

GW - 72

# MONITORING REPORTS

DATE:

2001

February 26, 2002

RECEIVED  
MAR 18 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



**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**

Dear Mr. Price:

Enclosed please find the subject report for the BJ Services Company, U.S.A. (BJ Services) facility at Hobbs, New Mexico. During the December 2001 groundwater sampling, event monitor wells MW-3, MW-4, MW-5, MW-11A, MW-12D, MW-13, and MW-14 were sampled 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.

Comparison of analytical data from the December 2001 sampling event to historical constituent concentration data on a well-by-well basis (see Tables 4, 5, and 6 of the subject report, as applicable) suggests that the deviation from standard monitor well purging procedures that occurred in December 2001 had minimal effect on chemical analytical data.

Additionally, the surface completion of monitor well MW-10 has been damaged, so that surficial soil materials have entered the well and accumulated to an approximate thickness of 1.6 feet in the bottom of the well. The accumulated sediment in the well and the 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.

Comparison of the December 2001 analytical results from monitor well MW-10 (see Appendix A of the subject report) to historical constituent concentrations data from the well (see Tables 4 and 6 of the subject report) indicates that the introduction of a substantial quantity foreign materials into monitor well MW-10, in combination with the resultant minimal production of groundwater from the well, has rendered the December 2001 data from monitor well MW-10 invalid.

February 26, 2002  
Mr. Wayne Price  
Page 2

During the upcoming March 2002 quarterly sampling event, Brown and Caldwell will collect groundwater samples from all water-producing wells after purging the well to stability, dryness, or removal of three well volumes of water and compare the March 2002 constituent concentration data to corresponding December 2001 data to further substantiate the December 2001 data.

For monitor well MW-10, BJ Services will:

1. Repair the surface completion to ensure that it seals adequately to prevent introduction of surficial soil materials into the well; and
2. Attempt to remove accumulated sediment from the bottom of the well in order to improve the ability of the well to produce an adequate quantity of low turbidity groundwater.

BJ Services anticipates performing these rehabilitative activities for monitor well MW-10 in late February 2002. The March 2002 quarterly groundwater sampling event will be conducted no sooner than 1 week following completion of these monitor well rehabilitation activities.

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**



Richard L. Rexroad, P.G.  
Project Manager

RLR:uak

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 R O W N   A N D   C A L D W E L L



**DECEMBER 2001 GROUNDWATER  
SAMPLING REPORT  
HOBBS, NEW MEXICO FACILITY**

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

**FEBRUARY 26, 2002**

**DECEMBER 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: 12832.017



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Richard L. Rexroad, P.G.  
Project Manager

February 26, 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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- 2 Cumulative Groundwater Elevation Data
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- 4 Cumulative BTEX and TPH Analytical Results for Groundwater Samples
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- 6 Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, and MW-12D

### APPENDICES

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



## 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 December 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 December 2001 sampling event is the second 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 December 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 December 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 December 6, 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 December 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. The top of the PVC casing of monitor well MW-10 has been damaged so that the well will not seal correctly. The well is apparently being filled with surficial soil materials that are entering the top of the well from the land surface. A small quantity of highly turbid water was removed from the well during the December 2001 sampling event, but review of chemical analysis of this turbid water, in comparison to the previous data from monitor well MW-10, indicate that the December 2001 chemical analysis of the turbid water recovered from well MW-10 does not provide valid data.

All wells were purged and sampled with disposable bailers and clean unused nylon string. Wells were typically purged dry or were sampled after removal of 0.25 gallons of water due to limited water columns in certain wells and minimal apparent recharge of groundwater to these wells. The wells were sampled in general order of least impacted to most impacted (based on analytical results from the September 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 groundwater sampling event are summarized in Table 3.

Groundwater samples were collected 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 December 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 December 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 December 2001 sampling event. No benzene concentrations in excess of the laboratory detection limit were reported in the seven groundwater samples submitted for BTEX analysis during this sampling event. As such, all benzene concentrations were less than the New Mexico Water Quality Control Commission (NMWQCC) standard of 0.01 milligrams per liter (mg/L). 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. 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 December 2001 chloride concentration of 276 mg/L in down-gradient well MW-14 exceeds the NMWQCC standard of 250 mg/L for chloride. The chloride concentration of well MW-15 in December 2001 was 215 mg/L. Chloride concentrations in monitor well MW-15 have remained essentially constant and less than 250 mg/L from the time of its installation in January 2001 to the present. The chloride concentration in monitor well MW-14 has fluctuated from 368 mg/L to 222 mg/L during this time period.

Groundwater samples from selected wells were analyzed for nitrate and 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. 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 December 2001 sampling event is the fifth 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 at least seven 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

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 December 2001 sampling event is the second 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 four groundwater sampling events from December 2000 through September 2001. Concentrations of toluene, ethylbenzene, and xylenes in monitor well MW-10 have undergone similar decreases over this time period. December 2001 chemical data from MW-10 are not considered valid, as previously discussed in Section 2.1.

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 three groundwater sampling events. There has been only one detection each of toluene, ethylbenzene, and xylenes in monitor well MW-11A groundwater since December 2000.

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 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.



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

Although there was minimal hydrocarbon impact detected in former field waste tanks area monitor wells MW-11A and MW-12D in December 2001, dissolved oxygen concentrations in these wells were less than the dissolved oxygen content of background monitor well MW-5, as indicated in Table 3. The decreases in dissolved oxygen concentrations in former field waste tanks area monitor wells MW-11A and MW-12D relative to the background dissolved oxygen concentration are likely due to the residual effects of hydrocarbons at this former source area.

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 B.I. Services Hobbs, New Mexico Facility, for example).

Continued use of dissolved oxygen as an electron acceptor during intrinsic bioremediation is likely to occur if residual hydrocarbons are present at the former field waste tanks 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.

Nitrate was detected at a concentration of 2.38 mg/L in background monitor well MW-5 during the December 2001 sampling event. Although there was minimal to no hydrocarbon impact at former field waste tanks area wells MW-11A and MW-12D in December 2001, nitrate was not detected in either of these wells. The decreased nitrate concentrations observed in December 2001 at former field waste tanks area wells 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 measured in background monitor well MW-5 in December 2001, so the occurrence of natural attenuation of hydrocarbons based on ferrous iron concentrations in monitor wells at the former field waste tanks area can not be evaluated based on December 2001 data.

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. December 2001 sulfate concentrations in former field waste tanks area monitor wells MW-11A and MW-12D are 240 mg/L and 200 mg/L, respectively. The December 2001 sulfate concentration in background monitor well MW-5 is 120 mg/L. The fact that sulfate concentrations in former source area monitor wells MW-11A and MW-12D 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 0.0041 mg/L in December 2001, 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.

6. Redox potential is a measure of chemical energy in groundwater. The redox potential of groundwater from background well MW-5 was measured at 90.6 millivolts (mV) in December 2001. Respective redox potentials of -78.0 mV and -119.3 mV were measured in former field waste tanks area monitor wells MW-11A and MW-12D in December 2001. The negative redox values in former field waste tank area monitor wells MW-11A and MW-12D as compared to the positive redox value in the background well at the facility provide 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 was not measured in background monitor well MW-5 in December 2001, so natural attenuation of hydrocarbons at the former field waste tank area cannot be evaluated based on December 2001 alkalinity data. Previous alkalinity data from the facility have generally been inconclusive regarding the occurrence of natural attenuation.

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 historic ferrous iron data from background wells and monitor wells at the former field waste tanks area. 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 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 December 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-D was detected at low concentrations in two wells in this area (MW-4 and MW-7), but was also detected at a comparable concentration in the upgradient background well (MW-5). There were no detections of TPH-G in December 2001 at monitor wells located near the former fueling system area. BTEX and TPH concentrations in these wells have remained below applicable standards for the past seven quarterly groundwater sampling events.
- December 2001 benzene concentrations in former field waste tanks area monitor wells MW-11A and MW-12D 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.
- The current chloride concentration of 276 mg/L in monitor well MW-14 exceeds the NMQCC standard of 250 mg/L. Chloride concentrations have varied between 368 mg/L and 222 mg/L in monitor well MW-14 since its installation in January 2001. Chloride concentrations in monitor well MW-15 have remained essentially constant and less than 250 mg/L since installation of these wells in January 2001.

### 4.2 Recommendations

- Attempt to rehabilitate former field waste tanks source area monitor well MW-10 by removing accumulated sediment from the bottom of the well. If successful, repair the cracked top of PVC casing, place a sealing well cap on the well, and install a new concrete well pad around this flush-mounted well.
- 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 quarterly sampling events of monitor wells pertaining to the former fueling system source area in March 2002 and June 2002. If analytical results for groundwater samples continue to not exceed the groundwater remediation goals specified in the RAP during the 1-year monitoring period following collection of confirmation soil samples in July 2001 (as specified in the RAP), 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

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

February 26, 2002

Final Distribution as follows:

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

Attention: Mr. Wayne Price

1 copy to: State of New Mexico  
Oil Conservation Division, Hobbs District Office  
1625 N. French Dr.  
Post Office Box 1980  
Hobbs, New Mexico 88240

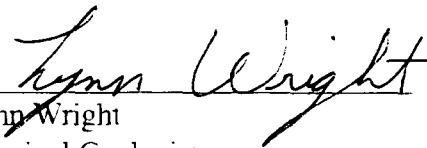
Attention: Mr. Chris Williams

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11211 FM 2920  
Tomball, Texas 77375

Attention: Ms. Jo Ann Cobb

1 copy to: Brown and Caldwell, Project File

## QUALITY CONTROL REVIEWER

  
Lynn Wright  
Principal Geologist

RLR/uak

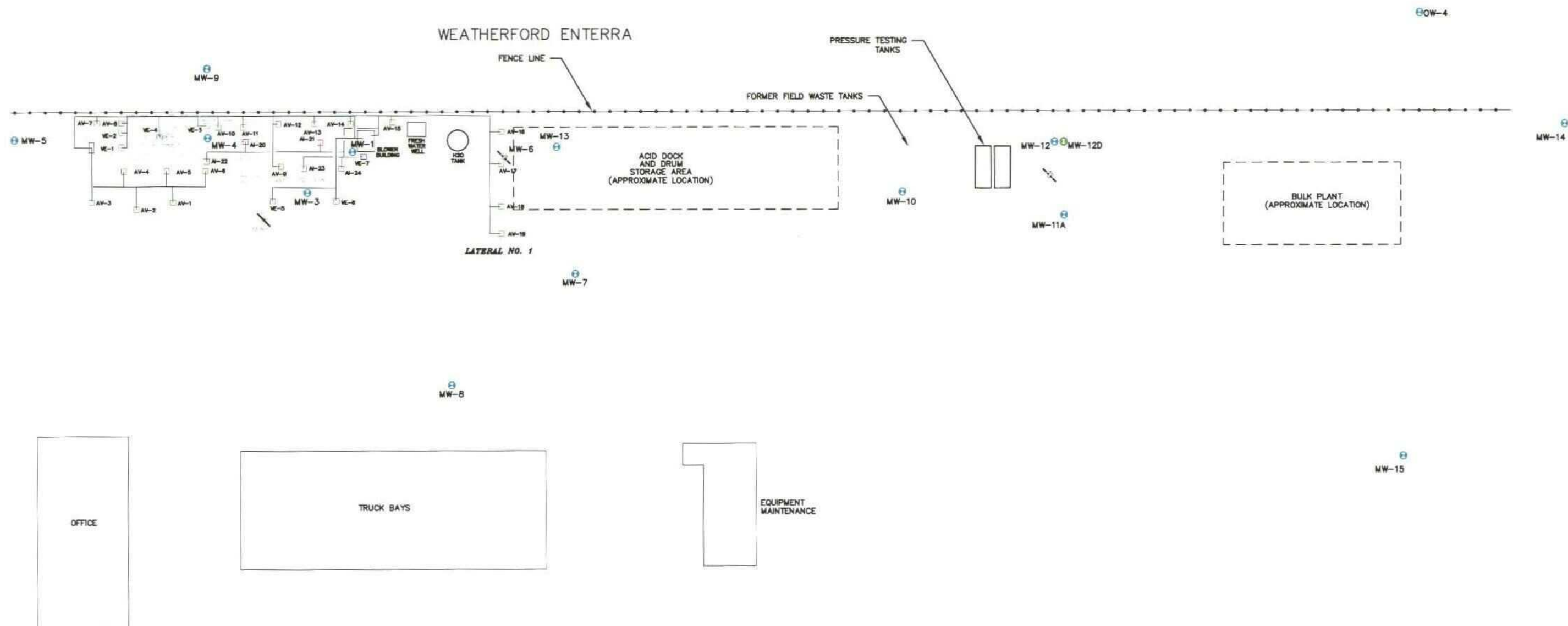
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# Figures



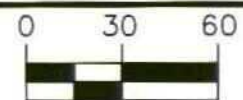


## FIGURES



**BROWN AND  
CALDWELL**  
HOUSTON, TEXAS

SUBMITTED: \_\_\_\_\_ DATE: \_\_\_\_\_  
PROJECT MANAGER  
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_  
BROWN AND CALDWELL



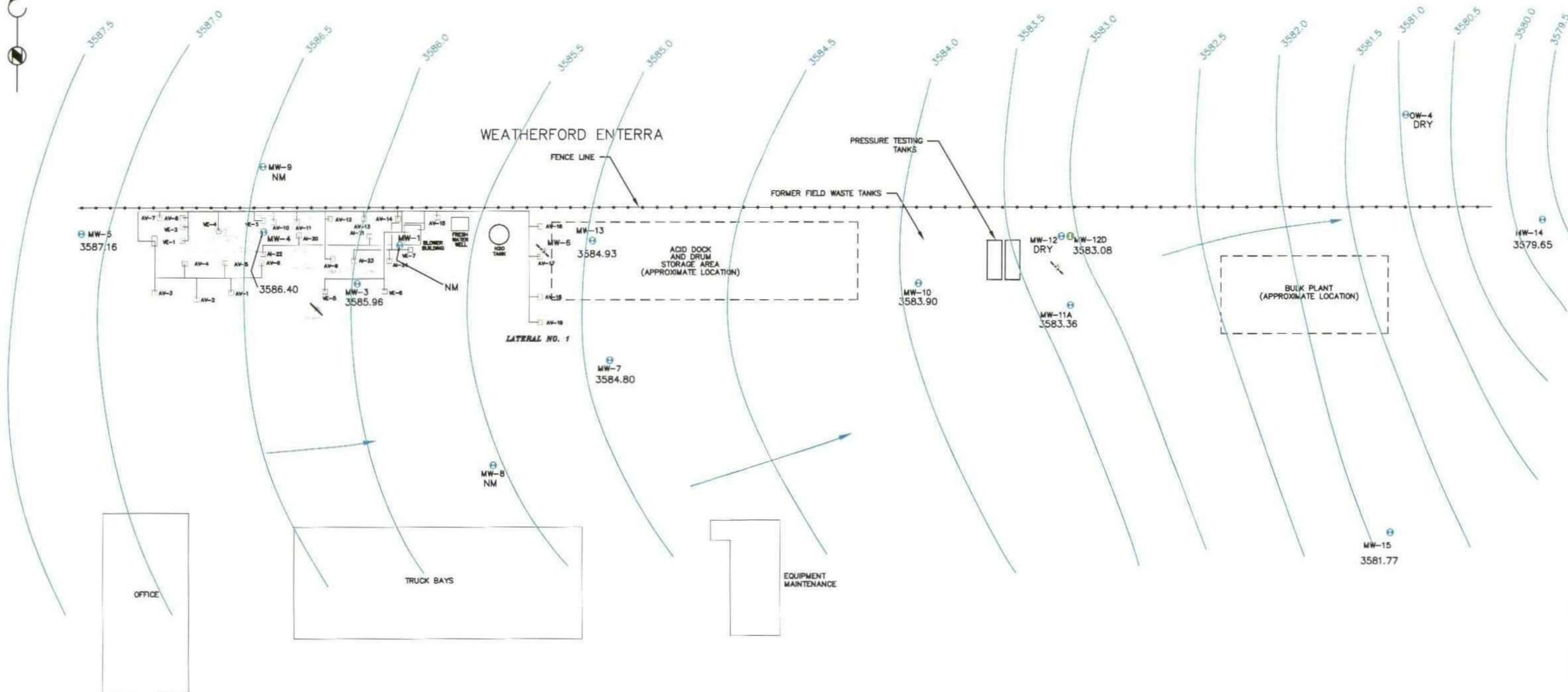
SCALE IN FEET

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

**LEGEND**

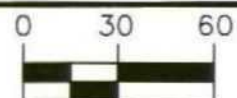
- MW-3 EXISTING MONITOR WELL LOCATION
- BIOSPARGING SYSTEM
- MONITOR WELL (PLUGGED AND ABANDONED)

TITLE	SITE MAP		DATE
CLIENT	BJ SERVICES COMPANY, U.S.A.		PROJECT NUMBER
SITE	HOBBS, NEW MEXICO		FIGURE NUMBER
			1



**BROWN AND CALDWELL**  
HOUSTON, TEXAS

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PROJECT MANAGER  
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_  
BROWN AND CALDWELL



SCALE IN FEET

DRAWN BY: CLK DATE 1/02

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

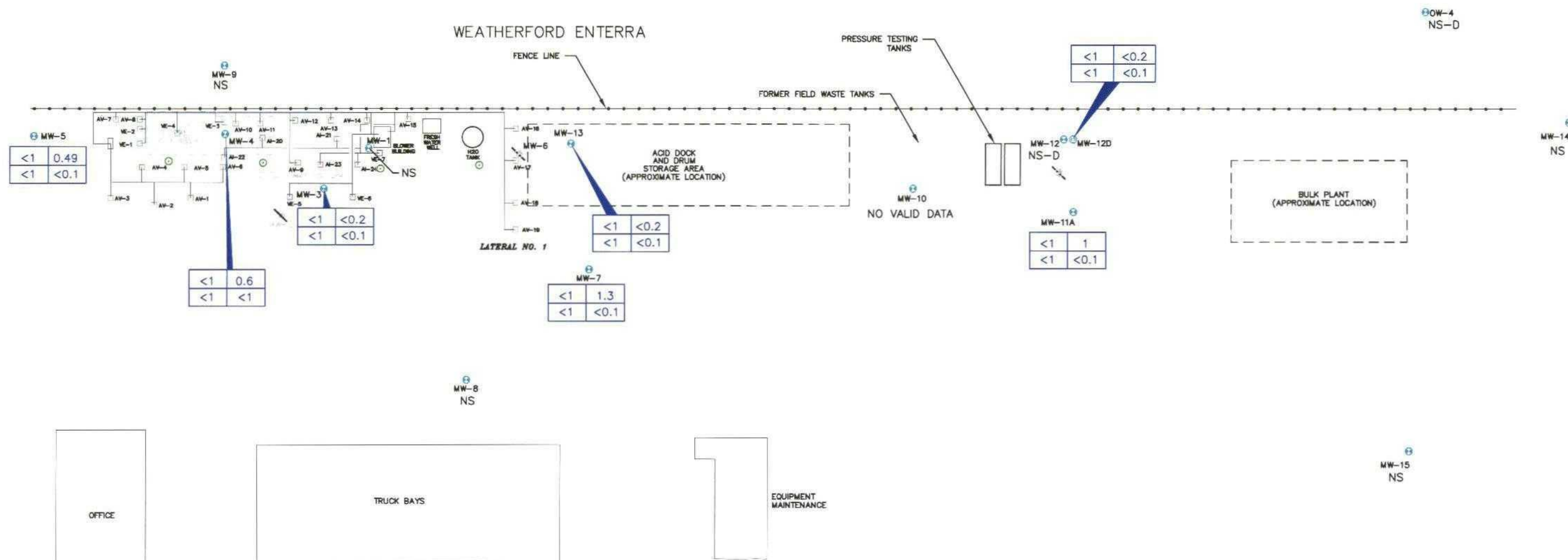
REV'D BY: \_\_\_\_\_ DATE: \_\_\_\_\_

- LEGEND**
- 3585.96 MW-3 MONITOR WELL LOCATION WITH GROUNDWATER ELEVATION (feet AMSL)
  - BIOSPARGING SYSTEM
  - GROUNDWATER FLOW DIRECTION
  - MONITOR WELL (PLUGGED AND ABANDONED)
  - NM - NOT MEASURED

TITLE	GROUNDWATER ELEVATION MAP FOR DECEMBER 6, 2001	DATE	1/17/02
CLIENT	BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER	12832.016
SITE	HOBBS, NEW MEXICO	FIGURE NUMBER	2



## WEATHERFORD ENTERRA



**BROWN AND  
CALDWELL**  
HOUSTON, TEXAS

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PROJECT MANAGER

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_  
BROWN AND CALDWELL

0 30 60  
SCALE IN FEET

DRAWN BY: CLK DATE: 1/02

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

## LEGEND

- MW-3 EXISTING MONITOR WELL LOCATION  
MW-2 MONITOR WELL (PLUGGED AND ABANDONED)
- BENZENE (ug/L) 

<1	<0.2
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 - TPH-D (mg/L)  
TOTAL BTEX (ug/L) 

<1	<0.1
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 - TPH-G (mg/L)
- NS = NOT SAMPLED  
NS-D = NOT SAMPLED (DRY WELL)

BIOSPARGING SYSTEM

TITLE HYDROCARBONS DISTRIBUTION  
MAP FOR DECEMBER 6, 2001

CLIENT BJ SERVICES COMPANY, U.S.A.

SITE HOBBS, NEW MEXICO

DATE  
1/17/02

PROJECT NUMBER  
12832.016

FIGURE NUMBER  
3

# Tables



## TABLES

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

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 - August 10, 1992	Brown and Caldwell conducted a soil and groundwater investigation 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.

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

Date	Activity
June 21, 1993	ENSR Consulting and Engineering (ENSR), the environmental consultant 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.



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

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.

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

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.

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

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.

**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)
		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	
		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	0.27	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	
		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	57.90	0.00	3.589.65	
		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	
		12/6/2001	not measured			
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-5	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	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	3.593.45	
		12/2/1996	52.23	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	

**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	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	
		3/9/2000	56.23	0.00	3.588.77	
		6/8/2000	56.66	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	
MW-4	3.645.28	9/10/01	58.54	0.00	3.586.46	(1)  PSH Sheen  200 ml PSH
		12/6/2001	59.04	0.00	3.585.96	
		8/10/1992	50.55	0.00	3.594.75	
		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	51.05	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	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	
		3/24/1998	53.20	0.25	3.592.29	
		6/23/1998	53.82	0.22	3.591.64	
		9/30/1998	53.96	0.00	3.591.32	
		12/9/1998	54.27	0.00	3.591.01	
		3/10/1999	54.69	0.04	3.590.62	
		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	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	
		12/7/2000	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	
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	

**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	1/26/1994	52.50	0.00	3,595.22	
		5/3/1995	53.57	0.00	3,594.15	
		7/31/1995	53.27	0.00	3,594.45	
		11/14/1995	52.85	0.00	3,594.89	
		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	56.95	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	
		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	
		12/6/2001	60.56	0.00	3,587.16	
MW-6	3,644.74	2/9/1995	50.58	0.00	3,594.16	(1)
		8/18/1995	50.78	0.00	3,593.96	
		1/26/1994	51.00	0.00	3,593.74	
		5/3/1995	52.65	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	51.65	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	-	-	-	(5),(6)
MW-7	3,644.55	2/9/1995	50.55	0.00	3,594.02	(1)
		8/18/1995	50.74	0.00	3,593.81	
		1/26/1994	51.01	0.00	3,593.54	

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

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-7	3.644.55	5/3/1995	52.25	0.00	3.592.30	
		7/31/1995	51.92	0.00	3.592.65	
		11/14/1995	51.48	0.00	3.593.07	
		2/23/1996	52.15	0.00	3.592.40	
		5/31/1996	51.78	0.00	3.592.77	
		8/23/1996	52.02	0.00	3.592.55	
		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	55.75	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	58.24	0.00	3.586.26	
		6/21/01	58.91	0.00	3.585.64	
		9/10/01	59.25	0.00	3.585.30	
		12/6/2001	59.75	0.00	3.584.80	
MW-8	3.644.87	2/9/1995	50.48	0.00	3.594.39	(1)
		8/18/1995	50.67	0.00	3.594.20	
		1/26/1996	50.96	0.00	3.593.91	
		5/3/1996	52.15	0.00	3.592.72	
		7/31/1996	51.77	0.00	3.593.10	
		11/14/1996	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	52.45	0.00	3.592.44	
		3/12/1997	52.95	0.00	3.591.94	
		6/12/1997	53.96	0.00	3.590.91	
		9/11/1997	52.75	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	3.589.87	
		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	
		12/9/1999	-	-	-	(3)
		3/9/2000	56.52	0.00	3.588.35	

**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	6/8/2000	-	-	-	
		9/13/2000	-	-	-	
		12/7/2000	-	-	-	
		3/8/2001	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	not measured			
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	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	
		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	3.590.65	
		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	55.69	0.00	3.589.09	
		6/8/2000	-	-	-	
		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	
		12/6/2001	not measured			
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	
		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	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	
		3/12/1997	54.21	0.00	3.590.26	
		6/12/1997	53.99	0.00	3.590.48	



**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	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	
		12/7/2000	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	
		12/6/2001	60.65	0.00	3.583.90	
MW-11	3.643.78	8/18/1995	51.97	0.00	3.591.86	(1)
		1/26/1994	52.37	0.00	3.591.46	
		5/3/1995	53.38	0.00	3.590.40	
		7/31/1995	53.35	0.00	3.590.45	
		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	3.590.55	
		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	52.95	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	55.45	0.00	3.588.81	
		9/30/1998	55.96	0.00	3.588.28	
		12/9/1998	56.15	0.00	3.588.11	
		3/10/1999	56.45	0.00	3.587.81	
		6/10/1999	56.94	0.00	3.587.30	
		7/2/1999	57.01	0.00	3.587.25	
		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	3.586.25	
		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	

**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	3/8/2001	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	
		12/6/2001	60.88	0.00	3.583.36	
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	
		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	
		12/7/2000	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	
12/6/2001	well dry					
MW-12D	3.644.38	7/2/1999	57.15	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	-	-	-	
		12/7/2000	-	-	-	
		3/8/2001	-	-	-	
		6/21/01	-	-	-	
		9/10/01	-	-	-	
		12/6/2001	61.30	0.00	3.583.08	
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	3.587.25	
		12/7/2000	58.68	0.00	3.586.84	
		3/8/2001	59.19	0.00	3.586.35	
		6/21/01	59.80	0.00	3.585.72	
		9/10/01	60.05	0.00	3.585.49	
		12/6/2001	60.59	0.00	3.584.95	
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	

**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-14	3.642.45	9/10/01	62.31	0.00	3.580.14	
		12/6/2001	62.80	0.00	3.579.65	
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	
		12/6/2001	61.47	0.00	3.581.77	
OW-4	3.644.06	7/2/1999	58.18	0.00	3.585.88	(8)
		9/14/1999	58.65	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	
		3/8/2001	61.45	0.00	3.582.63	(10)
		6/21/01	61.48	0.00	3.582.58	
		9/10/01	61.55	0.00	3.582.53	
		12/6/2001		well dry		

(1) - Top of casing elevations and groundwater elevations of all monitor wells were relative to an arbitrary datum of

100.00 feet prior to March 1997 and have been converted to Mean Sea Level (MSL).

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

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

Note: The specific gravity (SG) of the free product is 0.8.

(3) - Not measured.

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

(5) - Well plugged and abandoned July 2, 1994.

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

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

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

(9) - TOC elevation for MW-15 estimated relative to TOC elevation for MW-7.

**Table 3**  
**December 6, 2001 Field Screening Results for Groundwater Samples**  
**Hobbs, New Mexico Facility**  
**BJ Services Company, U.S.A.**

Monitor Well	Cumulative Gallons Removed	pH	Temperature (°C)	Conductivity (umhos/cm)	Redox (mV)	Dissolved Oxygen (meter) (mg/L)	Dissolved Oxygen (Hach kit) (mg/L)	Ferrous Iron (mg/L)	Alkalinity (mg/L)
MW-3	NM <sup>(2)</sup>	7.5	NM	NM	NM	NM	NM	NM	NM
MW-4	0.25	7.26	17.38	1289.0	-51.6	3.61	NM	NM	NM
MW-5	0.25	7.58	17.37	1151	90.6	4.46	NM	NM	NM
MW-7	0.25	6.99	19.0	787	106.2	2.60	NM	NM	NM
MW-10 <sup>(3)</sup>	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-11A	0.25	6.95	17.02	4005	-78.0	1.85	0.0	6.0	770
MW-12D	0.25	7.4	18.6	1134	-119.5	0.98	0.4	0.4	720
MW-13	0.25	7.32	18.31	1645	8.5	0.99	0.4	2.6	NM
MW-14	0.25	7.39	17.18	1819	58.1	1.21	NM	NM	NM
MW-15	0.25	7.20	18.52	1281	111.1	4.71	NM	NM	NM
OW-4 <sup>(4)</sup>	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

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

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

<sup>(4)</sup> Well dry. NM-D=Not Measured (well dry)

Monitor well MW-2 not operative after January 1994. P&A'd 7/1/95

Monitor well MW-6 P&A'd 7/1/95

Monitor well MW-11 not operative after September 1997. P&A'd 7/1/95

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-1	8/10/92	Regular	5550.0	12090.0	2160.0	7570.0	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	5700.0	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	1500.0	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	5300.0	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	54000.0	7500.0	27000.0	180	160
	9/12/97	Regular	1800.0	4400.0	1000.0	5000.0	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	55.0	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
	5/10/1999	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	0.65	0.70
	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	NS
	3/9/2000	Regular	<1	<1	<1	9.1	14	1.3
	6/8/2000	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
	3/8/2001	Regular	2.0	<1	<1	<1	0.45	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	NS	NS	NS	NS	NS	NS	NS
MW-2	8/10/92	Regular	14.5	<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	5300.0	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	530.0	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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-5	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	5.5
	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	550.0	1.0	3.8
	12/10/1998	Regular	13.0	220.0	160.0	290.0	1.5	0.45
	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	0.52	< 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
MW-4	8/10/97	Regular	2594.0	10360.0	2160.0	6740.0	NA	NA
	2/9/98	Regular	5200.0	15000.0	2200.0	10000.0	NA	NA
	8/19/98	Regular	5000.0	12000.0	< 2000	7000.0	NA	NA
	1/27/99	Regular	NSP	NSP	NSP	NSP	NA	NSP
	5/3/99	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/99	Regular	5700.0	17000.0	3500.0	15000.0	NA	120
	11/15/99	Regular	490.0	1600.0	510.0	1100.0	NA	5.1
	2/23/99	Regular	360.0	2800.0	560.0	2500.0	NA	18
	5/31/99	Regular	84.0	850.0	280.0	1100.0	NA	6.1
	8/23/99	Regular	110.0	1400.0	450.0	1800.0	NA	9.8
	12/2/99	Regular	190.0	2000.0	1800.0	7200.0	56	45
	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	76
	12/10/97	Regular	250.0	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	9.5	4.5
	12/10/1998	Duplicate	26.0	62.0	180.0	850.0	3.9	4.5
	3/10/1999	Regular	8.0	20.0	250.0	1400.0	13.0	15
	6/10/1999	Regular	<1.0	<1.0	12.0	12.0	0.44	0.65
	9/14/1999	Regular	< 1.0	< 1.0	5.5	13.1	0.35	0.17
	12/9/1999	Regular	< 1	2.5	2.5	20.1	2	0.55
	3/10/2000	Regular	< 1	< 1	< 1	3.6	2.6	0.15
	6/8/2000	Regular	< 1	< 1	< 1	< 1	0.44	0.25
	9/13/2000	Regular	< 1	< 1	< 1	< 1	0.61	<0.1
	12/7/2000	Regular	< 1	< 1	1.5	< 1	0.55	0.16
	3/8/2001	Regular	< 1	< 1	< 1	< 1	0.45	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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-5	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	< 0.5	< 0.5	< 0.5	< 0.6	NA	NA
	11/15/95	Regular	< 0.5	1.2	< 0.5	1.5	NA	NA
	2/23/96	Regular	< 0.5	< 0.5	< 0.5	< 0.6	NA	NA
	5/31/96	Regular	31.0	86.0	10.0	20.0	NA	NA
	8/23/96	Regular	< 0.5	< 0.5	< 0.5	< 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	0.50	< 0.1
	6/21/2001	Regular	< 1	< 1	< 1	< 1	0.20	< 0.1
	9/10/2001	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	12/6/2001	Regular	< 1	< 1	< 1	< 1	0.45	< 0.1
MW-6	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	7000.0	19000.0	3100.0	7200.0	NA	NA
	8/19/93	Regular	8100.0	19000.0	3500.0	6400.0	NA	NA
	1/27/94	Regular	7960.0	20200.0	3830.0	6150.0	NA	NA
	5/4/95	Regular	11000.0	17000.0	2900.0	6000.0	NA	NA
	8/1/95	Regular	8300.0	12000.0	2500.0	5100.0	NA	60
	11/15/95	Regular	8900.0	17000.0	2900.0	5500.0	NA	57
	2/23/96	Regular	8100.0	10000.0	2300.0	4000.0	NA	58
	5/31/96	Regular	83.0	150.0	15.0	51.0	NA	0.57
	5/31/96	Duplicate	87.0	160.0	13.0	47.0	NA	0.52
	8/23/96	Regular	31.0	28.0	9.4	7.9	NA	0.46
	12/2/96	Regular	< 1	< 1	< 1	1.7	5.6	< 0.1
	3/12/97	Regular	12.0	< 5	6.8	18.0	12	< 0.5
	6/12/97	Regular	1900.0	1400.0	410.0	310.0	7.8	7.4
	9/11/97	Regular	11.0	1.3	3.4	< 1	1	< 0.1
	12/10/97	Regular	3.0	4.2	1.2	3.9	1.7	0.14
	3/23/98	Regular	3.6	< 1	4.0	< 1	< 0.2	< 0.1
	6/23/98	Regular	170.0	4.1	15.0	7.2	1.2	0.51
	9/30/1998	Regular	1000.0	420.0	140.0	270.0	4.0	3.3

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-6 <sup>1</sup>	12/10/1998	Regular	7.6	6.6	1.7	5.8	2.0	< 0.1
	5/10/1999	Regular	2500.0	950.0	590.0	1400.0	11.0	15
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	85.0	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	< 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	< 1	< 1	< 1	< 1	1.8	< 0.1
	3/9/2000	Regular	< 1	< 1	< 1	< 1	0.60	< 0.1
	6/8/2000	Regular	< 1	< 1	< 1	< 1	< 0.20	< 0.1
	9/13/2000	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	12/7/2000	Regular	< 1	< 1	< 1	< 1	< 0.24	< 0.1
	3/8/2001	Regular	< 1	< 1	< 1	< 1	1.7	< 0.1
	6/21/2001	Regular	3.1	< 1	< 1	< 1	< 0.25	< 0.1
	9/10/2001	Regular	< 1	< 1	< 1	< 1	< 0.33	< 0.1
	12/6/2001	Regular	< 1	< 1	< 1	< 1	1.5	< 0.1
MW-8	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	3.0	4.9	0.8	3.7	NA	NA
	8/1/95	Regular	3.1	1.2	0.5	1.6	NA	< 0.001
	8/1/95	Duplicate	3.6	1.5	0.5	1.5	NA	< 0.1
	11/15/95	Regular	< 0.3	0.5	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	1.8	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	9/11/97	Regular	< 1	< 1	< 1	< 1	0.1	< 0.1
	12/10/97	Regular	< 1	< 1	< 1	< 1	0.5	< 0.1



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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-8	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
MW-9	4/22/95	Regular	570.0	380.0	< 50	870.0	NA	NA
	7/15/95	Regular	121.0	7.5	5.0	458.0	NA	NA
	8/19/95	Regular	390.0	290.0	40.0	250.0	NA	NA
	1/27/96	Regular	327.0	357.0	51.1	293.0	NA	NA
	5/3/96	Regular	380.0	110.0	19.0	120.0	NA	NA
	8/1/96	Regular	660.0	410.0	91.0	310.0	NA	6.7
	11/15/96	Regular	240.0	24.0	11.0	140.0	NA	1.5
	11/15/96	Duplicate	170.0	18.0	10.0	120.0	NA	1.9
	2/23/96	Regular	170.0	18.0	2.5	160.0	NA	4.3
	5/31/96	Regular	120.0	16.0	5.0	200.0	NA	NA
	8/23/96	Regular	82.0	15.0	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	15.0	2.4	270.0	5.7	2.9
	3/12/97	Regular	30.0	48.0	420.0	880.0	8.2	19
	6/12/97	Regular	4.5	2.1	11.0	97.0	2.6	2.2
	6/12/97	Duplicate	< 5	< 5	6.6	69.0	5.7	1.9
	9/12/97	Regular	2.1	2.3	2.1	120.0	1.7	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	1.5
	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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-9	12/6/2001	-	NS	NS	NS	NS	NS	NS
MW-10	8/19/95	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	1500.0	32.0	32.0	100.0	NA	5.6
	11/15/95	Regular	1000.0	24.0	15.0	56.0	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	1.5	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	2.5	26.0	2.7	0.76	0.35
	9/12/97	Duplicate	87.0	2.4	26.0	2.8	0.79	0.35
	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	5.5	1.5	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	0.56
	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	0.97	< 0.5
	6/10/1999	Regular	17.0	< 1.0	< 1.0	< 1.0	0.50	0.16
	9/14/1999	Regular	10.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/1999	Regular	25.0	< 1	< 1	1.2	0.44	0.16
	3/10/2000	Regular	300.0	4.5	6.6	43.2	1.1	0.85
	6/8/2000	Regular	78.0	1.7	7.2	9.0	0.67	0.74
	9/15/2000	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	0.7
	6/22/2001	Regular	< 1	< 1	< 1	< 1	1.2	< 0.1
	9/10/01 and 9/18/01	Regular	2	< 1	< 1	< 1	2.5	< 0.1
	12/6/2001	Regular	78	460	32	239	NA	2.2
MW-11	8/19/95	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/4/95	Regular	< 0.5	< 0.5	< 0.5	< 0.6	NA	NA
	8/1/95	Regular	44.0	29.0	5.5	13.0	NA	0.7
	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	0.5	4.7	NA	0.26
	12/2/96	Regular	970.0	< 5	6.0	8.1	2	1.5
	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	0.45	< 0.5
	6/12/97	Regular	150.0	23.0	19.0	< 5	1.1	0.55
MW-11A	9/12/97	Regular	220.0	15.0	27.0	13.0	1	0.46
	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	9.5	3.7	2.2	7.0	< 0.20	0.1

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-11A	12/10/1998	Regular	1.7	<1.0	<1.0	<1.0	<0.20	<0.1
	5/10/1999	Regular	<5	<5	<5	<5	0.5	<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	0.45	<0.1
	6/8/2000	Regular	5.6	<1	<1	<1	0.57	<0.1
	9/13/2000	Regular	1.4	<1	<1	<1	0.56	<0.1
	12/7/00	Regular	26	<1	<1	3.5	0.5	0.12
	5/8/01	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
MW-12	5/24/98	Regular	100.0	11.0	6.0	8.0	0.28	0.41
	6/23/98	Regular	88.0	<5	<5	<5	<0.2	<0.5
	6/23/98	Duplicate	89.0	<5	<5	<5	0.51	<0.5
	9/30/1998	Regular	260.0	5.0	1.2	7.9	<0.20	0.62
	12/10/1998	Regular	160.0	<1.0	<1.0	1.2	0.21	0.56
	5/10/1999	Regular	160.0	1.1	<1.0	2.9	0.58	0.45
	6/10/1999	Regular	49.0	1.4	<1.0	<1.0	0.22	0.15
	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	0.23
	5/10/2000	Regular	95.0	<1	<1	<1	<0.2	0.27
	5/10/2000	Duplicate	99.0	<1	<1	<1	0.27	0.27
	6/8/2000	Regular	62.0	<1	<1	<1	<0.2	<0.1
	9/13/2000	Regular	54.0	<1	<1	<1	0.25	<0.1
	12/7/2000	Regular	27	<1	2.4	1.4	<0.21	<0.1
	5/8/2001	Regular	14	<1	<1	<1	2.7	0.1
	6/22/2001	Regular	12	<1	<1	<1	0.55	0.11
	9/10/2001	Regular	NS-D	NS-D	NS-D	NS-D	NS-D	NS-D
	12/6/2001	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
	5/9/2000	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
	5/8/2001	-	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
MW-15	7/2/1999	Regular	1500.0	25.0	750.0	58.0	2.2	5.1
	9/14/1999	Regular	860.0	16.0	450.0	34.4	2.1	5.1
	12/9/1999	Regular	450.0	16.0	410.0	40.9	0.46	5.2
	5/10/2000	Regular	88.0	2.8	200.0	1.5	1.9	0.99
	6/8/2000	Regular	6.0	<1	65.0	5.5	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	0.45	<0.1
	5/8/2001	Regular	<1	<1	1.2	<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 Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-13	6/22/2001	Regular	< 1	< 1	< 1	< 1	0.31	<0.1
	9/10/2001	Regular	< 1	< 1	< 1	< 1	0.5	<0.1
	12/6/2001	Regular	< 1	< 1	< 1	< 1	<0.7	<0.1
MW-14	1/14/2001	Regular	<1	<1	<1	<1	<0.7	<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
MW-15	1/14/2001	Regular	<1	<1	<1	<1	<0.7	<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
OW-4	6/10/1999	Regular	<1.0	<1.0	<1.0	4.4	<0.7	<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	<0.7	<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	<0.7	<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
	12/6/2001	-	NS-D	NS-D	NS-D	NS-D	NS-D	NS-D

1 Well plugged and abandoned 7/1/99  
 NA= Not Analyzed    NS= Not Sampled    NS-D= Not Sampled because well was Dry    NS-P= Not Sampled due to Phase-separated hydrocarbons in well

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

Sample Date	Monitor Wells <sup>(1)</sup>														
	MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	MW-14
8/1/95	160	150	310	130	380	310	350	110	2200	3400	NA <sup>(3)</sup>	NA	NA	NA	NA
8/23/96	130	140	100	99	210	250	360	140	2000	2900	NA	NA	NA	NA	NA
3/23-24/98	212	206	126	151	183	223	364	164	2390	NA	940	1200	NA	NA	NA
3/9-10/99	163	156	142	155	411	238	274	123	1160	NA	834	314	NA	NA	NA
6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	195	496	NA
3/9-10/00	258	196	196	196	NA	224	241	131	474	NA	1290	327	117	276	NA
1/14/2001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3/8-9/01	NA	165	172	152	NA	224	250	127	879	NA	1720	586	NA	276	NA
6/21/2001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/10/2001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/18/2001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	78.8	NA	NA
12/6/2001	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

<sup>(1)</sup> - in mg/l.

<sup>(2)</sup> - NMWQC standard for chloride is 250 mg/l.

<sup>(3)</sup> - 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.

<sup>(4)</sup> - NA indicates not analyzed.

**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-5	3/23/98	3.87	190	<0.0012
	3/9/99	<0.1	195	<0.0012
	6/10/99	4.73	209	<0.0012
	9/14/99	4.3	210	<0.0012
	12/9/99	4.2	210	<0.0012
	3/9/00	5.3	260	<0.0012
	6/8/00	4.7	240	<0.0012
	9/13/00	3.93	200	<0.0012
	12/7/00	3.27	160	<0.0012
	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
MW-10	3/23/98	0.07	320	0.91
	6/23/98	<0.1	325	0.55
	9/30/98	<0.1	204	0.81
	12/10/98	<0.1	180	0.091
	3/9/99	<0.1	142	0.035
			225 <sup>(3)</sup>	
	9/14/99	<0.10	160	0.0049
	12/9/99	0.49	170	0.0039
	3/10/00	0.1	160	0.0056
	6/8/00	<0.1	150	0.031
	9/13/00	<0.1	160	0.031
	12/7/00	<0.1	190	0.17
	3/8/01	<0.1	270	<0.0012
	6/22/01	<0.1	270	0.044
	9/10/01	NA	NA	NA
MW-11A	3/23/98	<0.05	190	0.14
	6/23/98	<0.1	225	0.11
	9/30/98	0.4	196	0.043
	12/10/98	0.7	188	0.033

**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-11A	3/10/99	<0.1	164	0.094
		<0.1 <sup>(4)</sup>	227 <sup>(5)</sup>	
	6/10/99	<0.1	181	0.0036
	9/13/99	0.22	250	<0.0012
	12/9/99	<0.1	290	0.0079
	3/9/00	0.11	270	0.037
	6/8/00	<0.1	240	0.0069
	9/13/00	<0.1	320	<0.0012
	12/7/00	<0.1	260	0.0096
	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
MW-12	3/23/98	<0.05	240	<0.0012
	6/23/98	<0.1	240	<0.0012
	9/30/98	<0.1	168	<0.0012
	12/10/98	<0.1	202	<0.0012
	3/10/99	<0.1	137	<0.0012
		<0.1 <sup>(4)</sup>	193 <sup>(5)</sup>	
	6/10/99	<0.1	217	<0.0012
	9/14/99	<0.10	230	<0.0012
	12/9/99	<0.1	180	<0.0012
	3/10/00	<0.1	210	<0.0012
	6/8/00	<0.1	220	<0.0012
	9/13/00	<0.1	240	<0.0012
	12/7/00	<0.1	260	<0.0012
	3/8/01	<0.1	300	<0.0012
	6/22/01	<0.1	360	0.0021
	9/10/01	NS-D <sup>(5)</sup>	NS-D	NS-D
	12/6/01	NS-D	NS-D	NS-D

**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-12D <sup>(6)</sup>	9/18/01	NA	190	<0.0012
	12/6/01	<0.1	200	<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

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

<sup>(6)</sup> - Well MW-12D not sampled for applicable parameters until well MW-12 went dry

mg/L = milligrams per liter



## Appendices



## APPENDICES

A



**APPENDIX A**  
**Groundwater Sampling Forms**



## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-3

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 017Date: 12/6/01 Time: 1540Client: BJ ServicesPersonnel: Tesque, L; Mortl, AProject Location: Holts, NMWeather: Clear / Cooling

## 2. WELL DATA

Casing Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Screen Diameter: <u>2</u> inches	Type: <input checked="" type="checkbox"/> PVC <input type="checkbox"/> Stainless <input type="checkbox"/> Galv. Steel <input type="checkbox"/> Teflon® <input type="checkbox"/> Other: _____
Total Depth of Well: <u>62.00</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input checked="" type="checkbox"/> Other: <u>Historical</u>
Depth to Static Water: <u>59.44</u> feet	From: <input checked="" type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Depth to Product: <u>—</u> feet	From: <input type="checkbox"/> Top of Well Casing (TOC) <input type="checkbox"/> Top of Protective Casing <input type="checkbox"/> Other: _____
Length of Water Column: <u>2.96</u> feet	Well Volume: <u>0.49</u> gal
Screened Interval (from GS): <u>45-60</u>	
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft	

## 3. PURGE DATA

Purge Method: <input checked="" type="checkbox"/> Boiler, Size: <u>1</u> <input type="checkbox"/> Bladder Pump <input type="checkbox"/> 2" Submersible Pump <input type="checkbox"/> 4" Submersible Pump		Equipment Model(s): _____	
Materials: Pump/Boiler <input type="checkbox"/> Stainless <input type="checkbox"/> PVC <input type="checkbox"/> Teflon® <input checked="" type="checkbox"/> Other: <u>Polyethylene</u>		1. <u>YSI-600</u>	
Materials: <u>Rope</u> Tubing <input type="checkbox"/> Polyethylene <input type="checkbox"/> Polypropylene <input type="checkbox"/> Teflon® <input checked="" type="checkbox"/> Other: <u>Nylon</u>		2. _____	
Was well purged dry? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		3. _____	
Pumping Rate: _____ gal/min			

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other	Comments
1545	<u>0.4</u>	7.3	Purged	Nearly Dry;	Allow	10 minute	Recharge		
1558	Start	Sampling	→ well goes nearly Dry;	Allow	10 minute	Recharge			
	Complete	Sampling							

## 4. SAMPLING DATA

Method(s): <input checked="" type="checkbox"/> Boiler, Size: <u>1</u> <input type="checkbox"/> Bladder Pump <input type="checkbox"/> 2" Submersible Pump <input type="checkbox"/> 4" Submersible Pump		Geochemical Analyses	
Materials: Pump/Boiler <input type="checkbox"/> Stainless <input type="checkbox"/> PVC <input type="checkbox"/> Teflon® <input checked="" type="checkbox"/> Other: <u>Polyethylene</u>		Ferrous Iron: _____ mg/L	
Materials: Tubing/ <u>Rope</u> <input type="checkbox"/> Polyethylene <input type="checkbox"/> Polypropylene <input type="checkbox"/> Teflon® <input checked="" type="checkbox"/> Other: <u>Nylon</u>		DO: _____ mg/L	
Depth to Water at Time of Sampling: <u>DNM</u> Field Filtered? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Nitrate: _____ mg/L	
Sample ID: <u>MW-3</u> Sample Time: <u>1545</u> # of Containers: <u>5</u>		Sulfate: _____ mg/L	
Duplicate Sample Collected? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No ID: _____		Alkalinity: _____ mg/L	

5. COMMENTS	Replaced well cap - Old cap damaged; Replaced lock with 2001 series, Non-Traditional well vault contributing to damage to well cap - May need to replace vault
-------------	--

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

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## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-4

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 417Date: 12/6/01Time: 1645Client: BJ ServicePersonnel: Tengue, L; Mort, AProject Location: Hobbs, NMWeather: cool

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon ☐ Other: \_\_\_\_\_Total Depth of Well: 61.30 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☒ Other: HistoricalDepth to Static Water: 58.88 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Depth to Product: — feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: 2.42 feet Well Volume: 0.40 galScreened Interval (from GS): 45-60

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailor, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

Equipment Model(s)

Materials: Pump/Bailor ☐ Stainless ☐ PVC ☐ Teflon ☒ Other: Polyethylene  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable1. YSI-600Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

2. \_\_\_\_\_

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

3. \_\_\_\_\_

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1648	0.25	7.26	17.38	1289	-51.6	3.61	—		
1649	0.40	well Purged Nearly Dry							
		Allow Recharge for approximately 1 minute							

## 4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailor ☐ Stainless ☐ PVC ☐ Teflon ☒ Other: Polyethylene  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: DNM Field Filtered? ☐ Yes ☒ NoSample ID: MW-4Sample Time: 1650# of Containers: 5Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

Tubing has yellow powder on it - "wet" portion of tubing has yellow tint water "clear" but has black "organic" sludge at bottom of well based on visual of bailer when pulled up.

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



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## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-5

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 017Date: 12/6/01Time: 10:00Client: BJ ServicesPersonnel: Teague, L; Mortl, AProject Location: Hobbs, NMWeather: Cool, Clear

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: 64.5 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☒ Other: HystericalDepth to Static Water: 60.56 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Depth to Product: \_\_\_\_\_ feet

From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: 3.94 feet Well Volume: 0.66 galScreened Interval (from GS): 45.5-59.5

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

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

Equipment Model(s)

Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☒ Other: Polyethylene1. YSI-600Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon

2. \_\_\_\_\_

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

3. \_\_\_\_\_

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other	Comments
1045	0.25	7.58	17.37	11.51	90.6	4.46			Well nearly dry.
									Allow to recharge approximately 5 minutes
									Collected Sample as well continues to recharge slowly.

## 4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☒ Other: polyethyleneMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: NylonDepth to Water at Time of Sampling: DNH Field Filtered? ☐ Yes ☒ NoSample ID: MW-5 Sample Time: 1045 # of Containers: 9Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

Yellow "powder" on outside of tubing & inside of well.  
Well was locked & properly secured on arrival; oil/water interface probe-battery out; Had to remeasure DTW @ 1145 hrs.

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

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## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-7

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 417Date: 12/6/01Time: 1200Client: BS ServicesPersonnel: Teague, L. J. Marti, AProject Location: Hobbs, NMWeather: Warm, Clear

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon ☐ Other: \_\_\_\_\_Total Depth of Well: 61.5 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☒ Other: HistoricalDepth to Static Water: 59.75 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Depth to Product: \_\_\_\_\_ feet

From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: 1.75 feet Well Volume: 0.29 galScreened Interval (from GS): 45.5-59.5

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Boiler, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

Equipment Model(s): \_\_\_\_\_

Materials: Pump/Boiler ☐ Stainless ☐ PVC ☐ Teflon ☒ Other: Polyethylene  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable1. VSI-600Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

2. \_\_\_\_\_

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

3. \_\_\_\_\_

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1215	89.2	6.99	19.4	787	106.2	2.6	-		Greenish Yellow Tint -
									well Dry - Allow Recharge 30 minutes - Fill Vials - Dry
1420	Fill 3/4 of one Amber								- Well Dry; Allow Recharge
1530	Fill 1/4 of one Amber								1/3 of second Amber; well Dry; Allow Recharge
1747	Fill 2/3 of second Amber								well Dry

## 4. SAMPLING DATA

Method(s): ☒ Boiler, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Boiler ☐ Stainless ☐ PVC ☐ Teflon ☒ Other: Polyethylene  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableDepth to Water at Time of Sampling: DNM Field Filtered? ☐ Yes ☒ NoSample ID: MW-7Sample Time: 1215# of Containers: 5Duplicate Sample Collected? ☐ Yes ☐ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

Well continued to bail dry as sample containers were filled\* Based on start of Purge (Sample Collection over 5 hours)

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





## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: Mw-17

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 417Date: 12/6/01Time: 1641Client: BT ServicesPersonnel: Teague, L; Mortl, AProject Location: Hobbs, NMWeather: Cool, Clear

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: 62.0 feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☒ Other: HistoricalDepth to Static Water: 60.65 feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☒ Other: Broken

Depth to Product: \_\_\_\_\_ feet

From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: 0.65 feetWell Volume: 0.11 galScreened Interval (from GS): Not Reported

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailor, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

Equipment Model(s) \_\_\_\_\_

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

Pumping Rate: \_\_\_\_\_ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
									Well Sampled Dry - Start Sampling Mw-4 (Return)
									Water has large amounts of vegetative & insect matter content
									<u>see Note</u>

## 4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailor ☐ Stainless ☐ PVC ☐ Teflon® ☒ Other: Polyethylene  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: DNM Field Filtered? ☐ Yes ☒ NoSample ID: Mw-17Sample Time: 1700# of Containers: 6Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: NM mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: ✓ mg/L

## 5. COMMENTS

Manway Damaged - TOC is broken - well cap will not seal; well is sitting up from contaminants; well will be destroyed if manway not replaced.

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



## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW11 A

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 017Date: 12/6/01 Time: 1712Client: BJ ServicesPersonnel: Mortl, A, Tague, LProject Location: Hobbs, NMWeather: Cool - Sun going down

## 2. WELL DATA

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

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

Total Depth of Well: 63.3 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☒ Other: Historical

Depth to Static Water: 64.88 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: 2.42 feet Well Volume: 4.44 gal Screened Interval (from GS): 5' - 6.5'

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailor, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump

☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_ Equipment Model(s) \_\_\_\_\_

Materials: Pump/Bailor ☐ Stainless ☐ PVC ☐ Teflon® ☒ Other: Polyethylene

☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon

☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

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

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1720	0.25	6.95	17.02	4405	-75.4	1.53			
									well purged nearly dry @ 0.25 gallons. Allow 5 min.
									Recharge & Sample Well

## 4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump

☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

Materials: Pump/Bailor ☐ Stainless ☐ PVC ☐ Teflon® ☒ Other: Polyethylene

☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon

☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

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

Sample ID: MW11 A Sample Time: 1720 # of Containers: 9

Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: 6.4 mg/L

DO: 0.4 mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: 774 mg/L

## 5. COMMENTS

No lock on well cap & out of lock -  
Need lock for next sampling event.

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



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## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-12

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 017Date: 12/6/01Time: 1405Client: BT ServicesPersonnel: Teague, L, Morin, JProject Location: Hobbs, NMWeather: Warm, Clear

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: 67.8 feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☒ Other: DryDepth to Static Water: Dry feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☒ Other: Dry

Depth to Product: \_\_\_\_\_ feet

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

Length of Water Column: \_\_\_\_\_ feet

Well Volume: \_\_\_\_\_ gal

Screened Interval (from GS): \_\_\_\_\_

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☐ Baller, Size: \_\_\_\_\_ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

Equipment Model(s): \_\_\_\_\_

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

Pumping Rate: \_\_\_\_\_ gal/min

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

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

## 4. SAMPLING DATA

Method(s): ☐ Baller, Size: \_\_\_\_\_ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Baller ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableDepth to Water at Time of Sampling: \_\_\_\_\_ Field Filtered? ☐ Yes ☐ No

Sample ID: \_\_\_\_\_ Sample Time: \_\_\_\_\_ # of Containers: \_\_\_\_\_

Duplicate Sample Collected? ☐ Yes ☐ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

Well Dry, Bolts are stripped on well vault & need replacing

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



## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-12 D

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 017Date: 12/6/01Time: 1735Client: BJ ServicesPersonnel: Teague, L; Merrill AProject Location: Holbrook, NMWeather: Sunny Clear Wc

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: DNM feetFrom: ☐ Top of Well Casing (IOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Depth to Static Water: 61.3 feetFrom: ☐ Top of Well Casing (IOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Depth to Product: \_\_\_\_\_ feet

From: ☐ Top of Well Casing (IOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: 26.2 feet Well Volume: 4.3 galScreened Interval (from GS): 77.5-87.5

\* Based on Screened Interval

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailor, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailor ☐ Stainless ☐ PVC ☐ Teflon® ☒ Other: Polyethylene

Equipment Model(s)

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

Pumping Rate: \_\_\_\_\_ gal/min

3. \_\_\_\_\_

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other	Comments
1445	0.25	7.45	18.6	1134	-11943	0.98			
	Taking Sample after 2 C.35 gallon recovery based on other wells and dry wells.								

## 4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailor ☐ Stainless ☐ PVC ☐ Teflon® ☒ Other: Polyethylene☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: DNM Field Filtered? ☐ Yes ☒ NoSample ID: MW12 DSample Time: 1445# of Containers: 9Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: 0.4 mg/LDO: 0.4 mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

well back Boli holes Broken off

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

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## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-13

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 017Date: 12/6/01Time: 1510Client: BJ ServicesPersonnel: Teague, L., Morril, A.Project Location: Hobbs, NMWeather: Warm, Clear

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: 65.20 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☒ Other: HistoricalDepth to Static Water: 64.59 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Depth to Product: \_\_\_\_\_ feet

From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: 4.61 feetWell Volume: 0.77 galScreened Interval (from GS): 51-66

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailor, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

Equipment Model(s)

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

2. \_\_\_\_\_

Was well purged dry? ☐ Yes ☒ No

Pumping Rate: \_\_\_\_\_ gal/min

3. \_\_\_\_\_

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other	Comments
1515	0.25	7.32	19.31	1643	8.5	0.99			6121
	Water Recovered by bailer dropping. Allow 5 minute recharge								
	Take sample.								

## 4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailor ☐ Stainless ☐ PVC ☐ Teflon® ☒ Other: Polyethylene  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: DNM Field Filtered? ☐ Yes ☒ NoSample ID: MW-13Sample Time: 1515# of Containers: 5Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: 2.6 mg/LDO: 0.4 mg/LNitrate: — mg/LSulfate: — mg/LAlkalinity: 385 mg/L

## 5. COMMENTS

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

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## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW14

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 17Date: 12/6/01Time: 1807Client: BJ ServicesPersonnel: Tracy, L. Marshall, A.Project Location: Holbe, NMWeather: cool Dark

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: 69.2 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☒ Other: HistoricalDepth to Static Water: 62.8 feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Depth to Product: \_\_\_\_\_ feet

From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☒ Other: SLength of Water Column: 6.40 feetWell Volume: 1.07 galScreened Interval (from GS): 54.5-69.5

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailor, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

Equipment Model(s)

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

2. \_\_\_\_\_

Was well purged dry? ☐ Yes ☒ No

Pumping Rate: \_\_\_\_\_ gal/min

3. \_\_\_\_\_

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1807	20.25	7.39	17.18	1819	58.1	1.21	Remained 3 bails		
First two have full recovery, 3 bails has 1/2 recovery									
Decide to start sampling after allowing 5 minute recovery									
Collect one sample container									

## 4. SAMPLING DATA

Method(s): ☒ Bailor, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailor: ☐ Stainless ☐ PVC ☐ Teflon® ☒ Other: Polyethylene  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope: ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: DNM Field Filtered? ☐ Yes ☐ NoSample ID: MW14Sample Time: 1807# of Containers: 1Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

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

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## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-15

## 1. PROJECT INFORMATION

Project Number: \_\_\_\_\_ Task Number: \_\_\_\_\_

Date: \_\_\_\_\_

Time: 1300

Client: \_\_\_\_\_

Personnel: TeagueProject Location: Hobbs, NMWeather: Warming, Sunny

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon ☐ Other: \_\_\_\_\_Total Depth of Well: 67.0 feetFrom: ☒ Top of Well Casing (IOC) ☐ Top of Protective Casing ☒ Other: HistoricalDepth to Static Water: 61.47 feetFrom: ☒ Top of Well Casing (IOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Depth to Product: \_\_\_\_\_ feet

From: ☐ Top of Well Casing (IOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: 5.53 feetWell Volume: 0.92 galScreened Interval (from GS): 52-67

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Boiler, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

Equipment Model(s)

Materials: Pump/Boiler ☐ Stainless ☐ PVC ☐ Teflon ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable1. YSI-600Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

2. \_\_\_\_\_

Was well purged dry? ☐ Yes ☐ No

Pumping Rate: \_\_\_\_\_ gal/min

3. \_\_\_\_\_

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other	Comments
1314	7.25	7.20	18.52	1281	111	4.71			Purged "Dry"
									Allow to Recharge 5 minutes & collect one
									sample container

## 4. SAMPLING DATA

Method(s): ☒ Boiler, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Boiler ☐ Stainless ☐ PVC ☐ Teflon ☒ Other: Polyethylene  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: DNM Field Filtered? ☐ Yes ☒ NoSample ID: MW15Sample Time: 1310# of Containers: 1Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

No lock. Placed 2001 series lock on  
well cap

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



## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: OW-4

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 017Date: 12/6/01Time: 1345Client: BJ ServicesPersonnel: Teague, L, Math, LProject Location: Hobbs, NMWeather: Sunny, warm

## 2. WELL DATA

Casing Diameter: 4 inchesType: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 4 inchesType: ☐ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: 61.50 feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☒ Other: DryDepth to Static Water: 0-7 feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Depth to Product: \_\_\_\_\_ feet

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

Length of Water Column: \_\_\_\_\_ feet

Well Volume: \_\_\_\_\_ gal

Screened Interval (from GS): No Dry

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☐ Bailor, Size: \_\_\_\_\_ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

Equipment Model(s): \_\_\_\_\_

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

Pumping Rate: \_\_\_\_\_ gal/min

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

## 4. SAMPLING DATA

Method(s): ☐ Bailor, Size: \_\_\_\_\_ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailor ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableDepth to Water at Time of Sampling: \_\_\_\_\_ Field Filtered? ☐ Yes ☐ No

Sample ID: \_\_\_\_\_ Sample Time: \_\_\_\_\_ # of Containers: \_\_\_\_\_

Duplicate Sample Collected? ☐ Yes ☐ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

Well "Dry" - Moist - Silty - Sand at bottom based on "mud" streak in interface probe

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



B



## **APPENDIX B**

### **Laboratory Analytical Report for Groundwater Samples**



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

## Brown & Caldwell

Certificate of Analysis Number:

**01120267**

**Report To:**

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

fax: (713) 308-3886

**Project Name:**

BJ Service, Hobbs, NM #12832

**Site:**

Houston TX.

**Site Address:**

**PO Number:**

**State:**

New Mexico

**State Cert. No.:**

**Date Reported:**

12/24/01

This Report Contains A Total Of 30 Pages

Excluding This Page

And

Chain Of Custody

12/24/01

Date



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

Case Narrative for:  
**Brown & Caldwell**

Certificate of Analysis Number:

**01120267**

<b>Report To:</b>	<b>Project Name:</b>	BJ Service, Hobbs, NM #12832
Brown & Caldwell	<b>Site:</b>	Houston TX.
Rick Rexroad	<b>Site Address:</b>	
1415 Louisiana	<b>PO Number:</b>	
Suite 2509	<b>State:</b>	New Mexico
Houston	<b>State Cert. No.:</b>	
TX	<b>Date Reported:</b>	12/24/01
77002-		
ph: (713) 759-0999		
fax: (713) 308-3886		

A plastic unpreserved container and a set of unpreserved vials were received for your sample ID "MW13" (SPL ID: 01120267-05). Also a set of unpreserved vials were received for both sample ID's "MW3 and MW4" (SPL ID's: 01120267-6 and 01120267-07). No analyses were requested on the chain of custody for these containers. Per your request, via phone conversation, on December 12, 2001, no analyses were performed on the additional containers received. SPL analyzed the samples according to the analyses requested on the chain of custody.

