:

RunID:

Alkalinity, Bicarbonate

Method:

Analysis Date:

M2320 B

WorkOrder:

02030428

Lab Batch ID:

R55803

Method Blank

WET\_020315S-1070451 03/15/2002 15:30

Units: Analyst:

mg/L

SN

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02030428-01F

MW-9

02030428-02F

MW-10

02030428-03G

MW-11A

Analyte	Result	Rep Limit
Alkalinity, Bicarbonate	ND	2.0

# **Laboratory Control Sample (LCS)**

RunID:

WET\_020315S-1070453

Units:

mg/L

Analysis Date:

03/15/2002 15:30

Analyst:

SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Alkalinity, Bicarbonate	80.3	80	100	90	110

#### Sample Duplicate

Original Sample:

02030425-01

RunID:

WET\_020315S-1070454

Units:

mg/L

Analysis Date:

03/15/2002 15:30

SN Analyst:

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Bicarbonate	260	260	0	20

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference

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.



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

# **Brown & Caldwell** BJ Hobbs- 12832-017

Analysis:

Alkalinity, Carbonate

Method:

RunID:

Analysis Date:

M2320 B

WorkOrder:

02030428

Lab Batch ID:

R55804

Method Blank

WET\_020315T-1070509

Units:

mg/L SN

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

03/15/2002 15:30

Analyst:

02030428-01F

MW-9

02030428-02F

MW-10

02030428-03G

MW-11A

Analyte	Result	Rep Limit
Alkalinity, Carbonate	ND	2.0

#### **Laboratory Control Sample (LCS)**

RunID:

WET\_020315T-1070511

Units:

mg/L

Analysis Date:

03/15/2002 15:30

Analyst:

SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Alkalinity, Carbonate	80.3	80	100	90	110

#### Sample Duplicate

Original Sample:

02030425-01

RunID:

WET\_020315T-1070512

Units:

mg/L

Analysis Date:

03/15/2002 15:30

Analyst: SN

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Carbonate	ND	ND	0	20

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference

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.

# Sample Receipt Checklist And Chain of Custody



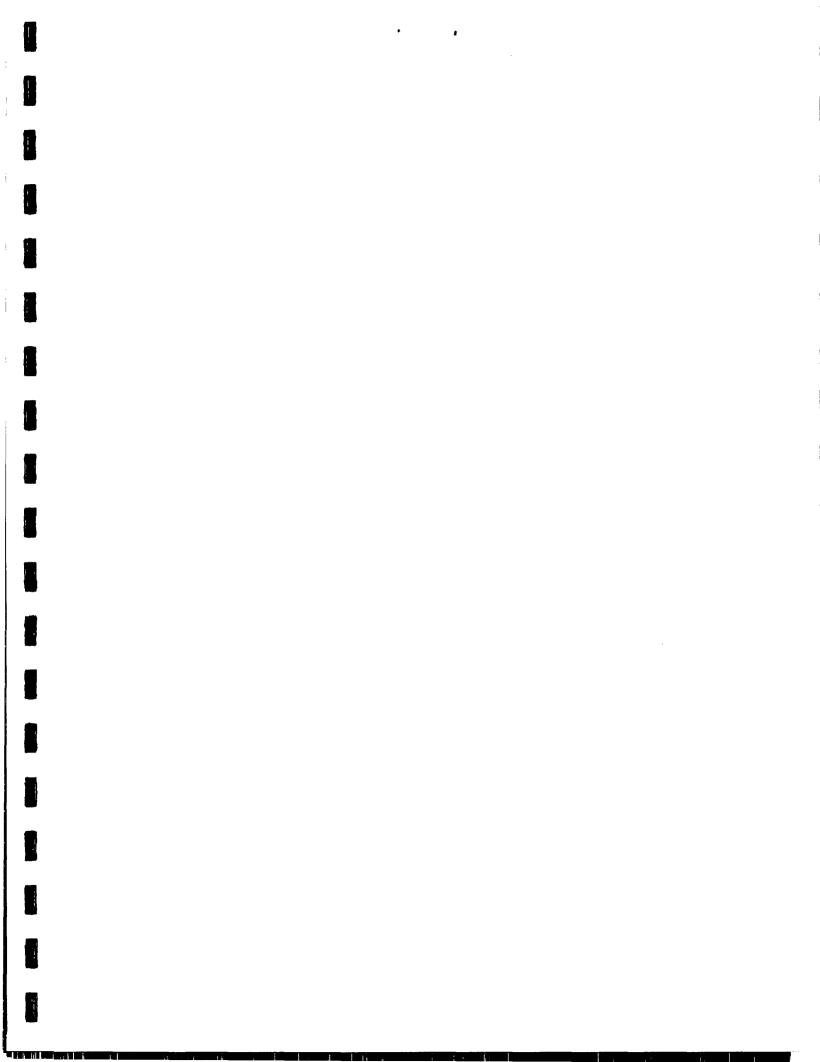
8880 INTERCHANGE DRIVE HOUSTON, TX 77054 (713) 660-0901

# Sample Receipt Checklist

Workorder: Date and Time Received: Temperature:	02030428 3/13/02 10:00:00 AM 4		Receive Carrier Chilled	name:	RE FedEx Water Ice	
1. Shipping container/co	poler in good condition?	Yes 🗹	No 🗆	Not Prese	ent 🗌	
2. Custody seals intact	on shippping container/cooler?	Yes 🗹	No 🗆	Not Prese	ent 🗌	
3. Custody seals intact	on sample bottles?	Yes	No 🗆	Not Prese	ent 🗹	
4. Chain of custody pres	sent?	Yes 🗹	No 🗌			
5. Chain of custody sign	ned when relinquished and received?	Yes 🗹	No 🗆			
6. Chain of custody agre	ees with sample labels?	Yes 🗹	No 🗆			
7. Samples in proper co	ntainer/bottle?	Yes 🗹	No 🗆			
8. Sample containers in	tact?	Yes 🗹	No 🗌			
9. Sufficient sample volu	ume for indicated test?	Yes 🗹	No 🗌			
10. All samples received	within holding time?	Yes 🗹	No 🗌			
11. Container/Temp Blanl	k temperature in compliance?	Yes 🗹	No $\square$			
12. Water - VOA vials hav	e zero headspace?	Yes 🗹	No 🗆	Not Applic	cable	
13. Water - pH acceptable	upon receipt?	Yes 🗹	No 🗆	Not Applic	cable 🗌	
SPL Representativ Client Name Contacte		Contact Date &	Time:			
Non Conformance Issues:						
Client Instructions:						
				-		