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

12/24/01

Date



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

## Brown & Caldwell

Certificate of Analysis Number:

**01120267**

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

fax: (713) 308-3886

**Fax To:**

Brown & Caldwell  
Rick Rexroad

fax : (713) 308-3886

**Project Name:** BJ Service, Hobbs, NM #12832

**Site:** Houston TX.

**Site Address:**

**PO Number:**

**State:** New Mexico

**State Cert. No.:**

**Date Reported:** 12/24/01

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD
W-5	01120267-01	Water	12/6/01 10:45:00 AM	12/7/01 1:00:00 PM	100213	<input type="checkbox"/>
MW-7	01120267-02	Water	12/6/01 12:15:00 PM	12/7/01 1:00:00 PM	100213	<input type="checkbox"/>
MW-15	01120267-03	Water	12/6/01 1:10:00 PM	12/7/01 1:00:00 PM	100213	<input type="checkbox"/>
W-12D	01120267-04	Water	12/6/01 2:45:00 PM	12/7/01 1:00:00 PM	100213	<input type="checkbox"/>
W-13	01120267-05	Water	12/6/01 3:15:00 PM	12/7/01 1:00:00 PM	100213	<input checked="" type="checkbox"/>
MW-13	01120267-05	Water	12/6/01 3:15:00 PM	12/7/01 1:00:00 PM	100214	<input type="checkbox"/>
W-3	01120267-06	Water	12/6/01 3:45:00 PM	12/7/01 1:00:00 PM	100213	<input checked="" type="checkbox"/>
W-3	01120267-06	Water	12/6/01 3:45:00 PM	12/7/01 1:00:00 PM	100214	<input type="checkbox"/>
MW-4	01120267-07	Water	12/6/01 4:50:00 PM	12/7/01 1:00:00 PM	100213	<input checked="" type="checkbox"/>
MW-4	01120267-07	Water	12/6/01 4:50:00 PM	12/7/01 1:00:00 PM	100214	<input type="checkbox"/>
W-10	01120267-08	Water	12/6/01 5:00:00 PM	12/7/01 1:00:00 PM	100214	<input type="checkbox"/>
MW-11A	01120267-09	Water	12/6/01 5:20:00 PM	12/7/01 1:00:00 PM	100214	<input type="checkbox"/>
MW-14	01120267-10	Water	12/6/01 6:07:00 PM	12/7/01 1:00:00 PM	100214	<input type="checkbox"/>
ip Blank 1	01120267-11	Water	12/6/01	12/7/01 1:00:00 PM	100214	<input type="checkbox"/>
ip Blank 2	01120267-12	Water	12/6/01	12/7/01 1:00:00 PM	100214	<input type="checkbox"/>
Trip Blank 3	01120267-13	Water	12/6/01	12/7/01 1:00:00 PM	100214	<input type="checkbox"/>

Joel Grice

Senior Project Manager

Joel Grice  
Laboratory Director

Ted Yen  
Quality Assurance Officer

12/24/01

Date



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

Client Sample ID: MW-5

Collected: 12/6/01 10:45:00 SPL Sample ID: 01120267-01

Site: Houston TX.

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	0.49	0.2	1		12/14/01 10:23	AR	955903
Surr: n-Pentacosane	70.0	% 18-120	1		12/14/01 10:23	AR	955903

Prep Method	Prep Date	Prep Initials
SW3510B	12/11/2001 12:08	KL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		12/18/01 2:04	D_R	952489
Surr: 1,4-Difluorobenzene	99.3	% 74-121	1		12/18/01 2:04	D_R	952489
Surr: 4-Bromofluorobenzene	97.0	% 55-150	1		12/18/01 2:04	D_R	952489

<b>HEADSPACE GAS ANALYSIS</b>			<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>		
Ethane	ND	0.0025	1		12/18/01 17:25	ER	954160
Ethylene	ND	0.0032	1		12/18/01 17:25	ER	954160
Methane	ND	0.0012	1		12/18/01 17:25	ER	954160

<b>NITROGEN, NITRATE (AS N)</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Nitrogen, Nitrate (As N)	2.38	0.1	1		12/08/01 8:00	ES	951750

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		12/18/01 2:49	D_R	952434
Ethylbenzene	ND	1	1		12/18/01 2:49	D_R	952434
Toluene	ND	1	1		12/18/01 2:49	D_R	952434
Xylenes Total	ND	1	1		12/18/01 2:49	D_R	952434
Surr: 4-Bromofluorobenzene	97.1	% 48-156	1		12/18/01 2:49	D_R	952434
Surr: 1,4-Difluorobenzene	98.4	% 72-137	1		12/18/01 2:49	D_R	952434

<b>SULFATE</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Sulfate	120	4	20		12/08/01 8:00	ES	952008

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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

12/24/01 12:06:45 PM



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

Client Sample ID: MW-7

Collected: 12/6/01 12:15:00 SPL Sample ID: 01120267-02

Site: Houston TX.

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	1.3	0.2	1		12/14/01 11:01	AR	955904
Surr: n-Pentacosane	162 MI	% 18-120	1	*	12/14/01 11:01	AR	955904

Prep Method	Prep Date	Prep Initials
SW3510B	12/11/2001 12:08	KL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		12/18/01 3:01	D_R	952490
Surr: 1,4-Difluorobenzene	99.0	% 74-121	1		12/18/01 3:01	D_R	952490
Surr: 4-Bromofluorobenzene	100	% 55-150	1		12/18/01 3:01	D_R	952490

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		12/18/01 3:19	D_R	952435
Ethylbenzene	ND	1	1		12/18/01 3:19	D_R	952435
Toluene	ND	1	1		12/18/01 3:19	D_R	952435
Xylenes, Total	ND	1	1		12/18/01 3:19	D_R	952435
Surr: 4-Bromofluorobenzene	98.8	% 48-156	1		12/18/01 3:19	D_R	952435
Surr: 1,4-Difluorobenzene	99.5	% 72-137	1		12/18/01 3:19	D_R	952435

**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: 12/6/01 1:10:00

SPL Sample ID: 01120267-03

Site: Houston TX.

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL							
Chloride	215	5	5	E325.3	12/19/01 14:30	CV	955557

**Qualifiers:**

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

12/24/01 12:06:49 PM





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

Client Sample ID: MW-12D

Collected: 12/6/01 2:45:00 SPL Sample ID: 01120267-04

Site: Houston TX.

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	ND	0.2	1		12/14/01 18:58	AR	955944
Surr: n-Pentacosane	83.2	% 18-120	1		12/14/01 18:58	AR	955944

Prep Method	Prep Date	Prep Initials
SW3510B	12/11/2001 12:08	KL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		12/18/01 5:01	D_R	952491
Surr: 1,4-Difluorobenzene	99.3	% 74-121	1		12/18/01 5:01	D_R	952491
Surr: 4-Bromofluorobenzene	99.0	% 55-150	1		12/18/01 5:01	D_R	952491

<b>HEADSPACE GAS ANALYSIS</b>			<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>		
Ethane	ND	0.0025	1		12/18/01 18:00	ER	954164
Ethylene	ND	0.0032	1		12/18/01 18:00	ER	954164
Methane	ND	0.0012	1		12/18/01 18:00	ER	954164

<b>NITROGEN, NITRATE (AS N)</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Nitrogen, Nitrate (As N)	ND	0.1	1		12/08/01 8:00	ES	951751

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		12/18/01 5:16	D_R	952439
Ethylbenzene	ND	1	1		12/18/01 5:16	D_R	952439
Toluene	ND	1	1		12/18/01 5:16	D_R	952439
Xylenes, Total	ND	1	1		12/18/01 5:16	D_R	952439
Surr: 4-Bromofluorobenzene	98.9	% 48-156	1		12/18/01 5:16	D_R	952439
Surr: 1,4-Difluorobenzene	99.7	% 72-137	1		12/18/01 5:16	D_R	952439

<b>SULFATE</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Sulfate	200	4	20		12/08/01 8:00	ES	952011

**Qualifiers:**  
ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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

12/24/01 12:06:50 PM



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

Client Sample ID: MW-13

Collected: 12/6/01 3:15:00

SPL Sample ID: 01120267-05

Site: Houston TX.

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	ND	0.2	1		12/14/01 19:36	AR	955906
Surr: n-Pentacosane	37.8	% 18-120	1		12/14/01 19:36	AR	955906

Prep Method	Prep Date	Prep Initials
SW3510B	12/11/2001 12:08	KL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		12/18/01 5:04	D_R	952492
Surr: 1,4-Difluorobenzene	99.7	% 74-121	1		12/18/01 5:04	D_R	952492
Surr: 4-Bromofluorobenzene	99.0	% 55-150	1		12/18/01 5:04	D_R	952492

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		12/18/01 5:46	D_R	952440
Ethylbenzene	ND	1	1		12/18/01 5:46	D_R	952440
Toluene	ND	1	1		12/18/01 5:46	D_R	952440
Xylenes, Total	ND	1	1		12/18/01 5:46	D_R	952440
Surr: 4-Bromofluorobenzene	97.3	% 48-156	1		12/18/01 5:46	D_R	952440
Surr: 1,4-Difluorobenzene	98.0	% 72-137	1		12/18/01 5:46	D_R	952440

**Qualifiers:** ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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

12/24/01 12:06:50 PM



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

Client Sample ID: MW-3

Collected: 12/6/01 3:45:00

SPL Sample ID: 01120267-06

Site: Houston TX.

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	ND	0.2	1		12/14/01 20:14	AR	955907
Surr: n-Pentacosane	85.4 %	18-120	1		12/14/01 20:14	AR	955907

Prep Method	Prep Date	Prep Initials
SW3510B	12/11/2001 12:08	KL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		12/18/01 6:01	D_R	952493
Surr: 1,4-Difluorobenzene	99.0 %	74-121	1		12/18/01 6:01	D_R	952493
Surr: 4-Bromofluorobenzene	97.7 %	55-150	1		12/18/01 6:01	D_R	952493

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		12/18/01 6:15	D_R	952441
Ethylbenzene	ND	1	1		12/18/01 6:15	D_R	952441
Toluene	ND	1	1		12/18/01 6:15	D_R	952441
Xylenes, Total	ND	1	1		12/18/01 6:15	D_R	952441
Surr: 4-Bromofluorobenzene	97.3 %	48-156	1		12/18/01 6:15	D_R	952441
Surr: 1,4-Difluorobenzene	97.0 %	72-137	1		12/18/01 6:15	D_R	952441

**Qualifiers:**  
ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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

12/24/01 12:05:51 PM



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

Client Sample ID: MW-4

Collected: 12/6/01 4:50:00

SPL Sample ID: 01120267-07

Site: Houston TX.

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	0.6	0.2	1		12/14/01 20:51	AR	955909
Surr: n-Pentacosane	63.8	% 18-120	1		12/14/01 20:51	AR	955909

Prep Method	Prep Date	Prep Initials
SW3510B	12/11/2001 12:08	IKL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	1	10		12/18/01 6:04	D_R	952494
Surr: 1,4-Difluorobenzene	106	% 74-121	10		12/18/01 6:04	D_R	952494
Surr: 4-Bromofluorobenzene	101	% 55-150	10		12/18/01 6:04	D_R	952494

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		12/18/01 16:53	D_R	954173
Ethylbenzene	ND	1	1		12/18/01 16:53	D_R	954173
Toluene	ND	1	1		12/18/01 16:53	D_R	954173
Xylenes, Total	ND	1	1		12/18/01 16:53	D_R	954173
Surr: 4-Bromofluorobenzene	77.3	% 48-156	1		12/18/01 16:53	D_R	954173
Surr: 1,4-Difluorobenzene	92.6	% 72-137	1		12/18/01 16:53	D_R	954173

**Qualifiers:**

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

12/24/01 12:08:51 PM



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

Client Sample ID: MW-10

Collected: 12/6/01 5:00:00

SPL Sample ID: 01120267-08

Site: Houston TX.

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	2.2	0.5		5	12/19/01 13:03	D_R	956076
Surr: 1,4-Difluorobenzene	122MI	% 74-121		5 *	12/19/01 13:03	D_R	956076
Surr: 4-Bromofluorobenzene	91.2	% 55-150		5	12/19/01 13:03	D_R	956076
<b>HEADSPACE GAS ANALYSIS</b>			<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>		
Ethane	ND	0.025		10	12/18/01 18:35	ER	954166
Ethylene	ND	0.032		10	12/18/01 18:35	ER	954166
Methane	0.53	0.012		10	12/18/01 18:35	ER	954166
<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	78	5		5	12/19/01 13:30	D_R	955232
Ethylbenzene	32	5		5	12/19/01 13:30	D_R	955232
Toluene	460	5		5	12/19/01 13:30	D_R	955232
Xylenes, Total	239	5		5	12/19/01 13:30	D_R	955232
Surr: 4-Bromofluorobenzene	90.4	% 48-156		5	12/19/01 13:30	D_R	955232
Surr: 1,4-Difluorobenzene	105	% 72-137		5	12/19/01 13:30	D_R	955232

**Qualifiers:**

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and POL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference



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

Client Sample ID: MW-11A

Collected: 12/6/01 5:20:00 SPL Sample ID: 01120267-09

Site: Houston TX.

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	1	0.2	2		12/14/01 20:14	AR	955895
Surr: n-Pentacosane	57.6	% 55-155	2		12/14/01 20:14	AR	955895

Prep Method	Prep Date	Prep Initials
SW3510B	12/11/2001 12:08	KL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		12/19/01 13:00	D_R	956074
Surr: 1,4-Difluorobenzene	104	% 74-121	1		12/19/01 13:00	D_R	956074
Surr: 4-Bromofluorobenzene	90.0	% 55-150	1		12/19/01 13:00	D_R	956074

<b>HEADSPACE GAS ANALYSIS</b>			<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>		
Ethane	ND	0.0025	1		12/18/01 18:47	ER	954167
Ethylene	ND	0.0032	1		12/18/01 18:47	ER	954167
Methane	0.0041	0.0012	1		12/18/01 18:47	ER	954167

<b>NITROGEN, NITRATE (AS N)</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Nitrogen, Nitrate (As N)	ND	0.1	1		12/08/01 8:00	ES	951752

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		12/19/01 13:04	D_R	955231
Ethylbenzene	ND	1	1		12/19/01 13:04	D_R	955231
Toluene	ND	1	1		12/19/01 13:04	D_R	955231
Xylenes, Total	ND	1	1		12/19/01 13:04	D_R	955231
Surr: 4-Bromofluorobenzene	73.6	% 48-156	1		12/19/01 13:04	D_R	955231
Surr: 1,4-Difluorobenzene	80.9	% 72-137	1		12/19/01 13:04	D_R	955231

<b>SULFATE</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Sulfate	240	4	20		12/08/01 8:00	ES	952012

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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

12/24/01 12:06:52 PM



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

Client Sample ID: MW-14

Collected: 12/6/01 6:07:00

SPL Sample ID: 01120267-10

Site: Houston TX.

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL							
Chloride	276	5	5	E325.3	12/19/01 14:30	CV	955560

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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

12/24/01 12:06:53 PM



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

Client Sample ID: Trip Blank 1

Collected: 12/6/01

SPL Sample ID: 01120267-11

Site: Houston TX.

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		12/18/01 2:02	D_R	952488
Surr: 1,4-Difluorobenzene	99.3	% 74-121	1		12/18/01 2:02	D_R	952488
Surr: 4-Bromofluorobenzene	97.7	% 55-150	1		12/18/01 2:02	D_R	952488
<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		12/18/01 2:20	D_R	952433
Ethylbenzene	ND	1	1		12/18/01 2:20	D_R	952433
Toluene	ND	1	1		12/18/01 2:20	D_R	952433
Xylenes, Total	ND	1	1		12/18/01 2:20	D_R	952433
Surr: 4-Bromofluorobenzene	97.9	% 48-156	1		12/18/01 2:20	D_R	952433
Surr: 1,4-Difluorobenzene	98.7	% 72-137	1		12/18/01 2:20	D_R	952433

**Qualifiers:**  
ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and POL

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





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

Client Sample ID: Trip Blank 2

Collected: 12/6/01

SPL Sample ID: 01120267-12

Site: Houston TX.

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1		1	12/19/01 12:01	D_R	956070
Surr: 1,4-Difluorobenzene	104	% 74-121		1	12/19/01 12:01	D_R	956070
Surr: 4-Bromofluorobenzene	94.3	% 55-150		1	12/19/01 12:01	D_R	956070
<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1		1	12/19/01 12:13	D_R	955229
Ethylbenzene	ND	1		1	12/19/01 12:13	D_R	955229
Toluene	ND	1		1	12/19/01 12:13	D_R	955229
Xylenes, Total	ND	1		1	12/19/01 12:13	D_R	955229
Surr: 4-Bromofluorobenzene	71.9	% 48-156		1	12/19/01 12:13	D_R	955229
Surr: 1,4-Difluorobenzene	81.6	% 72-137		1	12/19/01 12:13	D_R	955229

**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: Trip Blank 3

Collected: 12/6/01

SPL Sample ID: 01120267-13

Site: Houston TX.

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		12/21/01 13:01	DL	958960
Surr: 1,4-Difluorobenzene	104	% 74-121	1		12/21/01 13:01	DL	958960
Surr: 4-Bromofluorobenzene	95.0	% 55-150	1		12/21/01 13:01	DL	958960
<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		12/21/01 13:13	DL	958887
Ethylbenzene	ND	1	1		12/21/01 13:13	DL	958887
Toluene	ND	1	1		12/21/01 13:13	DL	958887
Xylenes, Total	ND	1	1		12/21/01 13:13	DL	958887
Surr: 4-Bromofluorobenzene	72.3	% 48-156	1		12/21/01 13:13	DL	958887
Surr: 1,4-Difluorobenzene	84.7	% 72-137	1		12/21/01 13:13	DL	958887

**Qualifiers:**  
ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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

12/24/01 12:06:54 PM

# *Quality Control Documentation*



# Quality Control Report

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

**Brown & Caldwell**  
BJ Service, Hobbs, NM #12832

Analysis: Diesel Range Organics  
Method: SW8015B

WorkOrder: 01120267  
Lab Batch ID: 16760A

## Method Blank

RunID: HP\_V\_011214C-955894 Units: mg/L  
Analysis Date: 12/14/2001 11:01 Analyst: AR  
Preparation Date: 12/11/2001 12:08 Prep By: KL Method SW3510B

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.10
Surr. n-Pentacosane	109.6	18-120

## Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01120267-01B	MW-5
01120267-02B	MW-7
01120267-04B	MW-12D
01120267-05B	MW-13
01120267-06B	MW-3
01120267-07B	MW-4
01120267-09B	MW-11A

## Laboratory Control Sample (LCS)

RunID: HP\_V\_011214C-955892 Units: mg/L  
Analysis Date: 12/14/2001 10:23 Analyst: AR  
Preparation Date: 12/11/2001 12:08 Prep By: KL Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	2.4	98	21	175

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

Sample Spiked: 01120267-01  
RunID: HP\_V\_011214C-955897 Units: mg/L  
Analysis Date: 12/14/2001 20:51 Analyst: AR  
Preparation Date: 12/11/2001 12:08 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	4.5	80.2	5	4.6	82.2	2.43	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.

12/24/01 12:08:56 PM



# Quality Control Report

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

## Brown & Caldwell

BJ Service, Hobbs, NM #12832

Analysis: Headspace Gas Analysis  
Method: RSK147

WorkOrder: 01120267  
Lab Batch ID: R50095

### Method Blank

RunID: VARC\_011219A-954129 Units: mg/L  
Analysis Date: 12/18/2001 11:44 Analyst: ER

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01120267-01C	MW-5
01120267-04C	MW-12D
01120267-08C	MW-10
01120267-09C	MW-11A

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

### Sample Duplicate

Original Sample: 01120267-09  
RunID: VARC\_011219A-954167 Units: mg/L  
Analysis Date: 12/18/2001 18:47 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	0.0041	0.0044	6	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.

12/24/01 12:08:58 PM



# Quality Control Report

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

## Brown & Caldwell

BJ Service, Hobbs, NM #12832

Analysis: Purgeable Aromatics  
Method: SW8021B

WorkOrder: 01120267  
Lab Batch ID: R49984

### Method Blank

RunID: HP\_O\_011217A-952419 Units: ug/L  
Analysis Date: 12/17/2001 17:02 Analyst: D\_R

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01120267-01A	MW-5
01120267-02A	MW-7
01120267-04A	MW-12D
01120267-05A	MW-13
01120267-06A	MW-3
01120267-11A	Trip Blank 1

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	99.4	72-130
Surr. 4-Bromofluorobenzene	98.9	70-130

### Laboratory Control Sample (LCS)

RunID: HP\_O\_011217A-952418 Units: ug/L  
Analysis Date: 12/17/2001 16:03 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	50	101	70	130
Ethylbenzene	50	50	100	70	130
Toluene	50	51	102	70	130
Xylenes, Total	150	151	101	70	130

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

Sample Spiked: 01120267-01  
RunID: HP\_O\_011217A-952430 Units: ug/L  
Analysis Date: 12/17/2001 23:53 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	24	122	20	25	123	0.641	21	32	164
Ethylbenzene	ND	20	24	122	20	24	122	0.412	19	52	142
Toluene	ND	20	25	123	20	25	123	0.368	20	38	159
Xylenes, Total	ND	60	73	122	60	73	122	0	18	53	144

Qualifiers: ND/U - Not Detected at the Reporting Limit MI - Matrix Interference  
B - Analyte detected in the associated Method Blank D - Recovery Unreportable due to Dilution  
J - Estimated value between MDL and PQL \* - Recovery Outside Advisable QC Limits

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



# Quality Control Report

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

Brown & Caldwell  
BJ Service, Hobbs, NM #12832

Analysis: Gasoline Range Organics  
Method: SW8015B

WorkOrder: 01120267  
Lab Batch ID: R49987

## Method Blank

RunID: HP\_O\_011217C-952543 Units: mg/L  
Analysis Date: 12/17/2001 17:00 Analyst: D\_R

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	99.7	74-121
Surr: 4-Bromofluorobenzene	99.0	55-150

## Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01120267-01A	MW-5
01120267-02A	MW-7
01120267-04A	MW-12D
01120267-05A	MW-13
01120267-06A	MW-3
01120267-07A	MW-4
01120267-11A	Trip Blank 1

## Laboratory Control Sample (LCS)

RunID: HP\_O\_011217C-952542 Units: mg/L  
Analysis Date: 12/17/2001 16:03 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	1	104	70	130

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

Sample Spiked: 01120267-02  
RunID: HP\_O\_011217C-952486 Units: mg/L  
Analysis Date: 12/18/2001 0:05 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	ND	0.9	1	115	0.9	0.97	108	5.71	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.

12/24/01 12:06:59 PM



# Quality Control Report

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

Brown & Caldwell  
BJ Service, Hobbs, NM #12832

Analysis: Purgeable Aromatics  
Method: SW8021B

WorkOrder: 01120267  
Lab Batch ID: R50043

## Method Blank

## Samples in Analytical Batch:

RunID: HP\_U\_011218A-953437 Units: ug/L  
Analysis Date: 12/18/2001 14:40 Analyst: D\_R

Lab Sample ID: 01120267-07A  
Client Sample ID: MW-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	81.9	72-130
Surr. 4-Bromofluorobenzene	81.3	70-130

## Laboratory Control Sample (LCS)

RunID: HP\_U\_011218A-953438 Units: ug/L  
Analysis Date: 12/18/2001 15:13 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	53	105	70	130
Ethylbenzene	50	52	104	70	130
Toluene	50	50	99	70	130
Xylenes, Total	150	163	109	70	130

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

Sample Spiked: 01120508-12  
RunID: HP\_U\_011218A-954181 Units: ug/L  
Analysis Date: 12/18/2001 20:41 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	19	93.0	20	20	98.0	5.27	21	32	164
Ethylbenzene	ND	20	18	89.3	20	18	90.4	1.22	19	52	142
Toluene	ND	20	15	77.3	20	16	80.4	3.95	20	38	159
Xylenes, Total	ND	60	58	96.7	60	61	102	5.04	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.

12/24/01 12:09:00 PM





# Quality Control Report

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

Brown & Caldwell  
BJ Service, Hobbs, NM #12832

Analysis: Purgeable Aromatics  
Method: SW8021B

WorkOrder: 01120267  
Lab Batch ID: R50134

## Method Blank

RunID: HP\_U\_011219A-955225 Units: ug/L  
Analysis Date: 12/19/2001 6:50 Analyst: D\_R

## Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01120267-08A	MW-10
01120267-09A	MW-11A
01120267-12A	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	87.4	72-130
Surr: 4-Bromofluorobenzene	86.5	70-130

## Laboratory Control Sample (LCS)

RunID: HP\_U\_011219A-955224 Units: ug/L  
Analysis Date: 12/19/2001 6:00 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	51	102	70	130
Ethylbenzene	50	50	100	70	130
Toluene	50	47	94	70	130
Xylenes, Total	150	151	101	70	130

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

Sample Spiked: 01120326-01  
RunID: HP\_U\_011219A-955752 Units: ug/L  
Analysis Date: 12/19/2001 19:01 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	19	97.1	20	21	105	8.12	21	32	164
Ethylbenzene	ND	20	19	95.6	20	20	99.9	4.41	19	52	142
Toluene	ND	20	17	84.0	20	18	88.2	4.92	20	38	159
Xylenes, Total	ND	60	63	105	60	66	110	4.65	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.

12/24/01 12:09:00 PM



# Quality Control Report

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

Brown & Caldwell  
BJ Service, Hobbs, NM #12832

Analysis: Gasoline Range Organics  
Method: SW8015B

WorkOrder: 01120267  
Lab Batch ID: R50182

## Method Blank

RunID: HP\_U\_011219C-956085 Units: mg/L  
Analysis Date: 12/19/2001 15:03 Analyst: D\_R

## Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01120267-08A	MW-10
01120267-09A	MW-11A
01120267-12A	Trip Blank 2

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr. 1,4-Difluorobenzene	106.7	74-121
Surr. 4-Bromofluorobenzene	75.3	55-150

## Laboratory Control Sample (LCS)

RunID: HP\_U\_011219C-956080 Units: mg/L  
Analysis Date: 12/19/2001 17:02 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.99	99	70	130

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

Sample Spiked: 01120326-02  
RunID: HP\_U\_011219C-956083 Units: mg/L  
Analysis Date: 12/19/2001 21:02 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	ND	0.9	0.58	63.9	0.9	0.58	64.3	0.503	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.

12/24/01 12:09:00 PM



# Quality Control Report

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

**Brown & Caldwell**  
BJ Service, Hobbs, NM #12832

Analysis: Purgeable Aromatics  
Method: SW8021B

WorkOrder: 01120267  
Lab Batch ID: R50338

## Method Blank

## Samples in Analytical Batch:

RunID: HP\_U\_011221A-958886 Units: ug/L  
Analysis Date: 12/21/2001 12:47 Analyst: DL

Lab Sample ID: 01120267-13A  
Client Sample ID: 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	85.3	72-130
Surr. 4-Bromofluorobenzene	84.1	70-130

## Laboratory Control Sample (LCS)

RunID: HP\_U\_011221A-958885 Units: ug/L  
Analysis Date: 12/21/2001 11:57 Analyst: DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	53	107	70	130
Ethylbenzene	50	52	105	70	130
Toluene	50	50	99	70	130
Xylenes, Total	150	163	109	70	130

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

Sample Spiked: 01120601-03  
RunID: HP\_U\_011221A-961312 Units: ug/L  
Analysis Date: 12/21/2001 15:49 Analyst: DL

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	21	103	20	21	106	3.07	21	32	164
Ethylbenzene	ND	20	18	89.8	20	19	93.7	4.24	19	52	142
Toluene	ND	20	17	82.7	20	17	86.2	4.13	20	38	159
Xylenes, Total	ND	60	54	90.0	60	56	93.3	3.64	18	53	144

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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



# Quality Control Report

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

Brown & Caldwell  
BJ Service, Hobbs, NM #12832

Analysis: Gasoline Range Organics  
Method: SW8015B

WorkOrder: 01120267  
Lab Batch ID: R50344

## Method Blank

## Samples in Analytical Batch:

RunID: HP\_U\_011221C-958959 Units: mg/L  
Analysis Date: 12/21/2001 12:04 Analyst: DL

Lab Sample ID Client Sample ID  
01120267-13A Trip Blank 3

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr. 1,4-Difluorobenzene	105.0	74-121
Surr. 4-Bromofluorobenzene	70.3	55-150

## Laboratory Control Sample (LCS)

RunID: HP\_U\_011221C-958958 Units: mg/L  
Analysis Date: 12/21/2001 12:02 Analyst: DL

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.89	89	70	130

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

Sample Spiked: 01120601-04  
RunID: HP\_U\_011221C-961337 Units: mg/L  
Analysis Date: 12/21/2001 16:04 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	0.41	45.2	0.9	0.36	39.6	13.2	36	36	160

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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

12/24/01 12:09:01 PM



# Quality Control Report

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

## Brown & Caldwell

BJ Service, Hobbs, NM #12832

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

WorkOrder: 01120267  
Lab Batch ID: R49944

### Method Blank

RunID: WET\_011208G-951738 Units: mg/L  
Analysis Date: 12/08/2001 8:00 Analyst: ES

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01120267-01D	MW-5
01120267-04D	MW-12D
01120267-09D	MW-11A

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

### Laboratory Control Sample (LCS)

RunID: WET\_011208G-951739 Units: mg/L  
Analysis Date: 12/08/2001 8:00 Analyst: ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.2	92	90	110

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

Sample Spiked: 01120253-03  
RunID: WET\_011208G-951743 Units: mg/L  
Analysis Date: 12/08/2001 8:00 Analyst: ES

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Nitrogen, Nitrate (As N)	0.28	10	9.93	96.5	10	9.82	95.4	1.17	20	76	124

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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

12/24/01 12:09:01 PM



# Quality Control Report

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

Brown & Caldwell  
BJ Service, Hobbs, NM #12832

Analysis: Sulfate  
Method: E300

WorkOrder: 01120267  
Lab Batch ID: R49958

## Method Blank

RunID: WET\_011208K-952006 Units: mg/L  
Analysis Date: 12/08/2001 8:00 Analyst: ES

## Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01120267-01D	MW-5
01120267-04D	MW-12D
01120267-09D	MW-11A

Analyte	Result	Rep Limit
Sulfate	ND	0.20

## Laboratory Control Sample (LCS)

RunID: WET\_011208K-952007 Units: mg/L  
Analysis Date: 12/08/2001 8:00 Analyst: ES

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sulfate	10	11	105	90	110

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

Sample Spiked: 01120267-01  
RunID: WET\_011208K-952009 Units: mg/L  
Analysis Date: 12/08/2001 8:00 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	320	99.5	200	330	106	6.28	20	80	120

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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.

12/24/01 12:09:02 PM



# Quality Control Report

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

**Brown & Caldwell**  
BJ Service, Hobbs, NM #12832

Analysis: Chloride, Total  
Method: E325.3

WorkOrder: 01120267  
Lab Batch ID: R50154

## Method Blank

RunID: WET\_0112191-955554 Units: mg/L  
Analysis Date: 12/19/2001 14:30 Analyst: CV

## Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01120267-03D	MW-15
01120267-10D	MW-14

Analyte	Result	Rep Limit
Chloride	ND	1.0

## Laboratory Control Sample (LCS)

RunID: WET\_0112191-955556 Units: mg/L  
Analysis Date: 12/19/2001 14:30 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: 01120267-03  
RunID: WET\_0112191-955556 Units: mg/L  
Analysis Date: 12/19/2001 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	220	250	465	99.9	250	465	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.

12/24/01 12:09:02 PM

*Sample Receipt Checklist  
And  
Chain of Custody*





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

Sample Receipt Checklist

Workorder:	01120267	Received By:	RE
Date and Time Received:	12/7/01 1:00:00 PM	Carrier name:	Greyhound
Temperature:	3	Chilled by:	Water Ice

- |   |   |  |   |
|---|---|--|---|
| 1. Shipping container/cooler in good condition?   | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            | Not Present <input type="checkbox"/>            |
| 2. Custody seals intact on shipping container/cooler?   | Yes <input type="checkbox"/>            | No <input type="checkbox"/>            | Not Present <input checked="" type="checkbox"/> |
| 3. Custody seals intact on sample bottles?  | Yes <input type="checkbox"/>            | No <input type="checkbox"/>            | Not Present <input checked="" type="checkbox"/> |
| 4. Chain of custody present?  | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 5. Chain of custody signed when relinquished and received?  | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 6. Chain of custody agrees with sample labels?<br>1. Received 1-plastic unpreserved & vial unpreserved for ID#MW-13 not written on COC. Also received 2-sets of vials unpreserved ID#MW-3 and MW-4 (for headspace) Login on hold. | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |   |
| 7. Samples in proper container/bottle?  | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 8. Sample containers intact?  | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 9. Sufficient sample volume for indicated test?   | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 10. All samples received within holding time?   | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 11. Container/Temp Blank temperature in compliance?   | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 12. Water - VOA vials have zero headspace?  | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            | Not Applicable <input type="checkbox"/>         |
| 13. Water - pH acceptable upon receipt?   | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            | Not Applicable <input type="checkbox"/>         |

SPL Representative: Wyatt, Neaundra

Contact Date & Time: 12/12/01 12:58:00 PM

Client Name Contacted: Rick Rexroad

Non Conformance  
Issues:

Client Instructions: Per Rick only want to analyze what is indicated on the chain of custody. Don't analyze the extra containers received.



SPL, Inc.

SPL Worksheet No:

01120267

100213

page 1 of 2

## Analysis Request &amp; Chain of Custody Record

Client Name: Brown & Caldwell		matrix		bottle		size		pres.		Number of Containers		Requested Analysis	
Address/Phone: 1415 Ambassador 713 759-0999		S = soil SL = sludge O = other:		P = plastic A = amber glass G = glass V = vial		1 = 1 liter 4 = 4oz 40 = vial 8 = 8oz 16 = 16oz		1 = HCl 2 = HNO3 3 = H2SO4 O = other:		BTX 8021 B		TPH-D 8015	
Client Contact: Rick Kerkoad										TPH-G 8015		RSK SOP 175/47	
Project Name: GJ 14443										Nitrate Method 300		Sulfate 300.0	
Project Number: 12852										Chlorides 325.3			
Project Location: 14443, N/A													
Invoice To:													
SAMPLE ID	DATE	TIME	comp	grab									
MW-5	12/6/01	10:45	X		W	NAP	AD	1	9	X	X	X	X
MW-7	12/6/01	12:15	X		W	NA	AD	1	5	X	X		
MW-15	12/6/01	13:10	X		W	P	AD		1	X			
MW-12D	12/6/01	14:45	X		W	NAP	AD	1	9	X	X	X	X
<b>RUSH</b>													
Client/Consultant Remarks:													
Laboratory remarks:													
Intact? <input type="checkbox"/> Y <input type="checkbox"/> N													
Temp: 3													
IM review (initial):													
Requested TAT													
Special Reporting Requirements													
Standard QC <input checked="" type="checkbox"/> Level 3 QC <input type="checkbox"/> Raw Data <input type="checkbox"/> Level 4 QC <input type="checkbox"/>													
1. Relinquished by Sample: Amanda Smith													
2. Received by:													
3. Relinquished by:													
4. Received by:													
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8880 Interchange Drive, Houston, TX 77054 (713) 660-0901 500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775

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



## page \_\_\_\_ of \_\_\_\_

[illegible]



# BROWN AND CALDWELL

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

## TRANSMITTAL MEMORANDUM

To: Mr. Wayne Price Energy, Minerals, and Natural Resources Dept. Oil Conservation Division 2040 South Pacheco Street, State Land Office Building Santa Fe, New Mexico 87505	Date: November 12, 2001	Job No: 12832-016
	Subject: Hobbs, New Mexico Groundwater Report	
	Certified Mail No.:	
	Equipment No:	
	Spec. Ref:	
Submittal No:		

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

### THESE ARE TRANSMITTED AS CHECKED BELOW:

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

### SUBMITTAL REVIEW ACTIONS:

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

Copies	Date	No.	Description
1	10/26/01		Final Groundwater Sampling Report, BJ Services Company, USA, Hobbs, New Mexico


### REMARKS:

RECEIVED

DEC 12 2001

Environmental Bureau  
Oil Conservation Division

cc: Mr. Chris Williams, State of New Mexico  
Ms. Jo Ann Cobb, BJ Services  
Brown and Caldwell Project File

  
Lynn Wright  
Principal Geologist

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

P:\WP\BJSERV\12832\0781.doc

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DEC 12 2001

Environmental Bureau  
Oil Conservation Division

B R O W N   A N D   C A L D W E L L

RECEIVED

DEC 14 2001

Environmental Bureau  
Oil Conservation Division

MARCH 2001 GROUNDWATER SAMPLING  
REPORT

HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

OCTOBER 26, 2001

**MARCH 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 Rexroad  
Project Manager

October 26, 2001

**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 field activities associated with the March 2001 quarterly groundwater sampling event at the BJ Services Company, U.S.A. (BJ Services) facility located at 2708 West County Road in Hobbs, New Mexico on March 8-9, 2001. The March 2001 sampling event included collection of groundwater samples from monitor wells MW-14 and MW-15, which were installed in January 2001. Groundwater samples were analyzed for gasoline and diesel range total petroleum hydrocarbons (TPH-G and TPH-D), benzene, toluene, ethylbenzene, and total xylenes (BTEX), polynuclear aromatic hydrocarbons (PAHs), carbonate, bicarbonate, major anions, major cations, total hardness, dissolved methane/ethylene/ethane, sulfates, and nitrates, as specified by the New Mexico Oil Conservation Division (NMOCD) in NMOCD Permit GW-072. This report presents a description of the groundwater sampling field activities, a summary of the analytical results, and an evaluation of remedial technologies being applied at the facility. A groundwater potentiometric surface map, a benzene concentration map, and a hydrocarbon distribution map are included.

A layout of the facility is shown in Figure 1. The facility formerly operated an above-grade on-site fueling system. Subsurface impact near the former diesel fueling system was first detected by the NMOCD during an on-site inspection on February 7, 1991. The fueling system was taken out of operation in July 1995. The NMOCD has required a quarterly groundwater monitoring program to assess the concentration of hydrocarbon constituents in groundwater as a result of the diesel fuel release. BJ Services removed three field waste tanks at the facility on March 6-7, 1997. The ongoing 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 biosparging system was activated in November 1995 to remediate soil and groundwater at the former fuel island area of the facility. The biosparging system was expanded in March/April 1997 and February/March 1998. Flow adjustments were made to the biosparging system during the June/July 1999 and March 2000 sampling events to intensify remedial pressure in the area of

monitor well MW-13. On November 1, 2000, the bioparging system was turned off. A site chronology detailing the history of the former fueling system and the former field waste tanks area, the soil and groundwater remediation system, and previous sampling events is presented in Table 1.



## **2.0 FIELD ACTIVITIES AND RESULTS**

Brown and Caldwell purged and sampled 13 groundwater monitor wells at and adjacent to the BJ Services Hobbs facility on March 8-9, 2001 to determine concentrations of dissolved-phase hydrocarbons in groundwater and to evaluate general groundwater quality in the area. The locations of the monitor wells at the facility are shown in Figure 1. The following subsections describe the field activities conducted by Brown and Caldwell at the facility in January 2001 and March 2001. The results of the associated groundwater analyses are also presented.

### **2.1 January 2001 Monitor Well Installation and Sampling Activities**

Monitor wells MW-14 and MW-15 were installed and developed in accordance with the workplan dated September 9, 2000, as subsequently approved by NMOCD. Boring logs and completion diagrams are presented in Appendix A. The monitor wells were sampled in January 2001 for the New Mexico Water Quality Control Commission (NMWQCC) parameters, including chloride, in accordance with the purging and sample collection procedures described in Section 2.2. The results of the January 2001 sampling event are presented in Table 2. The complete analytical report is provided in Appendix B. Monitor well MW-14 was re-sampled for chloride during the March 2001 sampling event. Chloride impact above the NMWQCC standard of 250 milligrams per liter (mg/L) was measured in monitor well MW-14.

### **2.2 March 2001 Groundwater Measurements and Sampling**

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. A cumulative table of groundwater elevation data is presented in Table 3. 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 (ft/ft). A groundwater elevation map for March 8-9, 2001 is presented in Figure 2. The groundwater elevation data presented in Table 3 indicate that

groundwater levels have declined in all monitor wells at the facility since late 1995. Monitor well OW-4 did not contain sufficient water for collection of a groundwater sample in March 2001.

The monitor wells were purged and sampled using disposable bailers. Field parameter measurements for pH, conductivity, oxidation-reduction (redox) potential, dissolved oxygen, and temperature were collected 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 C. Field readings for the groundwater sampling event are summarized in Table 4.

Groundwater samples were collected after completion of purging operations using disposable PVC bailers. Each sample was transferred to laboratory-prepared, clean glass or plastic containers sealed with Teflon<sup>®</sup>-lined lids, labeled, and placed on ice in an insulated cooler for shipment via overnight courier to the analytical laboratory. Each cooler was accompanied by completed chain-of-custody documentation.

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.

### **2.3 Results of Groundwater Analyses**

Groundwater samples collected from all wells during this sampling event except monitor wells MW-14 and MW-15 were analyzed for TPH-D and TPH-G by EPA Method 8015B, BTEX by EPA Method 8021B, PAHs by EPA Method 8310, the eight RCRA metals by the EPA 6010B Series, and the NMWQCC groundwater quality parameters, including major anions (chloride,



fluoride, nitrate, and sulfate), major cations (calcium, magnesium, potassium, and sodium), hardness, carbonate, and bicarbonate. Groundwater from monitor wells MW-14 and MW-15 was analyzed for BTEX, Method 8260 volatile organic compounds (VOCs), and chloride only, having previously been analyzed for BTEX, PAHs, RCRA metals, and NMWQCC groundwater quality parameters in January 2001. Groundwater samples from selected wells were analyzed for dissolved methane to assist in evaluation of natural attenuation processes at the facility. The laboratory analytical reports and chain-of-custody documentation for the groundwater samples collected during the March 2001 sampling event are provided in Appendix B.

Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 5. Current and cumulative analytical results for groundwater quality parameters as well as PAHs and RCRA metals detected in one or more wells in one or more sampling events since August 1995 are presented in Table 2, along with a listing of VOCs detected in monitor wells MW-14 and MW-15. The results for nitrate, sulfate, and dissolved methane analyses performed on groundwater samples from monitor wells MW-5, MW-10, MW-11A, and MW-12 to evaluate natural attenuation processes are presented in Table 6.

Benzene concentrations in excess of applicable laboratory detection limits were reported in four of the 13 groundwater samples collected during this sampling event. Benzene concentrations were below the NMWQCC standard of 0.01 mg/L in all wells except monitor wells MW-11A and MW-12. Figure 3 presents a benzene concentration and total BTEX distribution map for the March 2001 sampling event. A total petroleum hydrocarbon distribution map for the March 2001 sampling event is presented in Figure 4.

Benzene concentrations in monitor wells located near the former fuel island source area remained below the NMWQCC standard of 0.01 mg/L in March 2001. Benzene was detected at a concentration of 2 micrograms per liter ( $\mu\text{g/L}$ ) in monitor well MW-1. Benzene was not detected in monitor wells MW-3, MW-4, MW-9, or MW-13. Benzene has not been detected in monitor wells MW-3, MW-4, or MW-9 since June 1999, March 1999, and September 1998, respectively.

Benzene has not been detected in monitor well MW-13 since June 2000. Adjustments to the biosparging system in July 1999 and March 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 levels, as documented in previous quarterly groundwater sampling reports for the facility.

## **2.4 Natural Attenuation Evaluation**

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

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

The former field waste tanks in the eastern portion of the facility were removed in March 1997. Concentrations of total BTEX in monitor wells in the area of the former field waste tanks have been generally stable or declining subsequent to removal of the field waste tanks. 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.

Benzene and total BTEX concentrations measured in former field waste tanks area monitor wells MW-10 and MW-12 in March 2001 are lower than at any time during the monitoring history of these wells, providing primary evidence that natural attenuation of hydrocarbons is occurring in these areas.

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

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

March 2001 dissolved oxygen data for the facility are inconclusive because oxygen is typically added to groundwater when a bailer is used for well purging and sampling. However, historic evidence submitted to the NMOCD in previous quarterly groundwater monitoring reports for the facility has indicated that dissolved oxygen concentrations are typically depressed in hydrocarbon impacted monitor wells relative to non-impacted monitor wells at the facility, suggesting that natural attenuation of hydrocarbons is occurring at the facility.

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

Nitrate concentrations were measured at less than 0.10 mg/L in monitor wells MW-10, MW-11A, and MW-12 during the March 2001 sampling event. These concentrations are less than the background nitrate concentration of 3.24 mg/L measured in monitor well MW-5 (see Table 6). The low nitrate concentrations in monitor wells MW-10, MW-11A, and MW-12 suggest that nitrate is serving 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 concentrations ranging from 2.5 mg/L to 4.0 mg/L in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12, as shown in Table 4. The detections of ferrous iron in monitor wells MW-10, MW-11A, and MW-12 suggest that

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

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.

Sulfate concentrations in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12 exceed the concentration of sulfate in background monitor well, however (see Table 6). These data indicate 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 depletion of electron acceptors such as dissolved oxygen and nitrate has occurred.

Methane was detected only in monitor well MW-11A, which displays benzene and BTEX impact (see Tables 5 and 6). The presence of methane in monitor well MW-11A suggests the utilization of carbon dioxide as an electron acceptor, resulting in methanogenesis, is occurring during natural attenuation of hydrocarbons in the vicinity of monitor well MW-11A.

6. Redox is a measure of chemical energy in groundwater. Redox in background well MW-5 was measured at 174.0 millivolts (mV), as shown in Table 3. Redox values in the vicinity of former field waste tanks area wells MW-10, MW-11A, and MW-12 ranged from -87 mV to -117 mV. Redox values are positive in all non-impacted wells except MW-13. The negative redox values in the former field waste tank area monitor wells suggest that electron acceptors other than dissolved oxygen and nitrate (e.g., carbon dioxide) are being utilized in this area.

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

Bicarbonate alkalinity in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12 ranged from 475 mg/L to 646 mg/L, as compared to a value of 222 mg/L in the upgradient monitor well MW-5 (see Table 2). These data provide further evidence that natural attenuation of hydrocarbons is occurring in the area of the former field waste tanks area.

In conclusion, dissolved oxygen and nitrate data from this and previous groundwater sampling events suggest that these constituents are acting as electron acceptors during intrinsic bioremediation processes that are ongoing at former field waste tanks area of the facility. Redox

and alkalinity data provide further evidence that natural attenuation of hydrocarbons is occurring in this area. The detection of methane in former field waste tanks area monitor well MW-11A suggests that carbon dioxide is also serving locally as an electron acceptor during intrinsic bioremediation of hydrocarbons in this area.

It is recommended that monitoring for natural attenuation evaluation parameters continue in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12 and upgradient well MW-5. Redox, dissolved oxygen content, and alkalinity are good indicators of the occurrence of aerobic bioremediation of hydrocarbons, so it is also recommended that field testing for these parameters be performed in all wells to be sampled during upcoming groundwater monitoring events.



### 3.0 REMEDIATION SYSTEM

Based on the results of previous investigations conducted by Brown and Caldwell and Roberts/Schornick and Associates, Inc., Brown and Caldwell recommended the installation of a biosparging system in a Remedial Action Plan (RAP) submitted to the NMOCD in May 1994. The NMOCD approved the RAP on August 11, 1994. 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 the former fuel island source area monitor wells MW-1, MW-3, MW-4, MW-9, and MW-13, as documented in the December 2000 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 shut down completely on November 1, 2000. The March 2001 sampling event is the second sampling event since this shut down.

Benzene concentrations in former fuel island source area monitor wells MW-3, MW-4, MW-9, and MW-13 have remained at non-detectable levels since shut down of the biosparging system, as previously discussed in Section 2.3. BTEX constituent concentrations in these wells and monitor well MW-1 have now remained below applicable NMWQCC standards for four consecutive quarters. It is therefore recommended that the post-remediation confirmation sampling specified in the NMOCD-approved RAP for the former fuel island area of the facility be performed in conjunction with a quarterly monitoring event for all wells at the facility in June 2001. The proposed locations of the confirmation soil borings are indicated in Figures 3 and 4.

If this confirmation sampling confirms that the remediation goals for the facility have been met, then a biosparging system closure report for the former fuel island area of the facility will be prepared and submitted to NMOCD.





## **4.0 CONCLUSIONS AND RECOMMENDATIONS**

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

### **4.1 Conclusions**

- Dissolved benzene, BTEX, and TPH concentrations in all monitor wells located near the former fueling system source area are non-detectable or below applicable standards and have remained at these levels for the past four quarterly groundwater sampling events..
- Benzene concentrations in all monitor wells at the facility except MW-11A and MW-12 are less than the New Mexico WQCC standard of 0.01 mg/L for benzene.
- Benzene and total BTEX concentrations measured in former field waste tanks area monitor wells MW-10 and MW-12 in March 2001 are lower than at any time during the monitoring history of these wells.
- Natural attenuation processes appear to be occurring in the vicinity of the former field waste tanks removed in March 1997.
- The chloride concentration in monitor well MW-14 exceeds the NMQCC standard of 250.0 mg/L.

### **4.2 Recommendations**

- Perform an additional quarterly groundwater monitoring event for the former fuel island area monitor wells in June 2001. Perform confirmation sampling in this area as specified in the RAP in conjunction with this groundwater monitoring event.
- Submit a closure report for the biosparging system at the former fuel island area, if warranted based on the results of the June 2001 sampling activities.
- Continue the quarterly monitoring program for former field waste tank area monitor wells MW-10, MW-11A, and MW-12. Continue monitoring for natural attenuation parameters in these wells and the background monitor well MW-5, including field-testing for natural attenuation indicator parameters.

## DISTRIBUTION

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

October 26, 2001

Distribution as follows:

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

Attention: Mr. Wayne Price

1 copy to: State of New Mexico  
Oil Conservation Division, Hobbs District Office  
1625 N. French Dr.  
Post Office Box 1980  
Hobbs, New Mexico 88240

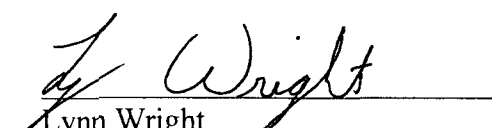
Attention: Mr. Chris Williams

1 copy to: BJ Services Company, U.S.A.  
11211 FM 2920  
Tomball, Texas 77375

Attention: Ms. Jo Ann Cobb

1 copy to: Brown and Caldwell, Project File

## QUALITY CONTROL REVIEWER

  
Lynn Wright  
Principal Geologist

RLR/uak

# Figures



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**BROWN AND  
CALDWELL**  
HOUSTON, TEXAS

SUBMITTED: \_\_\_\_\_ DATE: \_\_\_\_\_  
PROJECT MANAGER

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_  
BROWN AND CALDWELL



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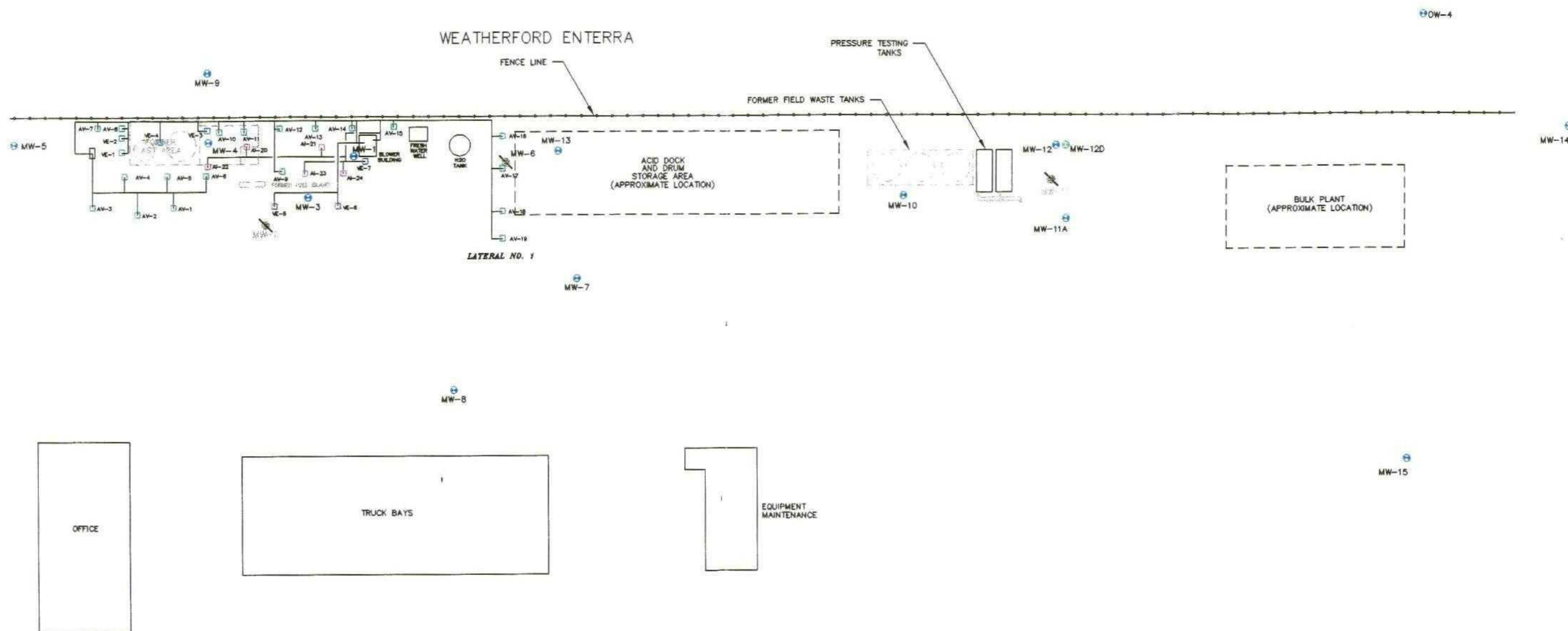
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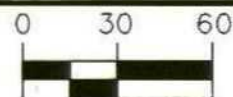
- MW-3 EXISTING MONITOR WELL LOCATION
- BIOSPARGING SYSTEM
- MW-2 MONITOR WELL (PLUGGED AND ABANDONED)

TITLE	SITE MAP	DATE	4/6/01
CLIENT	BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER	12832.016
SITE	HOBBS, NEW MEXICO	FIGURE NUMBER	1

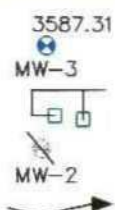


**BROWN AND  
CALDWELL**  
HOUSTON, TEXAS

SUBMITTED: \_\_\_\_\_ DATE: \_\_\_\_\_  
PROJECT MANAGER  
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_  
BROWN AND CALDWELL



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APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_



LEGEND  
MONITOR WELL LOCATION WITH GROUNDWATER ELEVATION (feet AMSL)  
BIOSPARGING SYSTEM  
MONITOR WELL (PLUGGED AND ABANDONED)  
GROUNDWATER FLOW DIRECTION

TITLE  
GROUNDWATER ELEVATION MAP FOR MARCH 8-9, 2001

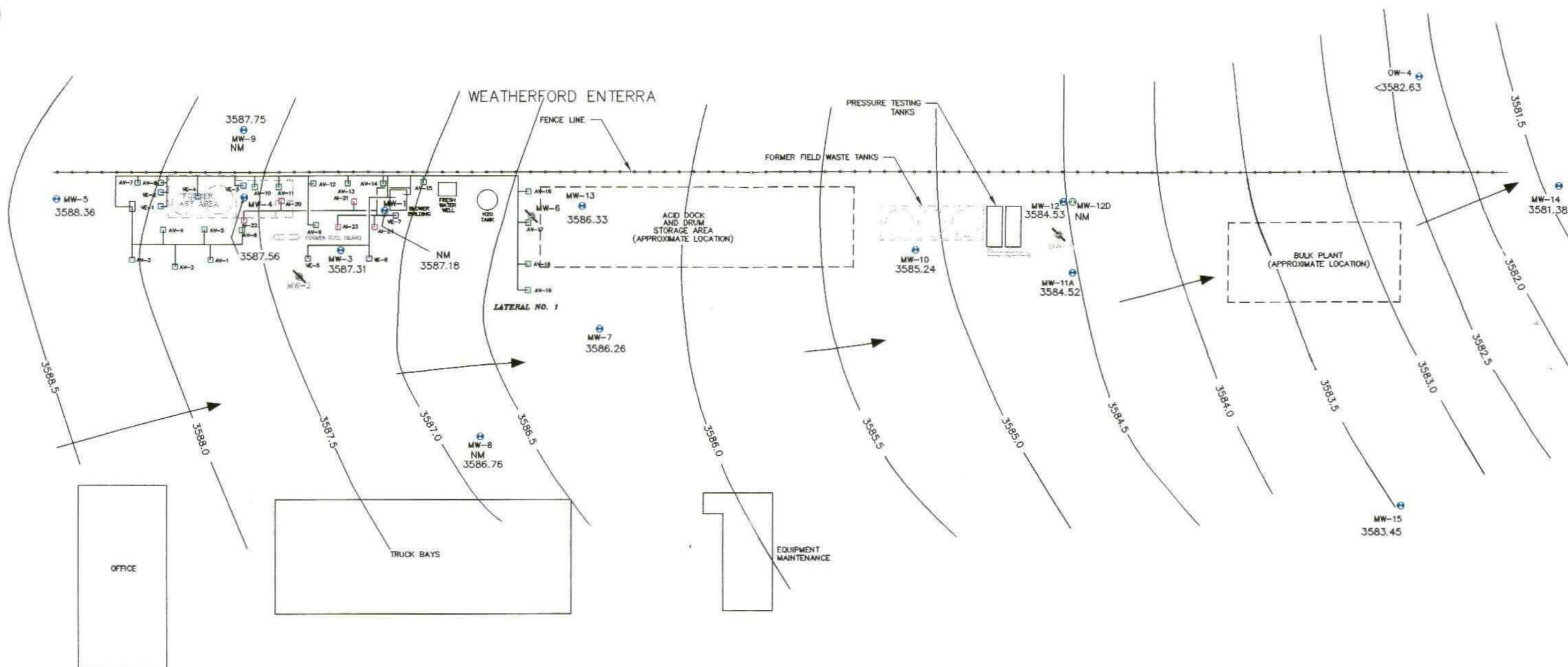
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BJ SERVICES COMPANY, U.S.A.

SITE  
HOBBS, NEW MEXICO

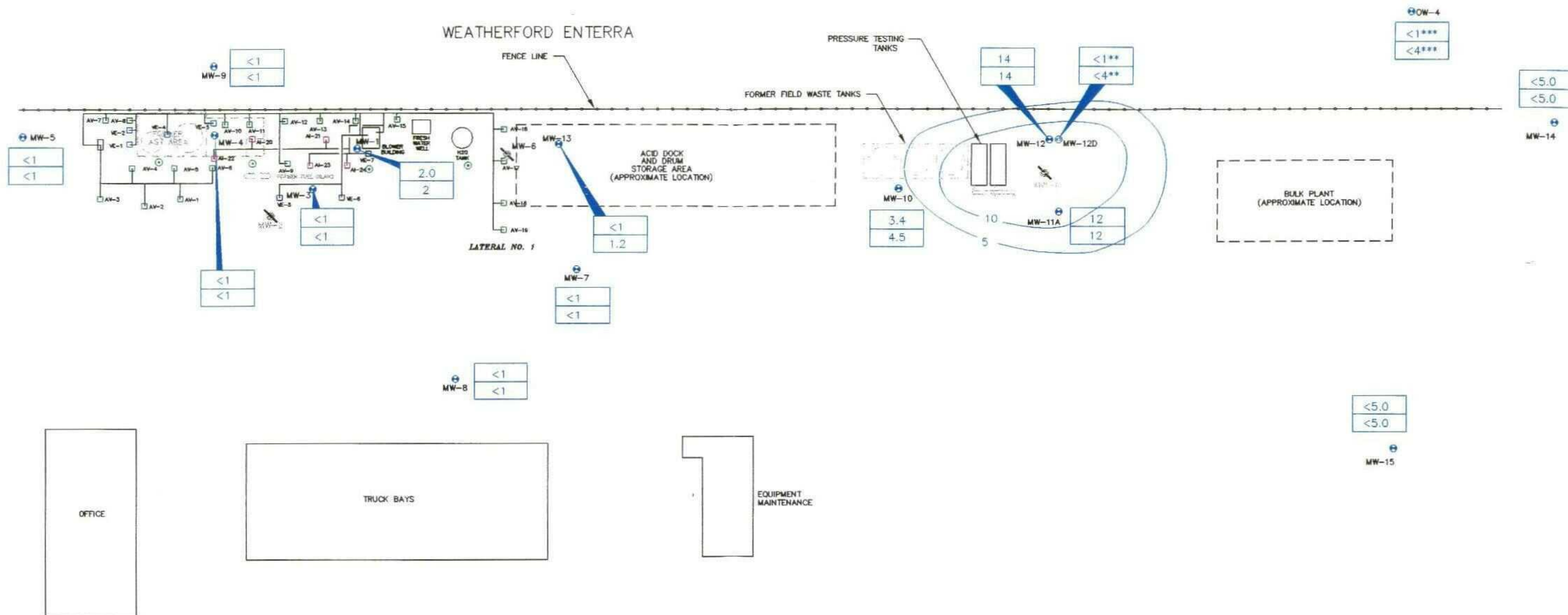
DATE  
4/6/01

PROJECT NUMBER  
12832.016

FIGURE NUMBER  
2







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

**BROWN AND CALDWELL**  
HOUSTON, TEXAS

SUBMITTED: \_\_\_\_\_ DATE: \_\_\_\_\_  
PROJECT MANAGER  
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_  
BROWN AND CALDWELL



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**LEGEND**

EXISTING MONITOR WELL LOCATION

MONITOR WELL (PLUGGED AND ABANDONED)

BENZENE CONCENTRATION (ug/L)

TOTAL BTEX CONCENTRATION (ug/L)

BIOSPARGING SYSTEM

BENZENE ISOCONCENTRATION CONTOUR (ug/L)

PROPOSED CONFIRMATION SOIL BORING LOCATION

\*\* INDICATES WELL NOT SAMPLED 3/8/01; DATA PRESENTED ARE FROM 6/8/00

\*\*\* INDICATES WELL NOT SAMPLED 3/8/01; DATA PRESENTED ARE FROM 9/13/00

TITLE: BENZENE ISOCONCENTRATION AND TOTAL BTEX DISTRIBUTION MAP FOR MARCH 8-9, 2001

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

SITE: HOBBS, NEW MEXICO

DATE: 4/6/01

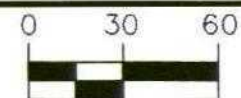
PROJECT NUMBER: 12832.016

FIGURE NUMBER: 3

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CALDWELL**  
HOUSTON, TEXAS

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APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_  
BROWN AND CALDWELL

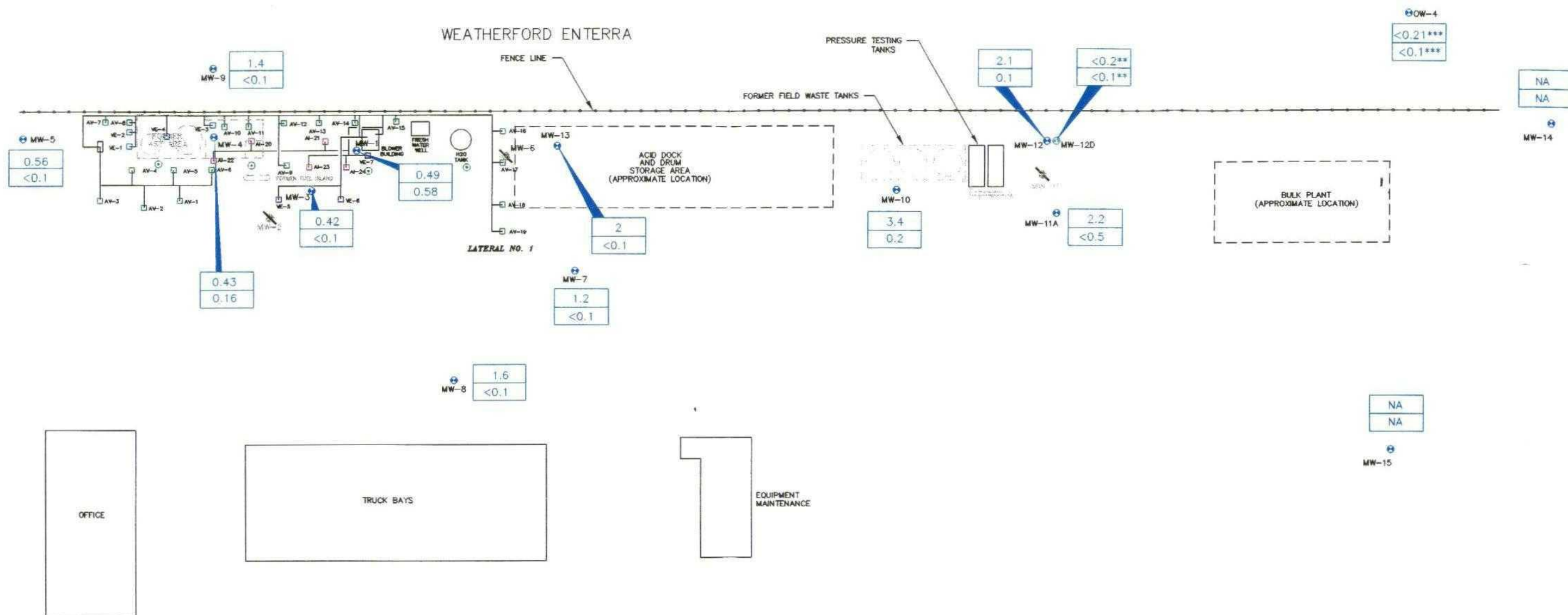


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**LEGEND**

- EXISTING MONITOR WELL LOCATION
- MONITOR WELL (PLUGGED AND ABANDONED)
- BIOPARGING SYSTEM
- PROPOSED CONFIRMATION SOIL BORING LOCATION
- TPH-D CONCENTRATION (mg/L)
- TPH-G CONCENTRATION (mg/L)
- \*\* - INDICATES WELL NOT SAMPLED 3/8/01; DATA PRESENTED ARE FROM 6/8/00
- \*\*\* - INDICATES WELL NOT SAMPLED 3/8/01; DATA PRESENTED ARE FROM 9/13/00

TITLE	TOTAL PETROLEUM HYDROCARBONS DISTRIBUTION MAP FOR MARCH 8-9, 2001		DATE	4-6-01
CLIENT	BJ SERVICES COMPANY, U.S.A.		PROJECT NUMBER	12832.016
SITE	HOBBS, NEW MEXICO		FIGURE NUMBER	4



# Tables





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

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

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

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

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

Date	Activity
August 23, 1996	Brown and Caldwell conducted the August 1996 groundwater sampling event.
December 2, 1996	Brown and Caldwell conducted the December 1996 groundwater sampling event.
March 6-7, 1997	BJ Services removed three field waste tank and associated hydrocarbon impacted soil.
March 12, 1997	Brown and Caldwell conducted the March 1997 groundwater sampling event.
March 14, 1997	Vapor extraction well VE-4 installed.
April 1997	Vapor extraction well VE-4 connected to the vapor extraction system.
June 12, 1997	Brown and Caldwell conducted the June 1997 groundwater sampling event.
September 11-12, 1997	Brown and Caldwell conducted the September 1997 groundwater sampling event.
December 10, 1997	Brown and Caldwell conducted the December 1997 groundwater sampling event.
February 3-14, 1998	Air injection wells AI-20 through AI-24, vapor extraction wells VE-5 though VE-7 and monitor wells MW-11A and MW-12 were installed.
February 19, 1998	Operation of previously existing injection wells suspended in preparation for start-up of new injection wells AI-20 through AI-24.
March 10, 1998	Operation of new air injection wells AI-20 through AI-24 and new vapor extraction wells VE-5 though VE-7 commenced.
March 23-24, 1998	Brown and Caldwell conducted the March 1998 groundwater sampling event.
March 24, 1998	Operation of previously existing injection wells and vapor extraction wells resumed.
June 23, 1998	Brown and Caldwell conducted the June 1998 groundwater sampling event.
September 30, 1998	Brown and Caldwell conducted the September 1998 groundwater sampling event.
December 9-10, 1998	Brown and Caldwell conducted the December 1998 groundwater sampling event.

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

Date	Activity
January 21, 1999	NMOCD requested submittal of a work plan by March 22, 1999 to perform additional groundwater delineation in the area of the former field waste tanks and the former AST/MW-6 area.
March 9-10, 1999	Brown and Caldwell conducted the March 1999 groundwater sampling event.
March 19, 1999	Brown and Caldwell submitted the work plan for groundwater delineation activities that was requested on January 22, 1999 to NMOCD.
May 19, 1999	NMOCD approved the groundwater delineation work plan.
June 10, 1999	Brown and Caldwell performed sampling of existing monitor wells for the June /July 1999 groundwater sampling event.
July 2, 1999	Brown and Caldwell completed plugging and abandonment of monitor wells MW-2, MW-6, and MW-11; installed and developed monitor wells MW-12D and MW-13; and sampled monitor wells MW-12D and MW-13 to complete the June/July 1999 groundwater sampling event.
July 14, 1999	Brown and Caldwell redirected air discharge from the shallow well injection system to Lateral No. 1 and optimized air flow to injection wells AI-16 and AI-17 to apply increased remedial pressure to the eastern portion of the west plume.
September 13-14, 1999	Brown and Caldwell conducted the September 1999 groundwater sampling event.
December 9, 1999	Brown and Caldwell conducted the December 1999 groundwater sampling event.
March 9-10, 2000	Brown and Caldwell conducted the March 2000 groundwater sampling event and shut off air flow to biosparging system Lateral Nos. 4S, 5S, 6S, and 7S.
June 8, 2000	Brown and Caldwell conducted the June 2000 groundwater sampling event.
September 13, 2000	Brown and Caldwell conducted the September 2000 groundwater sampling event.
November 1, 2000	Brown and Caldwell shut down the biosparging system.
December 7, 2000	Brown and Caldwell conducted the December 2000 groundwater sampling event.

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

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.

Table 2  
Summary of Detected Analytes for PAHs, Metals, VOCs, SVOCs and Groundwater Quality Parameters  
Hobbs, New Mexico Facility  
BJ Services Company, U.S.A.

Analyte (units)	Sample Date	Monitor Wells																
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
Bicarbonate, as CaCO <sub>3</sub> (mg/L)	8/1/95	380	430	490	290	670	440	360	570	520	560	NA	NA	NA	NA	NA	NA	NA
	8/23/96	310	310	210	270	120	400	280	390	520	430	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	286	214	175	247	180	309	260	306	557	NA	319	451	NA	NA	NA	NA	NA
	3/9-10/99	92	309	186	283	286	358	317	333	278	NA	335	386	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	200	520	NA	NA	316
	3/9-10/00	89.1	248	160	253	NA	301	362	279	455	NA	703	402	244	240	NA	NA	1020
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	374	250	NA
	3/8-9/01	90.9	242	232	222	NA	283	252	252	586	NA	646	475	NA	131	NA	NA	NA
Carbonate, as CaCO <sub>3</sub> (mg/L)	8/1/95	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	10	NA	NA	NA	NA	NA	NA	NA
	8/23/96	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NA	< 1	< 1	NA	NA	NA	NA	NA
	3/9-10/99	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	NA	< 1	< 1	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1	< 1	NA	NA	< 1
	3/9-10/00	< 2	< 2	< 2	< 2	NA	< 2	< 2	< 2	< 2	NA	< 2	< 2	< 2	< 2	NA	NA	< 4
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 2	< 2	NA
	3/8-9/01	< 2	< 2	< 2	< 2	NA	< 2	< 2	< 2	< 2	NA	< 2	< 2	NA	< 2	NA	NA	NA
Hardness-Total, as CaCO <sub>3</sub> (mg/L)	3/23-24/98	430	430	275	342	440	670	740	510	1450	NA	1000	1600	NA	NA	NA	NA	NA
	3/9-10/99	250	440	310	340	640	780	680	370	720	NA	1150	460	NA	NA	NA	NA	NA
	3/9-10/00	600	450	500	1200	NA	660	760	430	760	NA	880	700	260	540	NA	NA	3000
	3/8-9/01	310	470	610	440	NA	590	590	1000	1300	NA	1900	1300	NA	670	NA	NA	NA
Hydroxide (mg/L)	8/1/95	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA
	8/23/96	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA
Methane (mg/L)	3/23-24/98	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0012	< 0.0012	0.039	< 0.0012	0.91	NA	0.14	< 0.0012	NA	NA	NA	NA	NA
	3/9-10/99	NA	NA	NA	< 0.0012	NA	NA	NA	NA	0.035	NA	0.094	< 0.0012	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0015	0.0017	NA	NA	NA	< 0.0012
	3/9-10/00	< 0.0012	< 0.0012	< 0.0012	< 0.0012	NA	< 0.0012	0.13	< 0.0012	0.0056	NA	0.037	< 0.0012	< 0.0012	< 0.0012	NA	NA	< 0.0012
	3/8-9/01	< 0.0012	< 0.0012	< 0.0012	< 0.0012	NA	< 0.0012	< 0.0012	< 0.0012	< 0.0012	NA	0.0028	< 0.0012	NA	< 0.0012	NA	NA	NA
Anions (mg/L)																		
Chloride	8/1/95	160	150	310	130	380	310	350	110	2200	3400	NA	NA	NA	NA	NA	NA	NA
	8/23/96	130	140	100	99	210	250	360	140	2000	2900	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	212	206	126	151	183	223	264	164	2390	NA	940	1200	NA	NA	NA	NA	NA
	3/9-10/99	163	156	142	155	411	238	274	123	1160	NA	834	314	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	195	496	NA	NA	266
	3/9-10/00	258	196	196	196	NA	224	241	131	474	NA	1290	327	117	276	NA	NA	258
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	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	NA	NA
Fluoride	3/23-24/98	0.9	1.2	1.2	0.6	1.1	0.8	0.9	1.3	6.1	NA	2.9	4.2	NA	NA	NA	NA	NA
	3/9-10/99	1.54	1.46	1.5	1.38	1.79	1.56	1.44	1.84	4.93	NA	3.08	3.13	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.83	2.22	NA	NA	3.45
	3/9-10/00	1.7	1.1	1.1	1.1	NA	0.75	0.69	1.5	1	NA	< 0.1	1.7	1.3	1.7	NA	NA	3.8
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.5	1.2	NA
	3/8-9/01	1.3	0.77	0.63	0.86	NA	0.69	0.66	0.92	1.2	NA	1.1	1.9	NA	1.6	NA	NA	NA
Nitrate (Nitrogen as N)	8/1/95	4.7	5.6	15	28	1.3	9.2	11	38	< 0.1	5.5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	11	7.6	7.6	12	< 0.5	10	8.6	24	< 5	11	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	1.78	3.07	2.59	3.87	0.69	3.92	1.84	4.27	0.07	NA	< 0.05	< 0.05	NA	NA	NA	NA	NA
	3/9-10/99	0.7	2.1	2.6	NA	< 0.1	3.3	0.7	3.7	NA	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1	2.4	NA	NA	3.96
	3/9-10/00	0.33	2.9	3.7	5.3	NA	3.6	0.35	7.2	0.1	NA	0.11	< 0.1	0.14	< 0.1	NA	NA	3.6
	1/14/01-3/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.5	4.88	NA
	3/8-9/01	4.31	2.56	4.75	3.24	NA	2.82	0.664	7.9	< 0.1	NA	< 0.1	< 0.1	NA	< 0.1	NA	NA	NA
Sulfate	8/1/95	150	150	210	230	6.7	180	160	150	130	230	NA	NA	NA	NA	NA	NA	NA
	8/23/96	130	150	150	140	85	80	160	180	120	130	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	130	180	160	190	230	310	230	230	320	NA	190	240	NA	NA	NA	NA	NA
	3/9-10/99	196	162	178	195	72	246	240	146	223	NA	227	193	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	249	334	NA	NA	192
	3/9-10/00	530	190	250	260	NA	280	260	170	160	NA	270	210	200	170	NA	NA	200
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	180	130	NA
	3/8-9/01	210	170	180	180	NA	260	240	150	270	NA	330	300	NA	380	NA	NA	NA

Table 2  
Summary of Detected Analytes for PAHs, Metals, VOCs, SVOCs and Groundwater Quality Parameters  
Hobbs, New Mexico Facility  
BJ Services Company, U.S.A.

Analyte (units)	Sample Date	Monitor Wells																
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
Cations (mg/L)																		
Calcium	8/1/95	120	120	220	160	320	300	300	180	610	490	NA	NA	NA	NA	NA	NA	NA
	8/23/96	120	130	89	110	62	270	230	190	390	440	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	129	122	79	109	94	208	215	142	417	NA	259	388	NA	NA	NA	NA	NA
	3/9-10/99	80.2	129	90.8	116	141	233	197	122	214	NA	308	148	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	113	389	NA	NA	141
	3/9-10/00	155	119	147	387	NA	167	215	110	177	NA	229	180	78.1	122	NA	NA	882
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	179	150	NA	NA
	3/8-9/01	86.8	148	214	157	NA	172	183	381	331	NA	466	338	NA	198	NA	NA	NA
Magnesium	8/1/95	34	36	58	27	72	42	49	43	130	130	NA	NA	NA	NA	NA	NA	NA
	8/23/96	120	32	21	18	28	40	48	44	84	120	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	36	30	18	20	42	47	52	36	130	NA	96	108	NA	NA	NA	NA	NA
	3/9-10/99	19.7	31.5	20.4	21.6	62.2	54.4	47.7	28.5	43	NA	101	32.1	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	16.6	83.9	NA	NA	44.3
	3/9-10/00	41.3	27.5	26.3	29.2	NA	44.3	39.1	26.2	61	NA	47.7	30.6	7.25	38.8	NA	NA	74.5
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	87.5	28.3	NA
	3/8-9/01	20.7	24.9	25.9	16.6	NA	41.1	37.4	28.2	95.1	NA	93.4	95.3	NA	52.3	NA	NA	NA
Potassium	8/1/95	2.4	2.6	3.5	4.2	3	3.4	5	4.1	35	46	NA	NA	NA	NA	NA	NA	NA
	8/23/96	2.4	3	2.2	3.1	2.4	3.7	3.9	2.6	41	53	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	20	NA	30	70	NA	NA	NA	NA	NA
	3/9-10/99	3	4	3	4	4	9	4	3	15	NA	21	101	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	66	6	NA	NA	3
	3/9-10/00	4.01	4.11	3.95	5.61	NA	6.98	4.53	4.08	18.3	NA	18.6	104	70.6	2.84	NA	NA	10.7
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.59	4.59	NA
	3/8-9/01	<2	2.56	2.76	2.25	NA	5.15	2.94	3.84	19.5	NA	33.5	47.2	NA	2.26	NA	NA	NA
Sodium	8/1/95	100	93	140	110	130	95	94	98	660	2000	NA	NA	NA	NA	NA	NA	NA
	8/23/96	100	110	88	120	120	96	100	83	960	2600	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	113	126	109	130	100	92	101	118	1090	NA	312	381	NA	NA	NA	NA	NA
	3/9-10/99	126	135	124	155	141	110	115	122	856	NA	225	180	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	121	165	NA	NA	103
	3/9-10/00	123	112	115	123	NA	95.1	95.4	99.1	181	NA	608	129	103	114	NA	NA	97.3
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	144	108	NA
	3/8-9/01	141	124	135	147	NA	121	118	119	410	NA	801	185	NA	142	NA	NA	NA
Metals (mg/L)																		
Arsenic	8/1/95	0.0076	0.0043	< 0.002	0.0059	0.028	0.0033	0.0034	0.0055	0.015	0.0086	NA	NA	NA	NA	NA	NA	NA
	8/23/96	0.0078	0.0066	0.0059	0.0067	0.018	0.0036	0.0033	0.0044	0.028	0.011	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	0.007	0.007	0.008	0.007	0.013	< 0.005	< 0.005	0.005	0.035	NA	0.019	0.013	NA	NA	NA	NA	NA
	3/9-10/99	0.013	0.009	0.012	0.005	0.02	0.006	0.005	0.007	0.026	NA	0.036	0.066	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.022	0.008	NA	NA	<0.005
	3/9-10/00	0.0178	0.00817	0.0178	0.0173	NA	0.00849	0.00953	0.00757	0.0474	NA	0.108	0.0948	0.0143	<0.005	NA	NA	0.034
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00511	<0.005	NA
	3/8-9/01	0.0205	0.0094	0.0386	0.00974	NA	0.00694	NA	0.013	0.133	NA	0.08	0.0445	NA	0.00673	NA	NA	NA
Barium	8/1/95	0.069	0.38	0.34	0.049	1.1	0.069	0.075	0.089	0.37	0.2	NA	NA	NA	NA	NA	NA	NA
	8/23/96	0.064	0.24	0.069	0.038	0.29	0.061	0.066	0.089	0.26	0.2	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	0.11	0.182	0.044	0.044	0.208	0.059	0.074	0.066	0.287	NA	0.163	0.157	NA	NA	NA	NA	NA
	3/9-10/99	0.058	0.059	0.045	0.054	0.555	0.076	0.052	0.043	0.17	NA	0.174	0.144	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.155	0.333	NA	NA	0.062
	3/9-10/00	0.0917	0.108	0.0694	0.184	NA	0.046	0.236	0.0419	0.281	NA	0.872	0.245	0.0962	0.113	NA	NA	1.49
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0833	0.073	NA
	3/8-9/01	0.044	0.119	0.0978	0.0055	NA	0.043	0.0512	0.111	0.23	NA	0.401	0.603	NA	0.171	NA	NA	NA
Cadmium	8/1/95	< 0.001	< 0.001	0.0052	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	NA	NA	NA	NA	NA	NA	NA
	8/23/96	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	NA	< 0.005	< 0.005	NA	NA	NA	NA	NA
	3/9-10/99	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA	<0.005	<0.005	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	<0.005	NA	NA	<0.005
	3/9-10/00	<0.005	< 0.005	0.0178	<0.005	NA	<0.005	<0.005	<0.005	<0.005	NA	< 0.005	<0.005	<0.005	<0.005	NA	NA	<0.005
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	<0.005	NA
	3/8-9/01	<0.005	<0.005	0.0121	<0.005	NA	<0.005	<0.005	<0.005	<0.005	NA	<0.005	<0.005	NA	<0.005	NA	NA	NA

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BJ Services Company, U.S.A.

Analyte (units)	Sample Date	Monitor Wells																
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
Chromium	8/1/95	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	NA	NA	NA	NA
	8/23/96	<0.01	<0.01	<0.01	<0.01	0.049	<0.01	<0.01	<0.01	<0.01	<0.01	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA	<0.01	<0.01	NA	NA	NA	NA	NA
	3/9-10/99	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA	<0.01	<0.01	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02	0.02	NA	NA	<0.01
	3/9-10/00	<0.01	<0.01	<0.01	0.0248	NA	<0.01	<0.01	<0.01	0.031	NA	0.0342	0.0124	<0.01	<0.01	NA	NA	0.105
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.01	<0.01	NA
	3/8-9/01	<0.01	<0.01	0.0104	0.0101	NA	<0.01	<0.01	0.013	0.0109	NA	0.0392	0.0469	NA	0.0104	NA	NA	NA
Lead	8/1/95	<0.002	<0.002	0.0044	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0025	NA	NA	NA	NA	NA	NA	NA
	8/23/96	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA	<0.005	<0.005	NA	NA	NA	NA	NA
	3/9-10/99	<0.005	<0.005	<0.005	<0.005	0.013	<0.005	<0.005	<0.005	<0.005	NA	0.009	<0.005	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	<0.005	NA	NA	<0.005
	3/9-10/00	<0.005	<0.005	<0.005	0.00565	NA	<0.005	<0.005	<0.005	0.00661	NA	0.00595	<0.005	<0.005	<0.005	NA	NA	0.0355
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	<0.005	NA
	3/8-9/01	<0.005	<0.005	0.00602	<0.005	NA	<0.005	<0.005	0.00597	0.0222	NA	0.0119	0.00627	NA	<0.005	NA	NA	NA
Mercury	8/1/95	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	NA	NA	NA	NA	NA	NA	NA
	8/23/96	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	NA	NA	NA	NA	NA
	3/9-10/99	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0002	<0.0002	NA	NA	<0.0002
	3/9-10/00	0.000695	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	<0.0002	<0.0002	NA	NA	<0.0002
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.0002	<0.0002	NA
	3/8-9/01	<0.0002	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	NA	<0.0002	NA	NA	NA
Selenium	8/1/95	<0.004	<0.004	<0.004	<0.004	<0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	8/23/96	<0.004	<0.004	<0.004	<0.004	<0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NA	<0.005	<0.005	NA	NA	NA	NA	NA
	3/9-10/99	0.005	0.006	<0.005	0.006	<0.005	0.005	<0.005	<0.005	<0.005	NA	<0.005	<0.005	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	3/9-10/00	<0.005	<0.005	<0.005	<0.005	NA	0.00926	<0.005	<0.005	<0.005	NA	<0.005	<0.005	<0.005	<0.005	NA	NA	<0.005
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.005	0.00523	NA
	3/8-9/01	<0.005	0.00702	0.00508	0.00587	NA	0.00617	<0.005	0.0054	<0.005	NA	<0.005	<0.005	NA	<0.005	NA	NA	NA
PAHs (µg/L)																		
Acenaphthene	8/1/95	<50	<10	<500	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	<10	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	NA	<0.3	<0.3	NA	NA	NA	NA	NA
	3/9-10/99	<0.1	<0.1	<2.0	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<1.0	NA	NA	<0.1
	3/9-10/00	0.28	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.1	NA
	3/8-9/01	<0.12	<0.13	<0.12	<0.1	NA	<0.13	<0.12	<0.12	<0.15	NA	<0.13	<0.13	NA	<0.12	NA	NA	NA
Acenaphthylene	8/1/95	<50	<10	<500	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA	NA	NA	NA
	3/9-10/99	<0.1	<0.1	<0.1	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<1.0	NA	NA	<0.1
	3/9-10/00	0.91	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	0.4	NA	<0.1	<0.1	<0.1	1.8	NA	NA	<0.1
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.1	NA
	3/8-9/01	<0.12	<0.13	<0.12	<0.1	NA	<0.13	<0.12	<0.12	0.71	NA	0.35	<0.13	NA	<0.12	NA	NA	NA
Anthracene	8/1/95	<50	<10	<500	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA	NA	NA	NA
	3/9-10/99	<0.1	<0.1	<0.1	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<1.0	NA	NA	<0.1
	3/9-10/00	0.12	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.1	NA
	3/8-9/01	<0.12	<0.13	<0.12	<0.1	NA	<0.13	<0.12	<0.12	<0.15	NA	<0.13	<0.13	NA	<0.12	NA	NA	NA
Benzo(a)anthracene	8/1/95	<50	<10	<500	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	<10	<10	<30	<5	<30	<5	<5	<5	<5	<5	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	<10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA	NA	NA	NA
	3/9-10/99	<0.1	<0.1	0.2	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<1.0	NA	NA	<0.1
	3/9-10/00	0.18	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	<0.1	<0.1	<0.1	<0.1	NA	NA	<0.1
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.1	<0.1	<0.1	<0.1	NA
	3/8-9/01	<0.12	<0.13	<0.12	<0.1	NA	<0.13	<0.12	<0.12	<0.15	NA	<0.13	<0.13	NA	<0.12	NA	NA	NA



Table 2  
Summary of Detected Analytes for PAHs, Metals, VOCs, SVOCs and Groundwater Quality Parameters  
Hobbs, New Mexico Facility  
BJ Services Company, U.S.A.

Analyte (units)	Sample Date	Monitor Wells																
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
Benzo(k)fluoranthene	8/1/95	< 50	< 10	< 500	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	< 10	< 10	< 30	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	< 10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA
	3/9-10/99	< 0.1	< 0.1	0.2	< 0.1	< 2.0	< 0.1	< 0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 1.0	NA	NA	< 0.1
	3/9-10/00	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NA	NA	< 0.1
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA
	3/8-9/01	< 0.12	< 0.13	< 0.12	< 0.1	NA	< 0.13	< 0.12	< 0.12	< 0.15	NA	< 0.13	< 0.13	NA	< 0.12	NA	NA	NA
Benzo(a)pyrene	8/1/95	< 50	< 10	< 500	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	< 10	< 10	< 30	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	< 10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA
	3/9-10/99	< 0.1	< 0.1	0.2	< 0.1	< 2.0	< 0.1	< 0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 1.0	NA	NA	< 0.1
	3/9-10/00	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NA	NA	< 0.1
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA
	3/8-9/01	< 0.12	< 0.13	< 0.12	< 0.1	NA	< 0.13	< 0.12	< 0.12	< 0.15	NA	< 0.13	< 0.13	NA	< 0.12	NA	NA	NA
Fluorene	8/1/95	< 50	< 10	< 500	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	< 10	< 10	< 30	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	< 10	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	NA	< 0.3	< 0.3	NA	NA	NA	NA	NA
	3/9-10/99	< 0.1	< 0.1	< 2.0	< 0.1	< 2.0	< 0.1	< 0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 1.0	NA	NA	< 0.1
	3/9-10/00	25	< 0.1	0.36	< 0.1	NA	< 0.1	< 0.1	1.5	< 0.1	NA	< 0.1	< 0.1	< 0.1	1.6	NA	NA	< 0.1
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA
	3/8-9/01	< 0.12	< 0.13	< 0.12	< 0.1	NA	< 0.13	< 0.12	< 0.12	< 0.15	NA	< 0.13	< 0.13	NA	< 0.12	NA	NA	NA
Naphthalene	8/1/95	< 5	210	1700	< 5	470	< 5	< 5	15	92	< 5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	230	110	440	< 5	< 30	< 5	< 5	< 84	< 76	< 5	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	130	23	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	4	8	NA	0.8	11	NA	NA	NA	NA	NA
	3/9-10/99	10	8	170	0.1	160	< 0.1	< 0.1	< 0.1	6	NA	< 0.1	19	NA	NA	NA	NA	NA
Naphthalene	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.6	34	NA	NA	< 0.1
	3/9-10/00	2.4	< 0.1	0.44	< 0.1	NA	< 0.1	< 0.1	0.42	1.5	NA	0.12	0.26	< 0.1	56	NA	NA	< 0.1
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA
	3/8-9/01	< 0.12	< 0.13	< 0.12	< 0.1	NA	< 0.13	< 0.12	< 0.12	0.15	NA	0.21	< 0.13	NA	< 0.12	NA	NA	NA
Phenanthrene	8/1/95	< 50	< 10	< 500	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	< 10	< 10	< 30	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	< 10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA
	3/9-10/99	< 0.1	< 0.1	2	< 0.1	< 2.0	< 0.1	< 0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 1.0	NA	NA	< 0.1
	3/9-10/00	0.65	< 0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	< 0.1	0.22	NA	NA	< 0.1
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA
	3/8-9/01	< 0.12	< 0.13	< 0.12	< 0.1	NA	< 0.13	< 0.12	< 0.12	< 0.15	NA	< 0.13	< 0.13	NA	< 0.12	NA	NA	NA
Pyrene	8/1/95	< 50	< 10	< 500	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	< 10	< 10	< 30	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	NA	NA
	3/23-24/98	< 10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA
	3/9-10/99	< 0.1	< 0.1	0.4	< 0.1	< 2.0	< 0.1	< 0.1	< 0.1	< 0.1	NA	< 0.1	< 0.1	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 1.0	NA	NA	< 0.1
	3/9-10/00	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	NA	NA	< 0.1
	1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.1	< 0.1	NA
	3/8-9/01	< 0.12	< 0.13	< 0.12	< 0.1	NA	< 0.13	< 0.12	< 0.12	< 0.15	NA	< 0.13	< 0.13	NA	< 0.12	NA	NA	NA
VOCs (µg/L)																		
Acetone	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	<100	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	130	<100	NA	NA	<100
	3/8-9/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<100	NA	NA
sec-Butylbenzene	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	5	NA	NA	< 5
	3/8-9/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5.0	<5.0	NA

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Analyte (units)	Sample Date	Monitor Wells																
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	MW-14	MW-15	OW-4
Isopropylbenzene	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	31	NA	NA	< 5
	3/8-9/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5.0	<5.0	NA
Naphthalene	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	190	NA	NA	< 5
	3/8-9/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5.0	<5.0	NA
n-Propylbenzene	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	68	NA	NA	< 5
	3/8-9/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5.0	<5.0	NA
1,2,4-Trimethylbenzene	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	93	NA	NA	< 5
	3/8-9/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5.0	<5.0	NA
1,3,5-Trimethylbenzene	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	93	NA	NA	< 5
	3/8-9/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5.0	<5.0	NA
MTBE	3/23-24/98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	25	NA	NA	< 10
	3/8-9/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<5.0	<5.0	NA
SVOCs (µg/L)																		
2,4-Dimethylphenol	8/1/95	< 50	97	< 500	< 5	42	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	56	NA	NA	< 5
2-Methylnaphthalene	8/1/95	280	62	1500	< 5	150	< 5	< 5	36	23	< 5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	29	NA	NA	< 5
2-Methylphenol	8/1/95	< 50	56	< 500	< 5	< 30	< 5	< 5	< 5	< 5	< 5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	< 5
4-Methylphenol	8/1/95	< 80	< 20	< 800	< 8	150	< 8	< 8	< 8	< 8	< 8	NA	NA	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	< 5
Bis(2-ethylhexyl)phthalate	8/1/95	750	< 20	10000	40	< 40	< 7	< 7	< 7	< 7	< 7	NA	NA	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	< 5	NA	NA	< 5
Phenol	8/1/95	< 50	< 10	< 500	< 5	< 30	< 5	< 5	< 5	8.2	< 5	NA	NA	NA	NA	NA	NA	NA
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5	6	NA	NA	< 5

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

NA= Not Analyzed.

PAHs = Polynuclear Aromatic Hydrocarbons.

Table 3  
Cumulative Groundwater Elevation Data  
Hobbs, New Mexico Facility  
BJ Services Company, U.S.A.

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-1	3,647.53	08/10/92	53.22	0.00	3,594.31	(1)
		02/09/93	53.03	0.00	3,594.50	
		08/18/93	53.10	0.00	3,594.43	
		01/26/94	53.31	0.00	3,594.22	
		05/03/95	54.64	0.20	3,593.05	(2)
		07/31/95	54.14	0.00	3,593.39	
		11/14/95	53.69	0.00	3,593.84	
		02/23/96	54.32	0.00	3,593.21	
		05/31/96	54.14	0.00	3,593.39	
		08/23/96	56.17	0.00	3,591.36	
		12/02/96	55.27	0.00	3,592.26	
		03/12/97	55.70	0.27	3,592.05	
		06/12/97	55.08	0.02	3,592.47	
		09/12/97	55.64	0.51	3,592.31	
		12/10/97	55.46	0.00	3,592.07	PSH Sheen
		03/24/98	55.81	0.00	3,591.72	PSH Sheen
		06/23/98	56.38	0.06	3,591.20	
		09/30/98	56.82	0.00	3,590.71	PSH Sheen
		12/09/98	57.05	0.00	3,590.48	
		03/10/99	57.45	0.00	3,590.08	
		06/10/99	58.02	0.00	3,589.51	
		07/02/99	57.90	0.00	3,589.63	
		09/14/99	58.14	0.00	3,589.39	
		12/09/99	-	-	-	(3)
		03/09/00	58.99	0.00	3,588.54	
		06/00	-	-	-	
		09/00	-	-	-	
		12/7/00	-	-	-	
		03/08/01	60.35	0.00	3587.18	
MW-2	3,644.84	08/10/92	52.82	0.00	3,592.02	(1)
		02/09/93	49.60	0.00	3,595.24	
		08/18/93	49.71	0.00	3,595.13	
		01/26/94	49.97	0.00	3,594.87	
		05/03/95	-	-	-	(4),(5)
MW-3	3,645.00	08/10/92	52.99	0.00	3,592.01	(1)
		02/09/93	52.72	0.00	3,592.28	
		08/18/93	52.82	0.00	3,592.18	
		01/26/94	53.05	0.00	3,591.95	
		05/03/95	54.31	0.00	3,590.69	
		07/31/95	51.24	0.00	3,593.76	
		11/14/95	51.10	0.00	3,593.90	
		02/23/96	51.68	0.00	3,593.32	
		05/31/96	51.45	0.00	3,593.55	
		08/23/96	51.55	0.00	3,593.45	
		12/02/96	52.23	0.00	3,592.77	
		03/12/97	52.67	0.00	3,592.33	
		06/12/97	52.68	0.00	3,592.32	
		09/11/97	52.71	0.00	3,592.29	
		12/10/97	52.89	0.00	3,592.11	
		03/23/98	53.22	0.00	3,591.78	
		06/23/98	53.66	0.00	3,591.34	
		09/30/98	54.06	0.00	3,590.94	
		12/09/98	54.36	0.00	3,590.64	
		03/10/99	54.72	0.00	3,590.28	
		06/10/99	55.17	0.00	3,589.83	
		07/02/99	55.15	0.00	3,589.85	

Table 3  
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		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	
MW-4	3,645.28	08/10/92	50.55	0.00	3,594.73	(1)  PSH Sheen  200 ml PSH
		02/09/93	50.26	0.00	3,595.02	
		08/18/93	50.38	0.00	3,594.90	
		01/26/94	50.90	0.30	3,594.63	
		05/03/95	51.51	0.45	3,594.14	
		07/31/95	51.74	0.26	3,593.75	
		11/14/95	51.03	0.00	3,594.25	
		02/23/96	51.65	0.01	3,593.64	
		05/31/96	51.48	0.00	3,593.80	
		08/23/96	53.49	0.00	3,591.79	
		12/02/96	52.32	0.00	3,592.96	
		03/12/97	52.74	0.05	3,592.58	
		06/12/97	53.08	0.44	3,592.56	
		09/12/97	52.60	0.15	3,592.80	
		12/10/97	52.89	0.00	3,592.39	
		03/24/98	53.20	0.25	3,592.29	
		06/23/98	53.82	0.22	3,591.64	
		09/30/98	53.96	0.00	3,591.32	
		12/09/98	54.27	0.00	3,591.01	
		03/10/99	54.69	0.04	3,590.62	
		06/10/99	55.07	0.00	3,590.21	
		07/02/99	55.10	0.00	3,590.18	
		09/14/99	55.33	0.00	3,589.95	
		12/09/99	55.79	0.00	3,589.49	
		03/10/00	56.12	0.00	3,589.16	
		06/08/00	56.67	0.00	3,588.61	
		09/13/00	56.65	0.00	3,588.63	
		12/07/00	57.05	0.00	3,588.23	
		03/08/01	57.72	0.00	3,587.56	
MW-5	3,647.72	08/10/92	52.38	0.00	3,595.34	(1)
		02/09/93	52.06	0.00	3,595.66	
		08/18/93	52.16	0.00	3,595.56	
		01/26/94	52.50	0.00	3,595.22	
		05/03/95	53.57	0.00	3,594.15	
		07/31/95	53.27	0.00	3,594.45	
		11/14/95	52.83	0.00	3,594.89	
		02/23/96	53.57	0.00	3,594.15	
		05/31/96	53.16	0.00	3,594.56	
		08/23/96	53.41	0.00	3,594.31	
		12/02/96	53.98	0.00	3,593.74	
		03/12/97	54.44	0.00	3,593.28	
		06/12/97	54.48	0.00	3,593.24	
		09/12/97	54.29	0.00	3,593.43	
		12/10/97	54.66	0.00	3,593.06	
		03/23/98	55.05	0.00	3,592.67	
		06/23/98	55.44	0.00	3,592.28	
		09/30/98	55.65	0.00	3,592.07	
		12/09/98	56.00	0.00	3,591.72	
		03/09/99	56.45	0.00	3,591.27	

Table 3  
Cumulative Groundwater Elevation Data  
Hobbs, New Mexico Facility  
BJ Services Company, U.S.A.

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-5		06/10/99	56.91	0.00	3,590.81	
		07/02/99	56.93	0.00	3,590.79	
		09/14/99	57.12	0.00	3,590.60	
		12/09/99	57.41	0.00	3,590.31	
		03/09/00	57.92	0.00	3,589.80	
		06/08/00	58.32	0.00	3,589.40	
		09/13/00	58.36	0.00	3,589.36	
		12/07/00	58.71	0.00	3,589.01	
		03/08/01	59.36	0.00	3,588.36	
MW-6	3,644.74	02/09/93	50.58	0.00	3,594.16	(1)
		08/18/93	50.78	0.00	3,593.96	
		01/26/94	51.00	0.00	3,593.74	
		05/03/95	52.63	0.00	3,592.11	
		07/31/95	51.90	0.00	3,592.84	
		11/14/95	51.19	0.00	3,593.55	
		02/23/96	52.10	0.00	3,592.64	
		05/31/96	51.76	0.00	3,592.98	
		08/23/96	51.63	0.00	3,593.11	
		12/02/96	52.85	0.00	3,591.89	
		03/12/97	53.55	0.00	3,591.19	
		06/12/97	52.08	0.00	3,592.66	
		09/11/97	53.72	0.00	3,591.02	
		12/10/97	53.27	0.00	3,591.47	
		03/23/98	53.56	0.00	3,591.18	
		06/23/98	52.88	0.00	3,591.86	
		09/30/98	54.89	0.00	3,589.85	
		12/09/98	54.57	0.00	3,590.17	
		03/10/99	55.10	0.00	3,589.64	
		07/02/99				(5),(6)
MW-7	3,644.55	02/09/93	50.53	0.00	3,594.02	(1)
		08/18/93	50.74	0.00	3,593.81	
		01/26/94	51.01	0.00	3,593.54	
		05/03/95	52.25	0.00	3,592.30	
		07/31/95	51.92	0.00	3,592.63	
		11/14/95	51.48	0.00	3,593.07	
		02/23/96	52.15	0.00	3,592.40	
		05/31/96	51.78	0.00	3,592.77	
		08/23/96	52.02	0.00	3,592.53	
		12/02/96	52.52	0.00	3,592.03	
		03/12/97	52.99	0.00	3,591.56	
		06/12/97	53.08	0.00	3,591.47	
		09/11/97	53.00	0.00	3,591.55	
		12/10/97	53.28	0.00	3,591.27	
		03/23/98	53.59	0.00	3,590.96	
		06/23/98	54.20	0.00	3,590.35	
		09/30/98	54.54	0.00	3,590.01	
		12/09/98	54.74	0.00	3,589.81	
		03/09/99	55.15	0.00	3,589.40	
		06/10/99	55.66	0.00	3,588.89	
		07/02/99	55.73	0.00	3,588.82	
		09/13/99	55.94	0.00	3,588.61	
		12/09/99	56.38	0.00	3,588.17	
		03/09/00	56.74	0.00	3,587.81	
		06/08/00	57.17	0.00	3,587.38	
		09/13/00	57.40	0.00	3,587.15	
		12/07/00	57.77	0.00	3,586.78	

**Table 3**  
**Cumulative Groundwater Elevation Data**  
**Hobbs, New Mexico Facility**  
**BJ Services Company, U.S.A.**

Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
MW-7		03/08/01	58.29	0.00	3,586.26	
MW-8	3,644.87	02/09/93	50.48	0.00	3,594.39	(1)
		08/18/93	50.67	0.00	3,594.20	
		01/26/94	50.96	0.00	3,593.91	
		05/03/95	52.15	0.00	3,592.72	
		07/31/95	51.77	0.00	3,593.10	
		11/14/95	51.37	0.00	3,593.50	
		02/23/96	52.17	0.00	3,592.70	
		05/31/96	51.55	0.00	3,593.32	
		08/23/96	51.92	0.00	3,592.95	
		12/02/96	52.43	0.00	3,592.44	
		03/12/97	52.93	0.00	3,591.94	
		06/12/97	53.96	0.00	3,590.91	
		09/11/97	52.73	0.00	3,592.14	
		12/10/97	53.15	0.00	3,591.72	
		03/23/98	53.51	0.00	3,591.36	
		06/23/98	54.01	0.00	3,590.86	
		09/30/98	54.35	0.00	3,590.52	
		12/09/98	54.60	0.00	3,590.27	
		03/09/99	55.00	0.00	3,589.87	
		06/10/99	55.56	0.00	3,589.31	
		07/02/99	55.57	0.00	3,589.30	
		09/13/99	55.72	0.00	3,589.15	
		12/09/99	-	-	-	(3)
		03/09/00	56.52	0.00	3,588.35	
		06/00	-	-	-	
		09/00	-	-	-	
		12/00	-	-	-	
		03/08/01	58.11	0.00	3586.76	
MW-9	3,644.78	04/22/93	49.73	0.00	3,595.05	(1)
		07/15/93	49.65	0.00	3,595.13	
		08/18/93	49.85	0.00	3,594.93	
		01/26/94	50.02	0.00	3,594.76	
		05/03/95	51.35	0.00	3,593.43	
		07/31/95	50.97	0.00	3,593.81	
		11/14/95	50.43	0.00	3,594.35	
		02/23/96	51.12	0.00	3,593.66	
		05/31/96	50.89	0.00	3,593.89	
		08/23/96	50.98	0.00	3,593.80	
		12/02/96	51.58	0.00	3,593.20	
		03/12/97	52.21	0.05	3,592.61	
		06/12/97	52.10	0.00	3,592.68	PSH Sheen
		09/12/97	51.95	0.00	3,592.83	PSH Sheen
		12/10/97	52.37	0.00	3,592.41	PSH Sheen
		03/23/98	52.68	0.00	3,592.10	PSH Sheen
		06/23/98	53.08	0.00	3,591.70	PSH Sheen
		09/30/98	53.39	0.01	3,591.40	PSH Sheen
		12/09/98	53.68	0.00	3,591.10	
		03/10/99	54.15	0.00	3,590.63	
		06/10/99	54.68	0.00	3,590.10	
		07/02/99	54.71	0.00	3,590.07	
		09/13/99	54.71	0.00	3,590.07	
		12/09/99	-	-	-	(3)
		03/09/00	55.69	0.00	3,589.09	
		06/00	-	-	-	
		09/00	-	-	-	

Table 3  
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		12/00	-	-	-	
		03/08/01	57.03	0.00	3,587.75	
MW-10	3,644.47	08/18/93	51.54	0.00	3,592.93	(1)
		01/26/94	51.90	0.00	3,592.57	
		05/03/95	52.97	0.00	3,591.50	
		07/31/95	52.87	0.00	3,591.60	
		11/14/95	52.51	0.00	3,591.96	
		02/23/96	53.05	0.00	3,591.42	
		05/31/96	52.79	0.00	3,591.68	
		08/23/96	53.03	0.00	3,591.44	
		12/02/96	53.41	0.00	3,591.06	
		03/12/97	54.21	0.00	3,590.26	
		06/12/97	53.99	0.00	3,590.48	
		09/12/97	53.94	0.00	3,590.53	
		12/10/97	54.12	0.00	3,590.35	
		03/23/98	54.51	0.00	3,589.96	
		06/23/98	55.12	0.00	3,589.35	
		09/30/98	55.61	0.00	3,588.86	
		12/09/98	55.80	0.00	3,588.67	
		03/09/99	56.09	0.00	3,588.38	
		06/10/99	56.60	0.00	3,587.87	
		07/02/99	56.64	0.00	3,587.83	
		09/14/99	56.91	0.00	3,587.56	
		12/09/99	57.37	0.00	3,587.10	
		03/10/00	57.71	0.00	3,586.76	
		06/08/00	58.08	0.00	3,586.39	
		09/13/00	58.44	0.00	3,586.03	
		12/07/00	58.89	0.00	3,585.66	
		03/09/01	59.31	0.00	3,585.24	
MW-11	3,643.78	08/18/93	51.92	0.00	3,591.86	(1)
		01/26/94	52.32	0.00	3,591.46	
		05/03/95	53.38	0.00	3,590.40	
		07/31/95	53.35	0.00	3,590.43	
		11/14/95	52.96	0.00	3,590.82	
		02/23/96	53.50	0.00	3,590.28	
		05/31/96	53.25	0.00	3,590.53	
		08/23/96	53.49	0.00	3,590.29	
		12/02/96	53.79	0.00	3,589.99	
		03/12/97	53.81	0.00	3,589.97	
		06/12/97	53.96	0.00	3,589.82	
		09/12/97	52.93	0.00	3,590.85	
		12/10/97				
						(5),(6)

Table 3  
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	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	
		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	
MW-12	3,644.29	03/23/98	54.72	0.00	3,589.57	(7)
		06/23/98	55.48	0.00	3,588.81	
		09/30/98	56.02	0.00	3,588.27	
		12/09/98	56.17	0.00	3,588.12	
		03/10/99	56.45	0.00	3,587.84	
		06/10/99	56.97	0.00	3,587.32	
		07/02/99	56.99	0.00	3,587.30	
		09/14/99	57.41	0.00	3,586.88	
		12/09/99	57.76	0.00	3,586.53	
		03/10/00	58.08	0.00	3,586.21	
		06/08/00	58.42	0.00	3,585.87	
		09/13/00	58.85	0.00	3,585.44	
		12/07/00	59.31	0.00	3,584.98	
		03/08/01	59.76	0.00	3,584.53	
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	-	-	-	
		03/08/01	-	-	-	
MW-13	3,645.52	07/02/99	56.60	0.00	3,588.92	(9)
		09/14/99	56.92	0.00	3,588.60	
		12/09/99	57.28	0.00	3,588.24	
		03/10/00	57.68	0.00	3,587.84	
		06/08/00	58.04	0.00	3,587.48	
		09/13/00	58.29	0.00	3,587.23	
		12/07/00	58.68	0.00	3,586.84	
		03/08/01	59.19	0.00	3,586.33	
MW-14	3,642.45	03/08/01	61.07	0.00	3,581.38	



**Table 3**  
**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-15	3,643.24	03/08/01	59.79	0.00	3,583.45	
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)

- (1) - Top of casing elevations and groundwater elevations of all monitor wells were relative to an arbitrary datum of 100.00 feet prior to March 1997 and have been converted to Mean Sea Level (MSL).
- (2) - For wells having measurable thickness of free product, the groundwater elevation was calculated as follows:  
Groundwater Elevation = (TOC elevation)-(depth to groundwater)+[(free product thickness)x(SG of free product)]  
Note: The specific gravity (SG) of the free product is 0.82.
- (3) - Not measured.
- (4) - Monitor well MW-2 could not be located after January 1994.
- (5) - Well plugged and abandoned July 2, 1999.
- (6) - Monitor well MW-11 could not be located after September 12, 1997.
- (7) - TOC elevations for MW-11A and MW-12 estimated relative to TOC elevation for MW-10.
- (8) - TOC elevations for MW-12D and OW-4 estimated relative to TOC elevation for MW-12.
- (9) - TOC elevation for MW-13 estimated relative to TOC elevation for MW-7.

**Table 4**  
**March 8-9, 2001 Field Screening Results for Groundwater Samples**  
**Hobbs, New Mexico Facility**  
**BJ Services Company, U.S.A.**

Monitor Well	Cumulative Liters Removed	pH	Temperature (°C)	Conductivity (umhos/cm)	Redox (mV)	Dissolved Oxygen (meter) (mg/L)	Dissolved Oxygen (Hach kit) (mg/L)	Ferrous Iron (mg/L)	Alkalinity (mg/L)	Turbidity NTUs <sup>(1)</sup>
MW-1	1.0	8.27	17.1	99.4	86	6.58	NM	NM	NM	59.5
MW-3	1.0	7.80	15.8	0.136	137	5.56	NM	NM	NM	7.8
MW-4	1.0	7.81	16.5	0.138	94	6.94	NM	NM	NM	58.2
MW-5	1.0	7.67	16.7	0.133	174	6.98	NM	NM	NM	17.1
MW-7	1.0	7.14	15.9	0.174	164	5.06	NM	NM	NM	26.6
MW-8	1.0	7.52	15.5	0.169	166	5.50	NM	NM	NM	21.8
MW-9	1.0	7.90	16.2	0.1	153	4.89	NM	NM	NM	NM
MW-10	1.0	7.23	16.1	0.2	-117	4.71	4.0	2.5	770	195
MW-11A	1.0	7.16	15.3	0.634	-87	1.51	1.0	4.0	770	895
MW-12	1.0	7.22	16.3	0.22	-110	4.50	4.0	2.5	770	88
MW-13	1.0	7.80	17.2	0.178	-47	6.47	NM	NM	NM	37.5
MW-14	1.0	7.23	16	0.203	270	6.62	NM	NM	NM	20.4
MW-15	1.0	7.31	16.7	0.149	214	5.79	NM	NM	NM	18
OW-4 <sup>(2)</sup>	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

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

<sup>(2)</sup> 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.

NM=Not Measured

**Table 5**  
**Cumulative BTEX and TPH Analytical Results for Groundwater Samples**  
**Hobbs, New Mexico Facility**  
**BJ Services Company, U.S.A.**

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-1	8/10/92	Regular	5550.0	12090.0	2160.0	7370.0	NA	NA
	2/9/93	Regular	2100.0	6500.0	1300.0	7400.0	NA	NA
	8/19/93	Regular	3200.0	7300.0	1200.0	3700.0	NA	NA
	1/27/94	Regular	1930.0	4580.0	672.0	2390.0	NA	NA
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	390.0	1300.0	230.0	800.0	NA	5.7
	11/15/95	Regular	880.0	1800.0	300.0	970.0	NA	6.8
	2/23/96	Regular	1500.0	3700.0	620.0	2200.0	NA	21
	5/31/96	Regular	1100.0	1700.0	380.0	990.0	NA	7.5
	8/23/96	Regular	1800.0	3300.0	570.0	2100.0	NA	17
	12/2/96	Regular	5600.0	9600.0	2100.0	9600.0	100	64
	3/12/97	Regular	5500.0	9700.0	2600.0	8200.0	22	62
	6/12/97	Regular	5300.0	34000.0	7500.0	27000.0	180	160
	9/12/97	Regular	1800.0	4400.0	1000.0	3000.0	23	21
	12/10/97	Regular	7600.0	12000.0	2800.0	8200.0	11	71
	3/24/98	Regular	4800.0	7200.0	1200.0	2400.0	4.2	38
	6/23/98	Regular	53.0	680.0	580.0	1400.0	1.4	9.2
	9/30/98	Regular	3.2	90.0	280.0	970.0	2.5	3.6
	12/10/98	Regular	<1.0	1.5	17.0	110.0	1.4	0.31
	3/10/99	Regular	<1.0	<1.0	8.2	110.0	0.62	0.85
	3/10/99	Duplicate	<1.0	<1.0	7.9	110.0	0.66	0.84
	6/10/99	Regular	<1.0	1.1	<1.0	28.0	0.53	0.55
	6/10/99	Duplicate	<1.0	1.8	<1.0	41.0	0.69	0.76
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/99	-	NS	NS	NS	NS	NS	NS
	3/9/00	Regular	< 1	< 1	< 1	9.1	14	1.3
	6/8/00	-	NS	NS	NS	NS	NS	NS
	9/13/00	-	NS	NS	NS	NS	NS	NS
	12/7/00	-	NS	NS	NS	NS	NS	NS
	3/8/01	Regular	2.0	<1	<1	<1	0.49	0.58
MW-2	8/10/92	Regular	14.9	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	100.0	12.0	3.0	13.0	NA	NA
	1/27/94	Regular	< 1	1.2	2.0	2.5	NA	NA
MW-3	8/10/92	Regular	304.9	2099.0	6760.0	1586.0	NA	NA
	2/9/93	Regular	130.0	< 10	< 10	190.0	NA	NA
	8/19/93	Regular	560.0	3100.0	630.0	1900.0	NA	NA
	1/27/94	Regular	1070.0	5380.0	510.0	3120.0	NA	NA
	5/4/95	Regular	770.0	3300.0	470.0	1800.0	NA	NA
	8/1/95	Regular	490.0	2900.0	890.0	1600.0	NA	14
	11/15/95	Regular	250.0	1000.0	180.0	440.0	NA	2.9
	2/23/96	Regular	120.0	810.0	170.0	560.0	NA	4
	5/31/96	Regular	670.0	3900.0	1200.0	2300.0	NA	15
	8/23/96	Regular	330.0	2200.0	590.0	1500.0	NA	12
	12/2/96	Regular	220.0	1800.0	670.0	1000.0	0.89	7.4
	3/12/97	Regular	370.0	2000.0	960.0	1400.0	1.8	11
	6/12/97	Regular	860.0	4800.0	1700.0	2600.0	1.9	20
	9/11/97	Regular	770.0	3000.0	1600.0	1900.0	1.6	16
	12/10/97	Regular	240.0	740.0	500.0	450.0	0.59	5.3
	3/24/98	Regular	140.0	630.0	360.0	310.0	0.56	3.9
	6/23/98	Regular	100.0	720.0	350.0	490.0	0.40	4.9
	9/30/98	Regular	42.0	470.0	450.0	530.0	1.0	3.8

**Table 5**  
**Cumulative BTEX and TPH Analytical Results for Groundwater Samples**  
**Hobbs, New Mexico Facility**  
**BJ Services Company, U.S.A.**

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-3	12/10/98	Regular	13.0	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
	12/7/00	Regular	< 1	< 1	< 1	< 1	<0.25	< 0.1
	3/8/01	Regular	< 1	< 1	< 1	< 1	0.42	<0.1
MW-4	8/10/92	Regular	2594.0	10360.0	2160.0	6740.0	NA	NA
	2/9/93	Regular	5200.0	15000.0	2200.0	10000.0	NA	NA
	8/19/93	Regular	3000.0	12000.0	< 2000	7000.0	NA	NA
	1/27/94	Regular	NSP	NSP	NSP	NSP	NA	NSP
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	5700.0	17000.0	3500.0	13000.0	NA	120
	11/15/95	Regular	490.0	1600.0	310.0	1100.0	NA	5.2
	2/23/96	Regular	360.0	2800.0	560.0	2500.0	NA	18
	5/31/96	Regular	84.0	830.0	280.0	1100.0	NA	6.2
	8/23/96	Regular	110.0	1400.0	430.0	1800.0	NA	9.8
	12/2/96	Regular	190.0	2000.0	1800.0	7200.0	56	43
	3/12/97	Regular	220.0	1500.0	1500.0	4400.0	27	27
	6/12/97	Regular	47.0	270.0	360.0	950.0	2.5	6.2
	9/12/97	Regular	92.0	840.0	670.0	2100.0	15	7.6
	12/10/97	Regular	230.0	750.0	970.0	2300.0	3.7	16
	3/24/98	Regular	150.0	510.0	270.0	620.0	1.2	5.6
	6/23/98	Regular	160.0	890.0	590.0	1600.0	0.69	10
	9/30/98	Regular	80.0	180.0	370.0	840.0	2.0	3.9
	12/10/98	Regular	28.0	70.0	210.0	960.0	9.3	4.3
	12/10/98	Duplicate	26.0	62.0	180.0	830.0	3.9	4.3
	3/10/99	Regular	8.0	20.0	250.0	1400.0	13.0	13
	6/10/99	Regular	<1.0	<1.0	12.0	12.0	0.44	0.63
	9/14/99	Regular	< 1.0	< 1.0	3.3	13.1	0.35	0.17
	12/9/99	Regular	< 1	2.5	2.3	20.1	2	0.53
	3/10/00	Regular	< 1	< 1	< 1	3.6	2.6	0.15
	6/8/00	Regular	< 1	< 1	< 1	< 1	0.44	0.23
	9/13/00	Regular	< 1	< 1	< 1	< 1	0.61	<0.1
	12/7/00	Regular	< 1	< 1	1.3	< 1	0.53	0.16
	3/8/01	Regular	< 1	< 1	< 1	< 1	0.43	0.16
MW-5	8/10/92	Regular	< 4	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94	Regular	8.7	29.9	4.0	11.3	NA	NA
	5/3/95	Regular	3.7	5.3	0.9	4.6	NA	NA
	8/1/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	11/15/95	Regular	< 0.3	1.2	< 0.3	1.5	NA	NA
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	5/31/96	Regular	31.0	86.0	10.0	20.0	NA	NA
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1

Table 5  
Cumulative BTEX and TPH Analytical Results for Groundwater Samples  
Hobbs, New Mexico Facility  
BJ Services Company, U.S.A.

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-5	9/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	12/10/97	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/9/99	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	6/10/99	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/99	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/9/00	Regular	< 1	< 1	< 1	< 1	0.55	< 0.1
	6/8/00	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/13/00	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	12/7/00	Regular	< 1	< 1	< 1	< 1	< 0.25	< 0.1
	3/8/01	Regular	< 1	< 1	< 1	< 1	0.56	< 0.1
MW-6	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	7000.0	19000.0	3100.0	7200.0	NA	NA
	8/19/93	Regular	8100.0	19000.0	3500.0	6400.0	NA	NA
	1/27/94	Regular	7960.0	20200.0	3830.0	6150.0	NA	NA
	5/4/95	Regular	11000.0	17000.0	2900.0	6000.0	NA	NA
	8/1/95	Regular	8300.0	12000.0	2500.0	5100.0	NA	60
	11/15/95	Regular	8900.0	17000.0	2900.0	5500.0	NA	57
	2/23/96	Regular	8100.0	10000.0	2300.0	4000.0	NA	58
	5/31/96	Regular	83.0	150.0	15.0	51.0	NA	0.57
	5/31/96	Duplicate	87.0	160.0	13.0	47.0	NA	0.52
	8/23/96	Regular	31.0	28.0	9.4	7.9	NA	0.46
	12/2/96	Regular	< 1	< 1	< 1	1.7	5.6	< 0.1
	3/12/97	Regular	12.0	< 5	6.8	18.0	12	< 0.5
	6/12/97	Regular	1900.0	1400.0	410.0	310.0	7.8	7.4
	9/11/97	Regular	11.0	1.3	3.4	< 1	1	< 0.1
	12/10/97	Regular	3.0	4.2	1.2	3.9	1.7	0.14
	3/23/98	Regular	3.6	< 1	4.0	< 1	< 0.2	< 0.1
	6/23/98	Regular	170.0	4.1	15.0	7.2	1.2	0.51
	9/30/98	Regular	1000.0	420.0	140.0	270.0	4.0	3.3
	12/10/98	Regular	7.6	6.6	1.7	5.8	2.0	< 0.1
	3/10/99	Regular	2500.0	930.0	590.0	1400.0	11.0	13
MW-7	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	3.0	< 2	< 2	NA	NA
	1/27/94	Regular	1.1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	52.0	3.4	0.7	2.8	NA	NA
	8/1/95	Regular	22.0	2.2	0.9	2.8	NA	< 0.1
	11/15/95	Regular	8.4	0.8	< 0.3	0.9	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Duplicate	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	29.0	83.0	10.0	21.0	NA	0.25
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	9/11/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	12/10/97	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1

Table 5  
Cumulative BTEX and TPH Analytical Results for Groundwater Samples  
Hobbs, New Mexico Facility  
BJ Services Company, U.S.A.

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-7	3/23/98	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
MW-8	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	3.0	4.9	0.8	3.7	NA	NA
	8/1/95	Regular	3.1	1.2	0.5	1.6	NA	< 0.001
	8/1/95	Duplicate	3.6	1.5	0.5	1.5	NA	< 0.1
	11/15/95	Regular	< 0.3	0.5	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	1.8	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	9/11/97	Regular	< 1	< 1	< 1	< 1	0.1	< 0.1
	12/10/97	Regular	< 1	< 1	< 1	< 1	0.3	< 0.1
	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/9/99	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	6/10/99	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	9/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/99	-	NS	NS	NS	NS	NS	NS
	3/9/00	Regular	< 1	< 1	< 1	< 1	0.55	< 0.1
	6/8/00	-	NS	NS	NS	NS	NS	NS
	9/13/00	-	NS	NS	NS	NS	NS	NS
	12/7/00	-	NS	NS	NS	NS	NS	NS
	3/8/01	Regular	< 1	< 1	< 1	< 1	1.6	< 0.1
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

**Table 5**  
**Cumulative BTEX and TPH Analytical Results for Groundwater Samples**  
**Hobbs, New Mexico Facility**  
**BJ Services Company, U.S.A.**

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-9	8/23/96	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
	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
MW-10	8/19/93	Regular	190.0	460.0	< 200	240.0	NA	NA
	1/27/94	Regular	13.4	4.0	5.5	33.6	NA	NA
	5/4/95	Regular	980.0	15.0	11.0	84.0	NA	NA
	8/1/95	Regular	1300.0	32.0	32.0	100.0	NA	3.6
	11/15/95	Regular	1000.0	24.0	15.0	36.0	NA	1.7
	2/23/96	Regular	810.0	23.0	27.0	44.0	NA	2.4
	5/31/96	Regular	700.0	24.0	34.0	28.0	NA	2
	8/23/96	Regular	290.0	3.4	6.4	13.0	NA	1.4
	12/2/96	Regular	280.0	1.3	17.0	8.0	0.94	0.97
	3/12/97	Regular	110.0	< 5	17.0	< 5	0.61	0.57
	6/12/97	Regular	150.0	12.0	30.0	< 5	0.68	< 0.5
	9/12/97	Regular	87.0	2.3	26.0	2.7	0.76	0.33
	9/12/97	Duplicate	87.0	2.4	26.0	2.8	0.79	0.33
	12/10/97	Regular	41.0	9.8	12.0	7.7	1.1	0.28
	12/10/97	Duplicate	36.0	8.5	10.0	6.7	1.2	0.24
	3/23/98	Regular	36.0	< 5	5.9	< 5	1.6	< 0.5
	3/23/98	Duplicate	36.0	< 1	5.3	1.3	1.7	0.18
	6/23/98	Regular	37.0	< 5	< 5	< 5	2.1	< 0.5
	9/30/98	Regular	84.0	3.2	30.0	2.2	1.4	0.36
	12/10/98	Regular	29.0	1.0	7.0	1.0	0.86	0.18
	3/9/99	Regular	28.0	< 5.0	5.8	< 5.0	0.92	< 0.5
	6/10/99	Regular	17.0	< 1.0	< 1.0	< 1.0	0.30	0.16
	9/14/99	Regular	10.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/99	Regular	23.0	< 1	< 1	1.2	0.44	0.16
	3/10/00	Regular	300.0	4.3	6.6	43.2	1.2	0.85
	6/8/00	Regular	78.0	1.7	7.2	9.0	0.67	0.74
	9/13/00	Regular	23.0	1.5	1.1	2.9	1.6	0.41
	12/7/00	Regular	7.2	< 1	< 1	< 1	1.5	0.15
	3/8/01	Regular	3.4	1.1	< 1	< 1	3.4	0.2

**Table 5**  
**Cumulative BTEX and TPH Analytical Results for Groundwater Samples**  
**Hobbs, New Mexico Facility**  
**BJ Services Company, U.S.A.**

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-11	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
MW-11A	9/12/97	Regular	220.0	15.0	27.0	13.0	1	0.46
	3/24/98	Regular	24.0	5.0	< 5	< 5	0.28	0.14
	6/23/98	Regular	9.9	< 5	< 5	< 5	< 0.2	< 0.5
	9/30/98	Regular	9.3	3.7	2.2	7.0	< 0.20	0.1
	12/10/98	Regular	1.7	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/10/99	Regular	< 5	< 5	< 5	< 5	0.3	< 0.5
	6/10/99	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.10
	9/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/99	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/9/00	Regular	1.2	< 1	< 1	< 1	0.43	< 0.1
	6/8/00	Regular	3.6	< 1	< 1	< 1	0.37	< 0.1
	9/13/00	Regular	1.4	< 1	< 1	< 1	0.36	< 0.1
	12/7/00	Regular	26	< 1	< 1	3.3	0.3	0.12
	3/8/01	Regular	12	< 5	< 5	< 5	2.2	< 0.5
MW-12	3/24/98	Regular	100.0	11.0	6.0	8.0	0.29	0.41
	6/23/98	Regular	88.0	< 5	< 5	< 5	< 0.2	< 0.5
	6/23/98	Duplicate	89.0	< 5	< 5	< 5	0.31	< 0.5
	9/30/98	Regular	260.0	3.0	1.2	7.9	< 0.20	0.62
	12/10/98	Regular	160.0	< 1.0	< 1.0	1.2	0.21	0.36
	3/10/99	Regular	160.0	1.1	< 1.0	2.9	0.38	0.45
	6/10/99	Regular	49.0	1.4	< 1.0	< 1.0	0.22	0.13
	9/14/99	Regular	75.0	< 1.0	< 1.0	< 2.0	< 0.20	0.23
	12/9/99	Regular	64.0	< 1	< 1	< 1	< 0.2	0.21
	3/10/00	Regular	93.0	< 1	< 1	< 1	< 0.2	0.21
	3/10/00	Duplicate	99.0	< 1	< 1	< 1	0.22	0.22
	6/8/00	Regular	62.0	< 1	< 1	< 1	< 0.2	< 0.1
	9/13/00	Regular	34.0	< 1	< 1	< 1	0.23	< 0.1
	12/7/00	Regular	27	< 1	2.9	1.9	< 0.25	< 0.1
	3/8/01	Regular	14	< 1	< 1	< 1	2.1	0.1
MW-12D	7/2/99	Regular	< 5	< 5	< 5	< 5	< 0.20	< 0.10
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/99	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/9/00	Regular	< 1	< 1	< 1	< 1	0.24	< 0.1
	6/8/00	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/13/00	-	NS	NS	NS	NS	NS	NS
	12/7/00	-	NS	NS	NS	NS	NS	NS
MW-13	7/2/99	Regular	1500.0	23.0	750.0	58.0	2.2	5.1
	9/14/99	Regular	860.0	16.0	450.0	34.4	2.1	3.1
	12/9/99	Regular	430.0	16.0	410.0	40.9	0.46	3.2
	3/10/00	Regular	88.0	2.8	200.0	1.3	1.9	0.99



**Table 5**  
**Cumulative BTEX and TPH Analytical Results for Groundwater Samples**  
**Hobbs, New Mexico Facility**  
**BJ Services Company, U.S.A.**

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-13	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
MW-14	1/14/01	Regular	<1	<1	<1	<1	<0.2	<0.1
MW-15	1/14/01	Regular	<1	<1	<1	<1	<0.2	<0.1
OW-4	6/10/99	Regular	<1.0	<1.0	<1.0	4.4	<0.2	<0.10
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.2	<0.1
	3/9/00	Regular	<1.0	<1.0	<1.0	<1.0	0.25	<0.1
	6/8/00	Regular	<1.0	<1.0	<1.0	<1.0	<0.21	<0.1
	9/13/00	Regular	<1.0	<1.0	<1.0	<1.0	<0.2	<0.1
	12/7/00	-	NS-D	NS-D	NS-D	NS-D	NS-D	NS-D

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

NA=Not Analyzed

NS=Not Sampled

NS-D=Not Sampled because well was dry

NSP=Not Sampled due to Phase Separated Hydrocarbons

**Table 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)	Methane (mg/L)
MW-5	3/23/98	3.87	190	<0.0012
	3/9/99	<0.1	195	<0.0012
	6/10/99	4.73	209	<0.0012
	9/14/99	4.3	210	<0.0012
	12/9/99	4.2	210	<0.0012
	3/9/00	5.3	260	<0.0012
	6/8/00	4.7	240	<0.0012
	9/13/00	3.93	200	<0.0012
	12/7/00	3.27	160	<0.0012
	3/8/01	3.24	180	<0.0012
MW-10	3/23/98	0.07	320	0.91
	6/23/98	<0.1	325	0.55
	9/30/98	<0.1	204	0.81
	12/10/98	<0.1	180	0.091
	3/9/99	<0.1	142	0.035
			223 <sup>3</sup>	
	9/14/99	<0.10	160	0.0049
	12/9/99	0.49	170	0.0039
	3/10/00	0.1	160	0.0056
	6/8/00	<0.1	150	0.031
	9/13/00	<0.1	160	0.031
	12/7/00	<0.1	190	0.17
	3/8/01	<0.1	270	<0.0012
MW-11A	3/23/98	<0.05	190	0.14
	6/23/98	<0.1	225	0.11
	9/30/98	0.4	196	0.043
	12/10/98	0.7	188	0.033
	3/10/99	<0.1	164	0.094
		<0.1 <sup>2</sup>	227 <sup>3</sup>	
	6/10/99	<0.1	181	0.0036
	9/13/99	0.22	250	<0.0012
	12/9/99	<0.1	290	0.0079
	3/9/00	0.11	270	0.037
	6/8/00	<0.1	240	0.0069
	9/13/00	<0.1	320	<0.0012
	12/7/00	<0.1	260	0.0096

**Table 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)	Methane (mg/L)
MW-11A	3/8/01	<0.1	330	0.0028
MW-12	3/23/98	<0.05	240	<0.0012
	6/23/98	<0.1	240	<0.0012
	9/30/98	<0.1	168	<0.0012
	12/10/98	<0.1	202	<0.0012
	3/10/99	<0.1	137	<0.0012
		<0.1 <sup>2</sup>	193 <sup>3</sup>	
	6/10/99	<0.1	217	<0.0012
	9/14/99	<0.10	230	<0.0012
	12/9/99	<0.1	180	<0.0012
	3/10/00	<0.1	210	<0.0012
	6/8/00	<0.1	220	<0.0012
	9/13/00	<0.1	240	<0.0012
	12/7/00	<0.1	260	<0.0012
	3/8/01	<0.1	300	<0.0012

1=By EPA Method 300, except as noted

2=By EPA Method 353.3

3=By EPA Method 375.4

mg/L = milligrams per liter

## Appendices



A



## **APPENDIX A**

### **Boring Logs**

**MW-14**

Project Name: Chloride Investigation

Project Number: 12832.022

Sheet 1 of 2

Project Location: <b>Hobbs, New Mexico</b>		Logged By: <b>S. Lesikar</b>	Approved:
Drilling Contractor: <b>Pro - Sonic</b>		Date Started: <b>1/13/01</b>	Date Finished: <b>1/14/01</b>
Drilling Equipment: <b>Mobile B-61</b>	Driller: <b>Rene Sosa</b>	Total Boring Depth: (feet) <b>69.5</b>	Depth to Static Water: (feet) <b>60.0</b>
Drilling Method: <b>Air Rotary/HSA</b>	Borehole Diameter: <b>6 7/8"</b>	TOC Elevation:	Ground Elevation:
Sampling Method: <b>Split Spoon</b>		Diameter and Type of Well Casing: <b>2" Schedule 40 PVC</b>	
Comments: <b>Drilled with air rotary from 3' to 69.5'.</b>		Slot Size: <b>0.01</b>	Filter Material: <b>20/40 Sand</b>
		Development Method: <b>Bailer</b>	

[illegible]

Project Name: Chloride Investigation

Project Number: 12832.022

Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68				SAA					Cement/Bentonite grout
							47.5		
							50.0		2.5' Hydrated bentonite chips
									20-40 Silica sand
		SW	[Pattern]	SAND (SW); Softer, very fine, brown, uncemented, wet.					2" Diameter Schedule 40 Well Screen 0.01" Slot.
	▼								
							68.0		
							69.5		TD 69.5 ft.