13 (319) 327 4775	Caffery Parkway, Scott. LA 70583 (318) 237-4775	wav. S	v Park		Ambassador		<b>-</b> 500			-0901	13) 660	77054 (7	ĭ TX	Housto	8880 Interchange Drive, Houston, TX 77054 (713) 660-0901	) Intercha	
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	1	, "	Received by:	1. Rec	K	l	<u> </u>	date				,	uished b	3. Relinq	Standard X	s.	48hr (
			Received by:	2. Rec	7		21/2/62	2 mg		March	Me	1. Relinquished by Sampler:	1. Relinquished by Sample	1. Reling			
(Je						0	1400	Levi		Level 3 QC		Standard QC	Standa			,	
PM review (initial):		<i>3</i> .	its (speci	Special Detection Limits (specify):	ecial Dete	ds	Data	Raw	×	Fax Results		Special Reporting Requirements	Reporting	Special I	TAT	Requested TAT	Rec
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<i>\$\$</i>	010 691	010 660				• • • •		vial	glas	<u> </u>	7700	Carle vals raft		Coursiana St	415 Caus	1	Address/Phone:
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page of	428	030	20	0		ecore	ody F	f Cust	& Chain o	& CI	quest	Analysis Request & Chain of Custody Record					
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HOUSTON LABORATORY 8880 INTERCHANGE DRIVE HOUSTON, TEXAS 77054 (713) 660-0901

# **Brown & Caldwell**

# **Certificate of Analysis Number:**

# 02030427

Report To:

Brown & Caldwell Rick Rexroad 1415 Louisiana Suite 2509 Houston

TX 77002-

ph: (713) 759-0999

fax: (713) 308-3886

Project Name:

BJ-Hobbs 12832-017

Site:

Hobbs,NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

Date Reported:

3/25/02

# This Report Contains A Total Of 31 Pages

**Excluding This Page** 

And

Chain Of Custody



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

BJ-Hobbs 12832-017

# Case Narrative for: Brown & Caldwell

# **Certificate of Analysis Number:**

# 02030427

Report To:

Brown & Caldwell

Rick Rexroad 1415 Louisiana

Suite 2509 Houston

TX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

Site: Site Address:

PO Number:

**Project Name:** 

State:

**New Mexico** 

Hobbs,NM

State Cert. No.:

Date Reported: 3/25/02

Matrix spike (MS) and matrix spike duplicate (MSD) samples are chosen and tested at random from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. Since the MS and MSD are chosen at random from an analytical batch, the sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The Laboratory Control Sample (LCS) and the Method Blank (MB) are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

Any other 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

3/25/02

Date



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

# **Brown & Caldwell**

# **Certificate of Analysis Number:**

# 02030427

**Report To:** 

Fax To:

**Brown & Caldwell** 

**Rick Rexroad** 

1415 Louisiana **Suite 2509** 

Houston

TX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

Brown & Caldwell

Rick Rexroad fax: (713) 308-3886 **Project Name:** 

BJ-Hobbs 12832-017

Site:

Hobbs,NM

Site Address:

PO Number:

State:

**New Mexico** 

State Cert. No.:

**Date Reported:** 

3/25/02

	Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD
- MW 40D		00000407.04	Matar	0/10/00 10:07:00 DM	2/12/00 10:00:00 AM	160004	
MW-12D		02030427-01	Water	3/12/02 12:27:00 PM	3/13/02 10:00:00 AM	169934	
MW-13		02030427-02	Water	3/12/02 10:41:00 AM	3/13/02 10:00:00 AM	169934	
MW-14		02030427-03	Water	3/12/02 11:24:00 AM	3/13/02 10:00:00 AM	169934	
MW-15		02030427-04	Water	3/12/02 11:18:00 AM	3/13/02 10:00:00 AM	169934	
Trip Blank-	4 3/12/02	02030427-05	Water	3/12/02	3/13/02 10:00:00 AM	169934	

Sona West Sonia West

3/25/02

Date

Senior Project Manager

Joel Grice Laboratory Director

Ted Yen Quality Assurance Officer



Client Sample ID MW-12D

#### **HOUSTON LABORATORY**

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

SPL Sample ID:

02030427-01

8 l /8 # - 4 h d	Б	lesult		Don Limit		Dil Easter	OHAL	Date Analyzed	Analyst	Sog #
Analyses/Method		esuit		Rep.Limit		DII. Factor	GUAL	Date Analyzeu	Analyst	Seq. #
ALKALINITY, BICARBO	ONATE				MCL	M23	20 B	Units: m	g/L	
Alkalinity, Bicarbonate		260		2		1		03/15/02 15:30	SN	1070458
ALKALINITY, CARBON	IATE				MCL	M23	20 B	Units: m	g/L	
Alkalinity, Carbonate		ND		2		1		03/15/02 15:30	SN	1070516
CHLORIDE, TOTAL					MCL	E:	325.3	Units: m	g/L	
Chloride		75.8		1		1		03/14/02 11:00	CV	1061406
DIESEL RANGE ORGA	NICS				MCL	SW8	015B	Units: m	g/L	
Diesel Range Organics		0.44		0.2		1		03/19/02 5:47	AR	1068840
Surr: n-Pentacosane		76.0	%	18-120		1		03/19/02 5:47	AR	1068840
Prep Method	Prep Date			Prep Initials						
SW3510B	03/14/2002 12:11			KL						
FLUORIDE-IC					MCL		E300	Units: m	g/L	
Fluoride		1.4		0.1		1		03/13/02 11:55	ES	1067972
GASOLINE RANGE OR	IGANICS				MCL	SW8	015B	Units: m	g/L	
Gasoline Range Organics	S	ND		0.1		1		03/15/02 3:27	DL	1062084
Surr: 1,4-Difluorobenze	ene	102	%	74-121		1		03/15/02 3:27	DL	1062084
Surr: 4-Bromofluorobei	nzene	96.0	%	55-150		1		03/15/02 3:27	DL	1062084

MCL

MCL

MCL

25

0.0025

0.0032

0.0012

0.0002

Collected: 03/12/2002 12:27

Prep Method	Prep Date	Prep Initials
SW7470A	03/15/2002 9:30	RT

ND

ND

ND

ND

HARDNESS, TOTAL (TITRIMETRIC, EDTA)

Hardness (As CaCO3)

Ethane Ethylene

Methane

Mercury

MERCURY, TOTAL

**HEADSPACE GAS ANALYSIS** 

METALS BY METHO	D 6010B, TOTAL		MCL	SW6010B	Units: m	g/L	
Arsenic	0.0471	0.005		1	03/15/02 1:48	JS	1062853
Lead	ND	0.005		1	03/15/02 1:48	JS	1062853
Selenium	ND	0.005		1	03/15/02 1:48	JS	1062853
Barium	0.0865	0.005		1	03/19/02 3:39	NS	1068535
Cadmium	ND	0.005		1	03/19/02 3:39	NS	1068535
Calcium	120	0.1		1	03/21/02 1:12	NS	1069146
Chromium	ND	0.01		1	03/19/02 3:39	NS	1068535