# MW-15

Project Name: **Chloride Investigation**

Project Number: **12832.022**

Sheet **1** of **2**

Project Location: <b>Hobbs, New Mexico</b>		Logged By: <b>S. Lesikar</b>	Approved:
Drilling Contractor: <b>Pro - Sonic</b>		Date Started: <b>1/9/01</b>	Date Finished: <b>1/13/01</b>
Drilling Equipment: <b>Mobile B-61</b>	Driller: <b>Rene Sosa</b>	Total Boring Depth: (feet) <b>75.0</b>	Depth to Static Water: (feet) <b>60.0</b>
Drilling Method: <b>Air Rotary/HSA</b>	Borehole Diameter: <b>2"</b>	TOC Elevation:	Ground Elevation:
Sampling Method: <b>Split Spoon</b>		Diameter and Type of Well Casing: <b>2" Schedule 40 PVC</b>	
Comments: <b>Drilled with air rotary from 13' to 75'.</b>		Slot Size: <b>0.01</b>	Filter Material: <b>20/40 Sand</b>
		Development Method: <b>Bailer</b>	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sample Interval	Recovery (feet)	Sample ID	Remarks
2		SW		SILTY SAND (SW); Clayey, dark reddish-brown, damp.		2	2		Drill initial auger to 5' for surface casing
4						2	2		
6						2	2		
8						2	2		
10						2	2		
12		ML		CLAYEY SILT (ML); Slightly sandy, very light brown with pebbles and calcareous nodules very dry.		2	2		At 13' start air rotary, too hard for split spoon
14						1			
16				SANDSTONE; Medium brown, very fine grained, dry, interbedded with layers (2'-3' thick) of slightly cemented very fine sand.					
18									
20									
22									
24									
26									
28									
30									
32									
				SAA					

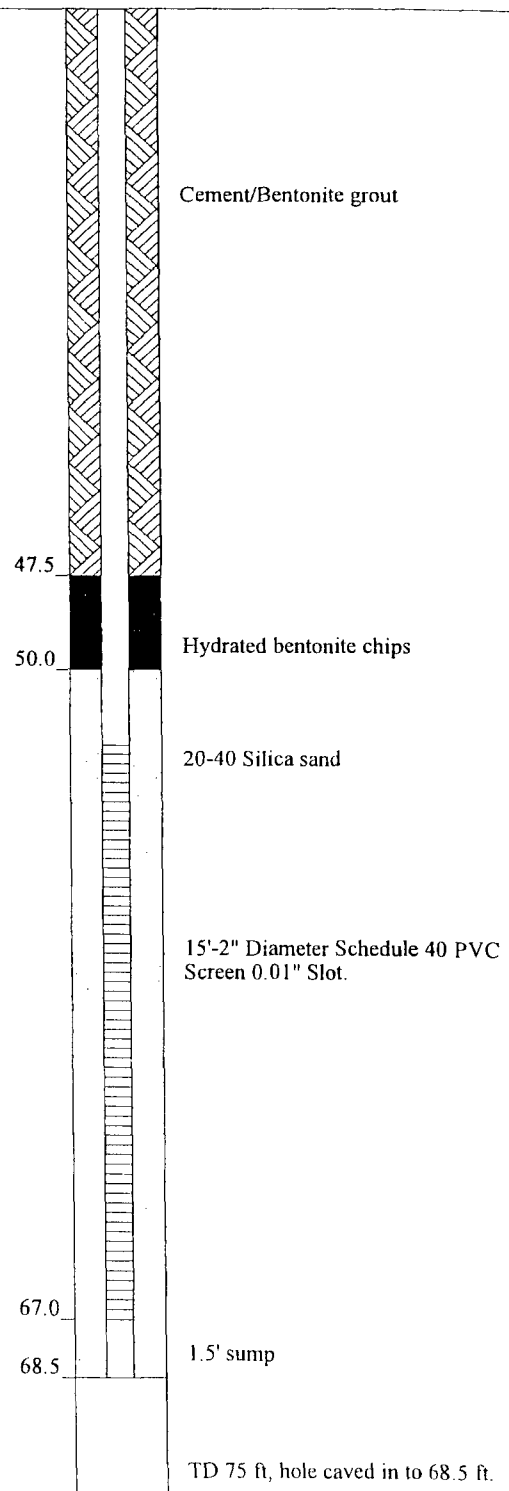
# MW-15

Project Name: Chloride Investigation

Project Number: 12832.022

Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
34									
36				SAA					
38									
40									
42									
44									
46									
48									
50									
52									
54									
56									
58		SP		SAND (SP); Softer, very fine, uncemented, wet.					
60	▼								
62									
64									
66									
68									
70				SAA					
72									
74									



B



## **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:**

**01010371**

**Report To:**

Brown & Caldwell  
Rick Rexroad  
1415 Louisiana  
Suite 2500  
Houston  
TX  
77002-  
ph: (713) 759-0999

fax: (713) 308-3886

**Project Name:**

**BJ Service #12832-022**

**Site:**

**Hobbs, NM**

**Site Address:**

**PO Number:**

**State:**

**New Mexico**

**State Cert. No.:**

**Date Reported:**

**1/29/01**

**This Report Contains A Total Of 32 Pages**

**Excluding This Page**

**And**

**Chain Of Custody**

1/29/01

Date



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

Case Narrative for:  
**Brown & Caldwell**

Certificate of Analysis Number:  
**01010371**

<b>Report To:</b>  Brown & Caldwell Rick Rexroad 1415 Louisiana Suite 2500 Houston TX 77002- ph: (713) 759-0999      fax: (713) 308-3886	<b>Project Name:</b> BJ Service #12832-022 <b>Site:</b> Hobbs, NM <b>Site Address:</b>  <b>PO Number:</b> <b>State:</b> New Mexico <b>State Cert. No.:</b> <b>Date Reported:</b> 1/29/01
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A trip blank was received with the samples but was not written on the chain of custody [SPL ID: 01010371-04]. Per our telephone conversation on January 17, 2001, SPL analyzed the trip blank for BTEX/ TPH-GRO by SW846 methods 8021/8015.

As per your request on January 17, 2001, the laboratory analyzed your sample "Soil Cuttings, MW-14, MW-15" for Gasoline Range Organics, Diesel Range Organics, and RCRA Metals.

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.

Your sample ID "MW-15" (SPL ID: 01010371-01) was randomly selected for use in SPL's quality control program for the Total Metals analysis by SW846 Method 6010B. The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) recoveries were outside of the advisable quality control limits for Cadmium and Chromium (Batch ID: 9679) due to matrix interference. A Post Digestion Spike (PDS) and Post Digestion Spike Duplicate (PDSD) was performed and all recoveries were within quality control limits. A Laboratory Control Sample (LCS) was analyzed as a quality control check for the analytical batch and all recoveries were within acceptable limits.

Any other exceptions associated with this report will be footnoted in the analytical result page(s) or the quality control summary page(s).

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

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

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

West, Sonia  
Senior Project Manager

1/30/01

Date



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

## Brown & Caldwell

Certificate of Analysis Number:

**01010371**

**Report To:** Brown & Caldwell  
Rick Rexroad  
1415 Louisiana  
Suite 2500  
Houston  
TX  
77002-  
ph: (713) 759-0999

fax: (713) 308-3886

**Fax To:** Brown & Caldwell  
Rick Rexroad

fax : (713) 308-3886

**Project Name:** BJ Service #12832-022

**Site:** Hobbs, NM

**Site Address:**

**PO Number:**

**State:** New Mexico

**State Cert. No.:**

**Date Reported:** 1/29/01

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD
W-15	01010371-01	Water	1/14/01 2:00:00 PM	1/16/01 10:00:00 AM	085943	<input type="checkbox"/>
MW-14	01010371-02	Water	1/14/01 4:00:00 PM	1/16/01 10:00:00 AM	085942	<input type="checkbox"/>
MW-14	01010371-02	Water	1/14/01 4:00:00 PM	1/16/01 10:00:00 AM	085943	<input type="checkbox"/>
Oil Cuttings, MW-14, MW-15	01010371-03	Solid	1/14/01 3:00:00 PM	1/16/01 10:00:00 AM	085943	<input type="checkbox"/>
Tip Blank 1/4/01	01010371-04	Water	1/14/01	1/16/01 10:00:00 AM	085943	<input type="checkbox"/>

*Sonia West*  
West, Sonia  
Senior Project Manager

1/29/01

Date

Joel Grice  
Laboratory Director

Ted Yen  
Quality Assurance Officer



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

Client Sample ID MW-15

Collected: 1/14/01 2:00:00

SPL Sample ID: 01010371-01

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>ALKALINITY, BICARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Bicarbonate	250	2		1	01/17/01 12:00	SN	533556
<b>ALKALINITY, CARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Carbonate	ND	2		1	01/17/01 12:00	SN	533579
<b>CHLORIDE, TOTAL</b>				<b>MCL</b>	<b>E325.3</b>	<b>Units: mg/L</b>	
Chloride	219	5		5	01/18/01 14:30	CV	536141
<b>DIESEL RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Diesel Range Organics	ND	0.2		1	01/20/01 6:55	AM	538060
Surr: n-Pentacosane	76.4	% 18-120		1	01/20/01 6:55	AM	538060

Prep Method	Prep Date	Prep Initials
SW3510B	01/17/2001 13:27	KL

<b>FLUORIDE-IC</b>				<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>	
Fluoride	1.2	0.1		1	01/16/01 11:23	KM	532528
<b>GASOLINE RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Gasoline Range Organics	ND	0.1		1	01/25/01 3:42	D_R	541375
Surr: 1,4-Difluorobenzene	96.3	% 74-121		1	01/25/01 3:42	D_R	541375
Surr: 4-Bromofluorobenzene	103	% 55-150		1	01/25/01 3:42	D_R	541375
<b>MERCURY, TOTAL</b>				<b>MCL</b>	<b>SW7470A</b>	<b>Units: mg/L</b>	
Mercury	ND	0.0002		1	01/23/01 11:11	R_T	539186

Prep Method	Prep Date	Prep Initials
SW7470A	01/23/2001 9:00	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>				<b>MCL</b>	<b>SW6010B</b>	<b>Units: mg/L</b>	
Arsenic	ND	0.005		1	01/20/01 1:36	EG	537003
Lead	ND	0.005		1	01/20/01 1:36	EG	537003
Selenium	0.00523	0.005		1	01/20/01 1:36	EG	537003
Barium	0.073	0.005		1	01/17/01 19:40	E_B	534402
Cadmium	ND	0.005		1	01/17/01 19:40	E_B	534402
Calcium	150	0.1		1	01/17/01 19:40	E_B	534402
Chromium	ND	0.01		1	01/17/01 19:40	E_B	534402
Magnesium	28.3	0.1		1	01/17/01 19:40	E_B	534402
Potassium	4.59	2		1	01/17/01 19:40	E_B	534402
Silver	ND	0.01		1	01/17/01 19:40	E_B	534402
Sodium	108	0.5		1	01/17/01 19:40	E_B	534402

Prep Method	Prep Date	Prep Initials
SW3010A	01/19/2001 9:55	R_T
SW3010A	01/17/2001 9:00	R_T

**Qualifiers:**

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference





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

Client Sample ID MW-15

Collected: 1/14/01 2:00:00

SPL Sample ID: 01010371-01

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>NITROGEN, NITRATE (AS N)</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Nitrogen, Nitrate (As N)	4.88	0.1	1		01/16/01 11:23	KM	532518
<b>POLYNUCLEAR AROMATIC HYDROCARBONS</b>			<b>MCL</b>	<b>SW8310</b>	<b>Units: ug/L</b>		
Acenaphthene	ND	0.1	1		01/23/01 17:31	KA	545133
Acenaphthylene	ND	0.1	1		01/23/01 17:31	KA	545133
Anthracene	ND	0.1	1		01/23/01 17:31	KA	545133
Benz(a)anthracene	ND	0.1	1		01/23/01 17:31	KA	545133
Benzo(a)pyrene	ND	0.1	1		01/23/01 17:31	KA	545133
Benzo(b)fluoranthene	ND	0.1	1		01/23/01 17:31	KA	545133
Benzo(g,h,i)perylene	ND	0.1	1		01/23/01 17:31	KA	545133
Benzo(k)fluoranthene	ND	0.1	1		01/23/01 17:31	KA	545133
Chrysene	ND	0.1	1		01/23/01 17:31	KA	545133
Dibenzo(a,h)anthracene	ND	0.1	1		01/23/01 17:31	KA	545133
Fluoranthene	ND	0.1	1		01/23/01 17:31	KA	545133
Fluorene	ND	0.1	1		01/23/01 17:31	KA	545133
Indeno(1,2,3-cd)pyrene	ND	0.1	1		01/23/01 17:31	KA	545133
Naphthalene	ND	0.1	1		01/23/01 17:31	KA	545133
Phenanthrene	ND	0.1	1		01/23/01 17:31	KA	545133
Pyrene	ND	0.1	1		01/23/01 17:31	KA	545133
Surr: 1-Fluoronaphthalene	51.1	% 15-96	1		01/23/01 17:31	KA	545133
Surr: Phenanthrene-d10	66.8	% 33-108	1		01/23/01 17:31	KA	545133

Prep Method	Prep Date	Prep Initials
SW3510B	01/18/2001 13:00	KL

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		01/25/01 3:42	D_R	541306
Ethylbenzene	ND	1	1		01/25/01 3:42	D_R	541306
Toluene	ND	1	1		01/25/01 3:42	D_R	541306
Xylenes, Total	ND	1	1		01/25/01 3:42	D_R	541306
Surr: 1,4-Difluorobenzene	96.5	% 72-137	1		01/25/01 3:42	D_R	541306
Surr: 4-Bromofluorobenzene	93.8	% 48-156	1		01/25/01 3:42	D_R	541306

<b>SULFATE</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Sulfate	130	4	20		01/16/01 11:23	KM	532538

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

1/29/01 12:43:51 PM



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

Client Sample ID MW-14

Collected: 1/14/01 4:00:00 SPL Sample ID: 01010371-02

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>ALKALINITY, BICARBONATE</b>			<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>		
Alkalinity, Bicarbonate	374	2	1		01/17/01 12:00	SN	533558
<b>ALKALINITY, CARBONATE</b>			<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>		
Alkalinity, Carbonate	ND	2	1		01/17/01 12:00	SN	533581
<b>CHLORIDE, TOTAL</b>			<b>MCL</b>	<b>E325.3</b>	<b>Units: mg/L</b>		
Chloride	368	5	5		01/18/01 14:30	CV	536144
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	ND	0.2	1		01/20/01 10:48	AM	538063
Surr: n-Pentacosane	79.0 %	18-120	1		01/20/01 10:48	AM	538063

Prep Method	Prep Date	Prep Initials
SW3510B	01/17/2001 13:27	KL

<b>FLUORIDE-IC</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Fluoride	3.5	0.1	1		01/16/01 11:23	KM	532531

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		01/25/01 4:09	D_R	541376
Surr: 1,4-Difluorobenzene	96.3 %	74-121	1		01/25/01 4:09	D_R	541376
Surr: 4-Bromofluorobenzene	102 %	55-150	1		01/25/01 4:09	D_R	541376

<b>MERCURY, TOTAL</b>			<b>MCL</b>	<b>SW7470A</b>	<b>Units: mg/L</b>		
Mercury	ND	0.0002	1		01/23/01 11:11	R_T	539187

Prep Method	Prep Date	Prep Initials
SW7470A	01/23/2001 9:00	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>			<b>MCL</b>	<b>SW6010B</b>	<b>Units: mg/L</b>		
Arsenic	0.00511	0.005	1		01/20/01 1:42	EG	537004
Lead	ND	0.005	1		01/20/01 1:42	EG	537004
Selenium	ND	0.005	1		01/20/01 1:42	EG	537004
Barium	0.0833	0.005	1		01/17/01 20:05	E_B	534408
Cadmium	ND	0.005	1		01/17/01 20:05	E_B	534408
Calcium	179	0.1	1		01/17/01 20:05	E_B	534408
Chromium	ND	0.01	1		01/17/01 20:05	E_B	534408
Magnesium	87.5	0.1	1		01/17/01 20:05	E_B	534408
Potassium	3.59	2	1		01/17/01 20:05	E_B	534408
Silver	ND	0.01	1		01/17/01 20:05	E_B	534408
Sodium	144	0.5	1		01/17/01 20:05	E_B	534408

Prep Method	Prep Date	Prep Initials
SW3010A	01/19/2001 9:55	R_T
SW3010A	01/17/2001 9:00	R_T

Qualifiers:

- ND/U - Not Detected at the Reporting Limit
- B - Analyte detected in the associated Method Blank
- \* - Surrogate Recovery Outside Advisable QC Limits
- J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-14

Collected: 1/14/01 4:00:00

SPL Sample ID: 01010371-02

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>NITROGEN, NITRATE (AS N)</b>				<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>	
Nitrogen, Nitrate (As N)	4.5	0.1	1		01/16/01 11:23	KM	532521
<b>POLYNUCLEAR AROMATIC HYDROCARBONS</b>				<b>MCL</b>	<b>SW8310</b>	<b>Units: ug/L</b>	
Acenaphthene	ND	0.1	1		01/23/01 19:23	KA	545136
Acenaphthylene	ND	0.1	1		01/23/01 19:23	KA	545136
Anthracene	ND	0.1	1		01/23/01 19:23	KA	545136
Benz(a)anthracene	ND	0.1	1		01/23/01 19:23	KA	545136
Benzo(a)pyrene	ND	0.1	1		01/23/01 19:23	KA	545136
Benzo(b)fluoranthene	ND	0.1	1		01/23/01 19:23	KA	545136
Benzo(g,h,i)perylene	ND	0.1	1		01/23/01 19:23	KA	545136
Benzo(k)fluoranthene	ND	0.1	1		01/23/01 19:23	KA	545136
Chrysene	ND	0.1	1		01/23/01 19:23	KA	545136
Dibenzo(a,h)anthracene	ND	0.1	1		01/23/01 19:23	KA	545136
Fluoranthene	ND	0.1	1		01/23/01 19:23	KA	545136
Fluorene	ND	0.1	1		01/23/01 19:23	KA	545136
Indeno(1,2,3-cd)pyrene	ND	0.1	1		01/23/01 19:23	KA	545136
Naphthalene	ND	0.1	1		01/23/01 19:23	KA	545136
Phenanthrene	ND	0.1	1		01/23/01 19:23	KA	545136
Pyrene	ND	0.1	1		01/23/01 19:23	KA	545136
Surr: 1-Fluoronaphthalene	41.7	% 15-96	1		01/23/01 19:23	KA	545136
Surr: Phenanthrene-d10	61.1	% 33-108	1		01/23/01 19:23	KA	545136

Prep Method SW3510B  
Prep Date 01/18/2001 13:00

Prep Initials KL

<b>PURGEABLE AROMATICS</b>				<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>	
Benzene	ND	1	1		01/25/01 4:09	D_R	541307
Ethylbenzene	ND	1	1		01/25/01 4:09	D_R	541307
Toluene	ND	1	1		01/25/01 4:09	D_R	541307
Xylenes, Total	ND	1	1		01/25/01 4:09	D_R	541307
Surr: 1,4-Difluorobenzene	94.6	% 72-137	1		01/25/01 4:09	D_R	541307
Surr: 4-Bromofluorobenzene	88.3	% 48-156	1		01/25/01 4:09	D_R	541307

<b>SULFATE</b>				<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>	
Sulfate	180	4	20		01/16/01 11:23	KM	532541

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID Soil Cuttings, MW-14, MW-15 Collected: 1/14/01 3:00:00 SPL Sample ID: 01010371-03

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8100M</b>	<b>Units: mg/Kg</b>		
Diesel Range Organics	ND	5.0		1	01/20/01 17:54	AM	536479
Surr: n-Pentacosane	91.8 %	20-154		1	01/20/01 17:54	AM	536479

Prep Method	Prep Date	Prep Initials
SW3550B	01/18/2001 12:35	J_L

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/Kg</b>		
Gasoline Range Organics	ND	0.10		1	01/19/01 20:02	TM	536256
Surr: 1,4-Difluorobenzene	101 %	63-122		1	01/19/01 20:02	TM	536256
Surr: 4-Bromofluorobenzene	105 %	39-150		1	01/19/01 20:02	TM	536256

<b>MERCURY, TOTAL</b>			<b>MCL</b>	<b>SW7471A</b>	<b>Units: mg/Kg</b>		
Mercury	ND	0.0330		1	01/22/01 13:17	R_T	538517

Prep Method	Prep Date	Prep Initials
SW7471A	01/22/2001 8:45	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>			<b>MCL</b>	<b>SW6010B</b>	<b>Units: mg/Kg</b>		
Arsenic	1.26	0.500		1	01/18/01 18:33	EG	536357
Lead	1.69	0.500		1	01/18/01 18:33	EG	536357
Selenium	ND	0.500		1	01/18/01 18:33	EG	536357
Barium	108	0.5		1	01/18/01 18:23	E_B	535207
Cadmium	ND	0.5		1	01/18/01 18:23	E_B	535207
Chromium	11.2	1		1	01/18/01 18:23	E_B	535207
Silver	ND	1		1	01/18/01 18:23	E_B	535207

Prep Method	Prep Date	Prep Initials
SW3050B	01/18/2001 9:30	R_T

**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



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Client Sample ID Trip Blank 1/4/01

Collected: 1/14/01

SPL Sample ID: 01010371-04

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		01/24/01 18:26	D_R	541368
Surr: 1,4-Difluorobenzene	96.0	% 74-121	1		01/24/01 18:26	D_R	541368
Surr: 4-Bromofluorobenzene	101	% 55-150	1		01/24/01 18:26	D_R	541368
<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		01/24/01 18:26	D_R	541296
Ethylbenzene	ND	1	1		01/24/01 18:26	D_R	541296
Toluene	ND	1	1		01/24/01 18:26	D_R	541296
Xylenes, Total	ND	1	1		01/24/01 18:26	D_R	541296
Surr: 1,4-Difluorobenzene	96.7	% 72-137	1		01/24/01 18:26	D_R	541296
Surr: 4-Bromofluorobenzene	91.8	% 48-156	1		01/24/01 18:26	D_R	541296

**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  
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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Diesel Range Organics  
Method: SW8015B

WorkOrder: 01010371  
Lab Batch ID: 9680

#### Method Blank

#### Samples in Analytical Batch:

RunID: HP\_V\_010119D-538054 Units: mg/L  
Analysis Date: 01/19/2001 17:24 Analyst: AM  
Preparation Date: 01/17/2001 13:27 Prep By: KL Method SW3510B

Lab Sample ID: 01010371-01C  
Client Sample ID: MW-15

Lab Sample ID: 01010371-02C  
Client Sample ID: MW-14

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20
Surr: n-Pentacosane	90.2	18-120

#### Laboratory Control Sample (LCS)

RunID: HP\_V\_010119D-538055 Units: mg/L  
Analysis Date: 01/19/2001 18:02 Analyst: AM  
Preparation Date: 01/17/2001 13:27 Prep By: KL Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	2.2	88	21	175

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

Sample Spiked: 01010389-03  
RunID: HP\_V\_010119D-538057 Units: mg/L  
Analysis Date: 01/19/2001 20:37 Analyst: AM  
Preparation Date: 01/17/2001 13:27 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	2.7	46.0	5	2.5	43.0	6.92	39	13	130

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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



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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Diesel Range Organics  
Method: SW8100M

WorkOrder: 01010371  
Lab Batch ID: 9700

#### Method Blank

#### Samples in Analytical Batch:

RunID: HP\_V\_010120A-536477 Units: mg/Kg  
Analysis Date: 01/20/2001 16:37 Analyst: AM  
Preparation Date: 01/18/2001 12:35 Prep By: J\_L Method SW3550B

Lab Sample ID: 01010371-03B  
Client Sample ID: Soil Cuttings, MW-14, MW-15

Analyte	Result	Rep Limit
Diesel Range Organics	ND	5.0
Surr: n-Pentacosane	95.4	20-154

#### Laboratory Control Sample (LCS)

RunID: HP\_V\_010120A-536478 Units: mg/Kg  
Analysis Date: 01/20/2001 17:16 Analyst: AM  
Preparation Date: 01/18/2001 12:35 Prep By: J\_L Method SW3550B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	83	82	99	50	150

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

Sample Spiked: 01010371-03  
RunID: HP\_V\_010120A-536480 Units: mg/Kg  
Analysis Date: 01/20/2001 18:33 Analyst: AM  
Preparation Date: 01/18/2001 12:35 Prep By: J\_L Method SW3550B

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	83	79	92.0	83	76	88.7	3.63	50	21	175

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

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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Gasoline Range Organics  
Method: SW8015B

WorkOrder: 01010371  
Lab Batch ID: R27993

#### Method Blank

#### Samples in Analytical Batch:

RunID: VARE\_010119A-536254 Units: mg/Kg  
Analysis Date: 01/19/2001 17:43 Analyst: TM

Lab Sample ID: 01010371-03A  
Client Sample ID: Soil Cuttings, MW-14, MW-15

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	100.7	63-122
Surr: 4-Bromofluorobenzene	109.3	39-150

#### Laboratory Control Sample (LCS)

RunID: VARE\_010119A-536251 Units: mg/Kg  
Analysis Date: 01/19/2001 16:20 Analyst: TM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.99	99	70	130

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

Sample Spiked: 01010377-01  
RunID: VARE\_010119A-536252 Units: mg/Kg-dry  
Analysis Date: 01/19/2001 16:48 Analyst: TM

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	475	450	94.7	475	510	108	12.7	50	26	147

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

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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Purgeable Aromatics  
Method: SW8021B

WorkOrder: 01010371  
Lab Batch ID: R28307

#### Method Blank

#### Samples in Analytical Batch:

RunID: HP\_S\_010124A-541294 Units: ug/L  
Analysis Date: 01/24/2001 17:34 Analyst: D\_R

Lab Sample ID      Client Sample ID  
01010371-01A      MW-15  
01010371-02A      MW-14  
01010371-04A      Trip Blank 1/4/01

Analyte	Result	Rep Limit
Benzene	ND	1.0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
Xylenes, Total	ND	1.0
Surr: 1,4-Difluorobenzene	94.8	72-137
Surr: 4-Bromofluorobenzene	90.3	48-156

#### Laboratory Control Sample (LCS)

RunID: HP\_S\_010124A-541293 Units: ug/L  
Analysis Date: 01/24/2001 16:15 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	52	105	70	130
Ethylbenzene	50	53	106	70	130
Toluene	50	53	107	70	130
Xylenes, Total	150	163	109	70	130

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

Sample Spiked: 01010610-02  
RunID: HP\_S\_010124A-541297 Units: ug/L  
Analysis Date: 01/24/2001 18:52 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	22	112	20	21	104	6.59	21	32	164
Ethylbenzene	ND	20	21	105	20	20	99.6	5.70	19	52	142
Toluene	ND	20	22	108	20	21	104	3.91	20	38	159
Xylenes, Total	ND	60	65	108	60	62	103	4.72	18	53	144

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Gasoline Range Organics  
Method: SW8015B

WorkOrder: 01010371  
Lab Batch ID: R28313

#### Method Blank

#### Samples in Analytical Batch:

RunID: HP\_S\_010124D-541367 Units: mg/L  
Analysis Date: 01/24/2001 17:34 Analyst: D\_R

Lab Sample ID	Client Sample ID
01010371-01A	MW-15
01010371-02A	MW-14
01010371-04A	Trip Blank 1/4/01

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	95.3	74-121
Surr: 4-Bromofluorobenzene	100.7	55-150

#### Laboratory Control Sample (LCS)

RunID: HP\_S\_010124D-541366 Units: mg/L  
Analysis Date: 01/24/2001 16:41 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	1.1	106	70	130

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

Sample Spiked: 01010610-03  
RunID: HP\_S\_010124D-541369 Units: mg/L  
Analysis Date: 01/24/2001 19:45 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	0.90	0.9	1.4	56.2	0.9	1.5	65.0	14.4	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

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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Polynuclear Aromatic Hydrocarbons  
Method: SW8310

WorkOrder: 01010371  
Lab Batch ID: 9703

#### Method Blank

#### Samples in Analytical Batch:

RunID:	2_010123A-545131	Units:	ug/L	Lab Sample ID	Client Sample ID
Analysis Date:	01/23/2001 16:17	Analyst:	KA	01010371-01B	MW-15
Preparation Date:	01/18/2001 13:00	Prep By:	KL	Method SW3510B	01010371-02B
					MW-14

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	62.9	15-96
Surr: Phenanthrene-d10	66.3	33-108

#### Laboratory Control Sample (LCS)

RunID:	2_010123A-545132	Units:	ug/L
Analysis Date:	01/23/2001 16:54	Analyst:	KA
Preparation Date:	01/18/2001 13:00	Prep By:	KL
		Method:	SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Acenaphthene	0.5	0.35	71	23	99
Acenaphthylene	0.5	0.41	81	29	104
Anthracene	0.5	0.33	67	28	126
Benz(a)anthracene	0.5	0.39	79	52	101
Benzo(a)pyrene	0.5	0.39	78	62	97
Benzo(b)fluoranthene	0.5	0.41	83	65	101
Benzo(g,h,i)perylene	0.5	0.41	81	36	117
Benzo(k)fluoranthene	0.5	0.41	82	64	104
Chrysene	0.5	0.43	86	64	124
Dibenzo(a,h)anthracene	0.5	0.38	76	33	111
Fluoranthene	0.5	0.39	78	51	100
Fluorene	0.5	0.39	78	20	105
Indeno(1,2,3-cd)pyrene	0.5	0.43	86	57	115
Naphthalene	0.5	0.34	68	19	95
Phenanthrene	0.5	0.38	77	29	105

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

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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Polynuclear Aromatic Hydrocarbons  
Method: SW8310

WorkOrder: 01010371  
Lab Batch ID: 9703

#### Laboratory Control Sample (LCS)

RunID: 2\_010123A-545132 Units: ug/L  
Analysis Date: 01/23/2001 16:54 Analyst: KA  
Preparation Date: 01/18/2001 13:00 Prep By: KL Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Pyrene	0.5	0.38	75	55	105

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

Sample Spiked: 01010371-01  
RunID: 2\_010123A-545134 Units: ug/L  
Analysis Date: 01/23/2001 18:08 Analyst: KA  
Preparation Date: 01/18/2001 13:00 Prep By: Method

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Acenaphthene	ND	0.5	0.19	37.2	0.5	0.21	41.8	11.5	30	1	97
Acenaphthylene	ND	0.5	0.19	37.1	0.5	0.2	39.5	6.09	30	1	122
Anthracene	ND	0.5	0.19	37.8	0.5	0.22	44.6	16.7	30	1	106
Benz(a)anthracene	ND	0.5	0.28	56.5	0.5	0.36	71.7	23.9	30	12	119
Benzo(a)pyrene	ND	0.5	0.26	52.6	0.5	0.34	67.2	24.3	30	1	105
Benzo(b)fluoranthene	ND	0.5	0.29	57.6	0.5	0.36	72.9	23.4	30	6	127
Benzo(g,h,i)perylene	ND	0.5	0.27	53.4	0.5	0.32	64.2	18.4	30	1	107
Benzo(k)fluoranthene	ND	0.5	0.28	56.4	0.5	0.36	71.2	23.2	30	5	119
Brysene	ND	0.5	0.3	60.5	0.5	0.38	75.9	22.7	30	1	144
Benzo(a,h)anthracene	ND	0.5	0.24	47.9	0.5	0.28	56.8	17.0	30	1	114
Fluoranthene	ND	0.5	0.34	67.7	0.5	0.4	79.8	16.4	30	14	126
Fluorene	ND	0.5	0.25	43.8	0.5	0.27	48.9	11.0	30	1	107
Benzo(1,2,3-cd)pyrene	ND	0.5	0.29	57.7	0.5	0.36	72.5	22.8	30	1	109
Naphthalene	ND	0.5	0.19	37.9	0.5	0.2	40.2	5.84	30	1	90
Phenanthrene	ND	0.5	0.35	51.3	0.5	0.38	57.2	10.8	30	1	128
Pyrene	ND	0.5	0.35	70.6	0.5	0.44	88.9	23.0	30	1	135

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

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## Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01010371  
Lab Batch ID: 9679

### Method Blank

### Samples in Analytical Batch:

RunID: TJA\_010117B-534400 Units: mg/L  
Analysis Date: 01/17/2001 19:31 Analyst: E\_B  
Preparation Date: 01/17/2001 9:00 Prep By: R\_T Method SW3010A

Lab Sample ID: 01010371-01D Client Sample ID: MW-15  
01010371-02D Client Sample ID: MW-14

Analyte	Result	Rep Limit
Barium	ND	0.005
Cadmium	ND	0.005
Calcium	ND	0.1
Chromium	ND	0.01
Magnesium	ND	0.1
Potassium	ND	2
Silver	ND	0.01
Sodium	ND	0.5

### Laboratory Control Sample (LCS)

RunID: TJA\_010117B-534401 Units: mg/L  
Analysis Date: 01/17/2001 19:35 Analyst: E\_B  
Preparation Date: 01/17/2001 9:00 Prep By: R\_T Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Barium	2	2	100	80	120
Cadmium	2	2.35	117	80	120
Calcium	20	20.9	104	80	120
Chromium	2	2.39	119	80	120
Magnesium	20	20.8	104	80	120
Potassium	20	20	100	80	120
Silver	2	2.01	100	80	120
Sodium	20	20.3	101	80	120

### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDS D)

Sample Spiked: 01010371-01  
RunID: TJA\_010117B-534406 Units: mg/L  
Analysis Date: 01/17/2001 19:57 Analyst: E\_B  
Preparation Date: 01/17/2001 9:00 Prep By: Method

Analyte	Sample Result	PDS Spike Added	PDS Result	PDS % Recovery	PDS D Spike Added	PDS D Result	PDS D % Recovery	RPD	RPD Limit	Low Limit	High Limit
Cadmium	ND	1	1.05	105	1	1.07	107	1.4	20	75	125
Chromium	ND	1	1.05	105	1	1.07	107	1.7	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.



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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01010371  
Lab Batch ID: 9679

Sample Spiked: 01010371-01  
RunID: TJA\_010117B-534403 Units: mg/L  
Analysis Date: 01/17/2001 19:44 Analyst: E\_B  
Preparation Date: 01/17/2001 9:00 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
Barium	0.073	1	1.05	98.2	1	1.06	99.0	0.887	20	75	125
Cadmium	ND	1	1.32	132 *	1	1	100	26.9 *	20	75	125
Calcium	150	10	162	120	10	162	118	1.04	20	75	125
Chromium	ND	1	1.31	131 *	1	1	100	26.9 *	20	75	125
Magnesium	28	10	39.4	111	10	39	107	3.60	20	75	125
Potassium	4.6	10	14	93.7	10	14.4	98.5	4.94	20	75	125
Silver	ND	1	0.979	97.9	1	0.99	99.0	1.08	20	75	125
Sodium	110	10	121	123	10	120	120	2.35	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.



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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01010371  
Lab Batch ID: 9704

#### Method Blank

#### Samples in Analytical Batch:

RunID: TJA\_010118A-535193 Units: mg/Kg  
Analysis Date: 01/18/2001 17:07 Analyst: E\_B  
Preparation Date: 01/18/2001 9:30 Prep By: R\_T Method SW3050B

Lab Sample ID: 01010371-03B  
Client Sample ID: Soil Cuttings, MW-14, MW-15

Analyte	Result	Rep Limit
Barium	ND	0.5
Cadmium	ND	0.5
Chromium	ND	1
Silver	ND	1

#### Laboratory Control Sample (LCS)

RunID: TJA\_010118A-535194 Units: mg/Kg  
Analysis Date: 01/18/2001 17:11 Analyst: E\_B  
Preparation Date: 01/18/2001 9:30 Prep By: R\_T Method SW3050B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Barium	177	156	N/A	137	218
Cadmium	64	55.3	N/A	49.2	78.7
Chromium	143	124	N/A	114	171
Silver	90	80.1	N/A	67	113

#### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked: 01010343-03  
RunID: TJA\_010118A-535199 Units: mg/Kg  
Analysis Date: 01/18/2001 17:33 Analyst: E\_B  
Preparation Date: 01/18/2001 9:30 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
Barium	90.6	100	179	88.6	100	179	88.4	0.25	20	75	125
Cadmium	ND	100	88.6	88.6	100	92.1	92.1	3.9	20	75	125

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

Sample Spiked: 01010434-03  
RunID: TJA\_010118A-535196 Units: mg/Kg  
Analysis Date: 01/18/2001 17:20 Analyst: E\_B  
Preparation Date: 01/18/2001 9:30 Prep By: R\_T Method SW3050B

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

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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01010371  
Lab Batch ID: 9704

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	91	100	164	73.1 *	100	168	77.4	5.73	20	75	125
Cadmium	ND	100	75.6	75.6	100	72.7	72.7 *	4.02	20	75	125
Chromium	6.2	100	91.9	85.7	100	87.2	81.0	5.63	20	75	125
Copper	ND	100	79.1	79.1	100	75.4	75.4	4.79	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.



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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01010371  
Lab Batch ID: 9704-T

#### Method Blank

#### Samples in Analytical Batch:

RunID: TJAT\_010118A-536347 Units: mg/Kg  
Analysis Date: 01/18/2001 17:35 Analyst: EG  
Preparation Date: 01/18/2001 9:30 Prep By: R\_T Method SW3050B

Lab Sample ID 01010371-03B Client Sample ID  
Soil Cuttings, MW-14, MW-15

Analyte	Result	Rep Limit
Arsenic	ND	0.5
Lead	ND	0.5
Selenium	ND	0.5

#### Laboratory Control Sample (LCS)

RunID: TJAT\_010118A-536348 Units: mg/Kg  
Analysis Date: 01/18/2001 17:41 Analyst: EG  
Preparation Date: 01/18/2001 9:30 Prep By: R\_T Method SW3050B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Arsenic	185	169	N/A	138	233
Lead	119	125	N/A	90.9	148
Selenium	150	143	N/A	111	188

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

Sample Spiked: 01010434-03  
RunID: TJAT\_010118A-536352 Units: mg/Kg  
Analysis Date: 01/18/2001 17:57 Analyst: EG  
Preparation Date: 01/18/2001 9:30 Prep By: R\_T Method SW3050B

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	2.6	200	167	82.2	200	163	80.4	2.30	20	75	125
Lead	7.9	100	90.6	82.7	100	86.5	78.5	5.15	20	75	125
Selenium	ND	200	170	84.8	200	164	81.9	3.44	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.



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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01010371  
Lab Batch ID: 9723-T

#### Method Blank

#### Samples in Analytical Batch:

RunID: TJAT\_010119C-536995 Units: mg/L  
Analysis Date: 01/20/2001 0:43 Analyst: EG  
Preparation Date: 01/19/2001 9:55 Prep By: R\_T Method SW3010A

Lab Sample ID: 01010371-01D Client Sample ID: MW-15  
01010371-02D Client Sample ID: MW-14

Analyte	Result	Rep Limit
Arsenic	ND	0.005
Lead	ND	0.005
Selenium	ND	0.005

#### Laboratory Control Sample (LCS)

RunID: TJAT\_010119C-536996 Units: mg/L  
Analysis Date: 01/20/2001 0:49 Analyst: EG  
Preparation Date: 01/19/2001 9:55 Prep By: R\_T Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Arsenic	4	4.01	100	80	120
Lead	2	2.02	101	80	120
Selenium	4	4.14	103	80	120

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

Sample Spiked: 01010472-01  
RunID: TJAT\_010119C-536998 Units: mg/L  
Analysis Date: 01/20/2001 1:05 Analyst: EG  
Preparation Date: 01/19/2001 9:55 Prep By: R\_T Method SW3010A

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Arsenic	ND	2	2.01	101	2	2.02	101	0.380	20	75	125
Lead	ND	1	0.988	98.8	1	0.989	98.9	0.101	20	75	125
Selenium	ND	2	2.07	103	2	2.08	104	0.583	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.



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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Mercury, Total  
Method: SW7471A

WorkOrder: 01010371  
Lab Batch ID: 9778A

#### Method Blank

#### Samples in Analytical Batch:

RunID: HGL\_010122A-538490 Units: mg/Kg  
Analysis Date: 01/22/2001 13:17 Analyst: R\_T  
Preparation Date: 01/22/2001 8:45 Prep By: Method

Lab Sample ID: 01010371-03B  
Client Sample ID: Soil Cuttings, MW-14, MW-15

Analyte	Result	Rep Limit
Mercury	ND	0.033

#### Laboratory Control Sample (LCS)

RunID: HGL\_010122A-538491 Units: mg/Kg  
Analysis Date: 01/22/2001 13:17 Analyst: R\_T  
Preparation Date: 01/22/2001 8:45 Prep By: R\_T Method SW7471A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Mercury	3.13	2.8	N/A	1.83	4.44

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

Sample Spiked: 01010222-12  
RunID: HGL\_010122A-538497 Units: mg/Kg  
Analysis Date: 01/22/2001 13:17 Analyst: R\_T  
Preparation Date: 01/22/2001 8:45 Prep By: R\_T Method SW7471A

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Mercury	0.12	0.33	0.498	114	0.33	0.422	91.2	22.3 *	20	75	125

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Mercury, Total  
Method: SW7470A

WorkOrder: 01010371  
Lab Batch ID: 9794A

#### Method Blank

#### Samples in Analytical Batch:

RunID:	_010123B-539251	Units:	mg/L	Lab Sample ID	Client Sample ID
Analysis Date:	01/23/2001 11:11	Analyst:	R_T	01010371-01D	MW-15
Preparation Date:	01/23/2001 9:00	Prep By:	R_T Method SW7470A	01010371-02D	MW-14

Analyte	Result	Rep Limit
Mercury	ND	0.0002

#### Laboratory Control Sample (LCS)

RunID:	_010123B-539252	Units:	mg/L
Analysis Date:	01/23/2001 11:11	Analyst:	R_T
Preparation Date:	01/23/2001 9:00	Prep By:	R_T Method SW7470A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Mercury	0.002	0.00197	98	85	115

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

Sample Spiked:	01010512-01		
RunID:	_010123B-539182	Units:	mg/L
Analysis Date:	01/23/2001 11:11	Analyst:	R_T
Preparation Date:	01/23/2001 9:00	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	0.00188	93.8	0.002	0.00188	93.8	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

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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

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

WorkOrder: 01010371  
Lab Batch ID: R27758

#### Method Blank

#### Samples in Analytical Batch:

RunID: WET\_010116F-532516 Units: mg/L  
Analysis Date: 01/16/2001 11:23 Analyst: KM

Lab Sample ID	Client Sample ID
01010371-01E	MW-15
01010371-02E	MW-14

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

#### Laboratory Control Sample (LCS)

RunID: WET\_010116F-532517 Units: mg/L  
Analysis Date: 01/16/2001 11:23 Analyst: KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.37	94	90	110

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

Sample Spiked: 01010371-01  
RunID: WET\_010116F-532519 Units: mg/L  
Analysis Date: 01/16/2001 11:23 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Nitrogen, Nitrate (As N)	4.9	10	14.7	98.7	10	14.7	98.7	0.0405	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

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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Fluoride-IC  
Method: E300

WorkOrder: 01010371  
Lab Batch ID: R27759

#### Method Blank

#### Samples in Analytical Batch:

RunID: WET\_010116G-532526 Units: mg/L  
Analysis Date: 01/16/2001 11:23 Analyst: KM

Lab Sample ID	Client Sample ID
01010371-01E	MW-15
01010371-02E	MW-14

Analyte	Result	Rep Limit
Fluoride	ND	0.10

#### Laboratory Control Sample (LCS)

RunID: WET\_010116G-532527 Units: mg/L  
Analysis Date: 01/16/2001 11:23 Analyst: KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Fluoride	10	9.7	97	90	110

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

Sample Spiked: 01010371-01  
RunID: WET\_010116G-532529 Units: mg/L  
Analysis Date: 01/16/2001 11:23 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Fluoride	1.2	10	10	93.1	10	11	95.2	2.19	20	80	120

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Sulfate  
Method: E300

WorkOrder: 01010371  
Lab Batch ID: R27760

#### Method Blank

RunID: WET\_010116H-532536 Units: mg/L  
Analysis Date: 01/16/2001 11:23 Analyst: KM

#### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01010371-01E	MW-15
01010371-02E	MW-14

Analyte	Result	Rep Limit
Sulfate	ND	0.20

#### Laboratory Control Sample (LCS)

RunID: WET\_010116H-532537 Units: mg/L  
Analysis Date: 01/16/2001 11:23 Analyst: KM

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: 01010371-01  
RunID: WET\_010116H-532539 Units: mg/L  
Analysis Date: 01/16/2001 11:23 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Sulfate	ND	200	330	97.8	200	330	98.4	0.649	20	80	120

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Alkalinity, Bicarbonate  
Method: M2320 B

WorkOrder: 01010371  
Lab Batch ID: R27812

#### Method Blank

#### Samples in Analytical Batch:

RunID: WET\_010117B-533553 Units: mg/L  
Analysis Date: 01/17/2001 12:00 Analyst: SN

Lab Sample ID	Client Sample ID
01010371-01F	MW-15
01010371-02F	MW-14

Analyte	Result	Rep Limit
Alkalinity, Bicarbonate	ND	2.0

#### Laboratory Control Sample (LCS)

RunID: WET\_010117B-533555 Units: mg/L  
Analysis Date: 01/17/2001 12:00 Analyst: SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Alkalinity, Bicarbonate	23.4	24.2	104	90	110

#### Sample Duplicate

Original Sample: 01010371-01  
RunID: WET\_010117B-533556 Units: mg/L  
Analysis Date: 01/17/2001 12:00 Analyst: SN

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

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Alkalinity, Carbonate  
Method: M2320 B

WorkOrder: 01010371  
Lab Batch ID: R27814

#### Method Blank

#### Samples in Analytical Batch:

RunID: WET\_010117C-533576 Units: mg/L  
Analysis Date: 01/17/2001 12:00 Analyst: SN

Lab Sample ID	Client Sample ID
01010371-01F	MW-15
01010371-02F	MW-14

Analyte	Result	Rep Limit
Alkalinity, Carbonate	ND	2.0

#### Laboratory Control Sample (LCS)

RunID: WET\_010117C-533578 Units: mg/L  
Analysis Date: 01/17/2001 12:00 Analyst: SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Alkalinity, Carbonate	23.4	24.2	104	90	110

#### Sample Duplicate

Original Sample: 01010371-01  
RunID: WET\_010117C-533579 Units: mg/L  
Analysis Date: 01/17/2001 12:00 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  
J - Estimated value between MDL and PQL

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

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



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### Quality Control Report

Brown & Caldwell

BJ Service #12832-022

Analysis: Chloride, Total  
Method: E325.3

WorkOrder: 01010371  
Lab Batch ID: R27983

#### Method Blank

#### Samples in Analytical Batch:

RunID:	WET_010118L-536138	Units:	mg/L	<u>Lab Sample ID</u>	<u>Client Sample ID</u>
Analysis Date:	01/18/2001 14:30	Analyst:	CV	01010371-01E	MW-15
				01010371-02E	MW-14

Analyte	Result	Rep Limit
Chloride	ND	1.0

#### Laboratory Control Sample (LCS)

RunID: WET\_010118L-536140 Units: mg/L  
Analysis Date: 01/18/2001 14:30 Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Chloride	109	112	103	90	110

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

Sample Spiked: 01010371-01  
RunID: WET\_010118L-536142 Units: mg/L  
Analysis Date: 01/18/2001 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	ND	250	473	102	250	473	102	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

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*Sample Receipt Checklist  
And  
Chain of Custody*



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Sample Receipt Checklist

Workorder: 01010371  
Date and Time Received: 1/16/01 10:00:00 AM  
Temperature: 3

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

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



**CBS Weather Now**

035943

## Analysis Request & Chain of Custody Record

01010271

Page 1 of 2

Client Name: Brown and Caldwell		matrix		bottle		size		pres.		Number of Containers		Requested Analysis	
Address/Phone: 1415 Louisiana, Suite 2500		W=water S=soil SL=sludge O=other:		P=plastic A=amber glass G=glass V=vial		1=1 liter 4=4oz 40=vial 8=8oz 16=16oz		1=HCl 2=HNO3 3=H2SO4 O=other:		BTEX 8021, TPH 8015 G		PAH 8310	
Client Contact: Rick Rexroad 713.646.1129										TPH 8015 D		8RCRA metals Ca, Mg, K, Na	
Project Name: RT Services												Cl <sub>2</sub> , NO <sub>3</sub> , SO <sub>4</sub> , FI	
Project Number: 12832-D22												CO <sub>3</sub> , HCO <sub>3</sub>	
Project Location: Hobbs, NM													
Invoice To: Brown and Caldwell													
SAMPLE ID	DATE	TIME	comp	grab									
MN-14 15	1-14-00	14:00	✓	✓	W	V	40ml	1	3	✓			
SEV		SEV			W	A	32oz	1	2	✓			
					W	A	32oz	1	2				
					W	P	32oz	2	1				
					W	P	32oz	1	1				
MN-14 15	1-14-00	14:00	✓	✓	W	P	32oz	1	1				
SEV		SEV			W	V	40ml	1	3	✓			
					W	A	32oz	1	2				
MN-14	1-14-00	16:00	✓	✓	W	V	40ml	1	3	✓			
					W	A	32oz	1	2				
Soil cuttings, MN-14, MN-15	1-14-00	15:00	✓	✓	S	G	8oz	1	2				
Soil cuttings, MN-14, MN-15	1-14-00	15:00	✓	✓	S	G	8oz	1	2				
Soil cuttings, MN-14, MN-15	1-14-00	15:00	✓	✓	S	G	8oz	1	2				
Client/Consultant Remarks:		Laboratory remarks:		Left mes bag 1-17-01 soil cuttings did not have analyses. Per R. Rexroad analyze soil cuttings for PCB/DIO + metals. 1-17-01 2:00pm.		Intact? <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>		Temp: 5		PM (initials):			
Requested TAT		Special Reporting Requirements		Fax Results <input checked="" type="checkbox"/>		Raw Data <input type="checkbox"/>		Special Detection Limits (specify):					
24hr <input type="checkbox"/> 72hr <input type="checkbox"/>		Standard QC <input checked="" type="checkbox"/> Level 3 QC <input type="checkbox"/> Level 4 QC <input type="checkbox"/>											
48hr <input type="checkbox"/> Standard <input checked="" type="checkbox"/>		1. Relinquished by Sampler: <i>Steve Fisher</i>		date: 1-15-00		time: 17:30		2. Received by: <i>FED-EX</i>					
Other <input type="checkbox"/>		3. Relinquished by:		date:		time:		4. Received by:					
		5. Relinquished by:		date:		time:		6. Received by Laboratory: <i>Shirley D. D. 1/16/01</i>					



SPL, Inc.

SPL Worksheet No.

01010371

005542

page 2 of 2

## Analysis Request &amp; Chain of Custody Record

## Requested Analysis

Client Name: BS Services Brown and CaldwellAddress/Phone: 1415 Louisiana, Ste 2500, HoustonClient Contact: Rick Rexroad 713.646.1129Project Name: BS ServicesProject Number: 12832-022Project Location: Hobbs, NMInvoice To: Brown and Caldwell

SAMPLE ID

DATE

TIME

comp  
grabmatrix bottle  
W=water S=soil  
SL=sludge O=other:P=plastic A=amber glass  
G=glass V=vial1=1 liter 4=4oz 40=vial  
8=8oz 16=16oz1=HCl 2=HNO3  
3=H2SO4 O=other:

Number of Containers

PAH 8310  
8 RCRA Metals  
Ca, Mg, K, NaCl<sup>-</sup>, NO<sub>3</sub><sup>-</sup>, SO<sub>4</sub><sup>-</sup>, F<sup>-</sup>CO<sub>3</sub>, HCO<sub>3</sub>

11/10

Client/Consultant Remarks:

Laboratory remarks:

Initialed? OK  
Temp: OK

Requested TAT

Special Reporting Requirements

Fax Results

☒

Raw Data

☐

Special Detection Limits (specify):

PMA review (initials):

24hr ☐ 72hr ☐48hr ☐ Standard ☒Other ☐1. Relinquished by Sample Scott JordanLevel 3 QC ☐Level 4 QC ☐

date 1-15-00 time 17:30

2. Received by: FED-CX4. Received by: James M. O'Dell

5. Relinquished by:

date

time

6. Received by Laboratory: James M. O'Dell

1/16/01 1000

☒ 8880 Interchange Drive, Houston, TX 77054 (713) 660-0901☐ 500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775☐ 459-Hobbs Drive, Trarion, LA 70584 (610) 947-5777



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

Case Narrative for:  
**Brown & Caldwell**

Certificate of Analysis Number:

**01020760**

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

Upon receipt of you samples it was found that sample was not received on March 9, 2001 for your sample "MW-7". Also, sample was received on March 9, 2001 for Trip Blank but was not listed on the chain of custody. On March 10, 2001, sample was not received for Trip Blank and sample was received for "MW-7". Tim Jenkins was notified of all non-conformance issues on March 9, 2001.

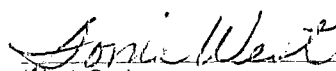
Matrix spike (MS) and matrix spike duplicate (MSD) samples are chosen and tested at random from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. Since the MS and MSD 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.

  
West, Sonia  
Senior Project Manager

3/30/01

Date





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

## Brown & Caldwell

Certificate of Analysis Number:

**01020760**

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

fax: (713) 308-3886

**Fax To:** Brown & Caldwell  
Rick Rexroad

fax: (713) 308-3886

**Project Name:** BJ Service, Hobbs, NM

**Site:** Hobbs, NM

**Site Address:**

**PO Number:**

**State:** New Mexico

**State Cert. No.:**

**Date Reported:**

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD
MW-1	01020760-01	Water	3/8/01 12:40:00 PM	3/9/01 09:30:00 AM	100825	<input type="checkbox"/>
MW-3	01020760-02	Water	3/8/01 11:20:00 AM	3/9/01 09:30:00 AM	100825	<input type="checkbox"/>
MW-4	01020760-03	Water	3/8/01 01:45:00 PM	3/9/01 09:30:00 AM	100825	<input type="checkbox"/>
MW-5	01020760-04	Water	3/8/01 10:15:00 AM	3/9/01 09:30:00 AM	100825	<input type="checkbox"/>
MW-5	01020760-04	Water	3/8/01 10:15:00 AM	3/10/01 10:00:00 AM	100825	<input type="checkbox"/>
MW-7	01020760-05	Water	3/8/01 10:50:00 AM	3/10/01 10:00:00 AM	100821	<input type="checkbox"/>
MW-8	01020760-06	Water	3/9/01 09:10:00 AM	3/9/01 09:30:00 AM	100821	<input type="checkbox"/>
MW-8	01020760-06	Water	3/9/01 09:10:00 AM	3/10/01 10:00:00 AM	100821	<input type="checkbox"/>
MW-9	01020760-07	Water	3/8/01 11:50:00 AM	3/9/01 09:30:00 AM	100825	<input type="checkbox"/>
MW-10	01020760-08	Water	3/9/01 09:30:00 AM	3/10/01 10:00:00 AM	100821	<input type="checkbox"/>
MW-11A	01020760-09	Water	3/8/01 03:15:00 PM	3/9/01 09:30:00 AM	100826	<input type="checkbox"/>
MW-12	01020760-10	Water	3/8/01 04:10:00 PM	3/9/01 09:30:00 AM	100825	<input type="checkbox"/>
MW-13	01020760-11	Water	3/8/01 02:30:00 PM	3/9/01 09:30:00 AM	100825	<input type="checkbox"/>
MW-14	01020760-12	Water	3/8/01 09:30:00 AM	3/9/01 09:30:00 AM	100825	<input type="checkbox"/>
MW-15	01020760-13	Water	3/8/01 09:45:00 AM	3/9/01 09:30:00 AM	100825	<input type="checkbox"/>
Duplicate	01020760-15	Water	3/9/01	3/10/01 10:00:00 AM	100821	<input type="checkbox"/>
Tip Blank 2/28/01	01020760-16	Water	3/9/01	3/10/01 10:00:00 AM	100821	<input type="checkbox"/>
MW-7	01020760-17	Water	3/9/01 09:50:00 AM	3/10/01 10:00:00 AM	100821	<input type="checkbox"/>

*Sonia West*  
West, Sonia  
Senior Project Manager

3/30/01

Date

Joel Grice  
Laboratory Director

Ted Yen  
Quality Assurance Officer



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

Client Sample ID MW-1

Collected: 3/8/01 12:40:00

SPL Sample ID: 01020760-01

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>ALKALINITY, BICARBONATE</b>			<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>		
Alkalinity, Bicarbonate	90.9	2	1		03/12/01 10:15	SN	597232
<b>ALKALINITY, CARBONATE</b>			<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>		
Alkalinity, Carbonate	ND	2	1		03/12/01 10:15	SN	597332
<b>CHLORIDE, TOTAL</b>			<b>MCL</b>	<b>E325.3</b>	<b>Units: mg/L</b>		
Chloride	181	5	5		03/20/01 11:30	CV	610204
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	0.49	0.25	1		03/20/01 18:38	AM	609585
Surr: n-Pentacosane	116	% 18-120	1		03/20/01 18:38	AM	609585

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 7:52	KL

<b>FLUORIDE-IC</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Fluoride	1.3	0.1	1		03/09/01 11:53	KM	594811
<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	0.58	0.1	1		03/18/01 19:36	D_R	605444
Surr: 1,4-Difluorobenzene	90.7	% 74-121	1		03/18/01 19:36	D_R	605444
Surr: 4-Bromofluorobenzene	94.7	% 55-150	1		03/18/01 19:36	D_R	605444

<b>HARDNESS, TOTAL (TITRIMETRIC, EDTA)</b>			<b>MCL</b>	<b>E130.2</b>	<b>Units: mg/L</b>		
Hardness (As CaCO3)	310	50	10		03/21/01 13:30	CV	612340

<b>HEADSPACE GAS ANALYSIS</b>			<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>		
Ethane	ND	0.0025	1		03/23/01 10:48	A_A	612655
Ethylene	ND	0.0032	1		03/23/01 10:48	A_A	612655
Methane	ND	0.0012	1		03/23/01 10:48	A_A	612655

<b>MERCURY, TOTAL</b>			<b>MCL</b>	<b>SW7470A</b>	<b>Units: mg/L</b>		
Mercury	ND	0.0002	1		03/21/01 16:24	R_T	610975

Prep Method	Prep Date	Prep Initials
SW7470A	03/21/2001 13:40	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>			<b>MCL</b>	<b>SW6010B</b>	<b>Units: mg/L</b>		
Arsenic	0.0205	0.005	1		03/15/01 21:52	NS	602623
Lead	ND	0.005	1		03/15/01 21:52	NS	602623
Selenium	ND	0.005	1		03/15/01 21:52	NS	602623
Barium	0.044	0.005	1		03/17/01 2:47	E_B	605387
Cadmium	ND	0.005	1		03/17/01 2:47	E_B	605387
Calcium	86.8	0.1	1		03/17/01 2:47	E_B	605387
Chromium	ND	0.01	1		03/17/01 2:47	E_B	605387

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-1

Collected: 3/8/01 12:40:00

SPL Sample ID: 01020760-01

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	20.7	0.1	1		03/17/01 2:47	E_B	605387
Potassium	ND	2	1		03/17/01 2:47	E_B	605387
Silver	ND	0.01	1		03/17/01 2:47	E_B	605387
Sodium	141	0.5	1		03/17/01 2:47	E_B	605387

Prep Method	Prep Date	Prep Initials
SW3010A	03/12/2001 15:00	MME

NITROGEN, NITRATE (AS N)			MCL	E300	Units: mg/L		
Nitrogen, Nitrate (As N)	4.31	0.1	1		03/09/01 11:53	KM	594832

POLYNUCLEAR AROMATIC HYDROCARBONS			MCL	SW8310	Units: ug/L		
Acenaphthene	ND	0.12	1		03/14/01 22:12	KA	606022
Acenaphthylene	ND	0.12	1		03/14/01 22:12	KA	606022
Anthracene	ND	0.12	1		03/14/01 22:12	KA	606022
Benz(a)anthracene	ND	0.12	1		03/14/01 22:12	KA	606022
Benzo(a)pyrene	ND	0.12	1		03/14/01 22:12	KA	606022
Benzo(b)fluoranthene	ND	0.12	1		03/14/01 22:12	KA	606022
Benzo(g,h,i)perylene	ND	0.12	1		03/14/01 22:12	KA	606022
Benzo(k)fluoranthene	ND	0.12	1		03/14/01 22:12	KA	606022
Chrysene	ND	0.12	1		03/14/01 22:12	KA	606022
Dibenzo(a,h)anthracene	ND	0.12	1		03/14/01 22:12	KA	606022
Fluoranthene	ND	0.12	1		03/14/01 22:12	KA	606022
Fluorene	ND	0.12	1		03/14/01 22:12	KA	606022
Indeno(1,2,3-cd)pyrene	ND	0.12	1		03/14/01 22:12	KA	606022
Naphthalene	ND	0.12	1		03/14/01 22:12	KA	606022
Phenanthrene	ND	0.12	1		03/14/01 22:12	KA	606022
Pyrene	ND	0.12	1		03/14/01 22:12	KA	606022
Surr: 1-Fluoronaphthalene	40.2	% 15-96	1		03/14/01 22:12	KA	606022
Surr: Phenanthrene-d10	61.1	% 33-108	1		03/14/01 22:12	KA	606022

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 8:00	KL

PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
Benzene	2	1	1		03/27/01 16:33	D_R	617963
Ethylbenzene	ND	1	1		03/27/01 16:33	D_R	617963
Toluene	ND	1	1		03/27/01 16:33	D_R	617963
Xylenes, Total	ND	1	1		03/27/01 16:33	D_R	617963
Surr: 1,4-Difluorobenzene	108	% 72-137	1		03/27/01 16:33	D_R	617963
Surr: 4-Bromofluorobenzene	82.9	% 48-156	1		03/27/01 16:33	D_R	617963

SULFATE			MCL	E300	Units: mg/L		
Sulfate	210	4	20		03/09/01 11:53	KM	594874

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-3

Collected: 3/8/01 11:20:00

SPL Sample ID: 01020760-02

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>ALKALINITY, BICARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Bicarbonate	242	2		1	03/12/01 10:15	SN	597235
<b>ALKALINITY, CARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Carbonate	ND	2		1	03/12/01 10:15	SN	597335
<b>CHLORIDE, TOTAL</b>				<b>MCL</b>	<b>E325.3</b>	<b>Units: mg/L</b>	
Chloride	165	2		2	03/20/01 11:30	CV	610207
<b>DIESEL RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Diesel Range Organics	0.42	0.25		1	03/20/01 20:34	AM	609594
Surr: n-Pentacosane	121MI	% 18-120		1 *	03/20/01 20:34	AM	609594

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 7:52	KL

<b>FLUORIDE-IC</b>				<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>	
Fluoride	0.77	0.1		1	03/09/01 11:53	KM	594814
<b>GASOLINE RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Gasoline Range Organics	ND	0.1		1	03/17/01 4:48	D_R	604417
Surr: 1,4-Difluorobenzene	91.7	% 74-121		1	03/17/01 4:48	D_R	604417
Surr: 4-Bromofluorobenzene	96.0	% 55-150		1	03/17/01 4:48	D_R	604417
<b>HARDNESS, TOTAL (TITRIMETRIC, EDTA)</b>				<b>MCL</b>	<b>E130.2</b>	<b>Units: mg/L</b>	
Hardness (As CaCO3)	470	25		5	03/21/01 13:30	CV	612345
<b>HEADSPACE GAS ANALYSIS</b>				<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>	
Ethane	ND	0.0025		1	03/23/01 11:26	A_A	612861
Ethylene	ND	0.0032		1	03/23/01 11:26	A_A	612861
Methane	ND	0.0012		1	03/23/01 11:26	A_A	612861
<b>MERCURY, TOTAL</b>				<b>MCL</b>	<b>SW7470A</b>	<b>Units: mg/L</b>	
Mercury	ND	0.0002		1	03/21/01 16:24	R_T	610986

Prep Method	Prep Date	Prep Initials
SW7470A	03/21/2001 13:40	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>				<b>MCL</b>	<b>SW6010B</b>	<b>Units: mg/L</b>	
Arsenic	0.0094	0.005		1	03/15/01 22:13	NS	602626
Lead	ND	0.005		1	03/15/01 22:13	NS	602626
Selenium	0.00702	0.005		1	03/21/01 13:49	NS	610670
Barium	0.119	0.005		1	03/17/01 2:51	E_B	605388
Cadmium	ND	0.005		1	03/17/01 2:51	E_B	605388
Calcium	148	0.1		1	03/17/01 2:51	E_B	605388
Chromium	ND	0.01		1	03/17/01 2:51	E_B	605388

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-3

Collected: 3/8/01 11:20:00

SPL Sample ID: 01020760-02

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	24.9	0.1	1		03/17/01 2:51	E_B	605388
Potassium	2.56	2	1		03/17/01 2:51	E_B	605388
Silver	ND	0.01	1		03/17/01 2:51	E_B	605388
Sodium	124	0.5	1		03/17/01 2:51	E_B	605388

Prep Method	Prep Date	Prep Initials
SW3010A	03/20/2001 12:35	MME
SW3010A	03/12/2001 15:00	MME

NITROGEN, NITRATE (AS N)	MCL	E300	Units: mg/L	
Nitrogen, Nitrate (As N)	2.56	0.1	1	03/09/01 11:53 KM 594835

POLYNUCLEAR AROMATIC HYDROCARBONS	MCL	SW8310	Units: ug/L	
Acenaphthene	ND	0.13	1	03/15/01 5:00 KA 611375
Acenaphthylene	ND	0.13	1	03/15/01 5:00 KA 611375
Anthracene	ND	0.13	1	03/15/01 5:00 KA 611375
Benz(a)anthracene	ND	0.13	1	03/15/01 5:00 KA 611375
Benzo(a)pyrene	ND	0.13	1	03/15/01 5:00 KA 611375
Benzo(b)fluoranthene	ND	0.13	1	03/15/01 5:00 KA 611375
Benzo(g,h,i)perylene	ND	0.13	1	03/15/01 5:00 KA 611375
Benzo(k)fluoranthene	ND	0.13	1	03/15/01 5:00 KA 611375
Chrysene	ND	0.13	1	03/15/01 5:00 KA 611375
Dibenzo(a,h)anthracene	ND	0.13	1	03/15/01 5:00 KA 611375
Fluoranthene	ND	0.13	1	03/15/01 5:00 KA 611375
Fluorene	ND	0.13	1	03/15/01 5:00 KA 611375
Indeno(1,2,3-cd)pyrene	ND	0.13	1	03/15/01 5:00 KA 611375
Naphthalene	ND	0.13	1	03/15/01 5:00 KA 611375
Phenanthrene	ND	0.13	1	03/15/01 5:00 KA 611375
Pyrene	ND	0.13	1	03/15/01 5:00 KA 611375
Surr: 1-Fluoronaphthalene	30.9	% 15-96	1	03/15/01 5:00 KA 611375
Surr: Phenanthrene-d10	54.4	% 33-108	1	03/15/01 5:00 KA 611375

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 8:00	KL

PURGEABLE AROMATICS	MCL	SW8021B	Units: ug/L	
Benzene	ND	1	1	03/17/01 4:48 D_R 604380
Ethylbenzene	ND	1	1	03/17/01 4:48 D_R 604380
Toluene	ND	1	1	03/17/01 4:48 D_R 604380
Xylenes, Total	ND	1	1	03/17/01 4:48 D_R 604380
Surr: 1,4-Difluorobenzene	94.8	% 72-137	1	03/17/01 4:48 D_R 604380
Surr: 4-Bromofluorobenzene	94.4	% 48-156	1	03/17/01 4:48 D_R 604380

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-3

Collected: 3/8/01 11:20:00

SPL Sample ID: 01020760-02

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>SULFATE</b>				<b>MCL</b>			
Sulfate	170	2	10	<b>E300</b>	03/09/01 11:53	KM	594878

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference



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

Client Sample ID MW-4

Collected: 3/8/01 1:45:00 P SPL Sample ID: 01020760-03

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>ALKALINITY, BICARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Bicarbonate	232	2		1	03/12/01 10:15	SN	597236
<b>ALKALINITY, CARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Carbonate	ND	2		1	03/12/01 10:15	SN	597336
<b>CHLORIDE, TOTAL</b>				<b>MCL</b>	<b>E325.3</b>	<b>Units: mg/L</b>	
Chloride	172	2		2	03/20/01 11:30	CV	610208
<b>DIESEL RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Diesel Range Organics	0.43	0.27		1	03/20/01 21:12	AM	609595
Surr: n-Pentacosane	85.2 %	18-120		1	03/20/01 21:12	AM	609595

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 7:52	KL

<b>FLUORIDE-IC</b>				<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>	
Fluoride	0.63	0.1		1	03/09/01 11:53	KM	594815
<b>GASOLINE RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Gasoline Range Organics	0.16	0.1		1	03/17/01 5:15	D_R	604418
Surr: 1,4-Difluorobenzene	90.3 %	74-121		1	03/17/01 5:15	D_R	604418
Surr: 4-Bromofluorobenzene	95.3 %	55-150		1	03/17/01 5:15	D_R	604418
<b>HARDNESS, TOTAL (TITRIMETRIC, EDTA)</b>				<b>MCL</b>	<b>E130.2</b>	<b>Units: mg/L</b>	
Hardness (As CaCO3)	610	50		10	03/21/01 13:30	CV	612346
<b>HEADSPACE GAS ANALYSIS</b>				<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>	
Ethane	ND	0.0025		1	03/23/01 11:39	A_A	612863
Ethylene	ND	0.0032		1	03/23/01 11:39	A_A	612863
Methane	ND	0.0012		1	03/23/01 11:39	A_A	612863
<b>MERCURY, TOTAL</b>				<b>MCL</b>	<b>SW7470A</b>	<b>Units: mg/L</b>	
Mercury	ND	0.0002		1	03/21/01 16:24	R_T	610987

Prep Method	Prep Date	Prep Initials
SW7470A	03/21/2001 13:40	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>				<b>MCL</b>	<b>SW6010B</b>	<b>Units: mg/L</b>	
Arsenic	0.0386	0.005		1	03/15/01 22:18	NS	602627
Lead	0.00602	0.005		1	03/15/01 22:18	NS	602627
Selenium	0.00508	0.005		1	03/15/01 22:18	NS	602627
Barium	0.0978	0.005		1	03/17/01 2:55	E_B	605389
Cadmium	0.0121	0.005		1	03/17/01 2:55	E_B	605389
Calcium	214	0.1		1	03/17/01 2:55	E_B	605389
Chromium	0.0104	0.01		1	03/17/01 2:55	E_B	605389

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-4

Collected: 3/8/01 1:45:00 P SPL Sample ID: 01020760-03

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	25.9	0.1	1		03/17/01 2:55	E_B	605389
Potassium	2.76	2	1		03/17/01 2:55	E_B	605389
Silver	ND	0.01	1		03/17/01 2:55	E_B	605389
Sodium	135	0.5	1		03/17/01 2:55	E_B	605389

Prep Method

Prep Date

Prep Initials

SW3010A

03/12/2001 15:00

MME

**NITROGEN, NITRATE (AS N)**

MCL

E300

Units: mg/L

Nitrogen, Nitrate (As N)	4.75	0.1	1	03/09/01 11:53	KM	594836
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**POLYNUCLEAR AROMATIC HYDROCARBONS**

MCL

SW8310

Units: ug/L

Acenaphthene	ND	0.12	1	03/15/01 5:37	KA	611376
Acenaphthylene	ND	0.12	1	03/15/01 5:37	KA	611376
Anthracene	ND	0.12	1	03/15/01 5:37	KA	611376
Benz(a)anthracene	ND	0.12	1	03/15/01 5:37	KA	611376
Benzo(a)pyrene	ND	0.12	1	03/15/01 5:37	KA	611376
Benzo(b)fluoranthene	ND	0.12	1	03/15/01 5:37	KA	611376
Benzo(g,h,i)perylene	ND	0.12	1	03/15/01 5:37	KA	611376
Benzo(k)fluoranthene	ND	0.12	1	03/15/01 5:37	KA	611376
Chrysene	ND	0.12	1	03/15/01 5:37	KA	611376
Dibenzo(a,h)anthracene	ND	0.12	1	03/15/01 5:37	KA	611376
Fluoranthene	ND	0.12	1	03/15/01 5:37	KA	611376
Fluorene	ND	0.12	1	03/15/01 5:37	KA	611376
Indeno(1,2,3-cd)pyrene	ND	0.12	1	03/15/01 5:37	KA	611376
Naphthalene	ND	0.12	1	03/15/01 5:37	KA	611376
Phenanthrene	ND	0.12	1	03/15/01 5:37	KA	611376
Pyrene	ND	0.12	1	03/15/01 5:37	KA	611376
Surr: 1-Fluoronaphthalene	40.7	% 15-96	1	03/15/01 5:37	KA	611376
Surr: Phenanthrene-d10	80.3	% 33-108	1	03/15/01 5:37	KA	611376

Prep Method

Prep Date

Prep Initials

SW3510B

03/10/2001 8:00

KL

**PURGEABLE AROMATICS**

MCL

SW8021B

Units: ug/L

Benzene	ND	1	1	03/17/01 5:15	D_R	604381
Ethylbenzene	ND	1	1	03/17/01 5:15	D_R	604381
Toluene	ND	1	1	03/17/01 5:15	D_R	604381
Xylenes, Total	ND	1	1	03/17/01 5:15	D_R	604381
Surr: 1,4-Difluorobenzene	89.4	% 72-137	1	03/17/01 5:15	D_R	604381
Surr: 4-Bromofluorobenzene	93.7	% 48-156	1	03/17/01 5:15	D_R	604381

**SULFATE**

MCL

E300

Units: mg/L

Sulfate	180	2	10	03/09/01 11:53	KM	594880
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**Qualifiers:**

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference





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

Client Sample ID MW-5

Collected: 3/8/01 10:15:00

SPL Sample ID: 01020760-04

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>ALKALINITY, BICARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Bicarbonate	222	2		1	03/12/01 10:15	SN	597237
<b>ALKALINITY, CARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Carbonate	ND	2		1	03/12/01 10:15	SN	597337
<b>CHLORIDE, TOTAL</b>				<b>MCL</b>	<b>E325.3</b>	<b>Units: mg/L</b>	
Chloride	152	2		2	03/20/01 11:30	CV	610209
<b>DIESEL RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Diesel Range Organics	0.56	0.22		1	03/20/01 21:51	AM	609596
Surr: n-Pentacosane	95.6 %	18-120		1	03/20/01 21:51	AM	609596

<u>Prep Method</u>	<u>Prep Date</u>	<u>Prep Initials</u>
SW3510B	03/10/2001 7:52	KL

<b>FLUORIDE-IC</b>				<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>	
Fluoride	0.86	0.1		1	03/09/01 11:53	KM	594816
<b>GASOLINE RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Gasoline Range Organics	ND	0.1		1	03/17/01 5:42	D_R	604419
Surr: 1,4-Difluorobenzene	91.3 %	74-121		1	03/17/01 5:42	D_R	604419
Surr: 4-Bromofluorobenzene	94.0 %	55-150		1	03/17/01 5:42	D_R	604419
<b>HARDNESS, TOTAL (TITRIMETRIC, EDTA)</b>				<b>MCL</b>	<b>E130.2</b>	<b>Units: mg/L</b>	
Hardness (As CaCO3)	440	25		5	03/21/01 13:30	CV	612348
<b>HEADSPACE GAS ANALYSIS</b>				<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>	
Ethane	ND	0.0025		1	03/23/01 11:51	A_A	612866
Ethylene	ND	0.0032		1	03/23/01 11:51	A_A	612866
Methane	ND	0.0012		1	03/23/01 11:51	A_A	612866
<b>MERCURY, TOTAL</b>				<b>MCL</b>	<b>SW7470A</b>	<b>Units: mg/L</b>	
Mercury	ND	0.0002		1	03/21/01 16:24	R_T	610988

<u>Prep Method</u>	<u>Prep Date</u>	<u>Prep Initials</u>
SW7470A	03/21/2001 13:40	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>				<b>MCL</b>	<b>SW6010B</b>	<b>Units: mg/L</b>	
Arsenic	0.00974	0.005		1	03/15/01 22:24	NS	602628
Lead	ND	0.005		1	03/15/01 22:24	NS	602628
Selenium	0.00587	0.005		1	03/15/01 22:24	NS	602628
Barium	0.055	0.005		1	03/17/01 2:59	E_B	605390
Cadmium	ND	0.005		1	03/17/01 2:59	E_B	605390
Calcium	157	0.1		1	03/17/01 2:59	E_B	605390
Chromium	0.0101	0.01		1	03/17/01 2:59	E_B	605390

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-5

Collected: 3/8/01 10:15:00

SPL Sample ID: 01020760-04

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	16.6	0.1	1		03/17/01 2:59	E_B	605390
Potassium	2.25	2	1		03/17/01 2:59	E_B	605390
Silver	ND	0.01	1		03/17/01 2:59	E_B	605390
Sodium	147	0.5	1		03/17/01 2:59	E_B	605390

Prep Method

Prep Date

Prep Initials

SW3010A

03/12/2001 15:00

MME

**NITROGEN, NITRATE (AS N)**

MCL

E300

Units: mg/L

Nitrogen, Nitrate (As N)	3.24	0.1	1		03/09/01 11:53	KM	594837
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**POLYNUCLEAR AROMATIC HYDROCARBONS**

MCL

SW8310

Units: ug/L

Acenaphthene	ND	0.1	1		03/15/01 6:14	KA	611377
Acenaphthylene	ND	0.1	1		03/15/01 6:14	KA	611377
Anthracene	ND	0.1	1		03/15/01 6:14	KA	611377
Benz(a)anthracene	ND	0.1	1		03/15/01 6:14	KA	611377
Benzo(a)pyrene	ND	0.1	1		03/15/01 6:14	KA	611377
Benzo(b)fluoranthene	ND	0.1	1		03/15/01 6:14	KA	611377
Benzo(g,h,i)perylene	ND	0.1	1		03/15/01 6:14	KA	611377
Benzo(k)fluoranthene	ND	0.1	1		03/15/01 6:14	KA	611377
Chrysene	ND	0.1	1		03/15/01 6:14	KA	611377
Dibenzo(a,h)anthracene	ND	0.1	1		03/15/01 6:14	KA	611377
Fluoranthene	ND	0.1	1		03/15/01 6:14	KA	611377
Fluorene	ND	0.1	1		03/15/01 6:14	KA	611377
Indeno(1,2,3-cd)pyrene	ND	0.1	1		03/15/01 6:14	KA	611377
Naphthalene	ND	0.1	1		03/15/01 6:14	KA	611377
Phenanthrene	ND	0.1	1		03/15/01 6:14	KA	611377
Pyrene	ND	0.1	1		03/15/01 6:14	KA	611377
Surr: 1-Fluoronaphthalene	51.4	% 15-96	1		03/15/01 6:14	KA	611377
Surr: Phenanthrene-d10	77.3	% 33-108	1		03/15/01 6:14	KA	611377

Prep Method

Prep Date

Prep Initials

SW3510B

03/10/2001 8:00

KL

**PURGEABLE AROMATICS**

MCL

SW8021B

Units: ug/L

Benzene	ND	1	1		03/17/01 5:42	D_R	604384
Ethylbenzene	ND	1	1		03/17/01 5:42	D_R	604384
Toluene	ND	1	1		03/17/01 5:42	D_R	604384
Xylenes, Total	ND	1	1		03/17/01 5:42	D_R	604384
Surr: 1,4-Difluorobenzene	94.3	% 72-137	1		03/17/01 5:42	D_R	604384
Surr: 4-Bromofluorobenzene	90.4	% 48-156	1		03/17/01 5:42	D_R	604384

**SULFATE**

MCL

E300

Units: mg/L

Sulfate	180	2	10		03/09/01 11:53	KM	594881
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**Qualifiers:**

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference



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

Client Sample ID MW-7

Collected: 3/8/01 10:50:00

SPL Sample ID: 01020760-05

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		03/17/01 6:09	D_R	604420
Surr: 1,4-Difluorobenzene	91.3	% 74-121	1		03/17/01 6:09	D_R	604420
Surr: 4-Bromofluorobenzene	99.0	% 55-150	1		03/17/01 6:09	D_R	604420
<b>HEADSPACE GAS ANALYSIS</b>			<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>		
Ethane	ND	0.0025	1		03/23/01 12:06	A_A	612869
Ethylene	ND	0.0032	1		03/23/01 12:06	A_A	612869
Methane	ND	0.0012	1		03/23/01 12:06	A_A	612869
<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		03/17/01 6:09	D_R	604385
Ethylbenzene	ND	1	1		03/17/01 6:09	D_R	604385
Toluene	ND	1	1		03/17/01 6:09	D_R	604385
Xylenes, Total	ND	1	1		03/17/01 6:09	D_R	604385
Surr: 1,4-Difluorobenzene	93.1	% 72-137	1		03/17/01 6:09	D_R	604385
Surr: 4-Bromofluorobenzene	90.1	% 48-156	1		03/17/01 6:09	D_R	604385

**Qualifiers:**

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference



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

Client Sample ID MW-8

Collected: 3/9/01 9:10:00 A SPL Sample ID: 01020760-06

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>ALKALINITY, BICARBONATE</b>			MCL	M2320 B	Units: mg/L		
Alkalinity, Bicarbonate	252	2		1	03/12/01 10:15	SN	597239
<b>ALKALINITY, CARBONATE</b>			MCL	M2320 B	Units: mg/L		
Alkalinity, Carbonate	ND	2		1	03/12/01 10:15	SN	597339
<b>CHLORIDE, TOTAL</b>			MCL	E325.3	Units: mg/L		
Chloride	250	5		5	03/20/01 11:30	CV	610210
<b>DIESEL RANGE ORGANICS</b>			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	1.6	0.29		1	03/20/01 22:29	AM	609600
Surr: n-Pentacosane	108 %	18-120		1	03/20/01 22:29	AM	609600

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 7:52	KL

<b>FLUORIDE-IC</b>			MCL	E300	Units: mg/L		
Fluoride	0.66	0.1		1	03/10/01 15:14	KM	594896
<b>GASOLINE RANGE ORGANICS</b>			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	ND	0.1		1	03/17/01 6:36	D_R	604421
Surr: 1,4-Difluorobenzene	92.3 %	74-121		1	03/17/01 6:36	D_R	604421
Surr: 4-Bromofluorobenzene	95.7 %	55-150		1	03/17/01 6:36	D_R	604421
<b>HARDNESS, TOTAL (TITRIMETRIC, EDTA)</b>			MCL	E130.2	Units: mg/L		
Hardness (As CaCO3)	590	50		10	03/21/01 13:30	CV	612349
<b>HEADSPACE GAS ANALYSIS</b>			MCL	RSK147	Units: mg/L		
Ethane	ND	0.0025		1	03/23/01 13:02	A_A	612877
Ethylene	ND	0.0032		1	03/23/01 13:02	A_A	612877
Methane	ND	0.0012		1	03/23/01 13:02	A_A	612877
<b>MERCURY, TOTAL</b>			MCL	SW7470A	Units: mg/L		
Mercury	ND	0.0002		1	03/21/01 16:24	R_T	610989

Prep Method	Prep Date	Prep Initials
SW7470A	03/21/2001 13:40	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>			MCL	SW6010B	Units: mg/L		
Arsenic	0.0061	0.005		1	03/15/01 22:29	NS	602629
Lead	ND	0.005		1	03/15/01 22:29	NS	602629
Selenium	ND	0.005		1	03/15/01 22:29	NS	602629
Barium	0.0512	0.005		1	03/17/01 3:04	E_B	605391
Cadmium	ND	0.005		1	03/17/01 3:04	E_B	605391
Calcium	183	0.1		1	03/17/01 3:04	E_B	605391
Chromium	ND	0.01		1	03/17/01 3:04	E_B	605391

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

3/30/01 2:29:02 PM



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

Client Sample ID MW-8

Collected: 3/9/01 9:10:00 A SPL Sample ID: 01020760-06

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	37.4	0.1	1		03/17/01 3:04	E_B	605391
Potassium	2.94	2	1		03/17/01 3:04	E_B	605391
Silver	ND	0.01	1		03/17/01 3:04	E_B	605391
Sodium	118	0.5	1		03/17/01 3:04	E_B	605391

Prep Method	Prep Date	Prep Initials
SW3010A	03/12/2001 15:00	MME

<b>NITROGEN, NITRATE (AS N)</b>		<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Nitrogen, Nitrate (As N)	0.664	0.1	1	03/10/01 15:14	KM	594956

<b>POLYNUCLEAR AROMATIC HYDROCARBONS</b>			<b>MCL</b>	<b>SW8310</b>	<b>Units: ug/L</b>	
Acenaphthene	ND	0.12	1		03/15/01 6:51	KA 611378
Acenaphthylene	ND	0.12	1		03/15/01 6:51	KA 611378
Anthracene	ND	0.12	1		03/15/01 6:51	KA 611378
Benz(a)anthracene	ND	0.12	1		03/15/01 6:51	KA 611378
Benzo(a)pyrene	ND	0.12	1		03/15/01 6:51	KA 611378
Benzo(b)fluoranthene	ND	0.12	1		03/15/01 6:51	KA 611378
Benzo(g,h,i)perylene	ND	0.12	1		03/15/01 6:51	KA 611378
Benzo(k)fluoranthene	ND	0.12	1		03/15/01 6:51	KA 611378
Chrysene	ND	0.12	1		03/15/01 6:51	KA 611378
Dibenzo(a,h)anthracene	ND	0.12	1		03/15/01 6:51	KA 611378
Fluoranthene	ND	0.12	1		03/15/01 6:51	KA 611378
Fluorene	ND	0.12	1		03/15/01 6:51	KA 611378
Indeno(1,2,3-cd)pyrene	ND	0.12	1		03/15/01 6:51	KA 611378
Naphthalene	ND	0.12	1		03/15/01 6:51	KA 611378
Phenanthrene	ND	0.12	1		03/15/01 6:51	KA 611378
Pyrene	ND	0.12	1		03/15/01 6:51	KA 611378
Surr: 1-Fluoronaphthalene	43.5	% 15-96	1		03/15/01 6:51	KA 611378
Surr: Phenanthrene-d10	70.0	% 33-108	1		03/15/01 6:51	KA 611378

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 8:00	KL

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>	
Benzene	ND	1	1		03/17/01 6:36	D_R 604386
Ethylbenzene	ND	1	1		03/17/01 6:36	D_R 604386
Toluene	ND	1	1		03/17/01 6:36	D_R 604386
Xylenes, Total	ND	1	1		03/17/01 6:36	D_R 604386
Surr: 1,4-Difluorobenzene	92.1	% 72-137	1		03/17/01 6:36	D_R 604386
Surr: 4-Bromofluorobenzene	90.6	% 48-156	1		03/17/01 6:36	D_R 604386

<b>SULFATE</b>		<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Sulfate	240	4	20	03/12/01 9:30	KM	596734

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-9

Collected: 3/8/01 11:50:00

SPL Sample ID: 01020760-07

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>ALKALINITY, BICARBONATE</b>			MCL	M2320 B	Units: mg/L		
Alkalinity, Bicarbonate	252	2	1	1	03/12/01 10:15	SN	597240
<b>ALKALINITY, CARBONATE</b>			MCL	M2320 B	Units: mg/L		
Alkalinity, Carbonate	ND	2	1	1	03/12/01 10:15	SN	597340
<b>CHLORIDE, TOTAL</b>			MCL	E325.3	Units: mg/L		
Chloride	127	2	2	2	03/20/01 11:30	CV	610211
<b>DIESEL RANGE ORGANICS</b>			MCL	SW8015B	Units: mg/L		
Diesel Range Organics	1.4	0.24	1	1	03/20/01 23:07	AM	609602
Surr: n-Pentacosane	107	% 18-120	1	1	03/20/01 23:07	AM	609602

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 7:52	KL

<b>FLUORIDE-IC</b>			MCL	E300	Units: mg/L		
Fluoride	0.92	0.1	1	1	03/09/01 11:53	KM	594817
<b>GASOLINE RANGE ORGANICS</b>			MCL	SW8015B	Units: mg/L		
Gasoline Range Organics	ND	0.1	1	1	03/17/01 7:03	D_R	604422
Surr: 1,4-Difluorobenzene	93.0	% 74-121	1	1	03/17/01 7:03	D_R	604422
Surr: 4-Bromofluorobenzene	96.0	% 55-150	1	1	03/17/01 7:03	D_R	604422
<b>HARDNESS, TOTAL (TITRIMETRIC, EDTA)</b>			MCL	E130.2	Units: mg/L		
Hardness (As CaCO3)	1000	50	10	10	03/21/01 13:30	CV	612351
<b>HEADSPACE GAS ANALYSIS</b>			MCL	RSK147	Units: mg/L		
Ethane	ND	0.0025	1	1	03/23/01 13:12	A_A	612882
Ethylene	ND	0.0032	1	1	03/23/01 13:12	A_A	612882
Methane	ND	0.0012	1	1	03/23/01 13:12	A_A	612882
<b>MERCURY, TOTAL</b>			MCL	SW7470A	Units: mg/L		
Mercury	ND	0.0002	1	1	03/21/01 16:24	R_T	610990

Prep Method	Prep Date	Prep Initials
SW7470A	03/21/2001 13:40	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>			MCL	SW6010B	Units: mg/L		
Arsenic	0.013	0.005	1	1	03/15/01 22:35	NS	602630
Lead	0.00597	0.005	1	1	03/15/01 22:35	NS	602630
Selenium	0.0054	0.005	1	1	03/15/01 22:35	NS	602630
Barium	0.111	0.005	1	1	03/17/01 3:08	E_B	605392
Cadmium	ND	0.005	1	1	03/17/01 3:08	E_B	605392
Calcium	381	0.1	1	1	03/17/01 3:08	E_B	605392
Chromium	0.013	0.01	1	1	03/17/01 3:08	E_B	605392

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-9

Collected: 3/8/01 11:50:00

SPL Sample ID: 01020760-07

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	28.2	0.1	1		03/17/01 3:08	E_B	605392
Potassium	3.84	2	1		03/17/01 3:08	E_B	605392
Silver	ND	0.01	1		03/17/01 3:08	E_B	605392
Sodium	119	0.5	1		03/17/01 3:08	E_B	605392

Prep Method	Prep Date	Prep Initials
SW3010A	03/12/2001 15:00	MME

NITROGEN, NITRATE (AS N)	MCL	E300	Units: mg/L
Nitrogen, Nitrate (As N)	7.9	0.1	1 03/09/01 11:53 KM 594838

POLYNUCLEAR AROMATIC HYDROCARBONS	MCL	SW8310	Units: ug/L
Acenaphthene	ND	0.12	1 03/15/01 7:28 KA 611379
Acenaphthylene	ND	0.12	1 03/15/01 7:28 KA 611379
Anthracene	ND	0.12	1 03/15/01 7:28 KA 611379
Benz(a)anthracene	ND	0.12	1 03/15/01 7:28 KA 611379
Benzo(a)pyrene	ND	0.12	1 03/15/01 7:28 KA 611379
Benzo(b)fluoranthene	ND	0.12	1 03/15/01 7:28 KA 611379
Benzo(g,h,i)perylene	ND	0.12	1 03/15/01 7:28 KA 611379
Benzo(k)fluoranthene	ND	0.12	1 03/15/01 7:28 KA 611379
Chrysene	ND	0.12	1 03/15/01 7:28 KA 611379
Dibenzo(a,h)anthracene	ND	0.12	1 03/15/01 7:28 KA 611379
Fluoranthene	ND	0.12	1 03/15/01 7:28 KA 611379
Fluorene	ND	0.12	1 03/15/01 7:28 KA 611379
Indeno(1,2,3-cd)pyrene	ND	0.12	1 03/15/01 7:28 KA 611379
Naphthalene	ND	0.12	1 03/15/01 7:28 KA 611379
Phenanthrene	ND	0.12	1 03/15/01 7:28 KA 611379
Pyrene	ND	0.12	1 03/15/01 7:28 KA 611379
Surr: 1-Fluoronaphthalene	32.3	% 15-96	1 03/15/01 7:28 KA 611379
Surr: Phenanthrene-d10	50.2	% 33-108	1 03/15/01 7:28 KA 611379

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 8:00	KL

PURGEABLE AROMATICS	MCL	SW8021B	Units: ug/L
Benzene	ND	1	1 03/17/01 7:03 D_R 604387
Ethylbenzene	ND	1	1 03/17/01 7:03 D_R 604387
Toluene	ND	1	1 03/17/01 7:03 D_R 604387
Xylenes, Total	ND	1	1 03/17/01 7:03 D_R 604387
Surr: 1,4-Difluorobenzene	92.8	% 72-137	1 03/17/01 7:03 D_R 604387
Surr: 4-Bromofluorobenzene	90.7	% 48-156	1 03/17/01 7:03 D_R 604387

SULFATE	MCL	E300	Units: mg/L
Sulfate	150	2	10 03/09/01 11:53 KM 594882

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-10

Collected: 3/9/01 9:30:00 A SPL Sample ID: 01020760-08

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>ALKALINITY, BICARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Bicarbonate	566	2		1	03/12/01 10:15	SN	597241
<b>ALKALINITY, CARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Carbonate	ND	2		1	03/12/01 10:15	SN	597341
<b>CHLORIDE, TOTAL</b>				<b>MCL</b>	<b>E325.3</b>	<b>Units: mg/L</b>	
Chloride	879	10		10	03/20/01 11:30	CV	610212
<b>DIESEL RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Diesel Range Organics	3.4	0.26		1	03/20/01 21:51	AM	609623
Surr: n-Pentacosane	131MI	% 18-120		1	03/20/01 21:51	AM	609623

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 7:52	KL

<b>FLUORIDE-IC</b>				<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>	
Fluoride	1.2	0.1		1	03/10/01 15:14	KM	594899
<b>GASOLINE RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Gasoline Range Organics	0.2	0.1		1	03/19/01 1:50	D_R	605448
Surr: 1,4-Difluorobenzene	91.7	% 74-121		1	03/19/01 1:50	D_R	605448
Surr: 4-Bromofluorobenzene	97.7	% 55-150		1	03/19/01 1:50	D_R	605448

<b>HARDNESS, TOTAL (TITRIMETRIC, EDTA)</b>				<b>MCL</b>	<b>E130.2</b>	<b>Units: mg/L</b>	
Hardness (As CaCO3)	1300	120		25	03/21/01 13:30	CV	612352

<b>HEADSPACE GAS ANALYSIS</b>				<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>	
Ethane	ND	0.0025		1	03/23/01 13:24	A_A	612888
Ethylene	ND	0.0032		1	03/23/01 13:24	A_A	612888
Methane	ND	0.0012		1	03/23/01 13:24	A_A	612888

<b>MERCURY, TOTAL</b>				<b>MCL</b>	<b>SW7470A</b>	<b>Units: mg/L</b>	
Mercury	ND	0.0002		1	03/21/01 16:24	R_T	610991

Prep Method	Prep Date	Prep Initials
SW7470A	03/21/2001 13:40	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>				<b>MCL</b>	<b>SW6010B</b>	<b>Units: mg/L</b>	
Arsenic	0.133	0.005		1	03/15/01 22:40	NS	602631
Lead	0.0222	0.005		1	03/15/01 22:40	NS	602631
Selenium	ND	0.005		1	03/15/01 22:40	NS	602631
Barium	0.23	0.005		1	03/17/01 3:12	E_B	605393
Cadmium	ND	0.005		1	03/17/01 3:12	E_B	605393
Calcium	331	0.1		1	03/17/01 3:12	E_B	605393
Chromium	0.0109	0.01		1	03/17/01 3:12	E_B	605393

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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





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

Client Sample ID MW-10

Collected: 3/9/01 9:30:00 A SPL Sample ID: 01020760-08

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	95.1	0.1	1		03/17/01 3:12	E_B	605393
Potassium	19.5	2	1		03/17/01 3:12	E_B	605393
Silver	ND	0.01	1		03/17/01 3:12	E_B	605393
Sodium	410	0.5	1		03/17/01 3:12	E_B	605393

Prep Method	Prep Date	Prep Initials
SW3010A	03/12/2001 15:00	MME

NITROGEN, NITRATE (AS N)	MCL	E300	Units: mg/L
Nitrogen, Nitrate (As N)	ND	0.1	1 03/10/01 15:14 KM 594962

POLYNUCLEAR AROMATIC HYDROCARBONS	MCL	SW8310	Units: ug/L
Acenaphthene	ND	0.15	1 03/15/01 8:05 KA 611380
Acenaphthylene	0.71	0.15	1 03/15/01 8:05 KA 611380
Anthracene	ND	0.15	1 03/15/01 8:05 KA 611380
Benz(a)anthracene	ND	0.15	1 03/15/01 8:05 KA 611380
Benzo(a)pyrene	ND	0.15	1 03/15/01 8:05 KA 611380
Benzo(b)fluoranthene	ND	0.15	1 03/15/01 8:05 KA 611380
Benzo(g,h,i)perylene	ND	0.15	1 03/15/01 8:05 KA 611380
Benzo(k)fluoranthene	ND	0.15	1 03/15/01 8:05 KA 611380
Chrysene	ND	0.15	1 03/15/01 8:05 KA 611380
Dibenzo(a,h)anthracene	ND	0.15	1 03/15/01 8:05 KA 611380
Fluoranthene	ND	0.15	1 03/15/01 8:05 KA 611380
Fluorene	ND	0.15	1 03/15/01 8:05 KA 611380
Indeno(1,2,3-cd)pyrene	ND	0.15	1 03/15/01 8:05 KA 611380
Naphthalene	0.15	0.15	1 03/15/01 8:05 KA 611380
Phenanthrene	ND	0.15	1 03/15/01 8:05 KA 611380
Pyrene	ND	0.15	1 03/15/01 8:05 KA 611380
Surr: 1-Fluoronaphthalene	38.4	% 15-96	1 03/15/01 8:05 KA 611380
Surr: Phenanthrene-d10	67.8	% 33-108	1 03/15/01 8:05 KA 611380

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 8:00	KL

PURGEABLE AROMATICS	MCL	SW8021B	Units: ug/L
Benzene	3.4	1	1 03/19/01 17:25 D_R 606725
Ethylbenzene	ND	1	1 03/19/01 17:25 D_R 606725
Toluene	1.1	1	1 03/19/01 17:25 D_R 606725
Xylenes, Total	ND	1	1 03/19/01 17:25 D_R 606725
Surr: 1,4-Difluorobenzene	93.3	% 72-137	1 03/19/01 17:25 D_R 606725
Surr: 4-Bromofluorobenzene	86.7	% 48-156	1 03/19/01 17:25 D_R 606725

SULFATE	MCL	E300	Units: mg/L
Sulfate	270	4	20 03/12/01 9:30 KM 596738

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-11A

Collected: 3/8/01 3:15:00 P SPL Sample ID: 01020760-09

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>ALKALINITY, BICARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Bicarbonate	646	2		1	03/12/01 10:15	SN	597243
<b>ALKALINITY, CARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Carbonate	ND	2		1	03/12/01 10:15	SN	597343
<b>CHLORIDE, TOTAL</b>				<b>MCL</b>	<b>E325.3</b>	<b>Units: mg/L</b>	
Chloride	1720	25		25	03/20/01 11:30	CV	610214
<b>DIESEL RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Diesel Range Organics	2.2	0.25		1	03/20/01 21:12	AM	609622
Surr: n-Pentacosane	108	% 18-120		1	03/20/01 21:12	AM	609622

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 7:52	KL

<b>FLUORIDE-IC</b>				<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>	
Fluoride	1.1	0.1		1	03/09/01 11:53	KM	594818
<b>GASOLINE RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Gasoline Range Organics	ND	0.5		5	03/19/01 2:17	D_R	605449
Surr: 1,4-Difluorobenzene	90.1	% 74-121		5	03/19/01 2:17	D_R	605449
Surr: 4-Bromofluorobenzene	91.3	% 55-150		5	03/19/01 2:17	D_R	605449
<b>HARDNESS, TOTAL (TITRIMETRIC, EDTA)</b>				<b>MCL</b>	<b>E130.2</b>	<b>Units: mg/L</b>	
Hardness (As CaCO3)	1900	120		25	03/21/01 13:30	CV	612354
<b>HEADSPACE GAS ANALYSIS</b>				<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>	
Ethane	ND	0.0025		1	03/23/01 13:35	A_A	612893
Ethylene	ND	0.0032		1	03/23/01 13:35	A_A	612893
Methane	0.0028	0.0012		1	03/23/01 13:35	A_A	612893
<b>MERCURY, TOTAL</b>				<b>MCL</b>	<b>SW7470A</b>	<b>Units: mg/L</b>	
Mercury	ND	0.0002		1	03/21/01 16:24	R_T	610992

Prep Method	Prep Date	Prep Initials
SW7470A	03/21/2001 13:40	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>				<b>MCL</b>	<b>SW6010B</b>	<b>Units: mg/L</b>	
Arsenic	0.08	0.005		1	03/15/01 22:45	NS	602632
Lead	0.0119	0.005		1	03/15/01 22:45	NS	602632
Selenium	ND	0.005		1	03/15/01 22:45	NS	602632
Barium	0.401	0.005		1	03/17/01 3:16	E_B	605394
Cadmium	ND	0.005		1	03/17/01 3:16	E_B	605394
Calcium	466	0.5		5	03/20/01 15:59	E_B	608949
Chromium	0.0392	0.01		1	03/17/01 3:16	E_B	605394

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-11A

Collected: 3/8/01 3:15:00 P SPL Sample ID: 01020760-09

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	93.4	0.1	1		03/17/01 3:16	E_B	605394
Potassium	33.5	2	1		03/17/01 3:16	E_B	605394
Silver	ND	0.01	1		03/17/01 3:16	E_B	605394
Sodium	801	2.5	5		03/19/01 20:24	E_B	606984

Prep Method	Prep Date	Prep Initials
SW3010A	03/12/2001 15:00	MME
	03/12/2001 15:00	

NITROGEN, NITRATE (AS N)			MCL	E300	Units: mg/L		
Nitrogen, Nitrate (As N)	ND	0.1		1	03/09/01 11:53	KM	594839

POLYNUCLEAR AROMATIC HYDROCARBONS			MCL	SW8310	Units: ug/L		
Acenaphthene	ND	0.13		1	03/15/01 8:42	KA	611381
Acenaphthylene	0.35	0.13		1	03/15/01 8:42	KA	611381
Anthracene	ND	0.13		1	03/15/01 8:42	KA	611381
Benz(a)anthracene	ND	0.13		1	03/15/01 8:42	KA	611381
Benzo(a)pyrene	ND	0.13		1	03/15/01 8:42	KA	611381
Benzo(b)fluoranthene	ND	0.13		1	03/15/01 8:42	KA	611381
Benzo(g,h,i)perylene	ND	0.13		1	03/15/01 8:42	KA	611381
Benzo(k)fluoranthene	ND	0.13		1	03/15/01 8:42	KA	611381
Chrysene	ND	0.13		1	03/15/01 8:42	KA	611381
Dibenzo(a,h)anthracene	ND	0.13		1	03/15/01 8:42	KA	611381
Fluoranthene	ND	0.13		1	03/15/01 8:42	KA	611381
Fluorene	ND	0.13		1	03/15/01 8:42	KA	611381
Indeno(1,2,3-cd)pyrene	ND	0.13		1	03/15/01 8:42	KA	611381
Naphthalene	0.21	0.13		1	03/15/01 8:42	KA	611381
Phenanthrene	ND	0.13		1	03/15/01 8:42	KA	611381
Pyrene	ND	0.13		1	03/15/01 8:42	KA	611381
Surr: 1-Fluoronaphthalene	57.9	% 15-96		1	03/15/01 8:42	KA	611381
Surr: Phenanthrene-d10	69.2	% 33-108		1	03/15/01 8:42	KA	611381

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 8:00	KL

PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L		
Benzene	12	5		5	03/19/01 19:39	D_R	606730
Ethylbenzene	ND	5		5	03/19/01 19:39	D_R	606730
Toluene	ND	5		5	03/19/01 19:39	D_R	606730
Xylenes, Total	ND	5		5	03/19/01 19:39	D_R	606730
Surr: 1,4-Difluorobenzene	92.5	% 72-137		5	03/19/01 19:39	D_R	606730
Surr: 4-Bromofluorobenzene	90.2	% 48-156		5	03/19/01 19:39	D_R	606730

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-11A

Collected: 3/8/01 3:15:00 P SPL Sample ID: 01020760-09

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
SULFATE				MCL		Units: mg/L	
Sulfate	330	4	20	E300	03/09/01 11:53	KM	594883

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference



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

Client Sample ID MW-12

Collected: 3/8/01 4:10:00 P SPL Sample ID: 01020760-10

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Data Analyzed	Analyst	Seq. #
<b>ALKALINITY, BICARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Bicarbonate	475	2		1	03/12/01 10:15	SN	597245
<b>ALKALINITY, CARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Carbonate	ND	2		1	03/12/01 10:15	SN	597345
<b>CHLORIDE, TOTAL</b>				<b>MCL</b>	<b>E325.3</b>	<b>Units: mg/L</b>	
Chloride	586	10		10	03/20/01 11:30	CV	610215
<b>DIESEL RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Diesel Range Organics	2.1	0.27		1	03/20/01 20:34	AM	609621
Surr: n-Pentacosane	127MI	% 18-120		1 *	03/20/01 20:34	AM	609621

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 7:52	KL

<b>FLUORIDE-IC</b>				<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>	
Fluoride	1.9	0.1		1	03/09/01 11:53	KM	594821
<b>GASOLINE RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Gasoline Range Organics	0.1	0.1		1	03/19/01 2:44	D_R	605450
Surr: 1,4-Difluorobenzene	89.7	% 74-121		1	03/19/01 2:44	D_R	605450
Surr: 4-Bromofluorobenzene	91.3	% 55-150		1	03/19/01 2:44	D_R	605450
<b>HARDNESS, TOTAL (TITRIMETRIC, EDTA)</b>				<b>MCL</b>	<b>E130.2</b>	<b>Units: mg/L</b>	
Hardness (As CaCO3)	1300	120		25	03/21/01 13:30	CV	612355
<b>HEADSPACE GAS ANALYSIS</b>				<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>	
Ethane	ND	0.0025		1	03/23/01 13:46	A_A	612897
Ethylene	ND	0.0032		1	03/23/01 13:46	A_A	612897
Methane	ND	0.0012		1	03/23/01 13:46	A_A	612897
<b>MERCURY, TOTAL</b>				<b>MCL</b>	<b>SW7470A</b>	<b>Units: mg/L</b>	
Mercury	ND	0.0002		1	03/21/01 16:24	R_T	610993

Prep Method	Prep Date	Prep Initials
SW7470A	03/21/2001 13:40	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>				<b>MCL</b>	<b>SW6010B</b>	<b>Units: mg/L</b>	
Arsenic	0.0445	0.005		1	03/15/01 0:21	NS	601645
Lead	0.00627	0.005		1	03/15/01 0:21	NS	601645
Selenium	ND	0.005		1	03/15/01 0:21	NS	601645
Barium	0.603	0.005		1	03/16/01 3:18	E_B	603713
Cadmium	ND	0.005		1	03/16/01 3:18	E_B	603713
Calcium	338	0.1		1	03/16/01 3:18	E_B	603713
Chromium	0.0469	0.01		1	03/16/01 3:18	E_B	603713

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-12

Collected: 3/8/01 4:10:00 P SPL Sample ID: 01020760-10

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	95.3	0.1	1		03/16/01 3:18	E_B	603713
Potassium	47.2	2	1		03/16/01 3:18	E_B	603713
Silver	ND	0.01	1		03/16/01 3:18	E_B	603713
Sodium	185	0.5	1		03/16/01 3:18	E_B	603713

Prep Method

SW3010A

Prep Date

03/13/2001 9:00

Prep Initials

MW

**NITROGEN, NITRATE (AS N)**

**MCL**

**E300**

**Units: mg/L**

Nitrogen, Nitrate (As N)	ND	0.1	1		03/09/01 11:53	KM	594842
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**POLYNUCLEAR AROMATIC HYDROCARBONS**

**MCL**

**SW8310**

**Units: ug/L**

Acenaphthene	ND	0.13	1		03/15/01 9:20	KA	611382
Acenaphthylene	ND	0.13	1		03/15/01 9:20	KA	611382
Anthracene	ND	0.13	1		03/15/01 9:20	KA	611382
Benz(a)anthracene	ND	0.13	1		03/15/01 9:20	KA	611382
Benzo(a)pyrene	ND	0.13	1		03/15/01 9:20	KA	611382
Benzo(b)fluoranthene	ND	0.13	1		03/15/01 9:20	KA	611382
Benzo(g,h,i)perylene	ND	0.13	1		03/15/01 9:20	KA	611382
Benzo(k)fluoranthene	ND	0.13	1		03/15/01 9:20	KA	611382
Chrysene	ND	0.13	1		03/15/01 9:20	KA	611382
Dibenzo(a,h)anthracene	ND	0.13	1		03/15/01 9:20	KA	611382
Fluoranthene	ND	0.13	1		03/15/01 9:20	KA	611382
Fluorene	ND	0.13	1		03/15/01 9:20	KA	611382
Indeno(1,2,3-cd)pyrene	ND	0.13	1		03/15/01 9:20	KA	611382
Naphthalene	ND	0.13	1		03/15/01 9:20	KA	611382
Phenanthrene	ND	0.13	1		03/15/01 9:20	KA	611382
Pyrene	ND	0.13	1		03/15/01 9:20	KA	611382
Surr: 1-Fluoronaphthalene	35.4	% 15-96	1		03/15/01 9:20	KA	611382
Surr: Phenanthrene-d10	63.5	% 33-108	1		03/15/01 9:20	KA	611382

Prep Method

SW3510B

Prep Date

03/10/2001 8:00

Prep Initials

KL

**PURGEABLE AROMATICS**

**MCL**

**SW8021B**

**Units: ug/L**

Benzene	14	1	1		03/19/01 17:52	D_R	606726
Ethylbenzene	ND	1	1		03/19/01 17:52	D_R	606726
Toluene	ND	1	1		03/19/01 17:52	D_R	606726
Xylenes, Total	ND	1	1		03/19/01 17:52	D_R	606726
Surr: 1,4-Difluorobenzene	102	% 72-137	1		03/19/01 17:52	D_R	606726
Surr: 4-Bromofluorobenzene	104	% 48-156	1		03/19/01 17:52	D_R	606726

**SULFATE**

**MCL**

**E300**

**Units: mg/L**

Sulfate	300	4	20		03/09/01 11:53	KM	594886
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**Qualifiers:**

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference



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

Client Sample ID MW-13

Collected: 3/8/01 2:30:00 P SPL Sample ID: 01020760-11

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>ALKALINITY, BICARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Bicarbonate	131	2	1		03/12/01 10:15	SN	597246
<b>ALKALINITY, CARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Carbonate	ND	2	1		03/12/01 10:15	SN	597346
<b>CHLORIDE, TOTAL</b>				<b>MCL</b>	<b>E325.3</b>	<b>Units: mg/L</b>	
Chloride	276	5	5		03/20/01 11:30	CV	610216
<b>DIESEL RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Diesel Range Organics	2	0.24	1		03/20/01 19:55	AM	609620
Surr: n-Pentacosane	152MI %	18-120	1 *		03/20/01 19:55	AM	609620

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 7:52	KL

<b>FLUORIDE-IC</b>				<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>	
Fluoride	1.6	0.1	1		03/09/01 11:53	KM	594822
<b>GASOLINE RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Gasoline Range Organics	ND	0.1	1		03/19/01 3:10	D_R	605451
Surr: 1,4-Difluorobenzene	89.3 %	74-121	1		03/19/01 3:10	D_R	605451
Surr: 4-Bromofluorobenzene	88.7 %	55-150	1		03/19/01 3:10	D_R	605451
<b>HARDNESS, TOTAL (TITRIMETRIC, EDTA)</b>				<b>MCL</b>	<b>E130.2</b>	<b>Units: mg/L</b>	
Hardness (As CaCO3)	670	50	10		03/21/01 13:30	CV	612356
<b>HEADSPACE GAS ANALYSIS</b>				<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>	
Ethane	ND	0.0025	1		03/23/01 13:57	A_A	612898
Ethylene	ND	0.0032	1		03/23/01 13:57	A_A	612898
Methane	ND	0.0012	1		03/23/01 13:57	A_A	612898
<b>MERCURY, TOTAL</b>				<b>MCL</b>	<b>SW7470A</b>	<b>Units: mg/L</b>	
Mercury	ND	0.0002	1		03/21/01 16:24	R_T	610996

Prep Method	Prep Date	Prep Initials
SW7470A	03/21/2001 13:40	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>				<b>MCL</b>	<b>SW6010B</b>	<b>Units: mg/L</b>	
Arsenic	0.00673	0.005	1		03/15/01 0:27	NS	601646
Lead	ND	0.005	1		03/15/01 0:27	NS	601646
Selenium	ND	0.005	1		03/15/01 0:27	NS	601646
Barium	0.171	0.005	1		03/16/01 3:33	E_B	603721
Cadmium	ND	0.005	1		03/16/01 3:33	E_B	603721
Calcium	198	0.1	1		03/16/01 3:33	E_B	603721
Chromium	0.0104	0.01	1		03/16/01 3:33	E_B	603721

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-13

Collected: 3/8/01 2:30:00 P SPL Sample ID: 01020760-11

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Magnesium	52.3	0.1	1		03/16/01 3:33	E_B	603721
Potassium	2.26	2	1		03/16/01 3:33	E_B	603721
Silver	ND	0.01	1		03/16/01 3:33	E_B	603721
Sodium	142	0.5	1		03/16/01 3:33	E_B	603721

Prep Method	Prep Date	Prep Initials
SW3010A	03/13/2001 9:00	MW

NITROGEN, NITRATE (AS N)		MCL	E300	Units: mg/L		
Nitrogen, Nitrate (As N)	ND	0.1	1	03/09/01 11:53	KM	594843

POLYNUCLEAR AROMATIC HYDROCARBONS		MCL	SW8310	Units: ug/L		
Acenaphthene	ND	0.12	1	03/15/01 9:57	KA	611383
Acenaphthylene	ND	0.12	1	03/15/01 9:57	KA	611383
Anthracene	ND	0.12	1	03/15/01 9:57	KA	611383
Benz(a)anthracene	ND	0.12	1	03/15/01 9:57	KA	611383
Benzo(a)pyrene	ND	0.12	1	03/15/01 9:57	KA	611383
Benzo(b)fluoranthene	ND	0.12	1	03/15/01 9:57	KA	611383
Benzo(g,h,i)perylene	ND	0.12	1	03/15/01 9:57	KA	611383
Benzo(k)fluoranthene	ND	0.12	1	03/15/01 9:57	KA	611383
Chrysene	ND	0.12	1	03/15/01 9:57	KA	611383
Dibenzo(a,h)anthracene	ND	0.12	1	03/15/01 9:57	KA	611383
Fluoranthene	ND	0.12	1	03/15/01 9:57	KA	611383
Fluorene	ND	0.12	1	03/15/01 9:57	KA	611383
Indeno(1,2,3-cd)pyrene	ND	0.12	1	03/15/01 9:57	KA	611383
Naphthalene	ND	0.12	1	03/15/01 9:57	KA	611383
Phenanthrene	ND	0.12	1	03/15/01 9:57	KA	611383
Pyrene	ND	0.12	1	03/15/01 9:57	KA	611383
Surr: 1-Fluoronaphthalene	30.4	% 15-96	1	03/15/01 9:57	KA	611383
Surr: Phenanthrene-d10	56.2	% 33-108	1	03/15/01 9:57	KA	611383

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 8:00	KL

PURGEABLE AROMATICS		MCL	SW8021B	Units: ug/L		
Benzene	ND	1	1	03/19/01 18:19	D_R	606727
Ethylbenzene	1.2	1	1	03/19/01 18:19	D_R	606727
Toluene	ND	1	1	03/19/01 18:19	D_R	606727
Xylenes, Total	ND	1	1	03/19/01 18:19	D_R	606727
Surr: 1,4-Difluorobenzene	96.1	% 72-137	1	03/19/01 18:19	D_R	606727
Surr: 4-Bromofluorobenzene	83.6	% 48-156	1	03/19/01 18:19	D_R	606727

SULFATE		MCL	E300	Units: mg/L		
Sulfate	380	10	50	03/09/01 11:53	KM	594887

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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





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

Client Sample ID MW-14

Collected: 3/8/01 9:30:00 A SPL Sample ID: 01020760-12

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL							
Chloride	327	10	10	E325.3	03/20/01 11:30	CV	610217

**Qualifiers:**

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference



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

Client Sample ID MW-14

Collected: 3/8/01 9:30:00 A SPL Sample ID: 01020760-12

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
VOLATILE ORGANICS BY METHOD 8260B			MCL	SW8260B	Units: ug/L		
1,1,1,2-Tetrachloroethane	ND	5.0	1		03/20/01 20:46	LT	609264
1,1,1-Trichloroethane	ND	5.0	1		03/20/01 20:46	LT	609264
1,1,2,2-Tetrachloroethane	ND	5.0	1		03/20/01 20:46	LT	609264
1,1,2-Trichloroethane	ND	5.0	1		03/20/01 20:46	LT	609264
1,1-Dichloroethane	ND	5.0	1		03/20/01 20:46	LT	609264
1,1-Dichloroethene	ND	5.0	1		03/20/01 20:46	LT	609264
1,1-Dichloropropene	ND	5.0	1		03/20/01 20:46	LT	609264
1,2,3-Trichlorobenzene	ND	5.0	1		03/20/01 20:46	LT	609264
1,2,3-Trichloropropane	ND	5.0	1		03/20/01 20:46	LT	609264
1,2,4-Trichlorobenzene	ND	5.0	1		03/20/01 20:46	LT	609264
1,2,4-Trimethylbenzene	ND	5.0	1		03/20/01 20:46	LT	609264
1,2-Dibromo-3-chloropropane	ND	5.0	1		03/20/01 20:46	LT	609264
1,2-Dibromoethane	ND	5.0	1		03/20/01 20:46	LT	609264
1,2-Dichlorobenzene	ND	5.0	1		03/20/01 20:46	LT	609264
1,2-Dichloroethane	ND	5.0	1		03/20/01 20:46	LT	609264
1,2-Dichloropropane	ND	5.0	1		03/20/01 20:46	LT	609264
1,3,5-Trimethylbenzene	ND	5.0	1		03/20/01 20:46	LT	609264
1,3-Dichlorobenzene	ND	5.0	1		03/20/01 20:46	LT	609264
1,3-Dichloropropane	ND	5.0	1		03/20/01 20:46	LT	609264
1,4-Dichlorobenzene	ND	5.0	1		03/20/01 20:46	LT	609264
2,2-Dichloropropane	ND	5.0	1		03/20/01 20:46	LT	609264
2-Butanone	ND	20	1		03/20/01 20:46	LT	609264
2-Chloroethyl vinyl ether	ND	10	1		03/20/01 20:46	LT	609264
2-Chlorotoluene	ND	5.0	1		03/20/01 20:46	LT	609264
2-Hexanone	ND	10	1		03/20/01 20:46	LT	609264
4-Chlorotoluene	ND	5.0	1		03/20/01 20:46	LT	609264
4-Isopropyltoluene	ND	5.0	1		03/20/01 20:46	LT	609264
4-Methyl-2-pentanone	ND	10	1		03/20/01 20:46	LT	609264
Acetone	ND	100	1		03/20/01 20:46	LT	609264
Acrylonitrile	ND	50	1		03/20/01 20:46	LT	609264
Benzene	ND	5.0	1		03/20/01 20:46	LT	609264
Bromobenzene	ND	5.0	1		03/20/01 20:46	LT	609264
Bromochloromethane	ND	5.0	1		03/20/01 20:46	LT	609264
Bromodichloromethane	ND	5.0	1		03/20/01 20:46	LT	609264
Bromoform	ND	5.0	1		03/20/01 20:46	LT	609264
Bromomethane	ND	10	1		03/20/01 20:46	LT	609264
Carbon disulfide	ND	5.0	1		03/20/01 20:46	LT	609264
Carbon tetrachloride	ND	5.0	1		03/20/01 20:46	LT	609264
Chlorobenzene	ND	5.0	1		03/20/01 20:46	LT	609264
Chloroethane	ND	10	1		03/20/01 20:46	LT	609264

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-14

Collected: 3/8/01 9:30:00 A SPL Sample ID: 01020760-12

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Chloroform	ND	5.0	1		03/20/01 20:46	LT	609264
Chloromethane	ND	10	1		03/20/01 20:46	LT	609264
cis-1,3-Dichloropropene	ND	5.0	1		03/20/01 20:46	LT	609264
Dibromochloromethane	ND	5.0	1		03/20/01 20:46	LT	609264
Dibromomethane	ND	5.0	1		03/20/01 20:46	LT	609264
Dichlorodifluoromethane	ND	10	1		03/20/01 20:46	LT	609264
Ethylbenzene	ND	5.0	1		03/20/01 20:46	LT	609264
Hexachlorobutadiene	ND	5.0	1		03/20/01 20:46	LT	609264
Isopropylbenzene	ND	5.0	1		03/20/01 20:46	LT	609264
Methyl tert-butyl ether	ND	5.0	1		03/20/01 20:46	LT	609264
Methylene chloride	ND	5.0	1		03/20/01 20:46	LT	609264
n-Butylbenzene	ND	5.0	1		03/20/01 20:46	LT	609264
n-Propylbenzene	ND	5.0	1		03/20/01 20:46	LT	609264
Naphthalene	ND	5.0	1		03/20/01 20:46	LT	609264
sec-Butylbenzene	ND	5.0	1		03/20/01 20:46	LT	609264
Styrene	ND	5.0	1		03/20/01 20:46	LT	609264
tert-Butylbenzene	ND	5.0	1		03/20/01 20:46	LT	609264
Tetrachloroethene	ND	5.0	1		03/20/01 20:46	LT	609264
Toluene	ND	5.0	1		03/20/01 20:46	LT	609264
trans-1,3-Dichloropropene	ND	5.0	1		03/20/01 20:46	LT	609264
Trichloroethene	ND	5.0	1		03/20/01 20:46	LT	609264
Trichlorofluoromethane	ND	5.0	1		03/20/01 20:46	LT	609264
Vinyl acetate	ND	10	1		03/20/01 20:46	LT	609264
Vinyl chloride	ND	10	1		03/20/01 20:46	LT	609264
cis-1,2-Dichloroethene	ND	5.0	1		03/20/01 20:46	LT	609264
m,p-Xylene	ND	5.0	1		03/20/01 20:46	LT	609264
o-Xylene	ND	5.0	1		03/20/01 20:46	LT	609264
trans-1,2-Dichloroethene	ND	5.0	1		03/20/01 20:46	LT	609264
1,2-Dichloroethene (total)	ND	5.0	1		03/20/01 20:46	LT	609264
Xylenes, Total	ND	5.0	1		03/20/01 20:46	LT	609264
Surr: 1,2-Dichloroethane-d4	100	% 62-119	1		03/20/01 20:46	LT	609264
Surr: 4-Bromofluorobenzene	102	% 78-123	1		03/20/01 20:46	LT	609264
Surr: Toluene-d8	104	% 74-122	1		03/20/01 20:46	LT	609264

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)  
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MI - Matrix Interference



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

Client Sample ID MW-15

Collected: 3/8/01 9:45:00 A SPL Sample ID: 01020760-13

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
VOLATILE ORGANICS BY METHOD 8260B			MCL	SW8260B	Units: ug/L		
1,1,1,2-Tetrachloroethane	ND	5.0	1		03/20/01 21:14	LT	609265
1,1,1-Trichloroethane	ND	5.0	1		03/20/01 21:14	LT	609265
1,1,2,2-Tetrachloroethane	ND	5.0	1		03/20/01 21:14	LT	609265
1,1,2-Trichloroethane	ND	5.0	1		03/20/01 21:14	LT	609265
1,1-Dichloroethane	ND	5.0	1		03/20/01 21:14	LT	609265
1,1-Dichloroethene	ND	5.0	1		03/20/01 21:14	LT	609265
1,1-Dichloropropene	ND	5.0	1		03/20/01 21:14	LT	609265
1,2,3-Trichlorobenzene	ND	5.0	1		03/20/01 21:14	LT	609265
1,2,3-Trichloropropane	ND	5.0	1		03/20/01 21:14	LT	609265
1,2,4-Trichlorobenzene	ND	5.0	1		03/20/01 21:14	LT	609265
1,2,4-Trimethylbenzene	ND	5.0	1		03/20/01 21:14	LT	609265
1,2-Dibromo-3-chloropropane	ND	5.0	1		03/20/01 21:14	LT	609265
1,2-Dibromoethane	ND	5.0	1		03/20/01 21:14	LT	609265
1,2-Dichlorobenzene	ND	5.0	1		03/20/01 21:14	LT	609265
1,2-Dichloroethane	ND	5.0	1		03/20/01 21:14	LT	609265
1,2-Dichloropropane	ND	5.0	1		03/20/01 21:14	LT	609265
1,3,5-Trimethylbenzene	ND	5.0	1		03/20/01 21:14	LT	609265
1,3-Dichlorobenzene	ND	5.0	1		03/20/01 21:14	LT	609265
1,3-Dichloropropane	ND	5.0	1		03/20/01 21:14	LT	609265
1,4-Dichlorobenzene	ND	5.0	1		03/20/01 21:14	LT	609265
2,2-Dichloropropane	ND	5.0	1		03/20/01 21:14	LT	609265
2-Butanone	ND	20	1		03/20/01 21:14	LT	609265
2-Chloroethyl vinyl ether	ND	10	1		03/20/01 21:14	LT	609265
2-Chlorotoluene	ND	5.0	1		03/20/01 21:14	LT	609265
2-Hexanone	ND	10	1		03/20/01 21:14	LT	609265
4-Chlorotoluene	ND	5.0	1		03/20/01 21:14	LT	609265
4-Isopropyltoluene	ND	5.0	1		03/20/01 21:14	LT	609265
4-Methyl-2-pentanone	ND	10	1		03/20/01 21:14	LT	609265
Acetone	ND	100	1		03/20/01 21:14	LT	609265
Acrylonitrile	ND	50	1		03/20/01 21:14	LT	609265
Benzene	ND	5.0	1		03/20/01 21:14	LT	609265
Bromobenzene	ND	5.0	1		03/20/01 21:14	LT	609265
Bromochloromethane	ND	5.0	1		03/20/01 21:14	LT	609265
Bromodichloromethane	ND	5.0	1		03/20/01 21:14	LT	609265
Bromoform	ND	5.0	1		03/20/01 21:14	LT	609265
Bromomethane	ND	10	1		03/20/01 21:14	LT	609265
Carbon disulfide	ND	5.0	1		03/20/01 21:14	LT	609265
Carbon tetrachloride	ND	5.0	1		03/20/01 21:14	LT	609265
Chlorobenzene	ND	5.0	1		03/20/01 21:14	LT	609265
Chloroethane	ND	10	1		03/20/01 21:14	LT	609265

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
\* - Surrogate Recovery Outside Advisable QC Limits  
J - Estimated Value between MDL and PQL