Qualifiers:

ND/U - Not Detected at the Reporting Limit

 $\ensuremath{\mathsf{B}}$  - 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

E130.2

**RSK147** 

SW7470A

1

Units: mg/L 03/19/02 11:45 CV

Units: mg/L

Units: mg/L

03/15/02 12:50 R\_T

ER

ER

03/22/02 10:27 ER

03/22/02 10:27

03/22/02 10:27

1068409

1070782

1070782

1070782

1063731



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

							<u> </u>		
Client Sample ID MW	-12D		Colle	cted: (	03/12/2002 1	12:27	SPL Sample I	<b>D</b> : 0203	30427-01
			Site:	Hol	bbs,NM				
Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	6.06		0.1		1		03/19/02 3:39	NS	106853
Potassium	72		2		1		03/19/02 3:39	NS	106853
Silver	ND		0.01		1		03/19/02 3:39	NS	106853
Sodium	79.4		0.5		1		03/19/02 3:39	NS	106853
Prep Method	Prep Date		Prep Initials						
SW3010A	03/14/2002 7:30		MW						
NITROGEN, NITRATE	(AS N)			MCL		E300	Units: m	g/L	
Nitrogen, Nitrate (As N)	ND		0.1		1		03/13/02 11:55	ES	106468
POLYNUCLEAR AROI	MATIC HYDROCARB	ONS		MCL	SW	8310	Units: uç	3/L	
Acenaphthene	ND		0.1		1		03/18/02 21:15	YN	106558
Acenaphthylene	ND		0.1		1		03/18/02 21:15	YN	106558
Anthracene	ND		0.1		1		03/18/02 21:15	YN	106558
Benz(a)anthracene	ND		0.1		1		03/18/02 21:15	YN	106558
Benzo(a)pyrene	ND		0.1		1		03/18/02 21:15	YN	106558
Benzo(b)fluoranthene	ND		0.1		1		03/18/02 21:15	YN	106558
Benzo(g,h,i)perylene	ND		0.1		1		03/18/02 21:15	YN	106558
Benzo(k)fluoranthene	ND		0.1		1		03/18/02 21:15	YN	106558
Chrysene	ND		0.1		1		03/18/02 21:15	YN	106558
Dibenzo(a,h)anthracene	ND		0.1		1		03/18/02 21:15	YN	106558
Fluoranthene	ND		0.1		1		03/18/02 21:15	YN	106558
Fluorene	ND		0.1		1		03/18/02 21:15	YN	106558
Indeno(1,2,3-cd)pyrene	ND		0.1		1		03/18/02 21:15	YN	106558
Naphthalene	ND		0.1		1		03/18/02 21:15	YN	106558
Phenanthrene	ND		0.1		1		03/18/02 21:15	YN	106558
Pyrene	ND		0.1		1		03/18/02 21:15	YN	106558
Surr: 1-Fluoronaphtha	lene 57.9	%	15-96		1		03/18/02 21:15	YN	106558
Surr: Phenanthrene-d	10 62.7	%	33-108		1		03/18/02 21:15	YN.	106558
Prep Method	Prep Date		Prep Initials						
SW3510B	03/15/2002 15:01	-	DB						
PURGEABLE AROMA	TICS			MCL	SW8	021B	Units: ug	<b>y</b> /∟	
Benzene	ND		1		1		03/15/02 3:27	DL	1062035
Ethylbenzene	ND		1		1		03/15/02 3:27	DL	1062035
Toluene	ND		1		1		03/15/02 3:27	DL	1062035
Xylenes,Total	ND		1		1		03/15/02 3:27	DL	1062035
Surr: 4-Bromofluorobe	enzene 103	%	48-156		1		03/15/02 3:27	DL	1062035
Surr: 1,4-Difluorobenz	ene 100	%	72-137		1		03/15/02 3:27	DL	1062035
SULFATE				MCL		E300	Units: m	g/L	
Sulfate	200		4		20		03/14/02 11:34		1068035

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



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

Client Sample ID MW-13 Collected: 03/12/2002 10:41 SPL Sample ID: 02030427-02

Client Sample ID MW	/-13			Colle	cted: (	03/12/2002 10:41	SPL Sample I	<b>D</b> : 02	2030427-02
				Site	: Hol	bbs,NM			
Analyses/Method	R	lesult		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analys	st Seq. #
ALKALINITY, BICARE	BONATE				MCL	M2320 B	Units: m	g/L	
Alkalinity, Bicarbonate		164		2		1	03/15/02 15:30	SN	1070459
ALKALINITY, CARBO	NATE				MCL	M2320 B	Units: m	ıq/L	
Alkalinity, Carbonate		ND		2		1	03/15/02 15:30		1070517
CHLORIDE, TOTAL					MCL	E325.3	Units: m	a/L	
Chloride		207		5		5	03/14/02 11:00		1061409
DIESEL RANGE ORG	ANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics		0.84		0.2		1	03/19/02 6:24	AR	1068841
Surr: n-Pentacosane		86.8	%	18-120		1	03/19/02 6:24	AR	1068841
Prep Method	Prep Date			Prep Initials					
SW3510B	03/14/2002 12:11	····	-	KL					
FLUORIDE-IC					MCL	E300	Units: m		
Fluoride		2.3		0.1	WICL	1	03/13/02 11:55		1067973
CACOLINE DANCE O	DOANICO				MOI	CW001ED	Uniterm		
GASOLINE RANGE O Gasoline Range Organi		ND		0.1	MCL	SW8015B	Units: m 03/15/02 3:52	DL DL	1062087
Surr: 1,4-Difluoroben		102	%	74-121		1	03/15/02 3:52	DL	1062087
Surr: 4-Bromofluorob		96.7	%	55-150		1	03/15/02 3:52	DL	1062087
HARDNESS, TOTAL (	TITRIMETRIC. E	DTA)			MCL	E130.2	Units: m	a/L	
Hardness (As CaCO3)	······································	750		50		10	03/19/02 11:45		1068410
HEADSPACE GAS AN	IALYSIS				MCL	RSK147	Units: m	a/L	
Ethane		ND		0.0025		1	03/22/02 10:37	ER	1070783
Ethylene		ND		0.0032		1	03/22/02 10:37	ER	1070783
Methane		ND		0.0012		1	03/22/02 10:37	ER	1070783
MERCURY, TOTAL					MCL	SW7470A	Units: m	g/L	
Mercury		ND		0.0002		1	03/15/02 12:50		1063732
Prep Method	Prep Date			Prep Initials					
SW7470A	03/15/2002 9:30			R_T					
METALS BY METHOD	6010B. TOTAL				MCL	SW6010B	Units: m	 α/L	
Arsenic		0.012		0.005		1	03/15/02 1:54	JS	1062854
Lead		ND		0.005		1	03/15/02 1:54	JS	1062854
Selenium	i	ND		0.005		1	03/15/02 1:54	JS	1062854
Barium	(	0.109		0.005		1	03/19/02 3:45	NS	1068536
Cadmium		ND		0.005		1	03/19/02 3:45	NS	1068536
Calcium		225		0.1		11	03/21/02 1:38	NS	1069149