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



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

Client Sample ID MW-15

Collected: 3/8/01 9:45:00 A SPL Sample ID: 01020760-13

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
Chloroform	ND	5.0	1		03/20/01 21:14	LT	609265
Chloromethane	ND	10	1		03/20/01 21:14	LT	609265
cis-1,3-Dichloropropene	ND	5.0	1		03/20/01 21:14	LT	609265
Dibromochloromethane	ND	5.0	1		03/20/01 21:14	LT	609265
Dibromomethane	ND	5.0	1		03/20/01 21:14	LT	609265
Dichlorodifluoromethane	ND	10	1		03/20/01 21:14	LT	609265
Ethylbenzene	ND	5.0	1		03/20/01 21:14	LT	609265
Hexachlorobutadiene	ND	5.0	1		03/20/01 21:14	LT	609265
Isopropylbenzene	ND	5.0	1		03/20/01 21:14	LT	609265
Methyl tert-butyl ether	ND	5.0	1		03/20/01 21:14	LT	609265
Methylene chloride	ND	5.0	1		03/20/01 21:14	LT	609265
n-Butylbenzene	ND	5.0	1		03/20/01 21:14	LT	609265
n-Propylbenzene	ND	5.0	1		03/20/01 21:14	LT	609265
Naphthalene	ND	5.0	1		03/20/01 21:14	LT	609265
sec-Butylbenzene	ND	5.0	1		03/20/01 21:14	LT	609265
Styrene	ND	5.0	1		03/20/01 21:14	LT	609265
tert-Butylbenzene	ND	5.0	1		03/20/01 21:14	LT	609265
Tetrachloroethene	ND	5.0	1		03/20/01 21:14	LT	609265
Toluene	ND	5.0	1		03/20/01 21:14	LT	609265
trans-1,3-Dichloropropene	ND	5.0	1		03/20/01 21:14	LT	609265
Trichloroethene	ND	5.0	1		03/20/01 21:14	LT	609265
Trichlorofluoromethane	ND	5.0	1		03/20/01 21:14	LT	609265
Vinyl acetate	ND	10	1		03/20/01 21:14	LT	609265
Vinyl chloride	ND	10	1		03/20/01 21:14	LT	609265
cis-1,2-Dichloroethene	ND	5.0	1		03/20/01 21:14	LT	609265
m,p-Xylene	ND	5.0	1		03/20/01 21:14	LT	609265
o-Xylene	ND	5.0	1		03/20/01 21:14	LT	609265
trans-1,2-Dichloroethene	ND	5.0	1		03/20/01 21:14	LT	609265
1,2-Dichloroethene (total)	ND	5.0	1		03/20/01 21:14	LT	609265
Xylenes, Total	ND	5.0	1		03/20/01 21:14	LT	609265
Surr: 1,2-Dichloroethane-d4	88.0	% 62-119	1		03/20/01 21:14	LT	609265
Surr: 4-Bromofluorobenzene	102	% 78-123	1		03/20/01 21:14	LT	609265
Surr: Toluene-d8	104	% 74-122	1		03/20/01 21:14	LT	609265

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)  
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MI - Matrix Interference



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

Client Sample ID Duplicate

Collected: 3/9/01

SPL Sample ID: 01020760-15

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	1.7	0.2	1		03/20/01 19:17	AM	609617
Surr: n-Pentacosane	148MI	% 18-120	1	*	03/20/01 19:17	AM	609617

Prep Method

Prep Date

Prep Initials

03/10/2001 7:52

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.5	5		03/19/01 3:37	D_R	605452
Surr: 1,4-Difluorobenzene	92.2	% 74-121	5		03/19/01 3:37	D_R	605452
Surr: 4-Bromofluorobenzene	92.3	% 55-150	5		03/19/01 3:37	D_R	605452

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	5.5	5	5		03/19/01 20:06	D_R	606731
Ethylbenzene	ND	5	5		03/19/01 20:06	D_R	606731
Toluene	ND	5	5		03/19/01 20:06	D_R	606731
Xylenes, Total	ND	5	5		03/19/01 20:06	D_R	606731
Surr: 1,4-Difluorobenzene	98.0	% 72-137	5		03/19/01 20:06	D_R	606731
Surr: 4-Bromofluorobenzene	90.8	% 48-156	5		03/19/01 20:06	D_R	606731

**Qualifiers:**

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference



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

Client Sample ID Trip Blank 2/28/01

Collected: 3/9/01

SPL Sample ID: 01020760-16

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		03/18/01 4:29	D_R	605443
Surr: 1,4-Difluorobenzene	92.0	% 74-121	1		03/18/01 4:29	D_R	605443
Surr: 4-Bromofluorobenzene	91.0	% 55-150	1		03/18/01 4:29	D_R	605443
<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		03/18/01 16:29	D_R	605323
Ethylbenzene	ND	1	1		03/18/01 16:29	D_R	605323
Toluene	ND	1	1		03/18/01 16:29	D_R	605323
Xylenes, Total	ND	1	1		03/18/01 16:29	D_R	605323
Surr: 1,4-Difluorobenzene	90.6	% 72-137	1		03/18/01 16:29	D_R	605323
Surr: 4-Bromofluorobenzene	87.6	% 48-156	1		03/18/01 16:29	D_R	605323

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference



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

Client Sample ID MW-7

Collected: 3/9/01 9:50:00 A SPL Sample ID: 01020760-17

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>ALKALINITY, BICARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Bicarbonate	283	2		1	03/12/01 10:15	SN	597249
<b>ALKALINITY, CARBONATE</b>				<b>MCL</b>	<b>M2320 B</b>	<b>Units: mg/L</b>	
Alkalinity, Carbonate	ND	2		1	03/12/01 10:15	SN	597349
<b>CHLORIDE, TOTAL</b>				<b>MCL</b>	<b>E325.3</b>	<b>Units: mg/L</b>	
Chloride	224	5		5	03/20/01 11:30	CV	610223
<b>DIESEL RANGE ORGANICS</b>				<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>	
Diesel Range Organics	1.2	0.25		1	03/20/01 18:38	AM	609615
Surr: n-Pentacosane	93.4 %	18-120		1	03/20/01 18:38	AM	609615

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 7:52	KL

<b>FLUORIDE-IC</b>				<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>	
Fluoride	0.69	0.1		1	03/10/01 15:14	KM	594900
<b>HARDNESS, TOTAL (TITRIMETRIC, EDTA)</b>				<b>MCL</b>	<b>E130.2</b>	<b>Units: mg/L</b>	
Hardness (As CaCO3)	590	120		25	03/21/01 13:30	CV	612357
<b>MERCURY, TOTAL</b>				<b>MCL</b>	<b>SW7470A</b>	<b>Units: mg/L</b>	
Mercury	ND	0.0002		1	03/21/01 16:24	R_T	610997

Prep Method	Prep Date	Prep Initials
SW7470A	03/21/2001 13:40	R_T

<b>METALS BY METHOD 6010B, TOTAL</b>				<b>MCL</b>	<b>SW6010B</b>	<b>Units: mg/L</b>	
Arsenic	0.00694	0.005		1	03/15/01 0:48	NS	601649
Lead	ND	0.005		1	03/15/01 0:48	NS	601649
Selenium	0.00617	0.005		1	03/15/01 0:48	NS	601649
Barium	0.043	0.005		1	03/16/01 3:37	E_B	603724
Cadmium	ND	0.005		1	03/16/01 3:37	E_B	603724
Calcium	172	0.1		1	03/16/01 3:37	E_B	603724
Chromium	ND	0.01		1	03/16/01 3:37	E_B	603724
Magnesium	41.1	0.1		1	03/16/01 3:37	E_B	603724
Potassium	5.15	2		1	03/16/01 3:37	E_B	603724
Silver	ND	0.01		1	03/16/01 3:37	E_B	603724
Sodium	121	0.5		1	03/16/01 3:37	E_B	603724

Prep Method	Prep Date	Prep Initials
SW3010A	03/13/2001 9:00	MW

<b>NITROGEN, NITRATE (AS N)</b>				<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>	
Nitrogen, Nitrate (As N)	2.82	0.1		1	03/10/01 15:14	KM	594963

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





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Client Sample ID MW-7

Collected: 3/9/01 9:50:00 A SPL Sample ID: 01020760-17

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
POLYNUCLEAR AROMATIC HYDROCARBONS			MCL	SW8310	Units: ug/L		
Acenaphthene	ND	0.13	1		03/15/01 10:34	KA	611384
Acenaphthylene	ND	0.13	1		03/15/01 10:34	KA	611384
Anthracene	ND	0.13	1		03/15/01 10:34	KA	611384
Benz(a)anthracene	ND	0.13	1		03/15/01 10:34	KA	611384
Benzo(a)pyrene	ND	0.13	1		03/15/01 10:34	KA	611384
Benzo(b)fluoranthene	ND	0.13	1		03/15/01 10:34	KA	611384
Benzo(g,h,i)perylene	ND	0.13	1		03/15/01 10:34	KA	611384
Benzo(k)fluoranthene	ND	0.13	1		03/15/01 10:34	KA	611384
Chrysene	ND	0.13	1		03/15/01 10:34	KA	611384
Dibenzo(a,h)anthracene	ND	0.13	1		03/15/01 10:34	KA	611384
Fluoranthene	ND	0.13	1		03/15/01 10:34	KA	611384
Fluorene	ND	0.13	1		03/15/01 10:34	KA	611384
Indeno(1,2,3-cd)pyrene	ND	0.13	1		03/15/01 10:34	KA	611384
Naphthalene	ND	0.13	1		03/15/01 10:34	KA	611384
Phenanthrene	ND	0.13	1		03/15/01 10:34	KA	611384
Pyrene	ND	0.13	1		03/15/01 10:34	KA	611384
Surr: 1-Fluoronaphthalene	36.6	% 15-96	1		03/15/01 10:34	KA	611384
Surr: Phenanthrene-d10	51.6	% 33-108	1		03/15/01 10:34	KA	611384

Prep Method	Prep Date	Prep Initials
SW3510B	03/10/2001 8:00	KL

SULFATE		MCL	E300	Units: mg/L	
Sulfate	260	4	20	03/12/01 9:30 KM	596740

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  
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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Diesel Range Organics  
Method: SW8015B

WorkOrder: 01020760  
Lab Batch ID: 10779

#### Method Blank

RunID: HP\_V\_010320D-609578 Units: mg/L  
Analysis Date: 03/20/2001 17:21 Analyst: AM  
Preparation Date: 03/10/2001 7:52 Prep By: KL Method SW3510B

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20
Surr: n-Pentacosane	115.8	18-120

#### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-01B	MW-1
01020760-02B	MW-3
01020760-03B	MW-4
01020760-04B	MW-5
01020760-06B	MW-8
01020760-07B	MW-9
01020760-08B	MW-10
01020760-09B	MW-11A
01020760-10B	MW-12
01020760-11B	MW-13
01020760-15B	Duplicate
01020760-17B	MW-7

#### Laboratory Control Sample (LCS)

RunID: HP\_V\_010320D-609581 Units: mg/L  
Analysis Date: 03/20/2001 18:00 Analyst: AM  
Preparation Date: 03/10/2001 7:52 Prep By: KL Method SW3510B

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: 01020760-01  
RunID: HP\_V\_010320D-609588 Units: mg/L  
Analysis Date: 03/20/2001 19:17 Analyst: AM  
Preparation Date: 03/10/2001 7:52 Prep By: KL Method SW3510B

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Diesel Range Organics	0.49	2.78	2.4	69.0	2.78	2.3	64.8	6.33	39	13	130

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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



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## Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Headspace Gas Analysis  
Method: RSK147

WorkOrder: 01020760  
Lab Batch ID: R32043

### Method Blank

RunID: VARC\_010323A-612649 Units: mg/L  
Analysis Date: 03/23/2001 8:33 Analyst: A\_A

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

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-01G	MW-1
01020760-02G	MW-3
01020760-03G	MW-4
01020760-04G	MW-5
01020760-05G	MW-7
01020760-06G	MW-8
01020760-07G	MW-9
01020760-08G	MW-10
01020760-09G	MW-11A
01020760-10G	MW-12
01020760-11G	MW-13

### Sample Duplicate

Original Sample: 01020760-01  
RunID: VARC\_010323A-612655 Units: mg/L  
Analysis Date: 03/23/2001 10:48 Analyst: A\_A

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

Qualifiers: ND/U - Not Detected at the Reporting Limit 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

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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Purgeable Aromatics  
Method: SW8021B

WorkOrder: 01020760  
Lab Batch ID: R31594

#### Method Blank

RunID: HP\_S\_010316A-604388 Units: ug/L  
Analysis Date: 03/16/2001 16:13 Analyst: D\_R

#### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-02A	MW-3
01020760-03A	MW-4
01020760-04A	MW-5
01020760-05A	MW-7
01020760-06A	MW-8
01020760-07A	MW-9

Analyte	Result	Rep Limit
Benzene	ND	1.0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
Xylenes, Total	ND	1.0
Surr: 1,4-Difluorobenzene	92.2	72-137
Surr: 4-Bromofluorobenzene	102.7	48-156

#### Laboratory Control Sample (LCS)

RunID: HP\_S\_010316A-604361 Units: ug/L  
Analysis Date: 03/16/2001 14:54 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	46	92	70	130
Ethylbenzene	50	49	98	70	130
Toluene	50	48	95	70	130
Xylenes, Total	150	144	96	70	130

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

Sample Spiked: 01030495-03  
RunID: HP\_S\_010316A-604375 Units: ug/L  
Analysis Date: 03/17/2001 0:46 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	31	155	20	21	10637.6 *	21	32	164	
Ethylbenzene	ND	20	30	151 *	20	21	10436.9 *	19	52	142	
Toluene	ND	20	31	153	20	21	10438.6 *	20	38	159	
Xylenes, Total	ND	60	94	157 *	60	62	10341.0 *	18	53	144	

Qualifiers: ND/U - Not Detected at the Reporting Limit MI - Matrix Interference  
B - Analyte detected in the associated Method Blank D - Recovery Unreportable due to Dilution  
J - Estimated value between MDL and PQL \* - Recovery Outside Advisable QC Limits

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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Gasoline Range Organics  
Method: SW8015B

WorkOrder: 01020760  
Lab Batch ID: R31596

#### Method Blank

#### Samples in Analytical Batch:

RunID: HP\_S\_010316C-604412 Units: mg/L  
Analysis Date: 03/16/2001 4:13 Analyst: D\_R

Lab Sample ID	Client Sample ID
01020760-02A	MW-3
01020760-03A	MW-4
01020760-04A	MW-5
01020760-05A	MW-7
01020760-06A	MW-8
01020760-07A	MW-9

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	91.7	74-121
Surr: 4-Bromofluorobenzene	110.7	55-150

#### Laboratory Control Sample (LCS)

RunID: HP\_S\_010316C-604410 Units: mg/L  
Analysis Date: 03/16/2001 3:20 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.76	76	70	130

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

Sample Spiked: 01030495-04  
RunID: HP\_S\_010316C-604414 Units: mg/L  
Analysis Date: 03/17/2001 1:40 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	ND	0.9	0.52	58.0	0.9	0.56	61.9	6.51	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

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## Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Purgeable Aromatics  
Method: SW8021B

WorkOrder: 01020760  
Lab Batch ID: R31638

### Method Blank

RunID: HP\_S\_010318A-605320 Units: ug/L  
Analysis Date: 03/18/2001 15:24 Analyst: D\_R

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-08A	MW-10
01020760-09A	MW-11A
01020760-10A	MW-12
01020760-11A	MW-13
01020760-15A	Duplicate
01020760-16A	Trip Blank 2/28/01

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	92.6	72-137
Surr: 4-Bromofluorobenzene	87.0	48-156

### Laboratory Control Sample (LCS)

RunID: HP\_S\_010318A-605314 Units: ug/L  
Analysis Date: 03/18/2001 13:53 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	53	107	70	130
Ethylbenzene	50	55	110	70	130
Toluene	50	54	107	70	130
Xylenes, Total	150	165	110	70	130

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

Sample Spiked: 01030432-02  
RunID: HP\_S\_010318A-606723 Units: ug/L  
Analysis Date: 03/19/2001 16:05 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	21	103	20	24	116	11.9	21	32	164
Ethylbenzene	ND	20	22	107	20	24	120	11.5	19	52	142
Toluene	ND	20	20	100	20	23	114	13.3	20	38	159
Xylenes, Total	ND	60	64	107	60	72	120	11.8	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.



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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Gasoline Range Organics  
Method: SW8015B

WorkOrder: 01020760  
Lab Batch ID: R31641

#### Method Blank

RunID: HP\_S\_010318B-605442 Units: mg/L  
Analysis Date: 03/18/2001 3:24 Analyst: D\_R

#### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-01A	MW-1
01020760-08A	MW-10
01020760-09A	MW-11A
01020760-10A	MW-12
01020760-11A	MW-13
01020760-15A	Duplicate
01020760-16A	Trip Blank 2/28/01

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	91.7	74-121
Surr: 4-Bromofluorobenzene	91.3	55-150

#### Laboratory Control Sample (LCS)

RunID: HP\_S\_010318B-605441 Units: mg/L  
Analysis Date: 03/18/2001 2:20 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.99	99	70	130

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

Sample Spiked: 01030432-04  
RunID: HP\_S\_010318B-605446 Units: mg/L  
Analysis Date: 03/18/2001 23:37 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	ND	0.9	0.73	81.3	0.9	0.64	70.7	13.9	36	36	160

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL  
MI - Matrix Interference  
D - Recovery Unreportable due to Dilution  
\* - Recovery Outside Advisable QC Limits

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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Purgeable Aromatics  
Method: SW8021B

WorkOrder: 01020760  
Lab Batch ID: R32259

#### Method Blank

#### Samples in Analytical Batch:

RunID: HP\_R\_010327A-618008 Units: ug/L  
Analysis Date: 03/27/2001 19:57 Analyst: D\_R

Lab Sample ID  
01020760-01A  
Client Sample ID  
MW-1

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	107.3	72-137
Surr: 4-Bromofluorobenzene	84.6	48-156

#### Laboratory Control Sample (LCS)

RunID: HP\_R\_010327A-616660 Units: ug/L  
Analysis Date: 03/27/2001 12:29 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	46	93	70	130
Ethylbenzene	50	48	96	70	130
Toluene	50	48	95	70	130
Xylenes, Total	150	144	96	70	130

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

Sample Spiked: 01030771-05  
RunID: HP\_R\_010327A-617993 Units: ug/L  
Analysis Date: 03/27/2001 21:39 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	23	116	20	21	104	11.2	21	32	164
Ethylbenzene	ND	20	23	116	20	21	106	9.04	19	52	142
Toluene	ND	20	24	118	20	22	107	9.82	20	38	159
Xylenes, Total	ND	60	71	118	60	65	108	8.82	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

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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Polynuclear Aromatic Hydrocarbons  
Method: SW8310

WorkOrder: 01020760  
Lab Batch ID: 10780

#### Method Blank

#### Samples in Analytical Batch:

RunID: 2\_010314A-606020 Units: ug/L  
Analysis Date: 03/14/2001 20:58 Analyst: KA  
Preparation Date: 03/10/2001 8:00 Prep By: KL Method SW3510B

Lab Sample ID	Client Sample ID
01020760-01D	MW-1
01020760-02D	MW-3
01020760-03D	MW-4
01020760-04D	MW-5
01020760-06D	MW-8
01020760-07D	MW-9
01020760-08D	MW-10
01020760-09D	MW-11A
01020760-10D	MW-12
01020760-11D	MW-13
01020760-17D	MW-7

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	66.5	15-96
Surr: Phenanthrene-d10	72.9	33-108

#### Laboratory Control Sample (LCS)

RunID: 2\_010314A-606067 Units: ug/L  
Analysis Date: 03/14/2001 21:35 Analyst: KA  
Preparation Date: 03/10/2001 8:00 Prep By: KL Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Acenaphthene	0.5	0.33	66	23	99
Acenaphthylene	0.5	0.41	83	29	104
Anthracene	0.5	0.32	63	28	126
Benz(a)anthracene	0.5	0.4	80	52	101
Benzo(a)pyrene	0.5	0.42	84	62	97
Benzo(b)fluoranthene	0.5	0.45	90	65	101
Benzo(g,h,i)perylene	0.5	0.41	82	36	117
Benzo(k)fluoranthene	0.5	0.43	85	64	104
Chrysene	0.5	0.43	87	64	124
Dibenzo(a,h)anthracene	0.5	0.38	76	33	111
Fluoranthene	0.5	0.39	78	51	100
Fluorene	0.5	0.39	78	20	105
Indeno(1,2,3-cd)pyrene	0.5	0.46	91	57	115
Naphthalene	0.5	0.35	71	19	95
Phenanthrene	0.5	0.52	104	29	105

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

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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Polynuclear Aromatic Hydrocarbons  
Method: SW8310

WorkOrder: 01020760  
Lab Batch ID: 10780

#### Laboratory Control Sample (LCS)

RunID: 2\_010314A-606067 Units: ug/L  
Analysis Date: 03/14/2001 21:35 Analyst: KA  
Preparation Date: 03/10/2001 8:00 Prep By: KL Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Pyrene	0.5	0.37	75	55	105

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

Sample Spiked: 01020760-01  
RunID: 2\_010314A-606023 Units: ug/L  
Analysis Date: 03/14/2001 22:49 Analyst: KA  
Preparation Date: 03/10/2001 8:00 Prep By: Method

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Acenaphthene	ND	0.5	0.086	17.3	0.5	0.085	16.9	2.15	30	1	97
Acenaphthylene	ND	0.5	0.18	23.8	0.5	0.15	16.7	34.9 *	30	1	122
Anthracene	ND	0.5	0.099	19.8	0.5	0.088	17.6	12.1	30	1	106
Benz(a)anthracene	ND	0.5	0.12	23.9	0.5	0.1	20.6	14.8	30	12	119
Benzo(a)pyrene	ND	0.5	0.14	27.7	0.5	0.082	16.5	50.7 *	30	1	105
Benzo(b)fluoranthene	ND	0.5	0.15	30.6	0.5	0.11	21.4	35.1 *	30	6	127
Benzo(g,h,i)perylene	ND	0.5	0.34	67.0	0.5	0.11	21.5	103 *	30	1	107
Benzo(k)fluoranthene	ND	0.5	0.14	27.7	0.5	0.095	19.0	37.1 *	30	5	119
Benzofluoranthene	ND	0.5	0.25	49.7	0.5	0.19	39.0	24.3	30	1	144
Dibenz(a,h)anthracene	ND	0.5	0.31	61.0	0.5	0.12	23.3	89.5 *	30	1	114
Fluoranthene	ND	0.5	0.12	23.1	0.5	0.097	19.4	17.6	30	14	126
Fluorene	ND	0.5	0.095	19.0	0.5	0.096	19.2	0.967	30	1	107
Indeno(1,2,3-cd)pyrene	ND	0.5	0.15	29.4	0.5	0.069	13.8	72.2 *	30	1	109
Naphthalene	ND	0.5	0.12	13.6	0.5	0.13	16.2	17.5	30	1	90
Phenanthrene	ND	0.5	0.14	28.2	0.5	0.12	24.4	14.4	30	1	128
Pyrene	ND	0.5	0.12	23.2	0.5	0.096	19.1	19.0	30	1	135

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

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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01020760  
Lab Batch ID: 10809

#### Method Blank

#### Samples in Analytical Batch:

RunID: TJA\_010316C-605373 Units: mg/L  
Analysis Date: 03/17/2001 1:47 Analyst: E\_B  
Preparation Date: 03/12/2001 15:00 Prep By: MME Method SW3010A

Lab Sample ID	Client Sample ID
01020760-01E	MW-1
01020760-02E	MW-3
01020760-03E	MW-4
01020760-04E	MW-5
01020760-06E	MW-8
01020760-07E	MW-9
01020760-08E	MW-10
01020760-09E	MW-11A

Analyte	Result	Rep Limit
Barium	ND	0.005
Cadmium	ND	0.005
Calcium	ND	0.1
Chromium	ND	0.01
Magnesium	ND	0.1
Potassium	ND	2
Silver	ND	0.01
Sodium	ND	0.5

#### Laboratory Control Sample (LCS)

RunID: TJA\_010316C-605374 Units: mg/L  
Analysis Date: 03/17/2001 1:51 Analyst: E\_B  
Preparation Date: 03/12/2001 15:00 Prep By: MME Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Barium	2	2.04	102	80	120
Cadmium	2	2.07	103	80	120
Calcium	20	20.8	104	80	120
Chromium	2	2.06	103	80	120
Magnesium	20	20.3	102	80	120
Potassium	20	20.1	100	80	120
Silver	2	2.08	104	80	120
Sodium	20	19.7	99	80	120

#### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked: 01030226-01  
RunID: TJA\_010316C-605379 Units: mg/L  
Analysis Date: 03/17/2001 2:11 Analyst: E\_B  
Preparation Date: 03/12/2001 15:00 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	98.3	10	103	47.6 *	10	104	52.5 *	9.8	20	75	125
Sodium	318	10	315	-24 *	10	312	-57 *	81.9 *	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.



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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01020760  
Lab Batch ID: 10809

Sample Spiked: 01030226-01  
RunID: TJA\_010316C-605376 Units: mg/L  
Analysis Date: 03/17/2001 1:59 Analyst: E\_B  
Preparation Date: 03/12/2001 15:00 Prep By: MME 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	0.14	1	1.14	100	1	1.12	98.7	1.76	20	75	125
Cadmium	ND	1	1.05	105	1	1.04	104	0.700	20	75	125
Calcium	98	10	112	139 *	10	110	117	17.4	20	75	125
Chromium	ND	1	1.02	102	1	1.02	102	0.0186	20	75	125
Magnesium	32	10	42.6	109	10	41.8	101	7.44	20	75	125
Potassium	ND	10	11.5	115	10	11.2	112	2.62	20	75	125
Silver	ND	1	1.04	104	1	1.03	103	0.973	20	75	125
Sodium	320	10	332	143 *	10	324	60.7 *	81.1 *	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.



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### Quality Control Report

**Brown & Caldwell**

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01020760  
Lab Batch ID: 10809-T

#### Method Blank

#### Samples in Analytical Batch:

RunID: TJAT\_010315A-602595 Units: mg/L  
Analysis Date: 03/15/2001 19:50 Analyst: NS  
Preparation Date: 03/12/2001 15:00 Prep By: MME Method SW3010A

Lab Sample ID	Client Sample ID
01020760-01E	MW-1
01020760-02E	MW-3
01020760-03E	MW-4
01020760-04E	MW-5
01020760-06E	MW-8
01020760-07E	MW-9
01020760-08E	MW-10
01020760-09E	MW-11A

Analyte	Result	Rep Limit
Arsenic	ND	0.005
Lead	ND	0.005
Selenium	ND	0.005

#### Laboratory Control Sample (LCS)

RunID: TJAT\_010315A-602596 Units: mg/L  
Analysis Date: 03/15/2001 19:55 Analyst: NS  
Preparation Date: 03/12/2001 15:00 Prep By: MME Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Arsenic	4	3.89	97	80	120
Lead	2	2.1	105	80	120
Selenium	4	4.22	106	80	120

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

Sample Spiked: 01030226-01  
RunID: TJAT\_010315A-602601 Units: mg/L  
Analysis Date: 03/15/2001 20:09 Analyst: NS  
Preparation Date: 03/12/2001 15:00 Prep By: MME Method SW3010A

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Arsenic	ND	2	2.06	103	2	2.05	102	0.547	20	75	125
Lead	ND	1	1.07	107	1	1.07	107	0.374	20	75	125
Selenium	ND	2	2.24	112	2	2.24	112	0.0849	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

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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01020760

Lab Batch ID: 10809A

#### Method Blank

#### Samples in Analytical Batch:

RunID: TJA\_010319B-606969 Units: mg/L  
Analysis Date: 03/19/2001 19:19 Analyst: E\_B  
Preparation Date: 03/12/2001 15:00 Prep By: MME Method SW3010A

Lab Sample ID: 01020760-09E  
Client Sample ID: MW-11A

Analyte	Result	Rep Limit
Sodium	ND	0.5

#### Laboratory Control Sample (LCS)

RunID: TJA\_010319B-606970 Units: mg/L  
Analysis Date: 03/19/2001 19:24 Analyst: E\_B  
Preparation Date: 03/12/2001 15:00 Prep By: MME Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sodium	20	19.5	97	80	120

#### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked: 01030226-01  
RunID: TJA\_010319B-606975 Units: mg/L  
Analysis Date: 03/19/2001 19:44 Analyst: E\_B  
Preparation Date: 03/12/2001 15:00 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
Sodium	312	10	312	3.1 *	10	312	1.7 *	59.5 *	20	75	125

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

Sample Spiked: 01030226-01  
RunID: TJA\_010319B-606972 Units: mg/L  
Analysis Date: 03/19/2001 19:32 Analyst: E\_B  
Preparation Date: 03/12/2001 15:00 Prep By: MME 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
Sodium	310	10	324	118	10	319	66.6 *	56.0 *	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.



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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01020760  
Lab Batch ID: 10809B

#### Method Blank

#### Samples in Analytical Batch:

RunID: TJA\_010320C-608941 Units: mg/L  
Analysis Date: 03/20/2001 15:28 Analyst: E\_B  
Preparation Date: 03/12/2001 15:00 Prep By: MME Method SW3010A

Lab Sample ID 01020760-09E  
Client Sample ID MW-11A

Analyte	Result	Rep Limit
Calcium	ND	0.1

#### Laboratory Control Sample (LCS)

RunID: TJA\_010320C-608942 Units: mg/L  
Analysis Date: 03/20/2001 15:32 Analyst: E\_B  
Preparation Date: 03/12/2001 15:00 Prep By: MME Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Calcium	20	20.5	102	80	120

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

Sample Spiked: 01030226-01  
RunID: TJA\_010320C-608944 Units: mg/L  
Analysis Date: 03/20/2001 15:40 Analyst: E\_B  
Preparation Date: 03/12/2001 15:00 Prep By: MME 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	98	10	110	124	10	107	92.3	29.2 *	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

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## Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01020760  
Lab Batch ID: 10826

### Method Blank

### Samples in Analytical Batch:

RunID: TJA\_010315C-603697 Units: mg/L  
Analysis Date: 03/16/2001 2:41 Analyst: E\_B  
Preparation Date: 03/13/2001 9:00 Prep By: MW Method SW3010A

Lab Sample ID	Client Sample ID
01020760-10E	MW-12
01020760-11E	MW-13
01020760-17E	MW-7

Analyte	Result	Rep Limit
Barium	ND	0.005
Cadmium	ND	0.005
Calcium	ND	0.1
Chromium	ND	0.01
Magnesium	ND	0.1
Potassium	ND	2
Silver	ND	0.01
Sodium	ND	0.5

### Laboratory Control Sample (LCS)

RunID: TJA\_010315C-603698 Units: mg/L  
Analysis Date: 03/16/2001 2:45 Analyst: E\_B  
Preparation Date: 03/13/2001 9:00 Prep By: MW Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Barium	2	2.03	102	80	120
Cadmium	2	2.11	105	80	120
Calcium	20	21.4	107	80	120
Chromium	2	2.14	107	80	120
Magnesium	20	20.4	102	80	120
Potassium	20	20.2	101	80	120
Silver	2	2.11	105	80	120
Sodium	20	20.1	100	80	120

### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked: 01030291-01  
RunID: TJA\_010315C-603707 Units: mg/L  
Analysis Date: 03/16/2001 3:06 Analyst: E\_B  
Preparation Date: 03/13/2001 9:00 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	71.6	10	79.4	77.4	10	78.6	69.3 *	11.1	20	75	125
Sodium	121	10	125	45.0 *	10	126	56.0 *	21.7 *	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.



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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01020760  
Lab Batch ID: 10826

Sample Spiked: 01030291-01  
RunID: TJA\_010315C-603700 Units: mg/L  
Analysis Date: 03/16/2001 2:53 Analyst: E\_B  
Preparation Date: 03/13/2001 9:00 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	0.33	1	1.32	98.9	1	1.36	104	4.55	20	75	125
Cadmium	ND	1	1.04	104	1	1.06	106	1.69	20	75	125
Calcium	72	10	83.1	114	10	84.2	126 *	9.69	20	75	125
Chromium	ND	1	1.04	104	1	1.06	106	2.26	20	75	125
Magnesium	19	10	28.9	103	10	29.6	110	6.61	20	75	125
Potassium	ND	10	11	105	10	11.6	110	4.92	20	75	125
Silver	ND	1	1.04	104	1	1.07	107	2.80	20	75	125
Sodium	120	10	131	108	10	135	141 *	26.8 *	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

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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01020760  
Lab Batch ID: 10826-T

#### Method Blank

#### Samples in Analytical Batch:

RunID: TJAT\_010314B-601637 Units: mg/L  
Analysis Date: 03/14/2001 23:35 Analyst: NS  
Preparation Date: 03/13/2001 9:00 Prep By: MW Method SW3010A

Lab Sample ID	Client Sample ID
01020760-10E	MW-12
01020760-11E	MW-13
01020760-17E	MW-7

Analyte	Result	Rep Limit
Arsenic	ND	0.005
Lead	ND	0.005
Selenium	ND	0.005

#### Laboratory Control Sample (LCS)

RunID: TJAT\_010314B-601638 Units: mg/L  
Analysis Date: 03/14/2001 23:40 Analyst: NS  
Preparation Date: 03/13/2001 9:00 Prep By: MW Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Arsenic	4	4.04	101	80	120
Lead	2	2.18	109	80	120
Selenium	4	4.36	109	80	120

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

Sample Spiked: 01030291-01  
RunID: TJAT\_010314B-601640 Units: mg/L  
Analysis Date: 03/14/2001 23:54 Analyst: NS  
Preparation Date: 03/13/2001 9:00 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	0.0065	2	2.08	104	2	2.15	107	3.17	20	75	125
Lead	ND	1	1.09	109	1	1.12	112	2.70	20	75	125
Selenium	ND	2	2.24	112	2	2.31	115	2.99	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.



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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Metals by Method 6010B, Total  
Method: SW6010B

WorkOrder: 01020760

Lab Batch ID: 11057C-T

#### Method Blank

#### Samples in Analytical Batch:

RunID: TJAT\_010321B-610668 Units: mg/L  
Analysis Date: 03/21/2001 13:35 Analyst: NS  
Preparation Date: 03/20/2001 12:35 Prep By: MME Method SW3010A

Lab Sample ID 01020760-02E  
Client Sample ID MW-3

Analyte	Result	Rep Limit
Selenium	ND	0.005

#### Laboratory Control Sample (LCS)

RunID: TJAT\_010321B-610669 Units: mg/L  
Analysis Date: 03/21/2001 13:40 Analyst: NS  
Preparation Date: 03/20/2001 12:35 Prep By: MME Method SW3010A

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Selenium	4	4.39	110	80	120

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

Sample Spiked: 01020760-02  
RunID: TJAT\_010321B-610671 Units: mg/L  
Analysis Date: 03/21/2001 13:54 Analyst: NS  
Preparation Date: 03/20/2001 12:35 Prep By: MME 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
Selenium	0.0070	2	2.24	111	2	2.24	112	0.302	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.



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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Mercury, Total  
Method: SW7470A

WorkOrder: 01020760  
Lab Batch ID: 11082

#### Method Blank

RunID: HGL\_010321E-610968 Units: mg/L  
Analysis Date: 03/21/2001 16:24 Analyst: R\_T  
Preparation Date: 03/21/2001 13:40 Prep By: R\_T Method SW7470A

Analyte	Result	Rep Limit
Mercury	ND	0.0002

#### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-01E	MW-1
01020760-02E	MW-3
01020760-03E	MW-4
01020760-04E	MW-5
01020760-06E	MW-8
01020760-07E	MW-9
01020760-08E	MW-10
01020760-09E	MW-11A
01020760-10E	MW-12
01020760-11E	MW-13
01020760-17E	MW-7

#### Laboratory Control Sample (LCS)

RunID: HGL\_010321E-610969 Units: mg/L  
Analysis Date: 03/21/2001 16:24 Analyst: R\_T  
Preparation Date: 03/21/2001 13:40 Prep By: R\_T Method E245.1

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Mercury	0.002	0.00179	90	80	120

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

Sample Spiked: 01020760-01  
RunID: HGL\_010321E-610977 Units: mg/L  
Analysis Date: 03/21/2001 16:24 Analyst: R\_T  
Preparation Date: 03/21/2001 13:40 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	0.00192	96.2	0.002	0.00197	98.6	2.41	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

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## Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Volatile Organics by Method 8260B  
Method: SW8260B

WorkOrder: 01020760  
Lab Batch ID: R31836

### Method Blank

### Samples in Analytical Batch:

UnitID: L\_010320B-609255 Units: ug/L  
Analysis Date: 03/20/2001 14:08 Analyst: LT

Lab Sample ID	Client Sample ID
01020760-12A	MW-14
01020760-13A	MW-15

Analyte	Result	Rep Limit
1,1,1,2-Tetrachloroethane	ND	5.0
1,1,1-Trichloroethane	ND	5.0
1,1,2,2-Tetrachloroethane	ND	5.0
1,1,2-Trichloroethane	ND	5.0
1,1-Dichloroethane	ND	5.0
1,1-Dichloroethene	ND	5.0
1,1-Dichloropropene	ND	5.0
1,2,3-Trichlorobenzene	ND	5.0
1,2,3-Trichloropropane	ND	5.0
1,2,4-Trichlorobenzene	ND	5.0
1,2,4-Trimethylbenzene	ND	5.0
1,2-Dibromo-3-chloropropane	ND	5.0
1,2-Dibromoethane	ND	5.0
1,2-Dichlorobenzene	ND	5.0
1,2-Dichloroethane	ND	5.0
1,2-Dichloropropane	ND	5.0
1,3,5-Trimethylbenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,3-Dichloropropane	ND	5.0
1,4-Dichlorobenzene	ND	5.0
2,2-Dichloropropane	ND	5.0
2-Butanone	ND	20
2-Chloroethyl vinyl ether	ND	10
2-Chlorotoluene	ND	5.0
2-Hexanone	ND	10
4-Chlorotoluene	ND	5.0
4-Isopropyltoluene	ND	5.0
4-Methyl-2-pentanone	ND	10
Acetone	ND	100
Acrylonitrile	ND	50
Benzene	ND	5.0
Bromobenzene	ND	5.0
Bromochloromethane	ND	5.0
Bromodichloromethane	ND	5.0
Bromoform	ND	5.0
Bromomethane	ND	10
Carbon disulfide	ND	5.0
Carbon tetrachloride	ND	5.0
Chlorobenzene	ND	5.0
Chloroethane	ND	10
Chloroform	ND	5.0
Chloromethane	ND	10
Dibromochloromethane	ND	5.0
Dibromomethane	ND	5.0
Dichlorodifluoromethane	ND	10
Ethylbenzene	ND	5.0
Hexachlorobutadiene	ND	5.0
Isopropylbenzene	ND	5.0
Methyl tert-butyl ether	ND	5.0
Methylene chloride	ND	5.0
n-Butylbenzene	ND	5.0

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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



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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Volatile Organics by Method 8260B  
Method: SW8260B

WorkOrder: 01020760  
Lab Batch ID: R31836

#### Method Blank

RunID: L\_010320B-609255 Units: ug/L  
Analysis Date: 03/20/2001 14:08 Analyst: LT

Analyte	Result	Rep Limit
n-Propylbenzene	ND	5.0
Naphthalene	ND	5.0
sec-Butylbenzene	ND	5.0
Styrene	ND	5.0
tert-Butylbenzene	ND	5.0
Tetrachloroethene	ND	5.0
Toluene	ND	5.0
Trichloroethene	ND	5.0
Trichlorofluoromethane	ND	5.0
Vinyl acetate	ND	10
Vinyl chloride	ND	10
cis-1,2-Dichloroethene	ND	5.0
cis-1,3-Dichloropropene	ND	5.0
m,p-Xylene	ND	5.0
o-Xylene	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
trans-1,3-Dichloropropene	ND	5.0
1,2-Dichloroethene (total)	ND	5.0
Xylenes, Total	ND	5.0
Surr: 1,2-Dichloroethane-d4	90.0	62-119
Surr: 4-Bromofluorobenzene	96.0	78-123
Surr: Toluene-d8	100.0	74-122

#### Laboratory Control Sample (LCS)

RunID: L\_010320B-609254 Units: ug/L  
Analysis Date: 03/20/2001 13:10 Analyst: LT

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
1,1-Dichloroethene	50	54	108	61	145
Benzene	50	51	102	76	127
Chlorobenzene	50	57	114	75	130
Toluene	50	56	112	76	125
Trichloroethene	50	58	116	71	120

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

Sample Spiked: 01030282-02  
RunID: L\_010320B-609257 Units: ug/L  
Analysis Date: 03/20/2001 16:32 Analyst: LT

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.



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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Volatile Organics by Method 8260B  
Method: SW8260B

WorkOrder: 01020760  
Lab Batch ID: R31836

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
1,1-Dichloroethene	ND	250	250	100	250	230	92	8	14	38	172
Benzene	490	250	750	104	250	730	96	8	11	66	134
Chlorobenzene	ND	250	270	108	250	270	108	0	13	67	115
Toluene	ND	250	250	100	250	260	104	4	13	59	125
Dichloroethene	ND	250	280	112	250	270	108	4	14	61	134

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

MI - Matrix Interference

D - Recovery Unreportable due to Dilution

\* - Recovery Outside Advisable QC Limits

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





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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Fluoride-IC  
Method: E300

WorkOrder: 01020760  
Lab Batch ID: R31137

#### Method Blank

RunID: WET\_0103090-594809 Units: mg/L  
Analysis Date: 03/09/2001 11:53 Analyst: KM

Analyte	Result	Rep Limit
Fluoride	ND	0.10

#### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-01F	MW-1
01020760-02F	MW-3
01020760-03F	MW-4
01020760-04F	MW-5
01020760-07F	MW-9
01020760-09F	MW-11A
01020760-10F	MW-12
01020760-11F	MW-13

#### Laboratory Control Sample (LCS)

RunID: WET\_0103090-594810 Units: mg/L  
Analysis Date: 03/09/2001 11:53 Analyst: KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Fluoride	10	9.1	91	90	110

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

Sample Spiked: 01020760-01  
RunID: WET\_0103090-594812 Units: mg/L  
Analysis Date: 03/09/2001 11:53 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Fluoride	1.3	10	9.7	83.8	10	9.7	84.0	0.214	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.



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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

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

WorkOrder: 01020760  
Lab Batch ID: R31139

#### Method Blank

RunID: WET\_010309P-594830 Units: mg/L  
Analysis Date: 03/09/2001 11:53 Analyst: KM

#### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-01F	MW-1
01020760-02F	MW-3
01020760-03F	MW-4
01020760-04F	MW-5
01020760-07F	MW-9
01020760-09F	MW-11A
01020760-10F	MW-12
01020760-11F	MW-13

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

#### Laboratory Control Sample (LCS)

RunID: WET\_010309P-594831 Units: mg/L  
Analysis Date: 03/09/2001 11:53 Analyst: KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.7	97	90	110

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

Sample Spiked: 01020760-01  
RunID: WET\_010309P-594833 Units: mg/L  
Analysis Date: 03/09/2001 11:53 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Nitrogen, Nitrate (As N)	4.3	10	14.7	104	10	14.7	104	0.173	20	76	124

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Sulfate  
Method: E300

WorkOrder: 01020760  
Lab Batch ID: R31141

#### Method Blank

RunID: WET\_010309Q-594871 Units: mg/L  
Analysis Date: 03/09/2001 11:53 Analyst: KM

Analyte	Result	Rep Limit
Sulfate	ND	0.20

#### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-01F	MW-1
01020760-02F	MW-3
01020760-03F	MW-4
01020760-04F	MW-5
01020760-07F	MW-9
01020760-09F	MW-11A
01020760-10F	MW-12
01020760-11F	MW-13

#### Laboratory Control Sample (LCS)

RunID: WET\_010309Q-594873 Units: mg/L  
Analysis Date: 03/09/2001 11:53 Analyst: KM

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: 01020760-01  
RunID: WET\_010309Q-594875 Units: mg/L  
Analysis Date: 03/09/2001 11:53 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Sulfate	210	200	420	103	200	420	105	1.30	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

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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Fluoride-IC  
Method: E300

WorkOrder: 01020760  
Lab Batch ID: R31142

#### Method Blank

#### Samples in Analytical Batch:

RunID: WET\_010310C-594894 Units: mg/L  
Analysis Date: 03/10/2001 15:14 Analyst: KM

Lab Sample ID	Client Sample ID
01020760-06F	MW-8
01020760-08F	MW-10
01020760-17F	MW-7

Analyte	Result	Rep Limit
Fluoride	ND	0.10

#### Laboratory Control Sample (LCS)

RunID: WET\_010310C-594895 Units: mg/L  
Analysis Date: 03/10/2001 15:14 Analyst: KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Fluoride	10	9	90	90	110

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

Sample Spiked: 01020760-06  
RunID: WET\_010310C-594897 Units: mg/L  
Analysis Date: 03/10/2001 15:14 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Fluoride	0.66	10	8.6	79.7 *	10	8.7	80.4	0.775	20	80	120

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

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

WorkOrder: 01020760  
Lab Batch ID: R31144

#### Method Blank

RunID: WET\_010310D-594953 Units: mg/L  
Analysis Date: 03/10/2001 15:14 Analyst: KM

#### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-06F	MW-8
01020760-08F	MW-10
01020760-17F	MW-7

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

#### Laboratory Control Sample (LCS)

RunID: WET\_010310D-594954 Units: mg/L  
Analysis Date: 03/10/2001 15:14 Analyst: KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	10.2	102	90	110

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

Sample Spiked: 01020760-06  
RunID: WET\_010310D-594958 Units: mg/L  
Analysis Date: 03/10/2001 15:14 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Nitrogen, Nitrate (As N)	0.66	10	10.2	95.8	10	10.2	95.7	0.0627	20	76	124

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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## Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Sulfate  
Method: E300

WorkOrder: 01020760  
Lab Batch ID: R31222

### Method Blank

RunID: WET\_010312E-596732 Units: mg/L  
Analysis Date: 03/12/2001 9:30 Analyst: KM

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-06F	MW-8
01020760-08F	MW-10
01020760-17F	MW-7

Analyte	Result	Rep Limit
Sulfate	ND	0.20

### Laboratory Control Sample (LCS)

RunID: WET\_010312E-596733 Units: mg/L  
Analysis Date: 03/12/2001 9:30 Analyst: KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sulfate	10	11	106	90	110

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

Sample Spiked: 01020760-06  
RunID: WET\_010312E-596736 Units: mg/L  
Analysis Date: 03/12/2001 9:30 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Sulfate	240	200	450	105	200	460	106	0.776	20	80	120

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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



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## Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Alkalinity, Bicarbonate  
Method: M2320 B

WorkOrder: 01020760  
Lab Batch ID: R31246

### Method Blank

RunID: WET\_010312K-597228 Units: mg/L  
Analysis Date: 03/12/2001 10:15 Analyst: SN

Analyte	Result	Rep Limit
Alkalinity, Bicarbonate	ND	2.0

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-01F	MW-1
01020760-02F	MW-3
01020760-03F	MW-4
01020760-04F	MW-5
01020760-06F	MW-8
01020760-07F	MW-9
01020760-08F	MW-10
01020760-09F	MW-11A
01020760-10F	MW-12

### Laboratory Control Sample (LCS)

RunID: WET\_010312K-597231 Units: mg/L  
Analysis Date: 03/12/2001 10:15 Analyst: SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Alkalinity, Bicarbonate	23.4	24.2	104	90	110

### Sample Duplicate

Original Sample: 01020760-01  
RunID: WET\_010312K-597232 Units: mg/L  
Analysis Date: 03/12/2001 10:15 Analyst: SN

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Bicarbonate	90.9	90.9	0	20

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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



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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Alkalinity, Bicarbonate  
Method: M2320 B

WorkOrder: 01020760  
Lab Batch ID: R31246A

#### Method Blank

#### Samples in Analytical Batch:

RunID: WET\_010312K-597228 Units: mg/L  
Analysis Date: 03/12/2001 10:15 Analyst: SN

Lab Sample ID	Client Sample ID
01020760-11F	MW-13
01020760-17F	MW-7

Analyte	Result	Rep Limit
Alkalinity, Bicarbonate	ND	2.0

#### Laboratory Control Sample (LCS)

RunID: WET\_010312K-597231 Units: mg/L  
Analysis Date: 03/12/2001 10:15 Analyst: SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Alkalinity, Bicarbonate	23.4	24.2	104	90	110

#### Sample Duplicate

Original Sample: 01020760-11  
RunID: WET\_010312K-597246 Units: mg/L  
Analysis Date: 03/12/2001 10:15 Analyst: SN

Analyte	Sample Result	DUP Result	RPD	RPD Limit
Alkalinity, Bicarbonate	131	131	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.





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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Alkalinity, Carbonate  
Method: M2320 B

WorkOrder: 01020760  
Lab Batch ID: R31248

#### Method Blank

RunID: WET\_010312L-597328 Units: mg/L  
Analysis Date: 03/12/2001 10:15 Analyst: SN

Analyte	Result	Rep Limit
Alkalinity, Carbonate	ND	2.0

#### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-01F	MW-1
01020760-02F	MW-3
01020760-03F	MW-4
01020760-04F	MW-5
01020760-06F	MW-8
01020760-07F	MW-9
01020760-08F	MW-10
01020760-09F	MW-11A
01020760-10F	MW-12

#### Laboratory Control Sample (LCS)

RunID: WET\_010312L-597331 Units: mg/L  
Analysis Date: 03/12/2001 10:15 Analyst: SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Alkalinity, Carbonate	23.4	24.2	104	90	110

#### Sample Duplicate

Original Sample: 01020760-01  
RunID: WET\_010312L-597332 Units: mg/L  
Analysis Date: 03/12/2001 10:15 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  
J - Estimated value between MDL and PQL

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

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



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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Alkalinity, Carbonate  
Method: M2320 B

WorkOrder: 01020760  
Lab Batch ID: R31248A

#### Method Blank

#### Samples in Analytical Batch:

RunID: WET\_010312L-597328 Units: mg/L  
Analysis Date: 03/12/2001 10:15 Analyst: SN

Lab Sample ID Client Sample ID  
01020760-11F MW-13  
01020760-17F MW-7

Analyte	Result	Rep Limit
Alkalinity, Carbonate	ND	2.0

#### Laboratory Control Sample (LCS)

RunID: WET\_010312L-597331 Units: mg/L  
Analysis Date: 03/12/2001 10:15 Analyst: SN

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Alkalinity, Carbonate	23.4	24.2	104	90	110

#### Sample Duplicate

Original Sample: 01020760-11  
RunID: WET\_010312L-597346 Units: mg/L  
Analysis Date: 03/12/2001 10:15 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 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.



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## Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Chloride, Total  
Method: E325.3

WorkOrder: 01020760  
Lab Batch ID: R31909

### Method Blank

RunID: WET\_010320U-610201 Units: mg/L  
Analysis Date: 03/20/2001 11:30 Analyst: CV

Analyte	Result	Rep Limit
Chloride	ND	1.0

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-01F	MW-1
01020760-02F	MW-3
01020760-03F	MW-4
01020760-04F	MW-5
01020760-06F	MW-8
01020760-07F	MW-9
01020760-08F	MW-10
01020760-09F	MW-11A
01020760-10F	MW-12
01020760-11F	MW-13

### Laboratory Control Sample (LCS)

RunID: WET\_010320U-610203 Units: mg/L  
Analysis Date: 03/20/2001 11:30 Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Chloride	109	110	101	90	110

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

Sample Spiked: 01020760-01  
RunID: WET\_010320U-610205 Units: mg/L  
Analysis Date: 03/20/2001 11:30 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	431	99.9	250	431	99.9	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.



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HOUSTON, TEXAS 77054  
(713) 660-0901

### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Chloride, Total  
Method: E325.3

WorkOrder: 01020760  
Lab Batch ID: R31909A

#### Method Blank

#### Samples in Analytical Batch:

RunID: WET\_010320U-610201 Units: mg/L  
Analysis Date: 03/20/2001 11:30 Analyst: CV

Lab Sample ID      Client Sample ID  
01020760-12B      MW-14  
01020760-17F      MW-7

Analyte	Result	Rep Limit
Chloride	ND	1.0

#### Laboratory Control Sample (LCS)

RunID: WET\_010320U-610203 Units: mg/L  
Analysis Date: 03/20/2001 11:30 Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Chloride	109	110	101	90	110

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

Sample Spiked: 01020760-12  
RunID: WET\_010320U-610218 Units: mg/L  
Analysis Date: 03/20/2001 11:30 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	330	500	827	99.9	500	827	99.9	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.



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(713) 660-0901

### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Hardness, Total (Titrimetric, EDTA)  
Method: E130.2

WorkOrder: 01020760  
Lab Batch ID: R32026

#### Method Blank

RunID: WET\_0103210-612335 Units: mg/L  
Analysis Date: 03/21/2001 13:30 Analyst: CV

Analyte	Result	Rep Limit
Hardness (As CaCO <sub>3</sub> )	ND	5.0

#### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01020760-01E	MW-1
01020760-02E	MW-3
01020760-03E	MW-4
01020760-04E	MW-5
01020760-06E	MW-8
01020760-07E	MW-9
01020760-08E	MW-10
01020760-09E	MW-11A
01020760-10E	MW-12
01020760-11E	MW-13

#### Laboratory Control Sample (LCS)

RunID: WET\_0103210-612338 Units: mg/L  
Analysis Date: 03/21/2001 13:30 Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Hardness (As CaCO <sub>3</sub> )	153	150	97	94	108

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

Sample Spiked: 01020760-01  
RunID: WET\_0103210-612342 Units: mg/L  
Analysis Date: 03/21/2001 13:30 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
Hardness (As CaCO <sub>3</sub> )	310	500	820	102	500	800	98.0	3.92	20	81	111

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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



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### Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Hardness, Total (Titrimetric, EDTA)  
Method: E130.2

WorkOrder: 01020760  
Lab Batch ID: R32026A

#### Method Blank

#### Samples in Analytical Batch:

RunID: WET\_0103210-612335 Units: mg/L  
Analysis Date: 03/21/2001 13:30 Analyst: CV

Lab Sample ID Client Sample ID  
01020760-17E MW-7

Analyte	Result	Rep Limit
Hardness (As CaCO <sub>3</sub> )	ND	5.0

#### Laboratory Control Sample (LCS)

RunID: WET\_0103210-612338 Units: mg/L  
Analysis Date: 03/21/2001 13:30 Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Hardness (As CaCO <sub>3</sub> )	153	150	97	94	108

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

Sample Spiked: 01020760-17  
RunID: WET\_0103210-612358 Units: mg/L  
Analysis Date: 03/21/2001 13:30 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
Hardness (As CaCO <sub>3</sub> )	590	1250	1800	98.0	1250	1800	98.0	0	20	81	111

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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

*Sample Receipt Checklist  
And  
Chain of Custody*



SPL, Inc.

SPL Worksheet No.

100825

## Analysis Request &amp; Chain of Custody Record

page 1 of 2

Client Name: Brown &amp; Caldwell

Address/Phone: 1415 Cypress St. #2500 (713) 784-9999

Client Contact: Rexie Rejzov

Project Name: BJSVCs

Project Number: 13532

Project Location: 40545

Invoice To: Rexie Rejzov

SAMPLE ID	DATE	TIME	comp	grab	matrix	bottle	size	pres.	Number of Containers	Requested Analysis
MW-12	3-3-01	16:10			W	Q4V	140	12	10	X
MW-14	3-8-01	9:30			W	Q4V	140	12	4	X
MW-15	3-8-01	5:45			W	Q4V	140	12	3	X
MW-5	3-8-01	10:15			W	Q4V	140	12	16	X
MW-7	3-8-01	10:50			W	Q4V	140	12	16	X
MW-3	3-8-01	11:20			W	Q4V	140	12	16	X
MW-9	3-8-01	11:50			W	Q4V	140	12	16	X
MW-1	3-8-01	12:40			W	Q4V	140	12	16	X
MW-4	3-8-01	13:45			W	Q4V	140	12	16	X
MW-13	3-8-01	14:30			W	Q4V	140	12	16	X

Client/Consultant Remarks:

Laboratory remarks:

PISH

Intact? ☐ Y ☒ N  
Temp: ☐ ☒ ☐

Special Reporting Requirements

Fax Results

☒

Raw Data

☐

Special Detection Limits (ppm):

Final review (initials):

(initials)

Requested TAT

Standard QC ☒Level 3 QC ☐Level 4 QC ☐24hr ☐72hr ☐48hr ☐Standard ☐Other ☐

1. Relinquished by Sampler:

3. Relinquished by:

5. Relinquished by:

2. Received by:

4. Received by:

6. Received by Laboratory:

3/9/01

☐ 8880 Interchange Drive, Houston, TX 77054 (713) 660-0901☐ 500 Ambassador Caffery Parkway, Scott, LA 70583 (518) 237-4775☐ 450-H...s Drive, Tra... Ci... (616) 297-5775





SPL, Inc.

SPL Worksheet No.

100826

## Analysis Request &amp; Chain of Custody Record

page 2 of 2

Client Name: Brown &amp; Caldwell

Address/Phone: 1415 Louisa St #250 (713) 759-4495

Client Contact: Rick Reynolds

Project Name: BJSUCS

Project Number: 12332

Project Location: 710 BJS

Invoice To: Rick Reynolds

SAMPLE ID DATE TIME comp grab

MU-11A 3-5-01 15:15

Client/Consultant Remarks:

Laboratory remarks:

Initial?

Temp:

Requested TAT

Special Reporting Requirements

Fax Results

Raw Data

Special Detection Limits (specify):

Standard QC

Level 3 QC

Level 4 QC

24hr

72hr

48hr

Standard

Other

1. Relinquished by:

3. Relinquished by:

5. Relinquished by:

2. Received by:

4. Received by:

6. Received by Laboratory:

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

500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4715

459-H...es Dr... Tr...ge C...MI 49604 (616) 947-5777

matrix bottle size pres. Number of Containers

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

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

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

VOC-8260 BTEX-8021

TPH ORO-8015

TPH GRO-8015

PAN 8010

PCRB METALS - 1/2" 2050-6010/ 720

Cu, Mg, K, Na 6010

Cd, Pb, Zn, Cu, Fe 325-3, 300.0

Bicarb Carl USA

Inert Nub, 5/11/01

GThong 15/1/01 717



SPL, Inc.

SPL Workorder No.

100821

Analysis Request & Chain of Custody Record

010207600

page 1 of 1

Client Name: Brown & Calhoun

Address/Phone: 1415 Louisiana #2500 (713) 759-0949

Client Contact: Rick Rendon

Project Name: B5SVCS

Project Number: 12632

Project Location: H0555

Service To: Nuclei Permeability

SAMPLE ID	DATE	TIME	comp	grab	matrix	bottle	size	pres.	Number of Containers	Requested Analysis				
										VOC-8260	PAH-8310	TPH-DRO-8215	TPH-CRO-8215	RE Minerals, Hardness
MW-7	3-8-01	10:50			W	V	40	1	14	X				3050-690-7000
MW-8	3-9-01	9:10			W	GLV	1/4	1/2	16	X				CA-Mg, K, Mn
MW-10	3-9-01	9:30			W	GLV	1/4	1/2	13	X				6010
Appl. core	3-9-01				W	GLV	1/4	1	8	X				CLD No. 500 fl.
Scip blank	3-11-01				W	V	40	1	2	X				200.0
MW-7	3-9-01	9:50			W	GL	1	1/2	5	X				Bicarb Carb
														4500
														methanol
														ethylene 15000 14/1/01

Client/Consultant Remarks:

Laboratory remarks:

CL 10.2

Intact? ☐ Y ☐ N

Requested TAT

Special Reporting Requirements

For Results

☒

Raw Data

☐

Special Detection Limits (specify):

PM review (initials):

Standard QC ☒

Level 3 QC

☐

Level 4 QC

☐

24hr ☐

72hr ☐

48hr ☐

Standard ☒

Other ☐

1. Relinquished by Sampler:

date

time

3-9-01

15:30

3. Relinquished by:

date

time

3-9-01

15:30

5. Relinquished by:

date

time

3-9-01

15:30

15:30

6. Received by Laboratory:

date

time

3/10/01

19:00

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

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

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

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



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

Sample Receipt Checklist

Workorder:	01020760	Received By:	DS
Date and Time Received:	3/10/01 10:00:00 AM	Carrier name:	FedEx
Temperature:	2	Chilled by:	Water Ice

- |  |   |                             |   |
|--|---|-----------------------------|---|
| 1. Shipping container/cooler in good condition?  | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Present <input type="checkbox"/>            |
| 2. Custody seals intact on shipping container/cooler?  | Yes <input type="checkbox"/>            | No <input type="checkbox"/> | Not Present <input checked="" type="checkbox"/> |
| 3. Custody seals intact on sample bottles?   | Yes <input type="checkbox"/>            | No <input type="checkbox"/> | Not Present <input checked="" type="checkbox"/> |
| 4. Chain of custody present?   | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 5. Chain of custody signed when relinquished and received?   | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 6. Chain of custody agrees with sample labels?<br>Sample was received but not listed on the chain of custody.<br>Aslo, the laboratory did not receive sample for MW-7. | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 7. Samples in proper container/bottle?   | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 8. Sample containers intact?   | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 9. Sufficient sample volume for indicated test?  | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 10. All samples received within holding time?  | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 11. Container/Trip Blank temperature in compliance?  | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 12. Water - VOA vials have zero headspace?   | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Applicable <input type="checkbox"/>         |
| 13. Water - pH acceptable upon receipt?  | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Applicable <input type="checkbox"/>         |

SPL Representative: Wyatt, Neaundra

Contact Date & Time: 3/9/01 10:09:00 AM

Client Name Contacted: Tim Jenkins

Non Conformance Issues: Sample was received but not listed on the chain of custody. Aslo, the laboratory did not receive sample for MW-7.

Client Instructions: Logged in samples on hold until further notice. Spoke to Tim Jenkins when he called about Trip Blank. Tim said that MW-7 and COC for Trip Blank were be shipped for delivery on March 10, 2001. Received sample on March 10, 2001.

C



C



C



**APPENDIX C**

**Groundwater Sampling Forms**

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-1

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 016Date: 3-8-01 Time: 12:30Client: BJSUCSPersonnel: Denny RainesProject Location: WJGSWeather: Cloudy, cool

## 2. WELL DATA

Casing Diameter: 3 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: 64.2 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Depth to Static Water: 60.35 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Depth to Product: \_\_\_\_\_ feet

From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: 3.85 feetWell Volume: 2.10 gal

Screened Interval (from GS): \_\_\_\_\_

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailer, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableWas well purged dry? ☒ Yes ☐ No Pumping Rate: \_\_\_\_\_ gal/min

Equipment Model(s)

1. Hobas 11-22

2. \_\_\_\_\_

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
12:35	1.06	8.27	17.1	99.4	86	6.58	59.5		

## 4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableDepth to Water at Time of Sampling: \_\_\_\_\_ Field Filtered? ☐ Yes ☐ NoSample ID: MW-1 Sample Time: 12:40 # of Containers: 16Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

Insufficient water in well to purge with pump collected grab sample with disposable bailer.

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



## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-3

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 016Date: 3-8-01 Time: 11:10Client: BT3003Personnel: DEAN, RAMESProject Location: HillsWeather: Cloudy, cool

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: 62 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Depth to Static Water: 57.69 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Depth to Product: — feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: (4.3) feetWell Volume: 3.7 gal

Screened Interval (from GS): \_\_\_\_\_

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailer, Size: 1.1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

Materials: Pump/Bailer

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

Equipment Model(s)

Materials: Rope/Tubing

☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableWas well purged dry? ☒ Yes ☐ No

Pumping Rate: \_\_\_\_\_ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
11:15	1.06	7.8	15.8	136	137	5.56	7.8		

## 4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1.1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

Materials: Pump/Bailer

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

Materials: Tubing/Rope

☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableDepth to Water at Time of Sampling: \_\_\_\_\_ Field Filtered? ☐ Yes ☐ NoSample ID: MW-3Sample Time: 11:20# of Containers: 16Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

Insufficient water to purge with pump.  
collected grab sample with disposable bailer

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

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-4

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 216Date: 3-8-01Time: 13:35Client: BJSWSPersonnel: Dean R. R.Project Location: HobbsWeather: cloudy, cool

## 2. WELL DATA

Casing Diameter: 2-3/4 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 2-2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: 61.3 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Depth to Static Water: 57.72 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Depth to Product: \_\_\_\_\_ feet

From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: 3.58 feetWell Volume: 3.6 gal

Screened Interval (from GS): \_\_\_\_\_

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailer, Size: 11 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

Equipment Model(s)

Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableWas well purged dry? ☒ Yes ☐ No Pumping Rate: \_\_\_\_\_ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
13:40	1.0 L	7.81	16.5	138 $\mu$ S/cm	94	6.94	58.2		

## 4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableDepth to Water at Time of Sampling: \_\_\_\_\_ Field Filtered? ☐ Yes ☒ NoSample ID: MW-4 Sample Time: 13:45 # of Containers: 16Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

Insufficient water column for purging with pump. Collected static sample with disposable bailer.

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

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: mw-5

## 1. PROJECT INFORMATION

Project Number: 12-832 Task Number: 2/6 Date: 3-5-01 Time: 10:00  
Client: BTSUCS Personnel: Dan Raites  
Project Location: Albion Weather: cloudy, cool

## 2. WELL DATA

Casing Diameter: 3 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_  
Screen Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_  
Total Depth of Well: 64.50 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Depth to Static Water: 59.30 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Depth to Product: - feet From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Length of Water Column: 5.14 feet Well Volume: 2.65 gal Screened Interval (from GS): \_\_\_\_\_  
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailer, Size: 1 1/2 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_  
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable  
Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable  
Was well purged dry? ☒ Yes ☐ No Pumping Rate: \_\_\_\_\_ gal/min  
Equipment Model(s):  
1. Hammer U-2.5  
2. \_\_\_\_\_

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
<u>10:10</u>	<u>5.00</u>	<u>7.60</u>	<u>16.0</u>	<u>2.133</u>	<u>174</u>	<u>6.98</u>	<u>17.1</u>		

## 4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1 1/2 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_  
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable  
Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable  
Depth to Water at Time of Sampling: \_\_\_\_\_ Field Filtered? ☐ Yes ☐ No  
Sample ID: MW5 Sample Time: 10:15 # of Containers: 16  
Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: 0 mg/L  
DO: 5 mg/L  
Nitrate: - mg/L  
Sulfate: - mg/L  
Alkalinity: 240 mg/L

## 5. COMMENTS

Insufficient water in well to purge with pump. Collected grab sample with bailer.

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

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-7

## 1. PROJECT INFORMATION

Project Number: 12537 Task Number: 016Date: 3-8-01Time: 1040Client: BO SUGSPersonnel: Danny RainesProject Location: 5-655Weather: Cloudy & cool

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: 61.5 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Depth to Static Water: 58.27 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Depth to Product: \_\_\_\_\_ feet

From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: 3.21 feetWell Volume: 0.5 gal

Screened Interval (from GS): \_\_\_\_\_

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailer, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableWas well purged dry? ☒ Yes ☐ No

Pumping Rate: \_\_\_\_\_ gal/min

Equipment Model(s)

1. Hydram U-22

2. \_\_\_\_\_

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
10:45	1.06	7.14	15.9	2.174	164	5.06	26.6		

## 4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableDepth to Water at Time of Sampling: \_\_\_\_\_ Field Filtered? ☐ Yes ☐ NoSample ID: MW-7Sample Time: 10:50# of Containers: 14Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

Well dry @ approx 1.5L purge, collected grab sample from well

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

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-8

## 1. PROJECT INFORMATION

Project Number: 12532 Task Number: 016Date: 3-9-01Time: 9:00Client: BJS SVCSPersonnel: DEAN, PAULProject Location: 12532Weather: Cloudy, cool

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: 62.2 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Depth to Static Water: 58.11 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Depth to Product: — feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: 4-9 feetWell Volume: 3.7 gal

Screened Interval (from GS): \_\_\_\_\_

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailer, Size: 12 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

Equipment Model(s)

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable1. Monitor U-22Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

2. \_\_\_\_\_

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

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
9:05	1.0 L	7.52	15.5	169 µm	166	5.50	2.18		

## 4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 12 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableDepth to Water at Time of Sampling: \_\_\_\_\_ Field Filtered? ☐ Yes ☒ NoSample ID: MW-8 Sample Time: 9:10 # of Containers: 10Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

In SUESS, 2001 water to sample with pump.  
collected first sample with disposable bailer.

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

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-9

## 1. PROJECT INFORMATION

Project Number: 12831 Task Number: 210Date: 3-8-01Time: 11:40Client: BO SUGPersonnel: Deany, R. KingProject Location: HallsWeather: cloudy, cool

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: 605 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Depth to Static Water: 57.03 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Depth to Product: — feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: 3.45 feetWell Volume: 2.58 gal

Screened Interval (from GS): \_\_\_\_\_

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

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

Equipment Model(s)

Materials: Pump/Bailer

☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable1. 6/4015-11-22

Materials: Rope/Tubing

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

2. \_\_\_\_\_

Was well purged dry? ☒ Yes ☐ No

Pumping Rate: \_\_\_\_\_ gal/min

Time	Cum. Gallons Removed -	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
<u>11:45</u>	<u>1.0L</u>	<u>7.90</u>	<u>16.2</u>	<u>3.10 mS/cm</u>	<u>153</u>	<u>5.56</u>			

## 4. SAMPLING DATA

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

Materials: Pump/Bailer

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

Materials: Tubing/Rope

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

Depth to Water at Time of Sampling: \_\_\_\_\_

Field Filtered? ☐ Yes ☐ NoSample ID: MW-9Sample Time: 11:50# of Containers: 16Duplicate Sample Collected? ☐ Yes ☒ No

ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

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

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

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-10

## 1. PROJECT INFORMATION

Project Number: 12532 Task Number: 016Date: 3-9-01Time: 9:20Client: BT SykesPersonnel: Dawn, JamesProject Location: NotbsWeather: Cloudy, cool

## 2. WELL DATA

Casing Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Screen Diameter: 2 inchesType: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_Total Depth of Well: 62 feetFrom: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Depth to Static Water: 55.31 feetFrom: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Depth to Product: \_\_\_\_\_ feet

From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_Length of Water Column: 2.09 feetWell Volume: 0.4 gal

Screened Interval (from GS): \_\_\_\_\_

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailer, Size: 111 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableWas well purged dry? ☒ Yes ☐ No Pumping Rate: \_\_\_\_\_ gal/min

Equipment Model(s)

1. Aluminum 4-22

2. \_\_\_\_\_

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
9:25	1.06	7.23	16.8	2214µm	-117	4.71	145		

## 4. SAMPLING DATA

Method(s): ☒ Bailer, Size: \_\_\_\_\_ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ DisposableMaterials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ DisposableDepth to Water at Time of Sampling: \_\_\_\_\_ Field Filtered? ☐ Yes ☐ NoSample ID: MW-10 Sample Time: 9:30 # of Containers: 13Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: 2.5 mg/LDO: 4.0 mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: 750 mg/L

## 5. COMMENTS

In sufficient water in well to purge with pump. collected grab sample with disposable bailer.

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

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW 11A

## 1. PROJECT INFORMATION

Project Number: 12-637 Task Number: 016 Date: 3-8-01 Time: 15:05  
Client: BTD SVU Personnel: Danny Raines  
Project Location: \_\_\_\_\_ Weather: \_\_\_\_\_

## 2. WELL DATA

Casing Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_  
Screen Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_  
Total Depth of Well: 67.5 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Depth to Static Water: 59.72 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Depth to Product: — feet From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Length of Water Column: 3.58 feet Well Volume: 0.6 gal Screened Interval (from GS): \_\_\_\_\_  
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailer, Size: 1.1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_ Equipment Model(s):  
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_ 1. Horizon 11-21  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable  
Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon 2. \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable  
Was well purged dry? ☒ Yes ☐ No Pumping Rate: \_\_\_\_\_ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
15:10	1.0L	746	15.3	-630	-87	1.51	895		
							895		

## 4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1.1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_  
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable  
Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable  
Depth to Water at Time of Sampling: \_\_\_\_\_ Field Filtered? ☐ Yes ☐ No  
Sample ID: MW-11A Sample Time: 15:15 # of Containers: 10  
Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: 4.0 mg/L  
DO: 1.0 mg/L  
Nitrate: — mg/L  
Sulfate: — mg/L  
Alkalinity: 770 mg/L

## 5. COMMENTS

In sufficient water column to purge with pump. Collected grab sample with bailer.

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



## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-12

## 1. PROJECT INFORMATION

Project Number: 12532 Task Number: 016 Date: 3-8-01 Time: 1600  
Client: BT SUG Personnel: DEAN RIGGS  
Project Location: Nobles Weather: Cloudy Cool

## 2. WELL DATA

Casing Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_  
Screen Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_  
Total Depth of Well: 60.8 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Depth to Static Water: 59.76 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Depth to Product: — feet From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Length of Water Column: 1.04 feet Well Volume: 0.17 gal Screened Interval (from GS): \_\_\_\_\_  
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailer, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_ Equipment Model(s): \_\_\_\_\_  
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable  
Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable  
Was well purged dry? ☒ Yes ☐ No Pumping Rate: \_\_\_\_\_ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
16:05	1.02	7.22	16.3	0.222 <sup>mg/L</sup>	-110	4.50	5.5		

## 4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_  
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable  
Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable  
Depth to Water at Time of Sampling: \_\_\_\_\_ Field Filtered? ☐ Yes ☐ No  
Sample ID: MW-12 Sample Time: 16:10 # of Containers: \_\_\_\_\_  
Duplicate Sample Collected? ☒ Yes ☐ No ID: duplicate

## Geochemical Analyses

Ferrous Iron: 2.5 mg/L  
DO: 4.0 mg/L  
Nitrate: — mg/L  
Sulfate: — mg/L  
Alkalinity: 780 mg/L

## 5. COMMENTS

In sufficient water to purge with pump.  
Collected grab sample with disposable bailer.

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

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-13

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 016Date: 3-8-01 Time: 14:20Client: BJ SUCSPersonnel: DEAN R. L. L.Project Location: 40665Weather: cloudy, cool

## 2. WELL DATA

Casing Diameter: 3 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_

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

Total Depth of Well: 65.2 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Depth to Static Water: 59.9 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Depth to Product: \_\_\_\_\_ feet From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_

Length of Water Column: 5.01 feet Well Volume: 1.0 gal Screened Interval (from GS): \_\_\_\_\_

Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailer, Size: 1.1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

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

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

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

Equipment Model(s)  
1. Alorica M-22  
2. \_\_\_\_\_

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
<u>14:25</u>	<u>1.02</u>	<u>7.80</u>	<u>17.2</u>	<u>178 µm</u>	<u>-47</u>	<u>6.47</u>	<u>37.5</u>		

## 4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1.1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_

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

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

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

Well ID: MW-13 Sample Time: 14:30 # of Containers: 16

Was Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L

DO: \_\_\_\_\_ mg/L

Nitrate: \_\_\_\_\_ mg/L

Sulfate: \_\_\_\_\_ mg/L

Alkalinity: \_\_\_\_\_ mg/L

REMARKS: Insufficient water in well for analysis with collected sample using disposable bailer.

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

Signature \_\_\_\_\_

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-14

## 1. PROJECT INFORMATION

Project Number: 12537 Task Number: 015 Date: 3-8-01 Time: 9:20  
Client: BSUSS Personnel: Devin, M. M. B.  
Project Location: Hubbs Weather: Cloudy, cool

## 2. WELL DATA

Casing Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_  
Screen Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_  
Total Depth of Well: 69.2 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Depth to Static Water: 61.07 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: 8.13 feet Well Volume: 1.3 gal Screened Interval (from GS): \_\_\_\_\_  
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailer, Size: 1.1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_  
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable  
Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable  
Was well purged dry? ☒ Yes ☐ No Pumping Rate: \_\_\_\_\_ gal/min  
Equipment Model(s)  
1. Horiba U-20  
2. \_\_\_\_\_

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
9:25	2.5L	7.23	16	2235-270	662	224	—		

## 4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1.1 ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_  
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable  
Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable  
Depth to Water at Time of Sampling: \_\_\_\_\_ Field Filtered? ☐ Yes ☐ No  
Sample ID: MW-14 Sample Time: 9:30 # of Containers: 4  
Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L  
DO: \_\_\_\_\_ mg/L  
Nitrate: \_\_\_\_\_ mg/L  
Sulfate: \_\_\_\_\_ mg/L  
Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

Insufficient water in well to purge with pump.  
Collected grab sample with 0.5 capacity bailer.

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

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-15

## 1. PROJECT INFORMATION

Project Number: 12837 Task Number: 016 Date: 3-8-01 Time: 9:40  
Client: B3 SVCS Personnel: Danny Raines  
Project Location: 40668 Weather: Cloudy, cool

## 2. WELL DATA

Casing Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_  
Screen Diameter: 2 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_  
Total Depth of Well: 67 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Depth to Static Water: 59.75 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Depth to Product: — feet From: ☐ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Length of Water Column: 7.25 feet Well Volume: 1.2 gal Screened Interval (from GS): \_\_\_\_\_  
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☒ Bailer, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_ Equipment Model(s):  
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_ 1. Horiba U-22  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable  
Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon 2. \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable  
Was well purged dry? ☒ Yes ☐ No Pumping Rate: \_\_\_\_\_ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
9:40	1.06	7.31	16.7	2.149	2.14	5.79	18		

## 4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1" ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_  
Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable  
Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☒ Other: Nylon  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable  
Depth to Water at Time of Sampling: \_\_\_\_\_ Field Filtered? ☐ Yes ☒ No  
Sample ID: MW-15 Sample Time: 9:45 # of Containers: 3  
Duplicate Sample Collected? ☐ Yes ☒ No ID: \_\_\_\_\_

## Geochemical Analyses

Ferrous Iron: \_\_\_\_\_ mg/L  
DO: \_\_\_\_\_ mg/L  
Nitrate: \_\_\_\_\_ mg/L  
Sulfate: \_\_\_\_\_ mg/L  
Alkalinity: \_\_\_\_\_ mg/L

## 5. COMMENTS

Insufficient water in well to purge with pump.  
collected grab sample with PVC bailer

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

## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: GW-4

## 1. PROJECT INFORMATION

Project Number: 12832 Task Number: 016 Date: 3-8-01 Time: 12:05  
Client: BJSVC Personnel: DEAN, MAHES  
Project Location: Adelphi Weather: cloudy, cool

## 2. WELL DATA

Casing Diameter: 4 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_  
Screen Diameter: 4 inches Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other: \_\_\_\_\_  
Total Depth of Well: 61.5 feet From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other: \_\_\_\_\_  
Depth to Static Water: 61.43 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: 2.08 feet Well Volume: \_\_\_\_\_ gal Screened Interval (from GS): \_\_\_\_\_  
Note: 2-inch well = 0.167 gal/ft 4-inch well = 0.667 gal/ft

## 3. PURGE DATA

Purge Method: ☐ Bailer, Size: \_\_\_\_\_ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump  
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: \_\_\_\_\_ Equipment Model(s) \_\_\_\_\_  
Materials: Pump/Bailer ☐ Stainless ☐ PVC ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable 1. \_\_\_\_\_  
Materials: Rope/Tubing ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: \_\_\_\_\_  
☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable 2. \_\_\_\_\_  
Was well purged dry? ☐ Yes ☐ No Pumping Rate: \_\_\_\_\_ gal/min

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	ORP	Dissolved Oxygen	Turbidity	Other:	Comments
<u>12:10</u>	<u>115E</u>								

## 4. SAMPLING DATA

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

## Geochemical Analyses

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

## 5. COMMENTS

not sampled well day

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



# BROWN AND CALDWELL

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

## TRANSMITTAL MEMORANDUM

To: Mr. Wayne Price State of New Mexico Energy, Minerals, and Natural Resources Dept. Oil Conservation Division 2040 South Pacheco Street, State Land Office Bld. Santa Fe, New Mexico 87505	Date: January 10, 2002	Job No: 12832-016
	Subject: Hobbs, New Mexico Facility	
	Certified Mail No.:	
	Equipment No:	
	Spec. Ref:	
Submittal No:		

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

### THESE ARE TRANSMITTED AS CHECKED BELOW:

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

### SUBMITTAL REVIEW ACTIONS:

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

Copies	Date	No.	Description
1	01/07/02	1	June 2001 Groundwater Sampling Report, BJ Services Company, U.S.A., Hobbs, New Mexico
1	01/07/02	1	September 2001 Groundwater Sampling Report, BJ Services Company, U.S.A., Hobbs, New Mexico

### REMARKS:

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



Richard L. Rexroad, P.G.

B R O W N   A N D   C A L D W E L L



**JUNE 2001 GROUNDWATER SAMPLING  
REPORT  
HOBBS, NEW MEXICO FACILITY**

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

**JANUARY 7, 2002**

**JUNE 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 Rexroad  
Project Manager

January 7, 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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### **DISTRIBUTION AND QA/QC REVIEWER'S SIGNATURE**

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- A Laboratory Analytical Reports for Groundwater Samples
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## 1.0 INTRODUCTION

Brown and Caldwell conducted field activities associated with the June 2001 quarterly groundwater sampling event at the BJ Services Company, U.S.A. (BJ Services) facility located at 2708 West County Road in Hobbs, New Mexico on June 21-22, 2001. Groundwater samples from monitor wells MW-14 and MW-15 were analyzed for chloride content. Groundwater samples from the remaining wells sampled in June 2001 were analyzed for gasoline- and diesel-range total petroleum hydrocarbons (TPH-G and TPH-D) and benzene, toluene, ethylbenzene, and xylenes (BTEX). This report presents a description of the groundwater sampling field activities, a summary of the analytical results, and an evaluation of remedial technologies being applied at the facility. A groundwater potentiometric surface map, a benzene concentration map, and a hydrocarbon distribution map are included.

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 are also presented in this report.

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 groundwater monitor wells at the facility on June 21-22, 2001 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. Brown and Caldwell installed and sampled four confirmation soil borings at the former fueling system area of the facility on July 23, 2001 to verify that cleanup goals for soil, as specified in the NMOCD-approved RAP for the facility, have been achieved. The following subsections describe the field activities conducted by Brown and Caldwell at the facility in June 2001 and July 2001 and present the results of the associated soil and groundwater analyses.

### 2.1 June 2001 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 June 21, 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 well OW-4 did not contain sufficient water in June 2001 for collection of a groundwater sample.

All monitor wells except MW-12 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. The wells were sampled in general order of least impacted to most impacted (based on analytical results from the March 2001 sampling event) to further mitigate the potential for cross-contamination of wells. Monitor well MW-12 did not contain adequate water to facilitate use of the bladder pump, so the well was purged using a disposable bailer.

Field parameter measurements for pH, conductivity, oxidation-reduction (redox) potential, dissolved oxygen, and temperature were collected 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 in each well. The groundwater sample collected from monitor well MW-12 was collected using the bailer that was used for purging the well. Each sample was transferred to laboratory-prepared, clean glass or plastic containers sealed with Teflon®-lined lids, labeled, and placed on ice in an insulated cooler for shipment via overnight courier to 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 collected from all wells during this sampling event except monitor wells MW-14 and MW-15 were analyzed for TPH-D and TPH-G by EPA Method 8015B and for BTEX by EPA Method 8021B. Groundwater samples from monitor wells MW-14 and MW-15 were analyzed for chloride by Method 325.3. Groundwater samples from selected wells were analyzed for nitrate and sulfate by Method 300.0 and for dissolved methane by Method RSK-SOP 147/175 to assist in evaluation of natural attenuation processes at the facility. The laboratory analytical

reports and chain-of-custody documentation for the groundwater samples collected during the June 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. The results for nitrate, sulfate, and dissolved methane analyses performed on groundwater samples from monitor wells MW-5, MW-10, MW-11A, and MW-12 are presented in Table 5.

Benzene concentrations in excess of the laboratory detection limit were reported in three of the 10 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 except monitor well MW-12. The detection of benzene at 0.012 mg/L in monitor well MW-12 is the lowest benzene concentration ever measured in this well, however.

Benzene concentrations in monitor wells located near the former fuel island source area remained below the NMWQCC standard of 0.01 mg/L in June 2001. Benzene was not detected in monitor wells MW-3, MW-4, or MW-13, and has not been detected in these wells 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.

Figure 3 presents a benzene concentration and total BTEX distribution map for the June 2001 sampling event. A total petroleum hydrocarbon distribution map for the June 2001 sampling event is presented in Figure 4.

Table 6 presents current and historic results for chloride analyses performed on groundwater samples collected at the facility. The chloride concentration of 222 mg/L in downgradient wells MW-14 and MW-15 in June 2001 is 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 222 mg/L during this time period.

### **2.3 July 2001 Confirmation Soil Boring Installation and Sampling Activities**

On July 23, 2001, Brown and Caldwell installed and sampled confirmation soil borings at four locations in the former fueling system area at which groundwater impact had previously been present, in accordance with the requirements specified in the RAP for the facility. The locations of these soil borings, which were designated as CSB-1 through CSB-4, are shown in Figures 3 and 4.

The confirmation soil borings were installed using an Ingersoll-Rand TH-60 truck-mounted air rotary drilling rig. The soil borings were advanced to the top of the water table. The depth to groundwater was measured prior to drilling at nearby monitor wells, using a decontaminated water level indicator, to verify the anticipated depth at which the saturated zone would be reached.

Soil cores were recovered at approximate 5-foot centers from a depth of 20 feet below grade to the total depth of each boring, scanned with a calibrated photoionization detector (PID), and classified using the Unified Soil Classification System (USCS). The soil cores were used in conjunction with soil cuttings derived from intervals not cored to create boring logs for each of the four soil borings, which are presented in Appendix C. PID screening of recovered soil cores was conducted using the following procedures:

1. A small quantity (i.e., a few ounces) of representative soil was removed from the recovered soil core and placed in a previously unused zip-lock bag;
2. The bag was sealed, and the exterior of the bag was labeled regarding soil boring identification and depth interval;
3. The sealed bag was placed in a sunny location for approximately 5 minutes;
4. The probe of the calibrated PID was inserted into the bag while simultaneously kneading the soil by hand through the exterior of the bag to further facilitate the release of volatile constituents that may have been present;

5. The maximum readout of the PID was recorded.

After completion of PID scanning and USCS classification, the remaining portion of each recovered soil core was separately wrapped in aluminum foil. The boring number and depth interval were marked on the exterior of the aluminum foil using waterproof ink, and the wrapped core was placed in an iced cooler until a determination is made as to whether a sample from the interval in question would be submitted for laboratory analysis. After determining which sample intervals were to be selected for laboratory analysis at a given sample location, wrapped soil cores were retrieved from the cooler, unwrapped, and appropriate sample containers were filled and labeled.

A soil sample from the interval immediately overlying the top of the saturated zone was collected from each confirmation boring and submitted for laboratory analysis. It was anticipated that a soil sample would also be collected for laboratory analysis from the interval of each confirmation soil boring that displayed the maximum PID response. No positive PID responses were obtained from cores recovered from any of the four confirmation soil borings, however. The sample submitted from an interval exclusive of the top of the saturated zone was therefore collected according to the following criteria:

1. If visual or olfactory evidence of contaminant impact in one or more soil cores from a given soil boring was observed, then the interval displaying the greatest apparent degree of visual or olfactory evidence of contaminant impact would have been selected for laboratory analysis. No visual or olfactory evidence of contaminant impact was observed in any of the recovered soil cores, however, so the following basis of soil sample selection was used.
2. Since there was no visual or olfactory evidence of contaminant impact in any of the recovered soil cores, a sample was submitted for laboratory analysis from an interval in which accumulation of downward-migrating contaminants would be anticipated based on vertical stratigraphic variation (e.g., a coarse-grained permeable interval overlying a fine grained interval, a coarse-grained permeable interval overlying a relatively impermeable, indurated layer, etc.) or, in the absence of this type of lithologic variation, from the second sample interval above the top of the saturated zone.

At the conclusion of sampling, the soil samples were delivered to an overnight courier for shipment to Southern Petroleum Laboratory in Houston, Texas. A completed chain-of-custody form was submitted to the analytical laboratory along with the samples. Each of the soil samples was analyzed for the following parameters:

- BTEX by EPA Method 8021B;
- TPH-D by EPA Method 8015; and
- TPH-G by EPA Method 8015.

The following section provides a discussion of the analytical results for the confirmation soil samples and a comparison of these results to the remediation goals for soil at the former fueling system area of the facility.

## **2.4 Results for Confirmation Soil Samples**

Table 7 presents the analytical results for the confirmation soil samples collected at the BJ Services Hobbs, New Mexico facility on July 23, 2001. The associated laboratory analytical report is provided in Appendix D.

There were no detections of benzene in any of the eight confirmation soil samples. There were no detections of BTEX constituents, TPH-D, or TPH-G in any of the soil samples collected from confirmation soil borings CSB-3 and CSB-4, which were the two southernmost borings.

Confirmation soil boring CSB-2 was installed at a location in immediate proximity to the former fuel island. There were no detections of BTEX constituents in either of the samples from this boring. TPH-G concentrations ranged from less than 0.10 milligrams per kilogram (mg/kg) in the 54- to 56-foot sample interval to 0.23 mg/kg in the sample collected from the 35- to 37-foot interval. TPH-D was detected at respective concentrations of 33 mg/kg and 25 mg/kg in these samples.

Confirmation soil boring CSB-1 was installed in immediate proximity to the location of the former diesel and gasoline aboveground storage tanks (ASTs). There were no detections of BTEX constituents, TPH-D, or TPH-G in the soil sample collected from the capillary fringe at a depth of 54 feet to 56 feet in this boring. Ethylbenzene and xylenes were detected at respective concentrations of 0.0013 mg/kg and 0.0118 mg/kg in the 45- to 47-foot sample from this boring, and TPH-G and TPH-D were detected at respective concentrations of 0.12 mg/kg and 6.6 mg/kg in this sample. Benzene and toluene were not detected in the 45- to 47-foot sample from confirmation soil boring CSB-1.

The following remediation goals for unsaturated-contaminated soils were specified in the NMOCD-approved RAP for the facility:

Parameter	Remediation Goal
Benzene	10 ppm
Total BTEX	50 ppm
TPH	1000 ppm

Comparison of the analytical results for the soil samples collected from confirmation soil borings CSB-1 through CSB-4 as presented in Table 7 to the remediation goals specified above indicates that hydrocarbon concentrations in all soil samples are less than these remediation goals. Hydrocarbon concentrations in the confirmation soil samples were in fact typically as much as 2 to 4 orders of magnitude less than these remediation goals.

Based on the cumulative groundwater analytical results presented in Section 2.2 and the confirmation soil sample analytical results presented herein, the following course of action is prescribed in the NMOCD-approved RAP for the former fueling system area of the BJ Services Hobbs, New Mexico facility:

1. Continue quarterly groundwater monitoring for 1 year;



2. If groundwater analytical results do not exceed the groundwater remediation goals specified in the RAP during the 1-year quarterly monitoring period, then;
3. A bioparging system closure report will be submitted for the former fueling system area of the facility; and
4. The bioparging system will be decommissioned, and the remediation and applicable monitor wells will be plugged and abandoned (P&Ad).

The bioparging system may be re-activated in the event that groundwater remediation goals are exceeded during the 1-year quarterly monitoring period.



### **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 source 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 June 2001 sampling event is the third 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 five 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

discussed in Section 2.4, indicate that remediation goals for soil in this area have successfully been achieved.

To further demonstrate the effectiveness of the biosparging system in remediating hydrocarbon-impacted soils in the former fueling system area, Figure 5 presents a comparison of BTEX and TPH data from soil samples collected in this area in July-August 1992 (prior to activation of the biosparging system in November 1995) to data from the July 2001 confirmation soil borings, which were installed after deactivation of the biosparging system in November 2000. Comparison of soil data from 1992 soil borings SB-2 and SB-6 to 2001 soil boring CSB-1, which were installed in the vicinity of the former diesel and gasoline AST locations, indicates that BTEX constituent concentrations have dropped by 2 to 5 orders of magnitude and that TPH-D concentrations have decreased by 2 to 3 orders of magnitude in this area as a result of operation of the biosparging system.

Soil boring SB-5 was installed in 1992 at the former fuel island location, and confirmation soil boring CSB-2 was installed in 2001 in close proximity to the SB-5 location. Comparison of soil samples collected from the capillary fringe in these two borings indicate that BTEX constituent concentrations have dropped by 2 to 4 orders of magnitude and that TPH-D concentrations have decreased by an order of magnitude in this area as a result of operation of the biosparging system.

Confirmation soil boring CSB-3 was installed in 2001 at a location downgradient of the former fuel island dispensers, in proximity to 1992 soil borings SB-1 and SB-4. Comparison of BTEX data from the confirmation soil samples to the 1992 soil samples indicates that BTEX constituent concentrations have typically decreased by 3 to 4 orders of magnitude. TPH-D concentrations have displayed decreases ranging from less than 1 order of magnitude to 3 orders of magnitude over this time period.

The data presented in Figure 5 also indicate that the upgradient extent of hydrocarbon impact to soil is defined by 1992 soil boring SB-7 and that the downgradient extent of hydrocarbon-impacted soil is defined by 2001 confirmation soil borings CSB-3 and CSB-4.

### **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).

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

The former field waste tanks in the eastern portion of the facility were removed in March 1997. Concentrations of total BTEX in monitor wells in the area of the former field waste tanks have been generally stable or declining subsequent to removal of the field waste tanks. 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 June 2001 sampling event is the first in which there were no detections of BTEX constituents in former field waste tanks area monitor well MW-10. The concentrations of benzene and total BTEX measured in former field waste tanks area monitor well MW-12 in June 2001 are lower than at any time during the monitoring history of the well. These data provide primary evidence that natural attenuation of hydrocarbons is occurring in these areas.

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

1. Dissolved oxygen may be utilized during intrinsic bioremediation. Dissolved oxygen concentrations should therefore be depressed in areas where intrinsic bioremediation is occurring. June 2001 dissolved oxygen data for the facility suggest that natural attenuation of hydrocarbons is ongoing at the facility.

Dissolved oxygen concentrations measured in non-hydrocarbon impacted monitor wells MW-3, MW-4, MW-5, MW-14 and MW-15 range from 3.33 mg/L to 4.61 mg/L.

Dissolved oxygen concentrations in former field waste tanks area monitor wells MW-10 and MW-11A were measured at 0.70 mg/L and 0.64 mg/L, respectively. Benzene was detected at a concentration of 0.0015 mg/L in monitor well MW-11A in June 2001, continuing a generally decreasing concentration trend in the well. Benzene was not detected in monitor well MW-10 in June 2001; this non-detection, the first in MW-10, also continues a generally declining trend in the well. It is anticipated that the dissolved oxygen content in monitor well MW-10 will begin, in the near future, to rebound to a concentration comparable to those measured in monitor wells MW-3, MW-4, MW-5, MW-14 and MW-15 in June 2001.

The dissolved oxygen content of former field waste tanks area monitor well MW-12 was not measured because oxygen is typically added to groundwater when a bailer is used for well purging and sampling. Hence, erroneous and potentially misleading dissolved oxygen data for monitor well MW-12 could have been generated had an attempt been made to measure the dissolved oxygen content of groundwater from this well.

The dissolved oxygen content of monitor well MW-13, which is located downgradient of the biosparging system at the former fueling system area, was measured at 1.40 mg/L in June 2001. This dissolved oxygen concentration is intermediate between the dissolved oxygen concentration measured in other non-hydrocarbon impacted monitor wells (i.e., MW-3, MW-4, MW-5, MW-14 and MW-15) and those exhibited by the former field waste tanks area monitor wells (i.e., MW-10 and MW-11A). Although no BTEX constituents were detected in monitor well MW-13, examination of the BTEX data presented in Table 4 indicates that decline in BTEX constituent concentrations in the well has been precipitous, with total BTEX concentrations of nearly 300 mg/L measured in the well as recently as March 2000. The intermediate dissolved oxygen concentration measured in monitor well MW-13 in June 2001 suggests that the concentration of

dissolved oxygen in this area is currently rebounding after the recent removal of hydrocarbons from groundwater in the area and the November 2000 deactivation of the biosparging system.

Historic evidence submitted to the NMOCD in previous quarterly groundwater monitoring reports for the facility has also indicated that dissolved oxygen concentrations are typically depressed in hydrocarbon-impacted monitor wells relative to non-impacted monitor wells at the facility, providing further evidence of the occurrence of natural attenuation of hydrocarbons at the facility.

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

Nitrate concentrations were measured at less than 0.1 mg/L in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12 during the June 2001 sampling event. These concentrations are less than the background nitrate concentration of 2.74 mg/L measured in monitor well MW-5 (see Table 5). The non-detections of nitrate in monitor wells MW-10, MW-11A, and MW-12 suggest that nitrate acts as an electron acceptor during natural attenuation of hydrocarbons that has occurred and continues to occur 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 respective concentrations of 6.5 mg/L and greater than 10 mg/L in former field waste tanks area monitor wells MW-11A and MW-10, as shown in Table 4. Ferrous iron was not detected in the background well, MW-5. The elevated ferrous iron concentrations in monitor wells MW-10 and MW-11A suggest 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 1.6 mg/L in monitor well MW-13. This ferrous iron concentration is intermediate between the ferrous iron concentration of 0 mg/L measured in the background well and those measured in former field waste tanks area monitor wells MW-10 and MW-11A (i.e., 6.5 mg/L and greater than 10 mg/L). The intermediate ferrous iron oxygen concentration measured in monitor well MW-13 in June 2001 provides further evidence that the groundwater geochemistry in the area of well MW-13 is currently returning to ambient conditions after the recent removal of hydrocarbons from groundwater in that area and the November 2000 deactivation of the biosparging system.

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. Sulfate concentrations in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12 exceed the concentration of sulfate in background monitor well, MW-5, however (see Table 5). These data indicate 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.

As shown in Table 5, methane was detected in the background well at a concentration of 0.0017 mg/L and at concentrations ranging from 0.0021 mg/L to 0.044 mg/L in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12. The elevated methane concentrations in monitor wells in 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 in this area, especially in the vicinity of monitor well MW-10, which displayed a methane concentration that is an order of magnitude greater than that of the background well, MW-5.

6. Redox potential is a measure of chemical energy in groundwater. The redox potential of groundwater from background well MW-5 was measured at 172.5 millivolts (mV). Redox values in other non-hydrocarbon impacted wells MW-3, MW-4, MW-14 and MW-15 ranged from 139.0 mV to 163.2 mV, as shown in Table 3. Redox values in monitor wells MW-10 and MW-11A, which are located in the vicinity of the former field wastes tanks, ranged from -103.8 mV to -104.5 mV. The negative redox values in the former field waste tank area monitor wells provide additional evidence that natural attenuation of hydrocarbons is occurring in the area of the former field waste tanks.

A groundwater redox potential of 94.0 mV was measured in monitor well MW-13. This value is intermediate between the redox values ranging from 139.0 mV to 172.5 mV in other non-hydrocarbon impacted wells (i.e., MW-3, MW-4, MW-5, MW-14 and MW-15) and the negative redox potentials measured in former field waste tanks area monitor wells MW-10 and 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 MW-4, MW-5, MW-7, MW-10, MW-11A and MW-13 in June 2001 are inconclusive, however.



In conclusion, dissolved oxygen and nitrate data from this and previous groundwater sampling events suggest that these constituents are acting as electron acceptors during intrinsic bioremediation processes that are ongoing at 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 elevated ferrous iron concentrations in monitor wells at the former field waste tanks area. Redox data provide further evidence that natural attenuation of hydrocarbons is occurring in this area. The elevated methane concentrations detected in former field waste tanks area monitor wells suggest that carbon dioxide is also serving locally as an electron acceptor during intrinsic bioremediation of hydrocarbons in this area.

It is recommended that monitoring for natural attenuation evaluation parameters continue in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12 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 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 June 2001 groundwater sampling event and the July 2001 confirmation soil sampling event conducted at the BJ Services Hobbs, New Mexico facility.

### 4.1 Conclusions

- Dissolved benzene, BTEX, and TPH concentrations in all monitor wells located near the former fueling system source area are non-detectable or below applicable standards and have remained at these levels for the past five quarterly groundwater sampling events.
- Benzene, total BTEX, and TPH concentrations in all confirmation soil samples collected at the former fueling system source area are less than the remediation goals for soil that were specified in the NMOCD-approved RAP for the facility.
- 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 soil and groundwater in this area.
- For the second consecutive quarter, benzene and total BTEX concentrations measured in former field waste tanks area monitor wells MW-10 and MW-12 are lower than at any time during the monitoring history of these wells. The June 2001 sampling event is the first in which there were no detections of BTEX constituents in monitor well MW-10. Benzene concentrations in all monitor wells at the former field waste tanks area of the facility, except MW-12, 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 are decreasing in monitor well MW-14 and

have remained essentially constant in monitor well MW-15 since the 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-12. 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 1 year.
- 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

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

January 7, 2002

Final Distribution as follows:

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Oil Conservation Division  
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Attention: Mr. Wayne Price

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Oil Conservation Division, Hobbs District Office  
1625 N. French Dr.  
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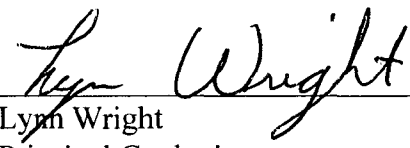
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## QUALITY CONTROL REVIEWER

  
Lynn Wright  
Principal Geologist

RLR/uak

# Figures

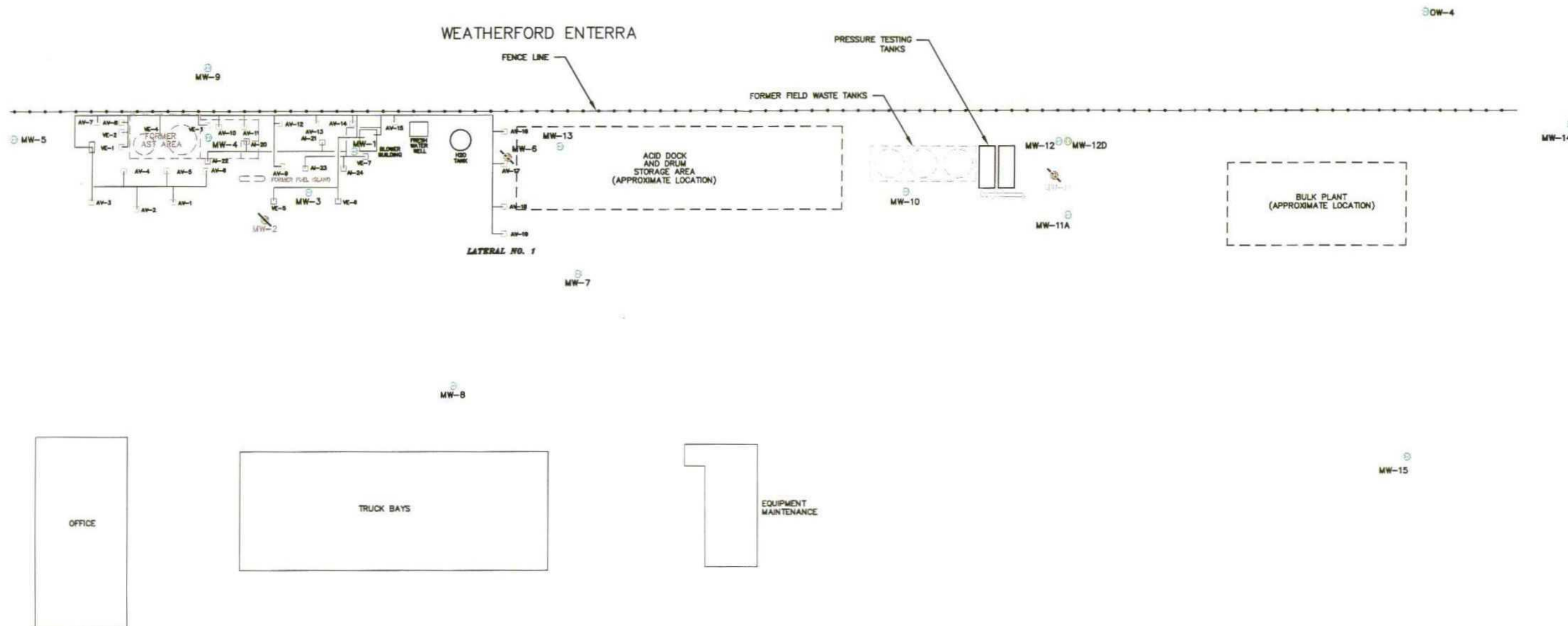


## FIGURES

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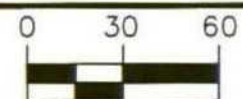
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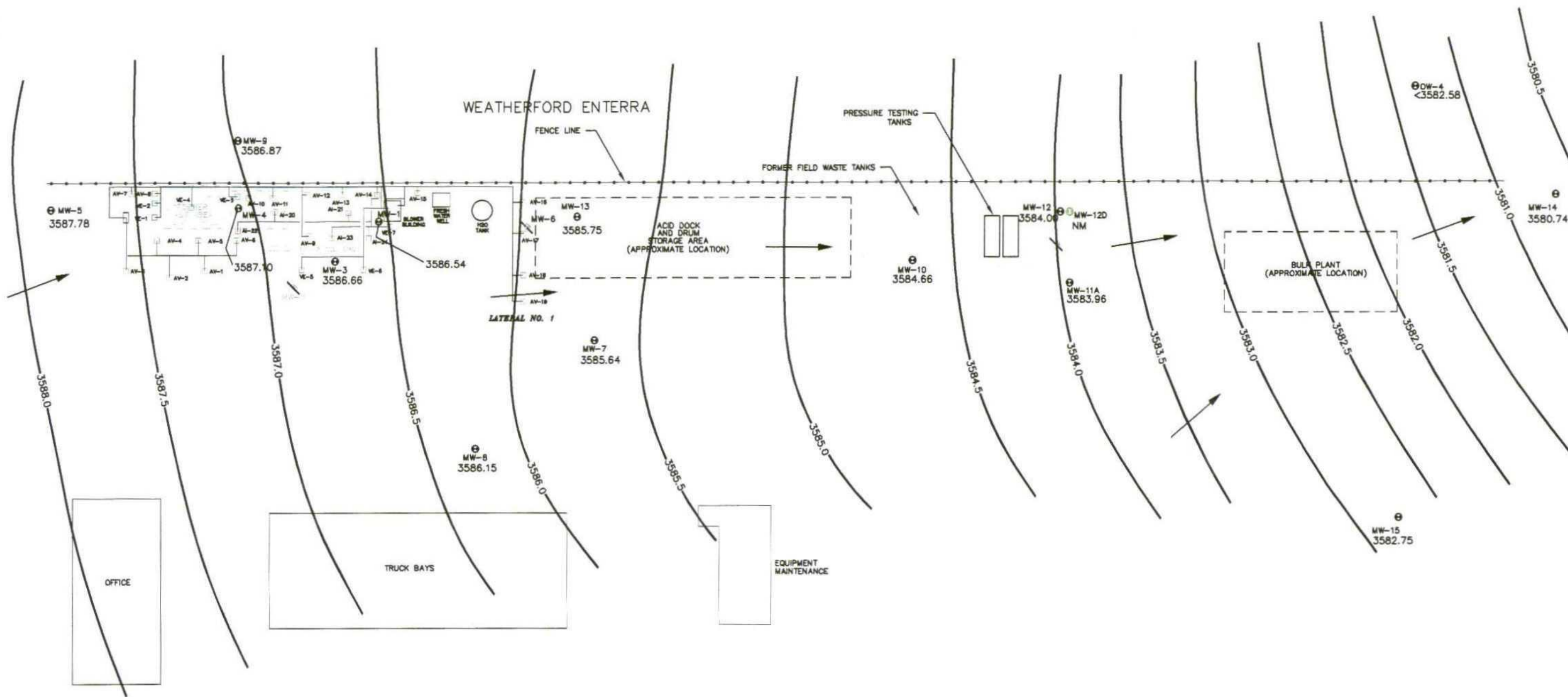
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## LEGEND

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

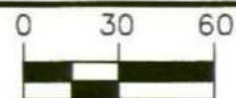
TITLE	SITE MAP	DATE	8/15/01
CLIENT	BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER	12832.016
SITE	HOBBS, NEW MEXICO	FIGURE NUMBER	1





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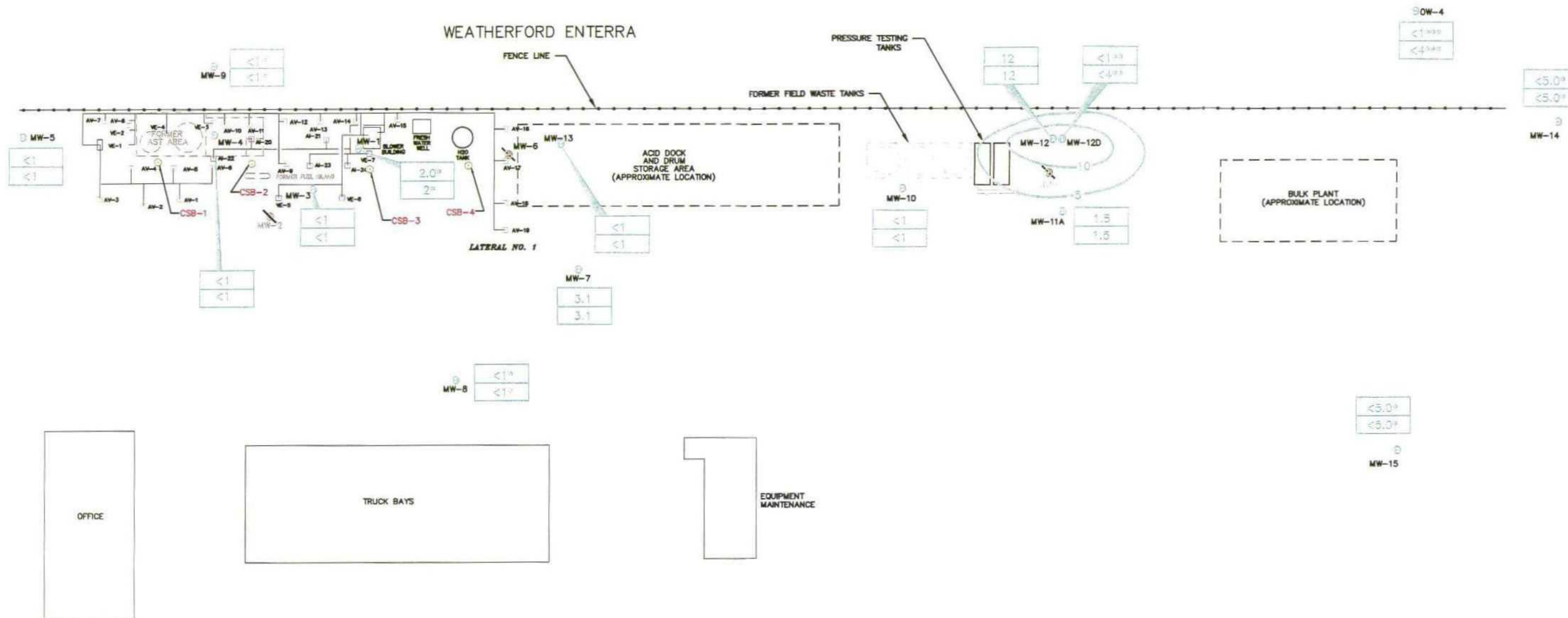
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- LEGEND**
- 3586.66  
MW-3  
○ MONITOR WELL LOCATION WITH GROUNDWATER ELEVATION (feet AMSL)
  - BIOSPARING SYSTEM
  - GROUNDWATER FLOW DIRECTION
  - MW-2  
○ MONITOR WELL (PLUGGED AND ABANDONED)

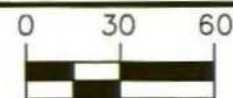
TITLE	GROUNDWATER ELEVATION MAP FOR JUNE 21, 2001	DATE	1/7/02
CLIENT	BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER	12832.016
SITE	HOBBS, NEW MEXICO	FIGURE NUMBER	2



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

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**LEGEND**  
 MW-3 EXISTING MONITOR WELL LOCATION  
 MW-2 MONITOR WELL (PLUGGED AND ABANDONED)  
 - BENZENE CONCENTRATION (ug/L)  
 - TOTAL BTEX CONCENTRATION (ug/L)  
 \* INDICATES WELL NOT SAMPLED JUNE 2001; DATA PRESENTED ARE FROM 3/8/01  
 \*\* INDICATES WELL NOT SAMPLED JUNE 2001; DATA PRESENTED ARE FROM 6/8/00  
 \*\*\* INDICATES WELL NOT SAMPLED JUNE 2001; DATA PRESENTED ARE FROM 9/13/00  
 BIOSPARING SYSTEM  
 - BENZENE ISOCONCENTRATION CONTOUR (ug/L)  
 - CONFIRMATION SOIL BORING LOCATION  
 CSB-1

TITLE BENZENE ISOCONCENTRATION AND TOTAL BTEX  
DISTRIBUTION MAP FOR JUNE 21-22, 2001

CLIENT BJ SERVICES COMPANY, U.S.A.

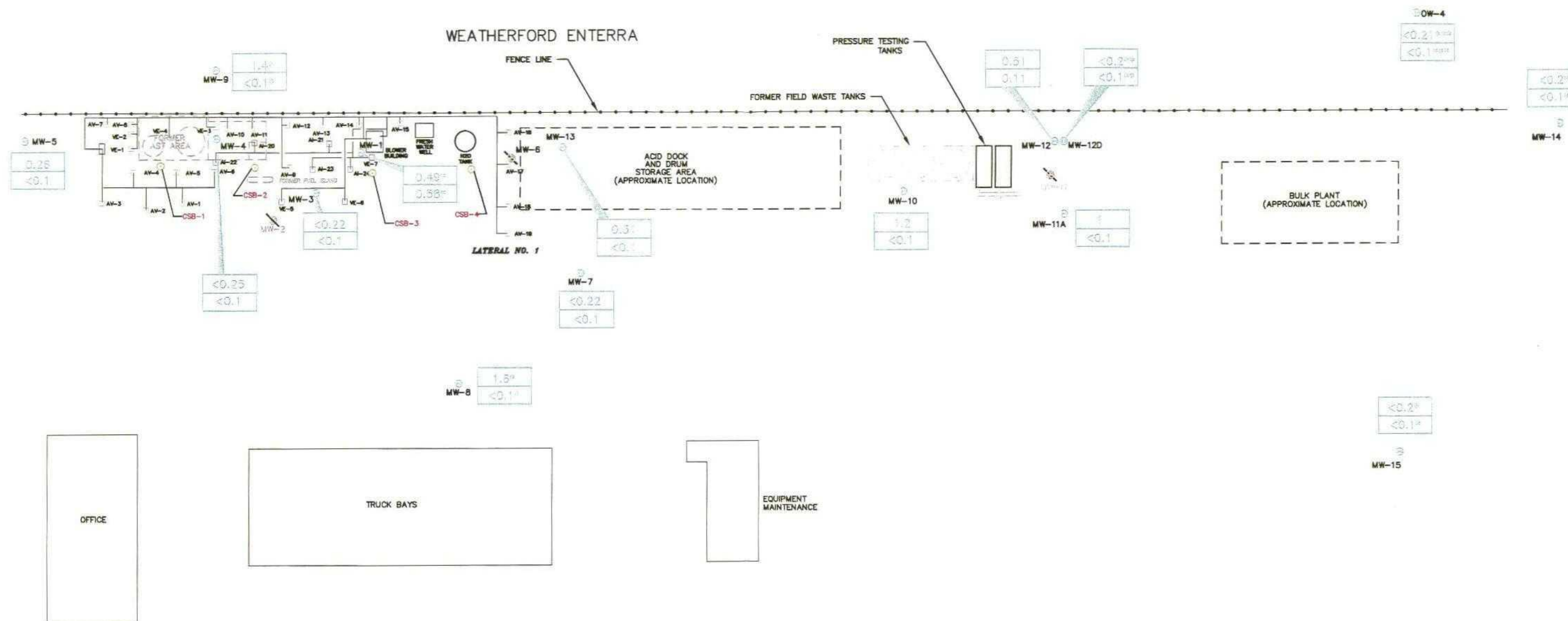
SITE HOBBS, NEW MEXICO

DATE  
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FIGURE NUMBER  
3





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**LEGEND**

- EXISTING MONITOR WELL LOCATION
  - MONITOR WELL (PLUGGED AND ABANDONED)
  - TPH-D CONCENTRATION (mg/L)
  - TPH-G CONCENTRATION (mg/L)
  - BIOSPARGING SYSTEM
  - CONFIRMATION SOIL BORING LOCATION
- INDICATES WELL NOT SAMPLED JUNE 2001; DATA PRESENTED ARE FROM 3/8/01  
--- INDICATES WELL NOT SAMPLED JUNE 2001; DATA PRESENTED ARE FROM 5/8/00  
--- INDICATES WELL NOT SAMPLED JUNE 2001; DATA PRESENTED ARE FROM 9/13/00

TITLE: TOTAL PETROLEUM HYDROCARBONS  
DISTRIBUTION MAP FOR JUNE 21-22, 2001

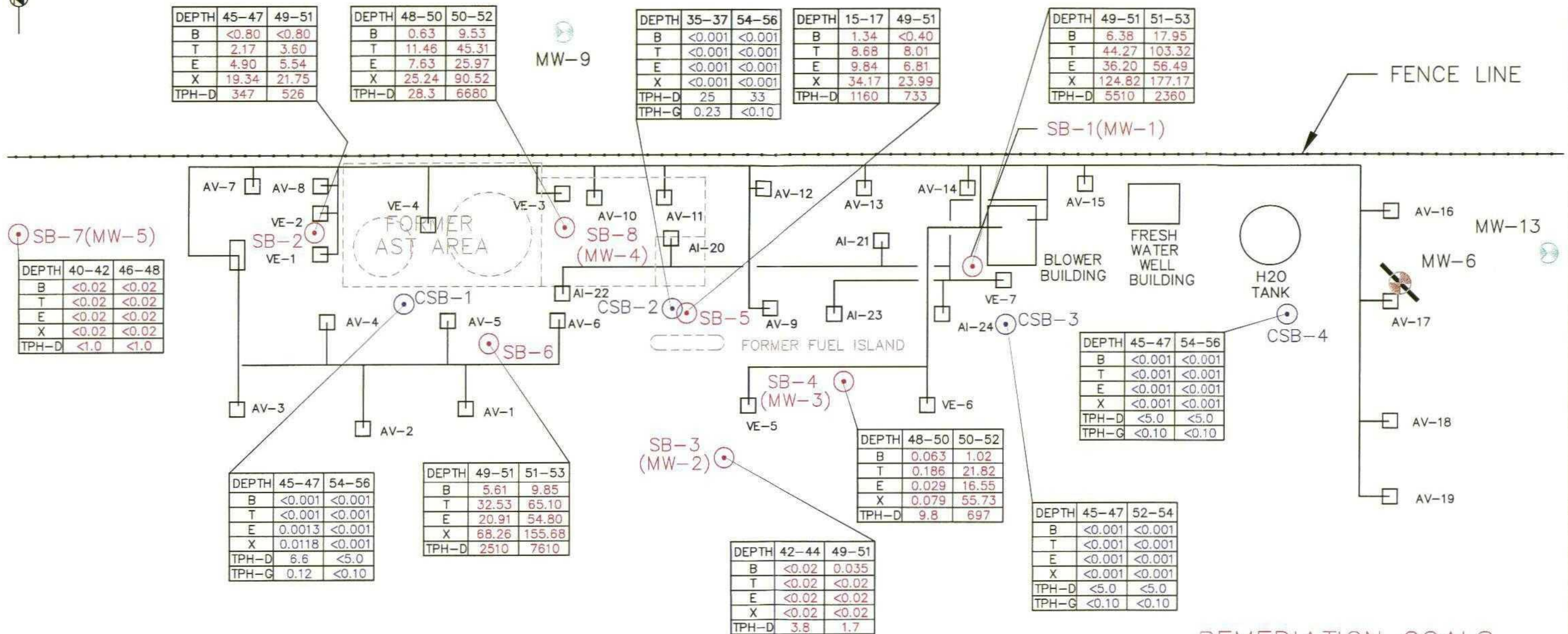
CLIENT: BJ SERVICES COMPANY, U.S.A.

SITE: HOBBS, NEW MEXICO

DATE: 7-9-01  
PROJECT NUMBER: 12832.016  
FIGURE NUMBER: 4



(WEATHERFORD ENTERRA PROPERTY)



## REMEDIATION GOALS

BENZENE	10 mg/kg
TOTAL BTEX	50 mg/kg
TPH	1000 mg/kg

NOTES:

1. SOIL BORINGS SB-1 THROUGH SB-8  
INSTALLED AND SAMPLED JULY-AUGUST  
1992.
2. TPH-G ANALYSIS WAS NOT PERFORMED ON  
SAMPLES FROM SOIL BORINGS SB-1  
THROUGH SB-8.
3. BIOSPARING SYSTEM ACTIVATED NOVEMBER  
1995, DEACTIVATED NOVEMBER 2000.
4. CONFIRMATION SOIL BORINGS CSB-1  
THROUGH CSB-4, INSTALLED AND SAMPLED  
JULY 2001.

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

SUBMITTED: \_\_\_\_\_ DATE: \_\_\_\_\_  
PROJECT MANAGER

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_  
BROWN AND CALDWELL



SCALE: 1" = 20'

DRAWN BY: CLK DATE 6/01  
CHK'D BY: DATE  
REV'D BY: DATE

### LEGEND

- 
- MW-3 - EXISTING MONITOR WELL LOCATION
  - MW-2 - MONITOR WELL (PLUGGED AND ABANDONED)
  - CSB-3 - 2001 CONFIRMATION SOIL BORING LOCATION
  - SB-1 (MW-1) - 1992 SOIL BORING LOCATION AND SUBSEQUENT MONITOR WELL INSTALLATION, IF APPLICABLE.
- BIOSPARING SYSTEM

DEPTH	= DEPTH OF SAMPLE (FEET)
B	= BENZENE (mg/kg)
T	= TOLUENE (mg/kg)
E	= ETHYLBENZENE (mg/kg)
X	= XYLENES (mg/kg)
TPH-D	= DIESEL-RANGE TPH (mg/kg)
TPH-G	= GASOLINE-RANGE TPH (mg/kg)

TITLE COMPARISON OF HYDROCARBON CONCENTRATIONS IN SOIL BEFORE AND AFTER BIOSPARGING SYSTEM OPERATION

CLIENT

BJ SERVICES COMPANY, U.S.A.

SITE

HOBBS, NEW MEXICO

DATE \_\_\_\_\_

8/14/01

PROJECT NUMBER

12832.016

FIGURE NUMBER

5

# Tables



## TABLES

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

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

Date	Activity
February 7, 1991	The 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 - August 10, 1992	Brown and Caldwell conducted a soil and groundwater investigation 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.



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

Date	Activity
June 21, 1993	ENSR Consulting and Engineering (ENSR), the environmental consultant 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.



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

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.

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

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.

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

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.

**Table 3**  
**June 21-22, 2001 Field Screening Results for Groundwater Samples**  
**Hobbs, New Mexico Facility**  
**BJ Services Company, U.S.A.**

Monitor Well	Cumulative Liters Removed	pH	Temperature (°C)	Conductivity (umhos/cm)	Redox (mV)	Dissolved Oxygen (meter) (mg/L)	Dissolved Oxygen (Hach kit) (mg/L)	Ferrous Iron (mg/L)	Alkalinity (mg/L)	Turbidity NTUs <sup>(1)</sup>
MW-3	0.5	7.69	25.65	279	156.1	6.73	NM	NM	NM	NM
	1.0	7.27	24.63	861	155.4	5.47	NM	NM	NM	NM
	1.4	7.21	23.62	1082	150.3	4.35	NM	NM	NM	55
	1.8	7.20	23.56	1121	146.3	3.87	3.4	NM	NM	NM
MW-4	1.0	7.92	29.11	180	133.4	6.92	NM	NM	NM	9.9
	1.4	7.01	24.74	1243	150.4	5.35	NM	NM	NM	NM
	1.7	7.09	23.88	1286	153.4	4.65	NM	NM	NM	24.4
	2.0	7.11	23.78	1297	154.0	4.61	0.0	0.8	385	NM
MW-5	1.2	6.50	21.64	1229	147.9	5.94	NM	NM	NM	NM
	1.7	6.11	21.44	1222	156.1	4.94	NM	NM	NM	27.5
	2.2	5.85	21.23	1222	168.2	3.72	NM	NM	NM	NM
	2.5	5.79	21.33	1220	172.5	3.45	2.0	0.0	770	22.9
MW-7	1	6.37	26.55	901	172.2	5.62	NM	NM	NM	26.6
	1.6	6.53	25.75	1104	173.9	4.91	NM	NM	NM	NM
	2.1	6.61	25.65	1324	175.3	3.77	1.0	0	< 385	0.0
MW-10	0.6	7.60	24.66	504	-49.5	5.66	NM	NM	NM	NM
	1.0	6.73	23.03	1924	-63.3	3.57	NM	NM	NM	NM
	1.3	6.65	23.12	2502	-84.6	1.50	NM	NM	NM	NM
	1.6	6.64	22.80	2635	-98.1	0.92	NM	NM	NM	NM
	1.9	6.64	22.81	2663	-103.8	0.70	0.0	> 10	575	102
MW-11A	1.0	7.06	20.22	2830	-14.9	3.65	NM	NM	NM	NM
	1.5	7.05	20.42	3625	-81.6	1.21	NM	NM	NM	> 1000
	1.8	7.06	20.41	3707	-91.5	0.94	NM	NM	NM	NM
	2.1	7.06	20.44	3788	-104.5	0.64	0.0	6.5	770	521
MW-12	NM-B	NM-B	NM-B	NM-B	NM-B	NM-B	NM-B	NM-B	NM-B	NM-B
MW-13	1.0	7.49	20.86	2151	198.2	3.02	NM	NM	NM	NM
	1.5	7.39	20.84	2209	127.4	1.51	NM	NM	NM	315
	1.8	7.37	20.83	2210	94.0	1.40	0.8	1.6	193	88
MW-14	1.0	7.07	23.59	162.1	162.1	7.36	NM	NM	NM	NM
	1.6	6.97	20.21	165.0	165.0	2.56	NM	NM	NM	24.5
	2.0	6.95	19.79	165.3	165.3	3.31	NM	NM	NM	NM
	2.6	6.95	19.69	159.0	139.0	3.33	3.15	NM	NM	NM
MW-15	1.0	7.00	20.23	1414	160.9	3.97	NM	NM	NM	NM
	2.0	6.99	20.17	1422	160.4	3.81	NM	NM	NM	NM
	2.5	6.96	20.16	1422	163.2	3.90	4.0	NM	NM	539
OW-4 <sup>(2)</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

<sup>(2)</sup> 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.