Qualifiers:

Chromium

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

0.0114

0.01

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

03/19/02 3:45 NS

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

1068536



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

Client Sample ID MV	V-13		Colle	cted: (	03/12/2002	10:41	SPL Sample I	<b>D</b> : 0203	0427-02
			Site	Hol	obs,NM				
Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.
Magnesium	44.7		0.1		1		03/19/02 3:45	NS	106853
Potassium	2.82		2		1		03/19/02 3:45	NS	106853
Silver	ND		0.01		1		03/19/02 3:45	NS	106853
Sodium	127		0.5		1		03/19/02 3:45	NS	106853
Prep Method	Prep Date		Prep Initials						
SW3010A	03/14/2002 7:30		MW						
NITROGEN, NITRATE	(AS N)			MCL		E300	Units: m	g/L	
Nitrogen, Nitrate (As N			0.1		1		03/13/02 11:55	ES	106468
POLYNUCLEAR ARO	MATIC HYDROCARBO	ONS		MCL	SW	<b>V8310</b>	Units: ug	;/L	
Acenaphthene	ND		0.1		1		03/18/02 16:11	YN	106558
Acenaphthylene	ND		0.1	·	1		03/18/02 16:11	YN	106558
Anthracene	ND		0.1		1		03/18/02 16:11	YN	106558
Benz(a)anthracene	ND		0.1		1		03/18/02 16:11	YN	106558
Benzo(a)pyrene	ND		0.1		1		03/18/02 16:11	YN	106558
Benzo(b)fluoranthene	ND		0.1		1		03/18/02 16:11	YN	106558
Benzo(g,h,i)perylene	ND		0.1		1		03/18/02 16:11	YN	106558
Benzo(k)fluoranthene	ND		0.1		1		03/18/02 16:11	YN	106558
Chrysene	ND		0.1		1		03/18/02 16:11	YN	106558
Dibenzo(a,h)anthracene	e ND		0.1		1		03/18/02 16:11	YN	106558
Fluoranthene	ND		0.1		1		03/18/02 16:11	YN	106558
Fluorene	ND		0.1		1		03/18/02 16:11	YN	106558
Indeno(1,2,3-cd)pyrene	ND		0.1		1		03/18/02 16:11	YN	106558
Naphthalene	ND		0.1		1	,	03/18/02 16:11	YN	106558
Phenanthrene	ND		0.1		1		03/18/02 16:11	YN	106558
Pyrene	ND		0.1		1		03/18/02 16:11	YN	106558
Surr: 1-Fluoronaphth	alene 54.5	%	15-96		1		03/18/02 16:11	YN	106558
Surr: Phenanthrene-	d10 57.6	%	33-108		1		03/18/02 16:11	YN	106558
Prep Method	Prep Date		Prep Initials						
SW3510B	03/15/2002 15:01		DB						
PURGEABLE AROMA	TICS			MCL	SW8	021B	Units: ug		
Benzene	ND		1		1		03/15/02 3:52	DL	106203
Ethylbenzene	ND		1		1		03/15/02 3:52	DL	1062036
Toluene	ND		1		1		03/15/02 3:52	DL.	1062036
Xylenes,Total	ND		11		1		03/15/02 3:52	DL	1062036
Surr: 4-Bromofluorob	enzene 102	%	48-156		1		03/15/02 3:52	DL	1062036
Surr: 1,4-Difluoroben	zene 100	%	72-137		1		03/15/02 3:52	DL	1062036
SULFATE				MCL		E300	Units: m	g/L	
Sulfate	380		4		20		03/14/02 11:34	ES	1068036

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



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

Client Sample ID MW-14 Collected: 03/12/2002 11:24 SPL Sample ID: 02030427-03

Site: Hobbs,NM

Analyses/Method	Result	Rep.Limit	D	il. Factor QUAL	Date Analyzed	Analyst Seq. #
CHLORIDE, TOTAL			MCL	E325.3	Units: mg/	L
Chloride	284	5		5	03/14/02 11:00 C	V 1061413

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



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

Client Sample ID MW-15 Collected: 03/12/2002 11:18 SPL Sample ID: 02030427-04

Site: Hobbs,NM

Analyses/Method	Result	Rep.Limit		Dil. Factor QUAL	Date Analyzed	Anaiyst	Seq. #
CHLORIDE, TOTAL			MCL	E325.3	Units: mg	/L	
Chloride	224	5		5	03/14/02 11:00	CV	1061416

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



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

Client Sample ID Trip Blank-4 3/12/02

Collected: 03/12/2002 0:00

SPL Sample ID:

02030427-05

Site: I	dob	bs.	NM	ı
---------	-----	-----	----	---

Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organics	ND		0.1		1	03/14/02 20:40	DL	1062067
Surr: 1,4-Difluorobenzene	101	%	74-121		1	03/14/02 20:40	DL	1062067
Surr: 4-Bromofluorobenzene	95.0	%	55-150		1	03/14/02 20:40	DL	1062067
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/L	
Benzene	ND		1		1	03/14/02 20:40	DL	1062022
Ethylbenzene	ND		1		1	03/14/02 20:40	DL	1062022
Toluene	ND		1		1	03/14/02 20:40	DL	1062022
Xylenes,Total	ND		1		1	03/14/02 20:40	DL	1062022
Surr: 4-Bromofluorobenzene	101	%	48-156		1	03/14/02 20:40	DL	1062022
Surr: 1,4-Difluorobenzene	99.7	%	72-137		1	03/14/02 20:40	DL	1062022

ND/U - Not Detected at the Reporting Limit

 $\ensuremath{\mathsf{B}}$  - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

# Quality Control Documentation



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

# **Brown & Caldwell** BJ-Hobbs 12832-017

Analysis:

RunID:

**Diesel Range Organics** 

Method:

SW8015B

WorkOrder:

02030427

Lab Batch ID:

18664

Method Blank

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

HP\_T\_020318B-1068833

Units:

AR

02030427-01B

03/18/2002 20:02

Analyst:

MW-12D

Preparation Date:

03/14/2002 12:11

Prep By: KL

Method SW3510B

02030427-02B

MW-13

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20
Surr: n-Pentacosane	70.2	18-120

# Laboratory Control Sample (LCS)

RunID:

HP\_T\_020318B-1068834

Units:

mg/L

Analysis Date: Preparation Date:

03/18/2002 20:38 03/14/2002 12:11

AR Analyst: Prep By: KL

Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	1.7	66	21	175

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

Sample Spiked:

02030441-02

RunID:

HP\_T\_020318B-1068836

Units:

mg/L

Analysis Date:

03/18/2002 22:28

AR Analyst:

Preparation Date: 03/14/2002 12:11 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	0.078	5	3.4	66.2	5	3.4	66.0	0.248	39	13	130

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:06:47 AM



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

# **Brown & Caldwell** BJ-Hobbs 12832-017

Analysis:

RunID:

Headspace Gas Analysis

Method:

Analysis Date:

**RSK147** 

WorkOrder:

02030427

Lab Batch ID:

R55822

Method Blank

VARC\_020322A-1070780

Units:

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

03/22/2002 9:34

Analyst: ER 02030427-01E

MW-12D

02030427-02E

MW-13

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

## Sample Duplicate

Original Sample:

02030428-03

VARC\_020322A-1070784

Units:

mg/L

RunID: Analysis Date:

03/22/2002 10:52

Analyst: ER

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	0.0044	0.0049	11	50
Propane	ND	ND	0	50
Propylene	ND	ND	0	50

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.



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

# Brown & Caldwell BJ-Hobbs 12832-017

Analysis:

RunID:

Analysis Date:

**Purgeable Aromatics** 

Method: SW8021B

WorkOrder:

02030427

Lab Batch ID:

R55390

Method Blank

HP\_U\_020314A-1062017

Units: ug/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

03/14/2002 17:18

18

Analyst: DL

02030427-01A

MW-12D

02030427-02A

MW-13

02030427-05A

Trip Blank-4 3/12/02

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	99.0	72-130
Surr: 4-Bromofluorobenzene	100.5	70-130

# **Laboratory Control Sample (LCS)**

RunID:

HP\_U\_020314A-1062016

Units:

ug/L

Analysis Date:

03/14/2002 16:27

Analyst:

DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	48	97	70	130
Ethylbenzene	50	50	99	70	130
Toluene	50	49	98	70	130
Xylenes,Total	150	146	97	70	130

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

Sample Spiked:

02030425-01

RunID: Analysis Date: HP\_U\_020314A-1062018

03/14/2002 17:43

Units: Analyst: ug/L 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	19	92.9	20	19	95.7	3.01	21	32	164
Ethylbenzene	ND	20	19	93.8	20	19	96.4	2.76	19	52	142
Toluene	, ND	20	19	93.9	20	19	97.4	3.61	20	38	159
Xylenes,Total	\ ND	60	56	93.3	60	57	95.0	1.77	18	53	144

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:07:31 AM



8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

# **Brown & Caldwell**

Analysis:

RunID:

**Gasoline Range Organics** 

HP\_U\_020314B-1062062

03/14/2002 17:18

Method:

Analysis Date:

SW8015B

BJ-Hobbs 12832-017

WorkOrder:

02030427

Lab Batch ID:

R55392

Method Blank

Units:

Analyst:

mg/L DL

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02030427-01A

MW-12D

02030427-02A

MW-13

02030427-05A

Trip Blank-4 3/12/02

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	103.0	74-121
Surr: 4-Bromofluorobenzene	96.3	55-150

## **Laboratory Control Sample (LCS)**

RuniD:

HP\_U\_020314B-1062061

Units:

mg/L

Analysis Date:

03/14/2002 16:52

Analyst:

DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.72	72	70	130

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

Sample Spiked:

02030425-02

RunID: Analysis Date: HP\_U\_020314B-1062063

03/14/2002 18:33

Units: Analyst:

mg/L 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	0.88	98.2	0.9	0.88	98.3	0.0904	36	36	160	

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:07:54 AM



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

# **Brown & Caldwell** BJ-Hobbs 12832-017

Analysis:

RunID:

**Polynuclear Aromatic Hydrocarbons** 

Method: SW8310 WorkOrder:

Samples in Analytical Batch:

02030427

Lab Batch ID:

18700

**Method Blank** 

2\_020318A-1065578

Units:

ug/L

Lab Sample ID

Client Sample ID

Analysis Date: 03/18/2002 13:38 Preparation Date: 03/15/2002 15:01

Analyst: Prep By: DB

ΥN Method SW3510B 02030427-01C 02030427-02C

MW-12D

MW-13

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	74.5	15-96
Surr: Phenanthrene-d10	74.8	33-108

# **Laboratory Control Sample (LCS)**

RunID:

2\_020318A-1065579

Units:

ug/L

Analysis Date:

03/18/2002 14:16

Analyst: ΥN

Preparation Date: 03/15/2002 15:01

Prep By: DB Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit	
Acenaphthene	0.5	0.34	68	45	97	
Acenaphthylene	0.5	0.37	73	42	122	
Anthracene	0.5	0.32	64	42	106	
Benz(a)anthracene	0.5	0.36	72	49	119	
Benzo(a)pyrene	0.5	0.35	69	54	105	
Benzo(b)fluoranthene	0.5	0.36	73	48	127	
Benzo(g,h,i)perylene	0.5	0.38	77	39	107	
Benzo(k)fluoranthene	0.5	0.36	71	53	119	
Chrysene	0.5	0.34	68	51	144	
Dibenzo(a,h)anthracene	0.5	0.39	78	40	114	
Fluoranthene	0.5	0.34	68	45	126	
Fluorene	0.5	0.34	69	46	107	
Indeno(1,2,3-cd)pyrene	0.5	0.39	77	45	109	

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:08:14 AM



**HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

# **Brown & Caldwell** BJ-Hobbs 12832-017

Analysis:

Polynuclear Aromatic Hydrocarbons

SW8310 Method:

WorkOrder:

02030427

Lab Batch ID:

18700

## Laboratory Control Sample (LCS)

RunID:

2\_020318A-1065579

Units:

ug/L

Analysis Date: Preparation Date: 03/15/2002 15:01

03/18/2002 14:16

Analyst: YN

Prep By: DB

Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit	
Naphthalene	0.5	0.33	66	44	90	
Phenanthrene	0.5	0.35	69	47	128	
Pyrene	0.5	0.35	70	51	135	

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

Sample Spiked:

02030427-01

2\_020318A-1065586

Units:

ug/L ΥN

Analysis Date: Preparation Date:

RunID:

03/18/2002 21:53 03/15/2002 15:01 Analyst:

Prep By: DB 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
Acenaphthene	ND	0.5	0.25	49.3	0.5	0.23	45.4	8.21	30	1	124
Acenaphthylene	ND	0.5	0.25	50.7	0.5	0.23	46.5	8.79	30	1	139
Anthracene	ND	0.5	0.24	47.3	0.5	0.22	44.2	6.81	30	1	126
Benz(a)anthracene	ND	0.5	0.28	56.4	0.5	0.27	53.4	5.43	30	12	135
Benzo(a)pyrene	ND	0.5	0.27	54.4	0.5	0.26	51.4	5.65	30	1	128
Benzo(b)fluoranthene	ND	0.5	0.28	57.0	0.5	0.27	53.9	5.51	30	6	150
Benzo(g,h,i)perylene	ND	0.5	0.3	59.3	0.5	0.28	55.8	6.05	30	1	116
Benzo(k)fluoranthene	ND	0.5	0.28	56.2	0.5	0.27	53.1	5.68	30	5	159
Chrysene	ND	0.5	0.27	53.5	0.5	0.25	50.4	5.92	30	1	199
Dibenzo(a,h)anthracene	ND	0.5	0.31	61.2	0.5	0.29	57.8	5.71	30	1	110
Fluoranthene	ND	0.5	0.26	52.1	0.5	0.25	49.1	6.01	30	14	123
-luorene	ND	0.5	0.26	51.0	0.5	0.24	47.2	7.75	30	1	142
Indeno(1,2,3-cd)pyrene	ND	0.5	0.29	57.0	0.5	0.27	53.5	6.46	30	1	116
Naphthalene	ND	0.5	0.24	47.4	0.5	0.22	44.1	7.22	30	1	122
Phenanthrene	ND	0.5	0.26	51.1	0.5	0.24	47.7	6.81	30	1	155
Pyrene	ND	0.5	0.28	56.4	0.5	0.27	53.1	5.98	30	1	140

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.



8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

### **Brown & Caldwell**

BJ-Hobbs 12832-017

Analysis:

RunID:

Metals by Method 6010B, Total

SW6010B Method:

Sodium

WorkOrder:

02030427

Lab Batch ID:

18657

**Method Blank** 

Units:

mg/L

NS

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

TJA\_020318F-1068520

02030427-01D

03/19/2002 1:59 Preparation Date:

03/14/2002 7:30

Analyst:

Prep By: MW Method SW3010A

02030427-02D

MW-12D MW-13

Analyte	Result	Rep Limit
Barium	ND	0.005
Cadmium	ND	0.005
Chromium	ND	0.01
Magnesium	ND	0.1
Potassium	ND	2
Silver	ND	0.01

### **Laboratory Control Sample (LCS)**

RunID:

TJA\_020318F-1068521

Units:

mg/L

Analysis Date:

03/19/2002 2:05

ND

Analyst: NS

Preparation Date: 03/14/2002 7:30 Prep By: MW Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Barium	1	0.895	90	80	120
Cadmium	1	0.957	96	80	120
Chromium	1	0.999	100	80	120
Magnesium	1	0.974	97	80	120
Potassium	10	10.1	101	80	120
Silver	1	0.971	97	80	120
Sodium	1	0.958	96	80	120

### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked:

02030442-05

RunID:

TJA\_020318F-1068526

Units:

mg/L NS

Analysis Date: Preparation Date:

03/19/2002 2:36 03/14/2002 7:30 Analyst: Prep By:

Method

	Analyte	Sample Result	PDS Spike Added	PDS Result	PDS % Recovery	PDSD Spike Added	PDSD Result	PDSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Magnesium		69.3	1	71.1	171 *	1	70	64.1 *	91.2 *	20	75	125
Potassium		57.5	10	69.3	118	10	68.9	114	3.2	20	75	125
Sodium		125	1	125	34.2 *	1	121	-340 *	245 *	20	75	125

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

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:08:38 AM



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

### **Brown & Caldwell** BJ-Hobbs 12832-017

Analysis: Method:

Metals by Method 6010B, Total

SW6010B

WorkOrder:

02030427

Lab Batch ID:

18657

Sample Spiked:

02030442-05

RunID:

TJA\_020318F-1068523

Units:

mg/L

Analysis Date:

03/19/2002 2:17

Analyst: NS

Preparation Date: 03/14/2002 7:30

Prep By: MW 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	1.06	84.8	1	1.14	92.5	8.59	20	75	125
Cadmium	ND	1	0.914	91.4	1	0.941	94.1	2.89	20	75	125
Chromium	ND	1	0.918	91.8	1	0.963	96.3	4.75	20	75	125
Magnesium	69	1	63.2	-618 *	1	67.3	-204 *	101 *	20	75	125
Potassium	58	10	64.8	72.7 *	10	67.1	96.2	27.9 *	20	75	125
Silver	ND	1	0.946	94.6	1	0.965	96.5	1.99	20	75	125
Sodium	120	1	113	-1160 *	1	123	-225 *	135 *	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:08:38 AM



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

### **Brown & Caldwell** BJ-Hobbs 12832-017

Analysis:

Metals by Method 6010B, Total

Method:

RunID:

SW6010B

WorkOrder:

02030427

Lab Batch ID:

18657-T

**Method Blank** 

TJAT\_020314B-1062837

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

03/14/2002 23:57

Units:

Analyst: JS 02030427-01D

MW-12D

Preparation Date:

03/14/2002 7:30

Prep By: MW Method SW3010A

02030427-02D

MW-13

Analyte	Result	Rep Limit
Arsenic	NE	0.005
Lead	NE	0.005
Selenium	NE	0.005

### **Laboratory Control Sample (LCS)**

RunID:

Analysis Date:

TJAT\_020314B-1062838

Units:

03/15/2002 0:03

Analyst: JS

Preparation Date: 03/14/2002 7:30

Prep By: MW Method SW3010A

mg/L

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Arsenic	1	0.995	99	80	120
Lead	1	0.978	98	80	120
Selenium	1	1.01	101	80	120

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

Sample Spiked:

02030442-05

RunID:

TJAT\_020314B-1062840

Units:

mg/L

Analysis Date:

03/15/2002 0:17

JS Analyst:

Preparation Date:

03/14/2002 7:30

Prep By: MW 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
Arsei	nic	0.014	1	0.997	98.3	1	1.03	101	3.16	20	75	125
Lead		ND	1	0.907	90.4	1	0.949	94.6	4.48	20	75	125
Seler	nlum	ND	1	0.991	99.1	1	1.03	103	4.31	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:09:02 AM



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

### **Brown & Caldwell BJ-Hobbs 12832-017**

Analysis: Method:

Metals by Method 6010B, Total

SW6010B

WorkOrder:

Lab Batch ID:

02030427 18657A

Samples in Analytical Batch:

RunID:

TJA\_020320D-1069137

Units:

mg/L NS

Lab Sample ID

Client Sample ID

Analysis Date:

03/21/2002 0:15

02030427-01D

MW-12D

Preparation Date:

03/14/2002 7:30

Analyst:

Prep By: MW Method SW3010A

02030427-02D

MW-13

	Analyte	Result	Rep Limit
Calcium		NE	0.1
Sodium		NIC	

Method Blank

### **Laboratory Control Sample (LCS)**

RunID:

TJA\_020320D-1069138

Units:

mg/L

Analysis Date: Preparation Date:

03/21/2002 0:21 03/14/2002 7:30 Analyst: NS

Prep By: MW Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Calcium	1	0.965	96	80	120
Sodium	1,	1.04	104	80	120

### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked:

02030442-05

RunID:

TJA\_020320D-1069143

Units:

mg/L

Analysis Date:

03/21/2002 0:52

Analyst:

NS

Preparation Date:

03/14/2002 7:30

Prep By:

Method

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	145	1	145	-6.6 *	1	143	-190 *	187 *	20	75	125
Sodium	126	1	124	-210 *	1	125	-110 *	66.7 *	20	75	125

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

Sample Spiked:

02030442-05

RunID:

TJA\_020320D-1069140

Units:

mg/L

Analysis Date:

03/21/2002 0:34

Analyst: NS

Preparation Date: 03/14/2002 7:30

Prep By: MW Method SW3010A

Analyte	Sample Result	MS Spike	MS Result	MS % Recovery	MSD Spike	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit	
J		Added			Added							

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:09:24 AM



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

# Brown & Caldwell BJ-Hobbs 12832-017

Analysis:

Metals by Method 6010B, Total

Method: SW6010B

WorkOrder:

02030427

Lab Batch ID:

18657A

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

Sample Spiked:

02030442-05

RunID:

TJA\_020320D-1069140

Units: r

: mg/L

Analysis Date:

Preparation Date: 03/14/2002 7:30

03/21/2002 0:34

anto. Ilig/i

Analyst: NS

Prep By: MW Method SW3010A

Anaiyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Calcium	140	1	137	-757 *	1	139	-539 *	33.6 *	20	75	125
Sodium	130	1	118	-722 *	1	119	-703 *	2.62	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

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.

3/25/02 11:09:25 AM



### **HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE

HOUSTON, TX 77054 (713) 660-0901

# **Brown & Caldwell**

Analysis: Method:

RunID:

Mercury, Total

SW7470A

BJ-Hobbs 12832-017

WorkOrder:

02030427

Samples in Analytical Batch:

Lab Batch ID:

18720

Method Blank

HGL\_020315B-1063715

Units:

Lab Sample ID

Client Sample ID

Analysis Date:

03/15/2002 12:50

Analyst:

mg/L R\_T

02030427-01D

MW-12D

Preparation Date:

Prep By: R\_T Method SW7470A

03/15/2002 9:30

02030427-02D

MW-13

Analyte Mercury

Result Rep Limit ND 0.0002

### **Laboratory Control Sample (LCS)**

RunID:

HGL\_020315B-1063717

Units:

mg/L

Analysis Date:

03/15/2002 12:50

Analyst: R\_T

Preparation Date:

03/15/2002 9:30

Prep By: R\_T Method SW7470A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Mercury	0.002	0.00212	106	80	120

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

Sample Spiked:

02030325-01

RunID:

HGL\_020315B-1063719

Units:

mg/L

Analysis Date:

03/15/2002 12:50

Analyst: R\_T

Preparation Date:

03/15/2002 9:30

Prep By: R\_T 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	0.00202	101	0.002	0.0022	110	8.53	20	75	125

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.



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

# Brown & Caldwell

Analysis:

Chloride, Total

Method:

E325.3

BJ-Hobbs 12832-017

WorkOrder:

02030427

Lab Batch ID:

R55362

Method Blank

RunID:

Analysis Date:

WET\_020314A-1061384 03/14/2002 11:00 Units:

Analyst:

mg/L

J/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02030427-01G 02030427-02G MW-12D MW-13

02030427-03A

AVA/ 4.4

02030427-03

MW-14

02030427-04A

MW-15

 Analyte
 Result
 Rep Limit

 Chloride
 ND
 1.0

### Laboratory Control Sample (LCS)

RunID:

WET\_020314A-1061386

Units:

mg/L

Analysis Date:

03/14/2002 11:00

Analyst:

cv

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Chloride	143	140	98	90	110

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

Sample Spiked:

02030254-01

RunID:

WET\_020314A-1061388

Units:

mg/L

Analysis Date:

03/14/2002 11:00

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	6.9	50	56	98.2	50	56.9	99.9	1.74	20	85	115

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:10:04 AM



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

# **Brown & Caldwell**

Analysis:

RunID:

Analysis Date:

Nitrogen, Nitrate (As N)

Method:

E300

BJ-Hobbs 12832-017

WorkOrder:

02030427

Lab Batch ID:

R55540

Method Blank

WET\_020313S-1064679 03/13/2002 11:55

Units: Analyst: mg/L

ES

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02030427-01F

MW-12D

02030427-02F

MW-13

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

### **Laboratory Control Sample (LCS)**

RunID:

WET\_020313S-1064680

Units:

mg/L

Analysis Date:

03/13/2002 11:55

Analyst: ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.46	95	90	110

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

Sample Spiked:

02030425-01

RunID:

WET\_020313S-1064682

Units:

mg/L

Analysis Date:

03/13/2002 11:55 ES Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Nitrogen, Nitrate (As N)	3.0	10	12.6	95.9	10	12.6	95.7	0.271	20	76	124

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:10:25 AM



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

### **Brown & Caldwell** BJ-Hobbs 12832-017

Analysis: Method:

RunID:

Fluoride-IC

E300

WorkOrder:

02030427

Lab Batch ID:

R55674

Method Blank

WET\_020313T-1067964

Units:

mg/L

ES

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

03/13/2002 11:55

Analyst:

02030427-01F

MW-12D

02030427-02F

MW-13

	Analyte	 Result	Rep Limit
Fluoride		 ND	0.10

### **Laboratory Control Sample (LCS)**

RunID:

WET\_020313T-1067965

Units:

mg/L

Analysis Date:

03/13/2002 11:55

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:

02030425-01

RunID:

WET\_020313T-1067967

Units:

mg/L ES

Analysis Date:

03/13/2002 11:55

Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Fluoride	1.4	10	9.8	84.1	10	9.7	82.4	1.97	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:10:45 AM



WET\_020314S-1068028

03/14/2002 11:34

### **HOUSTON LABORATORY**

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

### **Brown & Caldwell** BJ-Hobbs 12832-017

Analysis: Method:

RunID:

Analysis Date:

Sulfate

E300

WorkOrder:

02030427

Lab Batch ID:

R55679

**Method Blank** 

Units: Analyst: mg/L ES

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

02030427-01F

MW-12D

02030427-02F

MW-13

Analyte	Result	Rep Limit
Sulfate	ND	0.20

### **Laboratory Control Sample (LCS)**

RunID:

WET\_020314S-1068029

Units:

mg/L

Analysis Date:

03/14/2002 11:34

Analyst: ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sulfate	10	9.9	99	90	110

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

Sample Spiked:

02030425-01

RunID:

WET\_020314S-1068031

Units:

mg/L

Analysis Date:

03/14/2002 11:34

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	120	200	310	94.9	200	310	94.1	0.809	20	80	

Qualifiers:

ND/U - Not Detected at the Reporting Limit

J - Estimated value between MDL and PQL

MI - Matrix Interference D - Recovery Unreportable due to Dilution

B - Analyte detected in the associated Method Blank

\* - 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.

3/25/02 11:11:08 AM



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

### **Brown & Caldwell** BJ-Hobbs 12832-017

Analysis:

RunID:

Hardness, Total (Titrimetric, EDTA)

Method:

WorkOrder:

02030427

Lab Batch ID:

R55701

Method Blank

Units: mg/L

CV

Lab Sample ID

Client Sample ID

Analysis Date:

WET\_020319U-1068403 03/19/2002 11:45

Analyst:

02030427-01D

Samples in Analytical Batch:

MW-12D

02030427-02D

MW-13

Analyte	Result	Rep Limit
Hardness (As CaCO3)	ND	5.0

### **Laboratory Control Sample (LCS)**

RunID:

WET\_020319U-1068405

Units:

mg/L

Analysis Date:

03/19/2002 11:45

Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Hardness (As CaCO3)	202	200	101	94	108

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

Sample Spiked:

02030425-01

RunID:

WET\_020319U-1068407

Units:

mg/L

Analysis Date:

03/19/2002 11:45

CV Analyst:

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Hardness (As CaCO3)	420	500	920	100	500	920	100	0	20	81	111

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference

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.

3/25/02 11:11:29 AM



### **HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE

HOUSTON, TX 77054 (713) 660-0901

### **Brown & Caldwell**

BJ-Hobbs 12832-017

Analysis: Method:

RunID:

Alkalinity, Bicarbonate

M2320 B

WorkOrder:

02030427

Lab Batch ID:

R55803

**Method Blank** 

WET\_020315S-1070451

Units: mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

03/15/2002 15:30

Analyst: SN 02030427-01G

MW-12D

02030427-02G

MW-13

Analyte	Result	Rep Limit
Alkalinity, Bicarbonate	ND	2.0

### Laboratory Control Sample (LCS)

RunID:

WET\_020315S-1070453

Units:

mg/L

Analysis Date:

03/15/2002 15:30

Analyst:

SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit	
Alkalinity, Bicarbonate	80.3	80	100	90	110	

### Sample Duplicate

Original Sample:

02030425-01

RunID:

WET\_020315S-1070454

Units:

mg/L

Analysis Date:

03/15/2002 15:30

Analyst: SN

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Bicarbonate	260	260	0	20

Qualifiers:

ND/U - Not Detected at the Reporting Limit

MI - Matrix Interference

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

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.

3/25/02 11:11:53 AM



### **HOUSTON LABORATORY** 8880 INTERCHANGE DRIVE HOUSTON, TX 77054

(713) 660-0901

### **Brown & Caldwell** BJ-Hobbs 12832-017

Analysis:

RunID:

Alkalinity, Carbonate

Method: M2320 B WorkOrder:

02030427

Lab Batch ID:

R55804

Method Blank

mg/L

Lab Sample ID

Samples in Analytical Batch:

Client Sample ID

Analysis Date:

03/15/2002 15:30

WET\_020315T-1070509

Analyst: SN

Units:

02030427-01G

MW-12D

02030427-02G

MW-13

Analyte	Result	Rep Limit
Alkalinity, Carbonate	ND	2.0

### **Laboratory Control Sample (LCS)**

RunID:

WET\_020315T-1070511

Units:

mg/L

Analysis Date:

03/15/2002 15:30

Analyst:

SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Alkalinity, Carbonate	80.3	80	100	90	110

### Sample Duplicate

Original Sample:

02030425-01

RunID:

WET\_020315T-1070512

Units:

mg/L

Analysis Date:

03/15/2002 15:30

SN Analyst:

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Carbonate	ND	ND	0	20

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

MI - Matrix Interference

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.

# Sample Receipt Checklist And Chain of Custody



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

## Sample Receipt Checklist

Workorder:	02030427		Receive	ed By:	DS	
Date and Time Received:	3/13/02 10:00:00 AM		Carrier	name:	FedEx	
Temperature:	3		Chilled	by:	Water Ice	
1. Shipping container/o	cooler in good condition?	Yes 🗹	No 🗌	Not Pres	ent	All Physics Communications
2. Custody seals intact	t on shippping container/cooler?	Yes 🗹	No 🗆	Not Pres	ent	
3. Custody seals intact	t on sample bottles?	Yes	No 🗌	Not Pres	ent 🗹	
4. Chain of custody pre	esent?	Yes 🗹	No 🗌			
5. Chain of custody sig	ned when relinquished and received?	Yes 🗹	No 🗌			
6. Chain of custody ag	rees with sample labels?	Yes 🗹	No 🗌			
7. Samples in proper c	ontainer/bottle?	Yes 🗹	No 🗌			
8. Sample containers in	ntact?	Yes 🗹	No 🗌			
9. Sufficient sample vo	lume for indicated test?	Yes 🗹	No 🗌			
10. All samples received	I within holding time?	Yes 🗹	No 🗌			
11. Container/Temp Blan	nk temperature in compliance?	Yes 🗹	No 🗌			
12. Water - VOA vials ha	ve zero headspace?	Yes 🗹	No 🗌	Not Appli	icable 🗌	
13. Water - pH acceptable	le upon receipt?	Yes 🗹	No 🗌	Not Appli	icable $\square$	
SPL Representat		Contact Date &	Time:			
Client Name Contact	red:					
Non Conformance Issues:						
Client Instructions:						
L						

☐ 8880 Interchange Drive, Houston, TX 77054 (713) 660-0901 ☐ 500	Other   S. Relinquished by:  date  3   3   0 2		72hr	Standard QC 🕍 Level 3 QC	Requested TAT   Special Reporting Requirements   Fax Results   Raw Data		Client/Consultant Remarks:		/	TroBlunk-4 3/10/02 3/10/02 -	Ji	1	3/12/02 10:41 X W	X 22:21	D	water slud lastic oz	10050 -01 r ge	5=so = or   4oz = 16o   = H	NO3	STR 2500 glass	Client Name: Brown & Cald well 713759 0999 matrix bottle size pres.	Analysis Request & Chain of Custody Record
Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775	6. Received by Laboratory:	4. Received by:	time 2. Received by:	The state of the s	Special Detection Limits (specify):  PM review (initial):	در	Intact? Y N				X	X	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	インインインイン	PATE PATE TO THE	EX TIS The Manager of the Land	Bit No 1 Ca Was and 1 Ca Was an	10 113 3 16 300 CD - 14	Big Sost	015 (V) (A) (S)	Analys	0/0.2042 page 1 of 1