NM=Not Measured

NM-D=Not Measured (well dry)

NM-B=Not Measured (purged well with bailer)

p:\wp\BJSERV\2832\082ta.xls\TABLE 3

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-1	8/10/92	Regular	5550.0	12090.0	2160.0	7370.0	NA	NA
	2/9/93	Regular	2100.0	6500.0	1300.0	7400.0	NA	NA
	8/19/93	Regular	3200.0	7300.0	1200.0	3700.0	NA	NA
	1/27/94	Regular	1930.0	4580.0	672.0	2390.0	NA	NA
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	390.0	1300.0	230.0	800.0	NA	5.7
	11/15/95	Regular	880.0	1800.0	300.0	970.0	NA	6.8
	2/23/96	Regular	1500.0	3700.0	620.0	2200.0	NA	21
	5/31/96	Regular	1100.0	1700.0	380.0	990.0	NA	7.5
	8/23/96	Regular	1800.0	3300.0	570.0	2100.0	NA	17
	12/2/96	Regular	5600.0	9600.0	2100.0	9600.0	100	64
	3/12/97	Regular	5500.0	9700.0	2600.0	8200.0	22	62
	6/12/97	Regular	5300.0	34000.0	7500.0	27000.0	180	160
	9/12/97	Regular	1800.0	4400.0	1000.0	3000.0	23	21
	12/10/97	Regular	7600.0	12000.0	2800.0	8200.0	11	71
	3/24/98	Regular	4800.0	7200.0	1200.0	2400.0	4.2	38
	6/23/98	Regular	53.0	680.0	580.0	1400.0	1.4	9.2
	9/30/98	Regular	3.2	90.0	280.0	970.0	2.5	3.6
	12/10/98	Regular	<1.0	1.5	17.0	110.0	1.4	0.31
	3/10/99	Regular	<1.0	<1.0	8.2	110.0	0.62	0.85
	3/10/99	Duplicate	<1.0	<1.0	7.9	110.0	0.66	0.84
	6/10/99	Regular	<1.0	1.1	<1.0	28.0	0.53	0.55
	6/10/99	Duplicate	<1.0	1.8	<1.0	41.0	0.69	0.76
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/99	-	NS	NS	NS	NS	NS	NS
	3/9/00	Regular	< 1	< 1	< 1	9.1	14	1.3
	6/8/00	-	NS	NS	NS	NS	NS	NS
	9/13/00	-	NS	NS	NS	NS	NS	NS
	12/7/00	-	NS	NS	NS	NS	NS	NS
	3/8/01	Regular	2.0	<1	<1	<1	0.49	0.58
	6/21/01	-	NS	NS	NS	NS	NS	NS
MW-2	8/10/92	Regular	14.9	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	100.0	12.0	3.0	13.0	NA	NA
	1/27/94	Regular	< 1	1.2	2.0	2.5	NA	NA
MW-3	8/10/92	Regular	304.9	2099.0	6760.0	1586.0	NA	NA
	2/9/93	Regular	130.0	< 10	< 10	190.0	NA	NA
	8/19/93	Regular	560.0	3100.0	630.0	1900.0	NA	NA
	1/27/94	Regular	1070.0	5380.0	510.0	3120.0	NA	NA
	5/4/95	Regular	770.0	3300.0	470.0	1800.0	NA	NA
	8/1/95	Regular	490.0	2900.0	890.0	1600.0	NA	14
	11/15/95	Regular	250.0	1000.0	180.0	440.0	NA	2.9
	2/23/96	Regular	120.0	810.0	170.0	560.0	NA	4
	5/31/96	Regular	670.0	3900.0	1200.0	2300.0	NA	15
	8/23/96	Regular	330.0	2200.0	590.0	1500.0	NA	12
	12/2/96	Regular	220.0	1800.0	670.0	1000.0	0.89	7.4
	3/12/97	Regular	370.0	2000.0	960.0	1400.0	1.8	11
	6/12/97	Regular	860.0	4800.0	1700.0	2600.0	1.9	20
	9/11/97	Regular	770.0	3000.0	1600.0	1900.0	1.6	16
	12/10/97	Regular	240.0	740.0	500.0	450.0	0.59	5.3

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-3	3/24/98	Regular	140.0	630.0	360.0	310.0	0.56	3.9
	6/23/98	Regular	100.0	720.0	350.0	490.0	0.40	4.9
	9/30/98	Regular	42.0	470.0	450.0	530.0	1.0	3.8
	12/10/98	Regular	13.0	220.0	160.0	290.0	1.3	0.43
	3/10/99	Regular	3.2	7.4	42.0	32.0	0.2	0.44
	6/10/99	Regular	1.7	3.1	<1.0	36.0	<0.20	0.18
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/99	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/9/00	Regular	< 1	< 1	< 1	< 1	0.32	< 0.1
	6/8/00	Regular	< 1	< 1	< 1	< 1	<0.22	< 0.1
	9/13/00	Regular	< 1	< 1	< 1	< 1	<0.2	< 0.1
	12/7/00	Regular	< 1	< 1	< 1	< 1	<0.25	< 0.1
	3/8/01	Regular	< 1	< 1	< 1	< 1	0.42	<0.1
	6/21/01	Regular	< 1	< 1	< 1	< 1	<0.22	<0.1
MW-4	8/10/92	Regular	2594.0	10360.0	2160.0	6740.0	NA	NA
	2/9/93	Regular	5200.0	15000.0	2200.0	10000.0	NA	NA
	8/19/93	Regular	3000.0	12000.0	< 2000	7000.0	NA	NA
	1/27/94	Regular	NSP	NSP	NSP	NSP	NA	NSP
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	5700.0	17000.0	3500.0	13000.0	NA	120
	11/15/95	Regular	490.0	1600.0	310.0	1100.0	NA	5.2
	2/23/96	Regular	360.0	2800.0	560.0	2500.0	NA	18
	5/31/96	Regular	84.0	830.0	280.0	1100.0	NA	6.2
	8/23/96	Regular	110.0	1400.0	430.0	1800.0	NA	9.8
	12/2/96	Regular	190.0	2009.0	1800.0	7200.0	56	43
	3/12/97	Regular	220.0	1500.0	1500.0	4400.0	27	27
	6/12/97	Regular	47.0	270.0	360.0	950.0	2.5	6.2
	9/12/97	Regular	92.0	840.0	670.0	2100.0	15	7.6
	12/10/97	Regular	230.0	750.0	970.0	2300.0	3.7	16
	3/24/98	Regular	150.0	510.0	270.0	620.0	1.2	5.6
	6/23/98	Regular	160.0	890.0	590.0	1600.0	0.69	10
	9/30/98	Regular	80.0	180.0	370.0	840.0	2.0	3.9
	12/10/98	Regular	28.0	70.0	210.0	960.0	9.3	4.3
	12/10/98	Duplicate	26.0	62.0	180.0	830.0	3.9	4.3
	3/10/99	Regular	8.0	20.0	250.0	1400.0	13.0	13
	6/10/99	Regular	<1.0	<1.0	12.0	12.0	0.44	0.63
	9/14/99	Regular	< 1.0	< 1.0	3.3	13.1	0.35	0.17
	12/9/99	Regular	< 1	2.5	2.3	20.1	2	0.53
	3/10/00	Regular	< 1	< 1	< 1	3.6	2.6	0.15
	6/8/00	Regular	< 1	< 1	< 1	< 1	0.44	0.23
	9/13/00	Regular	< 1	< 1	< 1	< 1	0.61	<0.1
	12/7/00	Regular	< 1	< 1	1.3	< 1	0.53	0.16
	3/8/01	Regular	< 1	< 1	< 1	< 1	0.43	0.16
	6/21/01	Regular	< 1	< 1	< 1	< 1	<0.25	<0.1
MW-5	8/10/92	Regular	< 4	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94	Regular	8.7	29.9	4.0	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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-5	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	< 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
MW-6 <sup>1</sup>	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	7000.0	19000.0	3100.0	7200.0	NA	NA
	8/19/93	Regular	8100.0	19000.0	3500.0	6400.0	NA	NA
	1/27/94	Regular	7960.0	20200.0	3830.0	6150.0	NA	NA
	5/4/95	Regular	11000.0	17000.0	2900.0	6000.0	NA	NA
	8/1/95	Regular	8300.0	12000.0	2500.0	5100.0	NA	60
	11/15/95	Regular	8900.0	17000.0	2900.0	5500.0	NA	57
	2/23/96	Regular	8100.0	10000.0	2300.0	4000.0	NA	58
	5/31/96	Regular	83.0	150.0	15.0	51.0	NA	0.57
	5/31/96	Duplicate	87.0	160.0	13.0	47.0	NA	0.52
	8/23/96	Regular	31.0	28.0	9.4	7.9	NA	0.46
	12/2/96	Regular	< 1	< 1	< 1	1.7	5.6	< 0.1
	3/12/97	Regular	12.0	< 5	6.8	18.0	12	< 0.5
	6/12/97	Regular	1900.0	1400.0	410.0	310.0	7.8	7.4
	9/11/97	Regular	11.0	1.3	3.4	< 1	1	< 0.1
	12/10/97	Regular	3.0	4.2	1.2	3.9	1.7	0.14
	3/23/98	Regular	3.6	< 1	4.0	< 1	< 0.2	< 0.1
	6/23/98	Regular	170.0	4.1	15.0	7.2	1.2	0.51
	9/30/98	Regular	1000.0	420.0	140.0	270.0	4.0	3.3
	12/10/98	Regular	7.6	6.6	1.7	5.8	2.0	< 0.1
	3/10/99	Regular	2500.0	930.0	590.0	1400.0	11.0	13
MW-7	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	3.0	< 2	< 2	NA	NA
	1/27/94	Regular	1.1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	52.0	3.4	0.7	2.8	NA	NA
	8/1/95	Regular	22.0	2.2	0.9	2.8	NA	< 0.1

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-7	11/15/95	Regular	8.4	0.8	< 0.3	0.9	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Duplicate	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	29.0	83.0	10.0	21.0	NA	0.25
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	9/11/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	12/10/97	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	9/30/98	Regular	< 1.0	< 1.0		< 1.0	< 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
MW-8	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	3.0	4.9	0.8	3.7	NA	NA
	8/1/95	Regular	3.1	1.2	0.5	1.6	NA	< 0.001
	8/1/95	Duplicate	3.6	1.5	0.5	1.5	NA	< 0.1
	11/15/95	Regular	< 0.3	0.5	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	1.8	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	9/11/97	Regular	< 1	< 1	< 1	< 1	0.1	< 0.1
	12/10/97	Regular	< 1	< 1	< 1	< 1	0.3	< 0.1
	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	1	< 1	< 1	< 0.2	< 0.1
	9/30/98	Regular	< 1.0	1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	1.0	< 1.0	< 1.0	< 0.20	< 0.1
	3/9/99	Regular	< 1.0	1.0	< 1.0	< 1.0	< 0.20	< 0.1
	6/10/99	Regular	< 1.0	1.0	< 1.0	< 1.0	< 0.20	< 0.1
	9/13/99	Regular	< 1.0	1.0	< 1.0	< 2.0	< 0.20	< 0.10
	12/9/99	-	NS	NS	NS	NS	NS	NS
	3/9/00	Regular	< 1	1	1	< 1	0.55	< 0.1
	6/8/00	-	NS	NS	NS	NS	NS	NS



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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-8	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	NS	NS	NS
MW-9	4/22/93	Regular	570.0	380.0	< 50	870.0	NA	NA
	7/15/93	Regular	121.0	7.3	3.0	458.0	NA	NA
	8/19/93	Regular	390.0	290.0	40.0	250.0	NA	NA
	1/27/94	Regular	327.0	357.0	51.1	293.0	NA	NA
	5/3/95	Regular	380.0	110.0	19.0	120.0	NA	NA
	8/1/95	Regular	660.0	410.0	91.0	310.0	NA	6.2
	11/15/95	Regular	240.0	24.0	11.0	140.0	NA	1.5
	11/15/95	Duplicate	170.0	18.0	10.0	120.0	NA	1.9
	2/23/96	Regular	170.0	18.0	2.3	160.0	NA	4.3
	5/31/96	Regular	120.0	16.0	3.0	200.0	NA	NA
	8/23/96	Regular	82.0	13.0	6.0	270.0	NA	4
	8/23/96	Duplicate	76.0	14.0	4.8	250.0	NA	4.4
	12/2/96	Regular	61.0	< 25	< 25	210.0	2.6	2.8
	12/2/96	Duplicate	86.0	13.0	2.4	270.0	3.7	2.9
	3/12/97	Regular	30.0	48.0	420.0	880.0	8.2	19
	6/12/97	Regular	4.7	2.1	11.0	97.0	2.6	2.2
	6/12/97	Duplicate	< 5	< 5	6.6	69.0	5.2	1.9
	9/12/97	Regular	2.1	2.3	2.1	120.0	1.2	1.9
	12/10/97	Regular	4.9	9.0	6.8	62.0	0.86	0.92
	3/24/98	Regular	< 1	< 1	< 1	26.0	0.9	1
	6/23/98	Regular	2.4	22.0	10.0	36.0	< 0.2	0.25
	9/30/98	Regular	1.1	5.5	21.0	59.0	0.27	0.27
	12/10/98	Regular	< 1.0	1.9	17.0	79.0	5.1	0.25
	3/10/99	Regular	<1.0	<1.0	5.7	68.0	<0.2	0.22
	6/10/99	Regular	<1.0	1.8	1.8	71.0	<0.20	0.43
	9/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/99	-	NS	NS	NS	NS	NS	NS
	3/9/00	Regular	< 1	< 1	< 1	64.0	0.66	1.3
	6/8/00	-	NS	NS	NS	NS	NS	NS
	9/13/00	-	NS	NS	NS	NS	NS	NS
	12/7/00	-	NS	NS	NS	NS	NS	NS
	3/8/01	Regular	< 1	< 1	< 1	< 1	1.4	<0.1
	6/21/01	-	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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-10	12/10/97	Regular	41.0	9.8	12.0	7.7	1.1	0.28
	12/10/97	Duplicate	36.0	8.5	10.0	6.7	1.2	0.24
	3/23/98	Regular	36.0	< 5	5.9	< 5	1.6	< 0.5
	3/23/98	Duplicate	36.0	< 1	5.3	1.3	1.7	0.18
	6/23/98	Regular	37.0	< 5	< 5	< 5	2.1	< 0.5
	9/30/98	Regular	84.0	3.2	30.0	2.2	1.4	0.36
	12/10/98	Regular	29.0	1.0	7.0	1.0	0.86	0.18
	3/9/99	Regular	28.0	<5.0	5.8	<5.0	0.92	<0.5
	6/10/99	Regular	17.0	<1.0	<1.0	<1.0	0.30	0.16
	9/14/99	Regular	10.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/99	Regular	23.0	< 1	< 1	1.2	0.44	0.16
	3/10/00	Regular	300.0	4.3	6.6	43.2	1.2	0.85
	6/8/00	Regular	78.0	1.7	7.2	9.0	0.67	0.74
	9/13/00	Regular	23.0	1.5	1.1	2.9	1.6	0.41
	12/7/00	Regular	7.2	<1	<1	<1	1.5	0.15
	3/8/01	Regular	3.4	1.1	<1	<1	3.4	0.2
	6/22/01	Regular	< 1	< 1	< 1	< 1	1.2	<0.1
MW-11	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	8/1/95	Regular	44.0	29.0	5.5	13.0	NA	0.2
	11/15/95	Regular	190.0	2.8	6.2	11.0	NA	0.4
	2/23/96	Regular	49.0	1.2	0.5	4.0	NA	0.25
	5/31/96	Regular	300.0	83.0	12.0	28.0	NA	0.8
	8/23/96	Regular	100.0	1.2	0.3	4.7	NA	0.26
	12/2/96	Regular	970.0	< 5	6.0	8.1	2	1.3
	3/12/97	Regular	130.0	< 5	13.0	5.8	0.42	< 0.5
	3/12/97	Duplicate	100.0	< 5	10.0	5.1	0.43	< 0.5
	6/12/97	Regular	150.0	23.0	19.0	< 5	1.1	0.55
	9/12/97	Regular	220.0	15.0	27.0	13.0	1	0.46
MW-11A	3/24/98	Regular	24.0	5.0	< 5	< 5	0.28	0.14
	6/23/98	Regular	9.9	< 5	< 5	< 5	< 0.2	< 0.5
	9/30/98	Regular	9.3	3.7	2.2	7.0	<0.20	0.1
	12/10/98	Regular	1.7	<1.0	<1.0	<1.0	<0.20	<0.1
	3/10/99	Regular	<5	<5	<5	<5	0.3	<0.5
	6/10/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.10
	9/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/99	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/9/00	Regular	1.2	< 1	< 1	< 1	0.43	< 0.1
	6/8/00	Regular	3.6	< 1	< 1	< 1	0.37	< 0.1
	9/13/00	Regular	1.4	< 1	< 1	< 1	0.36	< 0.1
	12/7/00	Regular	26	<1	<1	3.3	0.3	0.12
	3/8/01	Regular	12	<5	<5	<5	2.2	<0.5
	6/22/01	Regular	1.5	< 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
	9/30/98	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

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

Monitor Well	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, ug/L				milligrams per liter, mg/L	
MW-12	6/10/99	Regular	49.0	1.4	<1.0	<1.0	0.22	0.13
	9/14/99	Regular	75.0	< 1.0	< 1.0	< 2.0	<0.20	0.23
	12/9/99	Regular	64.0	< 1	< 1	< 1	< 0.2	0.21
	3/10/00	Regular	93.0	< 1	< 1	< 1	< 0.2	0.21
	3/10/00	Duplicate	99.0	< 1	< 1	< 1	0.22	0.22
	6/8/00	Regular	62.0	< 1	< 1	< 1	< 0.2	< 0.1
	9/13/00	Regular	34.0	< 1	< 1	< 1	0.23	< 0.1
	12/7/00	Regular	27	<1	2.9	1.9	<0.25	<0.1
	3/8/01	Regular	14	<1	<1	<1	2.1	0.1
MW-12D	6/22/01	Regular	12	< 1	< 1	< 1	0.51	0.11
	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
MW-13	12/7/00	-	NS	NS	NS	NS	NS	NS
	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
MW-14	3/8/01	Regular	<1	<1	1.2	<1	2	<0.1
	6/22/01	Regular	< 1	< 1	< 1	< 1	0.31	<0.1
MW-15	1/14/01	Regular	<1	<1	<1	<1	<0.2	<0.1
	6/21/01	-	NS	NS	NS	NS	NS	NS
OW-4	1/14/01	Regular	<1	<1	<1	<1	<0.2	<0.1
	6/21/01	-	NS	NS	NS	NS	NS	NS
	6/10/99	Regular	<1.0	<1.0	<1.0	4.4	<0.2	<0.10
	9/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/9/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.2	<0.1
	3/9/00	Regular	<1.0	<1.0	<1.0	<1.0	0.25	<0.1
	6/8/00	Regular	<1.0	<1.0	<1.0	<1.0	<0.21	<0.1
	9/13/00	Regular	<1.0	<1.0	<1.0	<1.0	<0.2	<0.1
	12/7/00	-	NS-D	NS-D	NS-D	NS-D	NS-D	NS-D
OW-4	3/8/01	-	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

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

NA=Not Analyzed

NS=Not Sampled

NS-D=Not Sampled because well was dry

NSP=Not Sampled due to Phase Separated Hydrocarbons

**Table 5**  
**Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for**  
**Monitor Wells MW-5, MW-10, MW-11A, 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)	Methane (mg/L)
MW-5	3/23/98	3.87	190	<0.0012
	3/9/99	<0.1	195	<0.0012
	6/10/99	4.73	209	<0.0012
	9/14/99	4.3	210	<0.0012
	12/9/99	4.2	210	<0.0012
	3/9/00	5.3	260	<0.0012
	6/8/00	4.7	240	<0.0012
	9/13/00	3.93	200	<0.0012
	12/7/00	3.27	160	<0.0012
	3/8/01	3.24	180	<0.0012
	6/21/01	2.74	150	0.0017
MW-10	3/23/98	0.07	320	0.91
	6/23/98	<0.1	325	0.55
	9/30/98	<0.1	204	0.81
	12/10/98	<0.1	180	0.091
	3/9/99	<0.1	142	0.035
			223 <sup>3</sup>	
	9/14/99	<0.10	160	0.0049
	12/9/99	0.49	170	0.0039
	3/10/00	0.1	160	0.0056
	6/8/00	<0.1	150	0.031
	9/13/00	<0.1	160	0.031
	12/7/00	<0.1	190	0.17
	3/8/01	<0.1	270	<0.0012
	6/22/01	<0.1	270	0.044
MW-11A	3/23/98	<0.05	190	0.14
	6/23/98	<0.1	225	0.11
	9/30/98	0.4	196	0.043
	12/10/98	0.7	188	0.033
	3/10/99	<0.1	164	0.094
		<0.1 <sup>2</sup>	227 <sup>3</sup>	
	6/10/99	<0.1	181	0.0036
	9/13/99	0.22	250	<0.0012
	12/9/99	<0.1	290	0.0079

**Table 5**  
**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)	Methane (mg/L)
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
MW-12	3/23/98	<0.05	240	<0.0012
	6/23/98	<0.1	240	<0.0012
	9/30/98	<0.1	168	<0.0012
	12/10/98	<0.1	202	<0.0012
	3/10/99	<0.1	137	<0.0012
		<0.1 <sup>2</sup>	193 <sup>3</sup>	
	6/10/99	<0.1	217	<0.0012
	9/14/99	<0.10	230	<0.0012
	12/9/99	<0.1	180	<0.0012
	3/10/00	<0.1	210	<0.0012
	6/8/00	<0.1	220	<0.0012
	9/13/00	<0.1	240	<0.0012
	12/7/00	<0.1	260	<0.0012
	3/8/01	<0.1	300	<0.0012
	6/22/01	<0.1	360	0.0021

1=By EPA Method 300, except as noted

2=By EPA Method 353.3

3=By EPA Method 375.4

mg/L = milligrams per liter

**Table 6**  
**Cumulative Results<sup>(1)</sup> for Chloride<sup>(2)</sup> Analyses**  
**Hobbs, New Mexico Facility**  
**BJ Services Company, U.S.A.**

Sample Date	Monitor Wells <sup>(3)</sup>																
	MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-11A	MW-12	MW-12D	MW-13	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	NA	NA	NA	NA
8/23/96	130	140	100	99	210	250	360	140	2000	2900	NA	NA	NA	NA	NA	NA	NA
3/23-24/98	212	206	126	151	183	223	364	164	2390	NA	940	1200	NA	NA	NA	NA	NA
3/9-10/99	163	156	142	155	411	238	274	123	1160	NA	834	314	NA	NA	NA	NA	NA
6/10-7/2/99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	195	496	NA	NA	266
3/9-10/00	258	196	196	196	NA	224	241	131	474	NA	1290	327	117	276	NA	NA	258
1/14/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	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	NA	NA
6/21/01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	222	222	NA

(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 7**  
**Analytical Results<sup>(1)</sup> for Confirmation Soil Samples**  
**Hobbs, New Mexico Facility**  
**BJ Services Company, U.S.A.**

Confirmation Soil Boring ID	Depth Interval (feet below grade)	Benzene <sup>(2)</sup>	Toluene	Ethyl- benzene	Xylenes	Total BTEX <sup>(3)</sup>	TPH-D	TPH-G	TPH-D plus TPH-G <sup>(4)</sup>
CSB-1	45-47	<0.001	<0.001	0.0013	0.0118	0.0131	6.6	0.12	6.72
	54-56	<0.001	<0.001	<0.001	<0.001	<0.004	<5.0	<0.10	<5.1
CSB-2	35-37	<0.001	<0.001	<0.001	<0.001	<0.004	25	0.23	25.23
	54-56	<0.001	<0.001	<0.001	<0.001	<0.004	33	<0.10	33
CSB-3	45-47	<0.001	<0.001	<0.001	<0.001	<0.004	<5.0	<0.10	<5.1
	52-54	<0.001	<0.001	<0.001	<0.001	<0.004	<5.0	<0.10	<5.1
CSB-4	45-47	<0.001	<0.001	<0.001	<0.001	<0.004	<5.0	<0.10	<5.1
	54-56	<0.001	<0.001	<0.001	<0.001	<0.004	<5.0	<0.10	<5.1

<sup>(1)</sup> - in milligrams per kilogram (mg/kg)

<sup>(2)</sup> - remediation goal for benzene = 10 parts per million (ppm or mg/kg)

<sup>(3)</sup> - remediation goal for total BTEX = 50 ppm (50 mg/kg)

<sup>(4)</sup> - remediation goal for TPH = 1000 ppm (1000 mg/kg)

## 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."*

A



**APPENDIX A**

**Groundwater Sampling Forms**

























B



## **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:

**01060768**

<b>Report To:</b>  Brown & Caldwell Rick Rexroad 1415 Louisiana Suite 2509 Houston TX 77002- ph: (713) 759-0999      fax: (713) 308-3886	<b>Project Name:</b> BJ Service-Hobbs #12832-016 <b>Site:</b> Hobbs, NM <b>Site Address:</b>  <b>PO Number:</b> <b>State:</b> New Mexico <b>State Cert. No.:</b> <b>Date Reported:</b> 7/10/01
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This Report Contains A Total Of 20 Pages

Excluding This Page

And

Chain Of Custody



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

Case Narrative for:  
**Brown & Caldwell**

Certificate of Analysis Number:

**01060768**

<b>Report To:</b>  Brown & Caldwell Rick Rexroad 1415 Louisiana Suite 2509 Houston TX 77002- ph: (713) 759-0999      fax: (713) 308-3886	<b>Project Name:</b> BJ Service-Hobbs #12832-016 <b>Site:</b> Hobbs, NM <b>Site Address:</b>  <b>PO Number:</b> <b>State:</b> New Mexico <b>State Cert. No.:</b> <b>Date Reported:</b> 7/10/01
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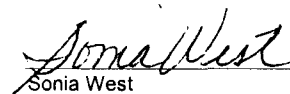
Matrix spike (MS) and matrix spike duplicate (MSD) samples are chosen and tested at random from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. Since the MS and MSD 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

7/10/01

Date



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

## Brown & Caldwell

Certificate of Analysis Number:

01060768

**Report To:** Brown & Caldwell

Rick Rexroad

1415 Louisiana

Suite 2509

Houston

TX

77002-

ph: (713) 759-0999

fax: (713) 308-3886

**Project Name:**

BJ Service-Hobbs #12832-016

**Site:**

Hobbs, NM

**Site Address:**

**PO Number:**

**State:**

New Mexico

**State Cert. No.:**

**Date Reported:**

7/10/01

**Fax To:**

Brown & Caldwell

Rick Rexroad

fax : (713) 308-3886

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD
MW-5	01060768-01	Water	6/21/01 10:45:00 AM	6/22/01 9:30:00 AM	096668	<input type="checkbox"/>
MW-7	01060768-02	Water	6/21/01 1:00:00 PM	6/22/01 9:30:00 AM	096668	<input type="checkbox"/>
MW-14	01060768-03	Water	6/21/01 2:30:00 PM	6/22/01 9:30:00 AM	096668	<input type="checkbox"/>
MW-15	01060768-04	Water	6/21/01 3:05:00 PM	6/22/01 9:30:00 AM	096668	<input type="checkbox"/>
MW-3	01060768-05	Water	6/21/01 3:45:00 PM	6/22/01 9:30:00 AM	096668	<input type="checkbox"/>
MW-4	01060768-06	Water	6/21/01 4:25:00 PM	6/22/01 9:30:00 AM	096668	<input type="checkbox"/>
TB-6/21/01	01060768-07	Water	6/21/01	6/22/01 9:30:00 AM	096668	<input type="checkbox"/>

*Sonia West*

Sonia West

Senior Project Manager

7/10/01

Date

Joel Grice  
Laboratory Director

Ted Yen  
Quality Assurance Officer

7/10/01 12:07:26 PM



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

Client Sample ID MW-5

Collected: 6/21/01 10:45:00 SPL Sample ID: 01060768-01

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #						
DIESEL RANGE ORGANICS			MCL	SW8015B	Units: mg/L								
Diesel Range Organics	ND	0.26	1		07/03/01 10:30 AM		727965						
Surr: n-Pentacosane	85.7 %	18-120	1		07/03/01 10:30 AM		727965						
<table><tr><td>Prep Method</td><td>Prep Date</td><td>Prep Initials</td></tr><tr><td>SW3510B</td><td>06/22/2001 19:37</td><td>KL</td></tr></table>								Prep Method	Prep Date	Prep Initials	SW3510B	06/22/2001 19:37	KL
Prep Method	Prep Date	Prep Initials											
SW3510B	06/22/2001 19:37	KL											
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L								
Gasoline Range Organics	ND	0.1	1		06/29/01 18:11 D_R		725868						
Surr: 1,4-Difluorobenzene	106 %	74-121	1		06/29/01 18:11 D_R		725868						
Surr: 4-Bromofluorobenzene	109 %	55-150	1		06/29/01 18:11 D_R		725868						
HEADSPACE GAS ANALYSIS			MCL	RSK147	Units: mg/L								
Ethane	ND	0.0025	1		07/05/01 17:32 DR		730543						
Ethylene	ND	0.0032	1		07/05/01 17:32 DR		730543						
Methane	0.0017	0.0012	1		07/05/01 17:32 DR		730543						
NITROGEN, NITRATE (AS N)			MCL	E300	Units: mg/L								
Nitrogen, Nitrate (As N)	2.74	0.1	1		06/22/01 10:00 KM		716089						
PURGEABLE AROMATICS			MCL	SW8021B	Units: ug/L								
Benzene	ND	1	1		06/29/01 18:11 D_R		725769						
Ethylbenzene	ND	1	1		06/29/01 18:11 D_R		725769						
Toluene	ND	1	1		06/29/01 18:11 D_R		725769						
Xylenes, Total	ND	1	1		06/29/01 18:11 D_R		725769						
Surr: 4-Bromofluorobenzene	103 %	48-156	1		06/29/01 18:11 D_R		725769						
Surr: 1,4-Difluorobenzene	98.6 %	72-137	1		06/29/01 18:11 D_R		725769						
SULFATE			MCL	E300	Units: mg/L								
Sulfate	150	4	20		06/22/01 10:00 KM		716096						

**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

7/10/01 12:07:30 PM



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

Client Sample ID MW-7

Collected: 6/21/01 1:00:00

SPL Sample ID: 01060768-02

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	ND	0.22		1	07/03/01 11:09 AM		727966
Surr: n-Pentacosane	88.2 %	18-120		1	07/03/01 11:09 AM		727966

Prep Method	Prep Date	Prep Initials
SW3510B	06/22/2001 19:37	KL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1		1	06/29/01 18:38 D_R		725871
Surr: 1,4-Difluorobenzene	100 %	74-121		1	06/29/01 18:38 D_R		725871
Surr: 4-Bromofluorobenzene	111 %	55-150		1	06/29/01 18:38 D_R		725871

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	3.1	1		1	06/29/01 18:38 D_R		725772
Ethylbenzene	ND	1		1	06/29/01 18:38 D_R		725772
Toluene	ND	1		1	06/29/01 18:38 D_R		725772
Xylenes, Total	ND	1		1	06/29/01 18:38 D_R		725772
Surr: 4-Bromofluorobenzene	104 %	48-156		1	06/29/01 18:38 D_R		725772
Surr: 1,4-Difluorobenzene	99.2 %	72-137		1	06/29/01 18:38 D_R		725772

**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

7/10/01 12:07:32 PM



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

Client Sample ID MW-14

Collected: 6/21/01 2:30:00

SPL Sample ID: 01060768-03

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
CHLORIDE, TOTAL				MCL			
				E325.3			
					Units: mg/L		
Chloride	222	5		5	07/06/01 11:10	CV	731560

**Qualifiers:**

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Surrogate Recovery Outside Advisable QC Limits

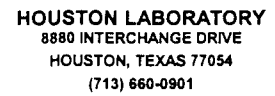
J - Estimated Value between MDL and PQL

>MCL - Result Over Maximum Contamination Limit(MCL)

D - Surrogate Recovery Unreportable due to Dilution

MI - Matrix Interference

7/10/01



**SPL Sample ID:** 01060768-04

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>CHLORIDE, TOTAL</b>				<b>MCL</b>	<b>E325.3</b>	<b>Units: mg/L</b>	
Chloride	222	5	5		07/06/01 11:10	CV	731563

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

7/10/01 12:07:33 PM



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

Client Sample ID MW-3

Collected: 6/21/01 3:45:00

SPL Sample ID: 01060768-05

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	ND	0.22	1		07/03/01 11:47 AM		727967
Surr: n-Pentacosane	77.8 %	18-120	1		07/03/01 11:47 AM		727967

Prep Method	Prep Date	Prep Initials
SW3510B	06/22/2001 19:37	KL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		06/30/01 0:09 D_R		725878
Surr: 1,4-Difluorobenzene	102 %	74-121	1		06/30/01 0:09 D_R		725878
Surr: 4-Bromofluorobenzene	100 %	55-150	1		06/30/01 0:09 D_R		725878

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		06/30/01 0:09 D_R		725807
Ethylbenzene	ND	1	1		06/30/01 0:09 D_R		725807
Toluene	ND	1	1		06/30/01 0:09 D_R		725807
Xylenes, Total	ND	1	1		06/30/01 0:09 D_R		725807
Surr: 4-Bromofluorobenzene	102 %	48-156	1		06/30/01 0:09 D_R		725807
Surr: 1,4-Difluorobenzene	98.0 %	72-137	1		06/30/01 0:09 D_R		725807

**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

7/10/01 12:07:34 PM





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

Client Sample ID MW-4

Collected: 6/21/01 4:25:00

SPL Sample ID: 01060768-06

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	ND	0.25	1		07/03/01 12:25 AM		727968
Surr: n-Pentacosane	100 %	18-120	1		07/03/01 12:25 AM		727968

Prep Method	Prep Date	Prep Initials
SW3510B	06/22/2001 19:37	KL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		06/30/01 0:36 D_R		725879
Surr: 1,4-Difluorobenzene	99.0 %	74-121	1		06/30/01 0:36 D_R		725879
Surr: 4-Bromofluorobenzene	100 %	55-150	1		06/30/01 0:36 D_R		725879

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		06/30/01 0:36 D_R		725808
Ethylbenzene	ND	1	1		06/30/01 0:36 D_R		725808
Toluene	ND	1	1		06/30/01 0:36 D_R		725808
Xylenes, Total	ND	1	1		06/30/01 0:36 D_R		725808
Surr: 4-Bromofluorobenzene	102 %	48-156	1		06/30/01 0:36 D_R		725808
Surr: 1,4-Difluorobenzene	98.4 %	72-137	1		06/30/01 0:36 D_R		725808

**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

7/10/01 12:07:35 PM



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

Client Sample ID TB-6/21/01

Collected: 6/21/01

SPL Sample ID: 01060768-07

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1		1	07/05/01 14:46	D_R	730864
Surr: 1,4-Difluorobenzene	104	% 74-121		1	07/05/01 14:46	D_R	730864
Surr: 4-Bromofluorobenzene	105	% 55-150		1	07/05/01 14:46	D_R	730864
<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1		1	06/29/01 17:43	D_R	725766
Ethylbenzene	ND	1		1	06/29/01 17:43	D_R	725766
Toluene	ND	1		1	06/29/01 17:43	D_R	725766
Xylenes, Total	ND	1		1	06/29/01 17:43	D_R	725766
Surr: 4-Bromofluorobenzene	105	% 48-156		1	06/29/01 17:43	D_R	725766
Surr: 1,4-Difluorobenzene	98.3	% 72-137		1	06/29/01 17:43	D_R	725766

**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

7/10/01 12:07:35 PM

# *Quality Control Documentation*



HOUSTON LABORATORY  
8880 INTERCHANGE DRIVE  
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## Quality Control Report

Brown & Caldwell

BJ Service-Hobbs #12832-016

Analysis: Diesel Range Organics  
Method: SW8015B

WorkOrder: 01060768  
Lab Batch ID: 12979

### Method Blank

RunID: HP\_V\_010703B-727960 Units: mg/L  
Analysis Date: 07/03/2001 5:22 Analyst: AM  
Preparation Date: 06/22/2001 19:37 Prep By: KL Method SW3510B

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01060768-01B	MW-5
01060768-02B	MW-7
01060768-05B	MW-3
01060768-06B	MW-4

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20
Surr: n-Pentacosane	91.6	18-120

### Laboratory Control Sample (LCS)

RunID: HP\_V\_010703B-727961 Units: mg/L  
Analysis Date: 07/03/2001 6:00 Analyst: AM  
Preparation Date: 06/22/2001 19:37 Prep By: KL Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	2.3	91	21	175

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

Sample Spiked: 01060738-02  
RunID: HP\_V\_010703B-727963 Units: mg/L  
Analysis Date: 07/03/2001 7:56 Analyst: AM  
Preparation Date: 06/22/2001 19:37 Prep By: KL Method SW3510B

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Diesel Range Organics	0.70	5	2.1	27.5	5	2.1	28.5	3.66	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.

7/10/01 12:07:40 PM



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## Quality Control Report

Brown & Caldwell

BJ Service-Hobbs #12832-016

Analysis: Headspace Gas Analysis  
Method: RSK147

WorkOrder: 01060768  
Lab Batch ID: R38400

### Method Blank

### Samples in Analytical Batch:

RunID: VARC\_010705A-730549 Units: mg/L  
Analysis Date: 07/05/2001 18:42 Analyst: DR

Lab Sample ID 01060768-01D  
Client Sample ID MW-5

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

### Sample Duplicate

Original Sample: 01060700-06  
RunID: VARC\_010705A-735492 Units: mg/L  
Analysis Date: 07/06/2001 14:40 Analyst: DR

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	0.054	0.055	2	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.

7/10/01 12:07:42 PM



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## Quality Control Report

Brown & Caldwell

BJ Service-Hobbs #12832-016

Analysis: Purgeable Aromatics  
Method: SW8021B

WorkOrder: 01060768  
Lab Batch ID: R38041

### Method Blank

RunID: HP\_R\_010629A-723625 Units: ug/L  
Analysis Date: 06/29/2001 12:40 Analyst: D\_R

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01060768-01A	MW-5
01060768-02A	MW-7
01060768-05A	MW-3
01060768-06A	MW-4
01060768-07A	TB-6/21/01

Analyte	Result	Rep Limit
Benzene	ND	1.0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
Xylenes, Total	ND	1.0
Surr: 1,4-Difluorobenzene	98.7	72-137
Surr: 4-Bromofluorobenzene	102.0	48-156

### Laboratory Control Sample (LCS)

RunID: HP\_R\_010629A-723624 Units: ug/L  
Analysis Date: 06/29/2001 10:40 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	51	101	70	130
Ethylbenzene	50	49	98	70	130
Toluene	50	50	101	70	130
Xylenes, Total	150	149	99	70	130

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

Sample Spiked: 01060768-01  
RunID: HP\_R\_010629A-725760 Units: ug/L  
Analysis Date: 06/29/2001 15:25 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	24	120	20	31	156	26.2 *	21	32	164
Ethylbenzene	ND	20	24	118	20	23	114	3.68	19	52	142
Toluene	ND	20	24	116	20	24	119	2.69	20	38	159
Xylenes, Total	ND	60	69	115	60	66	110	4.44	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.

7/10/01 12:07:44 PM



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## Quality Control Report

Brown & Caldwell

BJ Service-Hobbs #12832-016

Analysis: Gasoline Range Organics  
Method: SW8015B

WorkOrder: 01060768  
Lab Batch ID: R38135

### Method Blank

RunID: HP\_R\_010629C-725904 Units: mg/L  
Analysis Date: 06/29/2001 11:35 Analyst: D\_R

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01060768-01A	MW-5
01060768-02A	MW-7
01060768-05A	MW-3
01060768-06A	MW-4

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	97.7	74-121
Surr: 4-Bromofluorobenzene	105.7	55-150

### Laboratory Control Sample (LCS)

RunID: HP\_R\_010629C-725903 Units: mg/L  
Analysis Date: 06/29/2001 11:07 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.91	91	70	130

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

Sample Spiked: 01060768-02  
RunID: HP\_R\_010629C-725863 Units: mg/L  
Analysis Date: 06/29/2001 16:20 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	ND	0.9	0.79	81.1	0.9	0.73	74.3	8.75	36	36	160

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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

7/10/01 12:07:46 PM



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## Quality Control Report

Brown & Caldwell

BJ Service-Hobbs #12832-016

Analysis: Gasoline Range Organics  
Method: SW8015B

WorkOrder: 01060768  
Lab Batch ID: R38422

### Method Blank

### Samples in Analytical Batch:

RunID: HP\_S\_010705C-730863 Units: mg/L  
Analysis Date: 07/05/2001 13:12 Analyst: D\_R

Lab Sample ID 01060768-07A  
Client Sample ID TB-6/21/01

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	102.0	74-121
Surr: 4-Bromofluorobenzene	104.7	55-150

### Laboratory Control Sample (LCS)

RunID: HP\_S\_010705C-730862 Units: mg/L  
Analysis Date: 07/05/2001 12:45 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	1	101	70	130

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

Sample Spiked: 01070023-03  
RunID: HP\_S\_010705C-730866 Units: mg/L  
Analysis Date: 07/05/2001 21:35 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	1.7	0.9	2.4	74.7	0.9	2.4	74.2	0.687	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.





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## Quality Control Report

Brown & Caldwell

BJ Service-Hobbs #12832-016

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

WorkOrder: 01060768  
Lab Batch ID: R37664

### Method Blank

### Samples in Analytical Batch:

RunID: WET\_010622U-716083 Units: mg/L  
Analysis Date: 06/22/2001 10:00 Analyst: KM

Lab Sample ID: 01060768-01C  
Client Sample ID: MW-5

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

### Laboratory Control Sample (LCS)

RunID: WET\_010622U-716084 Units: mg/L  
Analysis Date: 06/22/2001 10:00 Analyst: KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.54	95	90	110

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

Sample Spiked: 01060771-01  
RunID: WET\_010622U-716086 Units: mg/L  
Analysis Date: 06/22/2001 10:00 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Nitrogen, Nitrate (As N)	320	500	909	117	500	906	116	0.384	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.

7/10/01 12:07:50 PM



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### Quality Control Report

**Brown & Caldwell**

**BJ Service-Hobbs #12832-016**

Analysis: Sulfate  
Method: E300

WorkOrder: 01060768  
Lab Batch ID: R37665

#### Method Blank

#### Samples in Analytical Batch:

RunID: WET\_010622V-716094 Units: mg/L  
Analysis Date: 06/22/2001 10:00 Analyst: KM

Lab Sample ID 01060768-01C  
Client Sample ID MW-5

Analyte	Result	Rep Limit
Sulfate	ND	0.20

#### Laboratory Control Sample (LCS)

RunID: WET\_010622V-716095 Units: mg/L  
Analysis Date: 06/22/2001 10:00 Analyst: KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Sulfate	10	11	108	90	110

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

Sample Spiked: 01060768-01  
RunID: WET\_010622V-716097 Units: mg/L  
Analysis Date: 06/22/2001 10:00 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Sulfate	150	200	360	107	200	360	107	0.0847	20	80	120

**Qualifiers:** ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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.

7/10/01 12:07:52 PM



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## Quality Control Report

**Brown & Caldwell**

BJ Service-Hobbs #12832-016

Analysis: Chloride, Total  
Method: E325.3

WorkOrder: 01060768  
Lab Batch ID: R38474

### Method Blank

RunID: WET\_010706C-731557 Units: mg/L  
Analysis Date: 07/06/2001 11:10 Analyst: CV

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01060768-03A	MW-14
01060768-04A	MW-15

Analyte	Result	Rep Limit
Chloride	ND	1.0

### Laboratory Control Sample (LCS)

RunID: WET\_010706C-731559 Units: mg/L  
Analysis Date: 07/06/2001 11:10 Analyst: CV

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Chloride	76.2	75.2	99	90	110

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

Sample Spiked: 01060768-03  
RunID: WET\_010706C-731561 Units: mg/L  
Analysis Date: 07/06/2001 11:10 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	220	250	470	99.1	250	470	99.1	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.

7/10/01 12:07:54 PM

*Sample Receipt Checklist  
And  
Chain of Custody*

7/10/01 12:07:56 PM



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

### Sample Receipt Checklist

Workorder: 01060768

Received By: RE

Date and Time Received: 6/22/01 9:30:00 AM

Carrier name: FedEx

Temperature: 3

Chilled by: Water Ice

- |  |   |                             |   |
|--|---|-----------------------------|---|
| 1. Shipping container/cooler in good condition?            | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Present <input type="checkbox"/>            |
| 2. Custody seals intact on shipping container/cooler?      | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Present <input type="checkbox"/>            |
| 3. Custody seals intact on sample bottles?                 | Yes <input type="checkbox"/>            | No <input type="checkbox"/> | Not Present <input checked="" type="checkbox"/> |
| 4. Chain of custody present?                               | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 5. Chain of custody signed when relinquished and received? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 6. Chain of custody agrees with sample labels?             | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 7. Samples in proper container/bottle?                     | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 8. Sample containers intact?                               | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 9. Sufficient sample volume for indicated test?            | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 10. All samples received within holding time?              | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 11. Container/Temp Blank temperature in compliance?        | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 12. Water - VOA vials have zero headspace?                 | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Applicable <input type="checkbox"/>         |
| 13. Water - pH acceptable upon receipt?                    | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Applicable <input type="checkbox"/>         |

SPL Representative:

Contact Date & Time:

Client Name Contacted:

Non Conformance  
Issues:

Client Instructions:

**SPL, Inc.**

## Analysis Request & Chain of Custody Record

SPL Weekend Nov

01060768

096668

page / of

Client Name:	BROWN AND CALDWELL
Address/Phone:	415 INDIANA, STE 250, HOUSTON 77137540777
Client Contact:	RICK PEXROAD
Project Name:	BS SERVICES - HOBBS
Project Number:	12832-016
Project Location:	HOBBS, NM
Invoice To:	BC

SAMPLE ID	DATE	TIME	comp	grab
MW-5	06/21/01	1645		✓
MW-7	06/21/01	1300		✓
MW-14	06/21/01	1430		✓
MW-15	06/21/01	1505		✓
MW-3	06/21/01	1545		✓
MW-4	06/21/01	1625		✓
TR-06/21/01	06/21/01			✓

matrix	bottle	size	pres.	Number of Containers	Requested Analysis
W=water S=soil SL=sludge O=other:	P=plastic A=amber glass G=glass V=vial	1 = 1 liter 4=4oz 40=vial 8=8oz 16=16oz	1=HCl 2=HNO3 3=H2SO4 O=other:		BTX (B021B) TH (P066E)-8015 Nitrate (300.0)* Sulfate (300.0) Dissolved Methane Ethane Ethane (UK 11471.7) CHLORIDE (325.3) 115 4/22

[illegible]

Client/Consultant Remarks:

Laboratory remarks:

Intact? ☐ Yes ☐ No

NITRATE must be analyzed within 24 hours of sampling

Requested TAT

### Special Reporting Requirements

### Far Results

Raw Data

Special Detection Limits (specify):

	24hr	72hr	Standard
✓	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Standard QC	<input checked="" type="checkbox"/>
1 Relinquished to Sampler	

Level 300

Level 4

time 11

2 Received for

3. Relinquished by:

4. Received by: CPA

6. Received by Laboratory: 1

4. Received by: John

6. Received by Laboratory: APR 20 1967

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

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

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



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

## Brown & Caldwell

Certificate of Analysis Number:

**01060808**

<b><u>Report To:</u></b> Brown & Caldwell Rick Rexroad 1415 Louisiana Suite 2509 Houston TX 77002- ph: (713) 759-0999      fax: (713) 308-3886	<b><u>Project Name:</u></b> BJ Service, Hobbs, NM <b><u>Site:</u></b> Hobbs, NM <b><u>Site Address:</u></b>  <b><u>PO Number:</u></b> <b><u>State:</u></b> New Mexico <b><u>State Cert. No.:</u></b> <b><u>Date Reported:</u></b> 7/10/01
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This Report Contains A Total Of 17 Pages

Excluding This Page

And

Chain Of Custody

7/10/01

Date



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

Case Narrative for:  
**Brown & Caldwell**

Certificate of Analysis Number:

**01060808**

<b>Report To:</b>  Brown & Caldwell Rick Rexroad 1415 Louisiana Suite 2509 Houston TX 77002- ph: (713) 759-0999      fax: (713) 308-3886	<b>Project Name:</b> BJ Service, Hobbs, NM <b>Site:</b> Hobbs, NM <b>Site Address:</b>  <b>PO Number:</b> <b>State:</b> New Mexico <b>State Cert. No.:</b> <b>Date Reported:</b> 7/10/01
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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

7/10/01

Date





HOUSTON LABORATORY  
8880 INTERCHANGE DRIVE  
HOUSTON, TEXAS 77054  
(713) 660-0801

## Brown & Caldwell

Certificate of Analysis Number:

**01060808**

**Report To:**

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

fax: (713) 308-3886

**Fax To:**

Brown & Caldwell

Rick Rexroad

fax : (713) 308-3886

**Project Name:**

BJ Service, Hobbs, NM

**Site:**

Hobbs, NM

**Site Address:**

**PO Number:**

**State:**

New Mexico

**State Cert. No.:**

**Date Reported:**

7/10/01

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD
MW-13	01060808-01	Water	6/22/01 7:35:00 AM	6/23/01 10:00:00 AM	096670	<input type="checkbox"/>
MW-11A	01060808-02	Water	6/22/01 8:40:00 AM	6/23/01 10:00:00 AM	096670	<input type="checkbox"/>
MW-12	01060808-03	Water	6/22/01 10:45:00 AM	6/23/01 10:00:00 AM	096670	<input type="checkbox"/>
MW-10	01060808-04	Water	6/22/01 10:00:00 AM	6/23/01 10:00:00 AM	096670	<input type="checkbox"/>
Duplicate	01060808-05	Water	6/22/01 9:00:00 AM	6/23/01 10:00:00 AM	096670	<input type="checkbox"/>
TB- 6/15/01	01060808-06	Water	6/22/01	6/23/01 10:00:00 AM	096670	<input type="checkbox"/>

*Gonia West*  
Gonia West  
Senior Project Manager

7/10/01

Date

Joel Grice  
Laboratory Director

Ted Yen  
Quality Assurance Officer

7/10/01 12:10:06 PM



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

Client Sample ID MW-13

Collected: 6/22/01 7:35:00

SPL Sample ID: 01060808-01

Site: Hobbs,NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	0.31	0.2	1		07/06/01 7:54 AM		731304
Surr: n-Pentacosane	90.0 %	18-120	1		07/06/01 7:54 AM		731304

Prep Method	Prep Date	Prep Initials
SW3510B	06/26/2001 15:52	KL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		06/29/01 19:33 D_R		725872
Surr: 1,4-Difluorobenzene	100 %	74-121	1		06/29/01 19:33 D_R		725872
Surr: 4-Bromofluorobenzene	106 %	55-150	1		06/29/01 19:33 D_R		725872

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		06/29/01 19:33 D_R		725779
Ethylbenzene	ND	1	1		06/29/01 19:33 D_R		725779
Toluene	ND	1	1		06/29/01 19:33 D_R		725779
Xylenes, Total	ND	1	1		06/29/01 19:33 D_R		725779
Surr: 4-Bromofluorobenzene	105 %	48-156	1		06/29/01 19:33 D_R		725779
Surr: 1,4-Difluorobenzene	98.7 %	72-137	1		06/29/01 19:33 D_R		725779

**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

7/10/01 12:10:12 PM



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

Client Sample ID MW-11A

Collected: 6/22/01 8:40:00

SPL Sample ID: 01060808-02

Site: Hobbs,NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	1	0.24	1		07/06/01 8:32 AM		731305
Surr: n-Pentacosane	91.6 %	18-120	1		07/06/01 8:32 AM		731305
Prep Method	Prep Date	Prep Initials					
SW3510B	06/26/2001 15:52	KL					
<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	0.1	0.1	1		06/29/01 20:01 D_R		725873
Surr: 1,4-Difluorobenzene	104 %	74-121	1		06/29/01 20:01 D_R		725873
Surr: 4-Bromofluorobenzene	112 %	55-150	1		06/29/01 20:01 D_R		725873
<b>HEADSPACE GAS ANALYSIS</b>			<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>		
Ethane	ND	0.0025	1		07/06/01 20:05 DR		733031
Ethylene	ND	0.0032	1		07/06/01 20:05 DR		733031
Methane	0.0074	0.0012	1		07/06/01 20:05 DR		733031
<b>NITROGEN, NITRATE (AS N)</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Nitrogen, Nitrate (As N)	ND	0.1	1		06/23/01 10:54 KM		716773
<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	1.5	1	1		06/29/01 20:01 D_R		725785
Ethylbenzene	ND	1	1		06/29/01 20:01 D_R		725785
Toluene	ND	1	1		06/29/01 20:01 D_R		725785
Xylenes, Total	ND	1	1		06/29/01 20:01 D_R		725785
Surr: 4-Bromofluorobenzene	125 %	48-156	1		06/29/01 20:01 D_R		725785
Surr: 1,4-Difluorobenzene	99.6 %	72-137	1		06/29/01 20:01 D_R		725785
<b>SULFATE</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Sulfate	180	4	20		06/25/01 10:52 KM		718273

**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

7/10/01



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

Client Sample ID MW-12

Collected: 6/22/01 10:45:00 SPL Sample ID: 01060808-03

Site: Hobbs,NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	0.51	0.22	1		07/06/01 9:11 AM		731307
Surr: n-Pentacosane	84.1 %	18-120	1		07/06/01 9:11 AM		731307
<u>Prep Method</u>		<u>Prep Date</u>	<u>Prep Initials</u>				
SW3510B		06/26/2001 15:52	KL				
<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	0.11	0.1	1		06/29/01 21:24 D_R		725874
Surr: 1,4-Difluorobenzene	102 %	74-121	1		06/29/01 21:24 D_R		725874
Surr: 4-Bromofluorobenzene	134 %	55-150	1		06/29/01 21:24 D_R		725874
<b>HEADSPACE GAS ANALYSIS</b>			<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>		
Ethane	ND	0.0025	1		07/06/01 20:19 DR		733033
Ethylene	ND	0.0032	1		07/06/01 20:19 DR		733033
Methane	0.0021	0.0012	1		07/06/01 20:19 DR		733033
<b>NITROGEN, NITRATE (AS N)</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Nitrogen, Nitrate (As N)	ND	0.1	1		06/23/01 10:54 KM		716774
<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	12	1	1		06/29/01 21:24 D_R		725800
Ethylbenzene	ND	1	1		06/29/01 21:24 D_R		725800
Toluene	ND	1	1		06/29/01 21:24 D_R		725800
Xylenes, Total	ND	1	1		06/29/01 21:24 D_R		725800
Surr: 4-Bromofluorobenzene	111 %	48-156	1		06/29/01 21:24 D_R		725800
Surr: 1,4-Difluorobenzene	100 %	72-137	1		06/29/01 21:24 D_R		725800
<b>SULFATE</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Sulfate	360	10	50		06/25/01 10:52 KM		718276

**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

7/10/01 12:10:16 PM



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

Client Sample ID MW-10

Collected: 6/22/01 10:00:00 SPL Sample ID: 01060808-04

Site: Hobbs,NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	1.2	0.25	1		07/06/01 9:49 AM		731309
Surr: n-Pentacosane	63.0 %	18-120	1		07/06/01 9:49 AM		731309

Prep Method	Prep Date	Prep Initials
SW3510B	06/26/2001 15:52	KL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		06/30/01 2:54 D_R		725880
Surr: 1,4-Difluorobenzene	101 %	74-121	1		06/30/01 2:54 D_R		725880
Surr: 4-Bromofluorobenzene	103 %	55-150	1		06/30/01 2:54 D_R		725880

<b>HEADSPACE GAS ANALYSIS</b>			<b>MCL</b>	<b>RSK147</b>	<b>Units: mg/L</b>		
Ethane	ND	0.0025	1		07/06/01 20:33 DR		733036
Ethylene	ND	0.0032	1		07/06/01 20:33 DR		733036
Methane	0.044	0.0012	1		07/06/01 20:33 DR		733036

<b>NITROGEN, NITRATE (AS N)</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Nitrogen, Nitrate (As N)	ND	0.1	1		06/23/01 10:54 KM		716776

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		06/30/01 2:54 D_R		727614
Ethylbenzene	ND	1	1		06/30/01 2:54 D_R		727614
Toluene	ND	1	1		06/30/01 2:54 D_R		727614
Xylenes, Total	ND	1	1		06/30/01 2:54 D_R		727614
Surr: 4-Bromofluorobenzene	103 %	48-156	1		06/30/01 2:54 D_R		727614
Surr: 1,4-Difluorobenzene	99.0 %	72-137	1		06/30/01 2:54 D_R		727614

<b>SULFATE</b>			<b>MCL</b>	<b>E300</b>	<b>Units: mg/L</b>		
Sulfate	270	4	20		06/25/01 10:52 KM		718277

**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

7/10/01 12:10:18 PM



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

Client Sample ID Duplicate

Collected: 6/22/01 9:00:00

SPL Sample ID: 01060808-05

Site: Hobbs,NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	1.9	0.24		1	07/06/01 10:28 AM		731311
Surr: n-Pentacosane	86.7 %	18-120		1	07/06/01 10:28 AM		731311

Prep Method	Prep Date	Prep Initials
SW3510B	06/26/2001 15:52	KL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.5		5	06/29/01 23:41 D_R		725877
Surr: 1,4-Difluorobenzene	97.6 %	74-121		5	06/29/01 23:41 D_R		725877
Surr: 4-Bromofluorobenzene	105 %	55-150		5	06/29/01 23:41 D_R		725877

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	5		5	06/29/01 23:41 D_R		725806
Ethylbenzene	ND	5		5	06/29/01 23:41 D_R		725806
Toluene	ND	5		5	06/29/01 23:41 D_R		725806
Xylenes, Total	ND	5		5	06/29/01 23:41 D_R		725806
Surr: 4-Bromofluorobenzene	101 %	48-156		5	06/29/01 23:41 D_R		725806
Surr: 1,4-Difluorobenzene	99.6 %	72-137		5	06/29/01 23:41 D_R		725806

**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

7/10/01 12:10:19 PM



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

Client Sample ID TB- 6/15/01

Collected: 6/22/01

SPL Sample ID: 01060808-06

Site: Hobbs,NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1	1		06/29/01 23:14	D_R	725876
Surr: 1,4-Difluorobenzene	97.3	% 74-121	1		06/29/01 23:14	D_R	725876
Surr: 4-Bromofluorobenzene	105	% 55-150	1		06/29/01 23:14	D_R	725876
<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1	1		06/29/01 23:14	D_R	725805
Ethylbenzene	ND	1	1		06/29/01 23:14	D_R	725805
Toluene	ND	1	1		06/29/01 23:14	D_R	725805
Xylenes, Total	ND	1	1		06/29/01 23:14	D_R	725805
Surr: 4-Bromofluorobenzene	101	% 48-156	1		06/29/01 23:14	D_R	725805
Surr: 1,4-Difluorobenzene	98.1	% 72-137	1		06/29/01 23:14	D_R	725805

**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

7/10/01 12:10:20 PM

# *Quality Control Documentation*





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

## Quality Control Report

Brown & Caldwell  
BJ Service, Hobbs, NM

Analysis: Diesel Range Organics  
Method: SW8015B

WorkOrder: 01060808  
Lab Batch ID: 13057

### Method Blank

RunID: HP\_V\_010706A-731280 Units: mg/L  
Analysis Date: 07/06/2001 3:24 Analyst: AM  
Preparation Date: 06/26/2001 15:52 Prep By: KL Method SW3510B

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01060808-01B	MW-13
01060808-02B	MW-11A
01060808-03B	MW-12
01060808-04B	MW-10
01060808-05B	Duplicate

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20
Surr: n-Pentacosane	65.4	18-120

### Laboratory Control Sample (LCS)

RunID: HP\_V\_010706A-731281 Units: mg/L  
Analysis Date: 07/06/2001 4:02 Analyst: AM  
Preparation Date: 06/26/2001 15:52 Prep By: KL Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	2	80	21	175

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

Sample Spiked: 01060861-04  
RunID: HP\_V\_010706A-731285 Units: mg/L  
Analysis Date: 07/06/2001 6:37 Analyst: AM  
Preparation Date: 06/26/2001 15:52 Prep By: KL Method SW3510B

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Diesel Range Organics	0.56	2.5	2.7	86.5	2.5	2.2	66.2	26.5	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.

7/10/01 12:10:25 PM



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

## Quality Control Report

**Brown & Caldwell**

BJ Service, Hobbs, NM

Analysis: Headspace Gas Analysis  
Method: RSK147

WorkOrder: 01060808.  
Lab Batch ID: R38526

### Method Blank

RunID: VARC\_010706B-733056 Units: mg/L  
Analysis Date: 07/08/2001 12:02 Analyst: DR

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01060808-02D	MW-11A
01060808-03D	MW-12
01060808-04D	MW-10

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

### Sample Duplicate

Original Sample: 01060810-10  
RunID: VARC\_010706B-733061 Units: mg/L  
Analysis Date: 07/08/2001 13:00 Analyst: DR

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	0.01	0.011	9	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.

7/10/01 12:10:27 PM



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

## Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

Analysis: Purgeable Aromatics  
Method: SW8021B

WorkOrder: 01060808  
Lab Batch ID: R38041

### Method Blank

RunID: HP\_R\_010629A-723625 Units: ug/L  
Analysis Date: 06/29/2001 12:40 Analyst: D\_R

Analyte	Result	Rep Limit
Benzene	ND	1.0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
Xylenes, Total	ND	1.0
Surr: 1,4-Difluorobenzene	98.7	72-137
Surr: 4-Bromofluorobenzene	102.0	48-156

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01060808-01A	MW-13
01060808-02A	MW-11A
01060808-03A	MW-12
01060808-04A	MW-10
01060808-05A	Duplicate
01060808-06A	TB- 6/15/01

### Laboratory Control Sample (LCS)

RunID: HP\_R\_010629A-723624 Units: ug/L  
Analysis Date: 06/29/2001 10:40 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	51	101	70	130
Ethylbenzene	50	49	98	70	130
Toluene	50	50	101	70	130
Xylenes, Total	150	149	99	70	130

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

Sample Spiked: 01060768-01  
RunID: HP\_R\_010629A-725760 Units: ug/L  
Analysis Date: 06/29/2001 15:25 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	24	120	20	31	156	26.2 *	21	32	164
Ethylbenzene	ND	20	24	118	20	23	114	3.68	19	52	142
Toluene	ND	20	24	116	20	24	119	2.69	20	38	159
Xylenes, Total	ND	60	69	115	60	66	110	4.44	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.

7/10/01 12:10:29 PM



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

## Quality Control Report

Brown & Caldwell  
BJ Service, Hobbs, NM

Analysis: Gasoline Range Organics  
Method: SW8015B

WorkOrder: 01060808  
Lab Batch ID: R38135

### Method Blank

RunID: HP\_R\_010629C-725904 Units: mg/L  
Analysis Date: 06/29/2001 11:35 Analyst: D\_R

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	97.7	74-121
Surr: 4-Bromofluorobenzene	105.7	55-150

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01060808-01A	MW-13
01060808-02A	MW-11A
01060808-03A	MW-12
01060808-04A	MW-10
01060808-05A	Duplicate
01060808-06A	TB- 6/15/01

### Laboratory Control Sample (LCS)

RunID: HP\_R\_010629C-725903 Units: mg/L  
Analysis Date: 06/29/2001 11:07 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.91	91	70	130

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

Sample Spiked: 01060768-02  
RunID: HP\_R\_010629C-725863 Units: mg/L  
Analysis Date: 06/29/2001 16:20 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	ND	0.9	0.79	81.1	0.9	0.73	74.3	8.75	36	36	160

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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

7/10/01 12:10:31 PM



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

## Quality Control Report

Brown & Caldwell

BJ Service, Hobbs, NM

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

WorkOrder: 01060808  
Lab Batch ID: R37702

### Method Blank

### Samples in Analytical Batch:

RunID: WET\_010623I-716764 Units: mg/L  
Analysis Date: 06/23/2001 10:54 Analyst: KM

Lab Sample ID	Client Sample ID
01060808-02C	MW-11A
01060808-03C	MW-12
01060808-04C	MW-10

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

### Laboratory Control Sample (LCS)

RunID: WET\_010623I-716766 Units: mg/L  
Analysis Date: 06/23/2001 10:54 Analyst: KM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.54	95	90	110

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

Sample Spiked: 01060811-03  
RunID: WET\_010623I-716769 Units: mg/L  
Analysis Date: 06/23/2001 10:54 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Nitrogen, Nitrate (As N)	2.6	10	12.2	96.0	10	12.2	96.5	0.499	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.



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

## Quality Control Report

**Brown & Caldwell**

BJ Service, Hobbs, NM

Analysis: Sulfate  
Method: E300

WorkOrder: 01060808  
Lab Batch ID: R37790

### Method Blank

### Samples in Analytical Batch:

RunID: WET\_010625I-718271 Units: mg/L  
Analysis Date: 06/25/2001 10:52 Analyst: KM

Lab Sample ID	Client Sample ID
01060808-02C	MW-11A
01060808-03C	MW-12
01060808-04C	MW-10

Analyte	Result	Rep Limit
Sulfate	ND	0.20

### Laboratory Control Sample (LCS)

RunID: WET\_010625I-718272 Units: mg/L  
Analysis Date: 06/25/2001 10:52 Analyst: KM

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: 01060808-02  
RunID: WET\_010625I-718274 Units: mg/L  
Analysis Date: 06/25/2001 10:52 Analyst: KM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Sulfate	180	200	410	112	200	410	111	0.202	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.

7/10/01 12:10:35 PM

*Sample Receipt Checklist  
And  
Chain of Custody*

7/10/01 12:10:36 PM



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

### Sample Receipt Checklist

Workorder: 01060808

Received By: RE

Date and Time Received: 6/23/01 10:00:00 AM

Carrier name: FedEx

Temperature: 4

Chilled by: Water Ice

- |  |   |  |   |
|--|---|--|---|
| 1. Shipping container/cooler in good condition?            | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            | Not Present <input type="checkbox"/>            |
| 2. Custody seals intact on shipping container/cooler?      | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            | Not Present <input type="checkbox"/>            |
| 3. Custody seals intact on sample bottles?                 | Yes <input type="checkbox"/>            | No <input type="checkbox"/>            | Not Present <input checked="" type="checkbox"/> |
| 4. Chain of custody present?                               | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 5. Chain of custody signed when relinquished and received? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 6. Chain of custody agrees with sample labels?             | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 7. Samples in proper container/bottle?                     | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 8. Sample containers intact?                               | Yes <input type="checkbox"/>            | No <input checked="" type="checkbox"/> |   |
| 1. Received 1-40ml vial ID#MW-13 broken.                   |   |  |   |
| 9. Sufficient sample volume for indicated test?            | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 10. All samples received within holding time?              | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 11. Container/Temp Blank temperature in compliance?        | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            |   |
| 12. Water - VOA vials have zero headspace?                 | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            | Not Applicable <input type="checkbox"/>         |
| 13. Water - pH acceptable upon receipt?                    | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>            | Not Applicable <input type="checkbox"/>         |

SPL Representative:

Contact Date & Time:

Client Name Contacted:

Non Conformance Issues: 1. 2-40ml vials for ID#MW-13 left for analysis.

Client Instructions:





SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Worksheet No:

01060808

096670

page 1 of 1

Client Name: BROWN AND CALDWELL  
Address/Phone: 1415 LOUISIANA, STE 2500, HOUSTON, TX 77054 (713) 759-0999  
Client Contact: RICK KERRROAD  
Project Name: BJ SERVICES - HOBBS  
Project Number: 12832-001  
Project Location: HOBBS, NM  
Invoice To: BC

Requested Analysis

SAMPLE ID	DATE	TIME	comp	grab	matrix	bottle	size	pres.	Number of Containers	BTX (6021B)	TPH (6021B) - 8015	Nitrate (300.0)*	Sulfate (300.0)	Dissolved Nitrate (14)	Ethene/Ethane (RST 12)
MW-13	06/22/01	0735		✓	W	P=plastic C=glass V=vial	1=1 liter 4=4oz 40=vial 8=8oz 16=16oz	1=HCl 2=HNO3 3=H2SO4 0=other:	4	X	X	X	X	X	X
MW-11A	06/22/01	0840		✓	W				3	X	X	X	X	X	X
MW-12	06/22/01	0945		✓	W				3	X	X	X	X	X	X
MW-10	06/22/01	1000		✓	W				3	X	X	X	X	X	X
DUP-10A	06/22/01	0900		✓	W				4	X	X	X	X	X	X
TS-06/22/01	06/22/01				W				2	X	X	X	X	X	X

Client/Consultant Remarks:

Nitrate must be analyzed within 24 hours of sampling

Requested TAT

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

Standard QC ☒

1. Relinquished by Sampler: [Signature]  
3. Relinquished by: [Signature]  
5. Relinquished by: [Signature]

Special Reporting Requirements / Fax Results

Raw Data ☐ Level 3 QC ☐ Level 4 QC ☐

Special Detection Limits (specify):

Laboratory remarks:

Intact? ☐ Y ☐ N

Temp: 4c

PM review (initial):

[Signature]

2. Received by: FEDEX  
time: 1030  
date: 06/24/01

4. Received by:

Received by Laboratory: [Signature]  
time: 6/29/01  
1000

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

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

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

C








## APPENDIX C

### Boring Logs for Confirmation Soil Borings

P:\Wp\BJSERV\12832\081r.doc

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

Project Location: <b>Hobbs, New Mexico</b>		Logged By: <b>Cory Green</b>	Approved: <b>Rick Rexroad</b>
Drilling Contractor: <b>Harrison &amp; Cooper</b>		Date Started: <b>7/23/01</b>	Date Finished: <b>7/23/01</b>
Drilling Equipment: <b>TD-60</b>	Driller: <b>Lenard Hennon</b>	Total Boring Depth: (feet) <b>56.0</b>	Depth to Static Water: (feet) <b>55.5</b>
Drilling Method: <b>Air Rotary</b>	Borehole Diameter: <b>8"</b>	TOC Elevation:	Ground Elevation: <b>ND</b>
Sampling Method: <b>Split Spoon</b>		Diameter and Type of Well Casing: <b>NA</b>	
Comments:		Slot Size: <b>NA</b>	Filter Material: <b>NA</b>
		Development Method: <b>NA</b>	







Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings Sampled Interval Recovery (feet)	Sample ID	Remarks
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32				Drilled Without Sampling			
		SM		Silty Sand (SM) light brown, fine-vfg, dry.	0  2		
					0  2		
		SP		Sand (SP) light brown to brown, fine grained.	0  2		

# CSB-1

Project Name: BJ Services

Project Number: 12832.023

Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings	Sampled Interval	Recovery (feet)	Sample ID	Remarks
34									
36		SM		Silty Sand (SM) brown, fine grained, soft, wet.	0		2		
38									
40		SP		Sand (SP) brown, vfg, slightly moist.	0		2		
42									
44									
46					0		2		Sample CSB-1-45-47
48									
50					0		2		
52									
54		SP		Sand (SP) brown, moist, wet @ 55.5'.	0		2		Sample CSB-1-54-56
56									

Project Location: <b>Hobbs, New Mexico</b>		Logged By: <b>Cory Green</b>	Approved: <b>Rick Rexroad</b>
Drilling Contractor: <b>Harrison &amp; Cooper</b>		Date Started: <b>7/23/01</b>	Date Finished: <b>7/23/01</b>
Drilling Equipment: <b>TD-60</b>	Driller: <b>Lenard Hennon</b>	Total Boring Depth: (feet) <b>56.0</b>	Depth to Static Water: (feet) <b>55.5</b>
Drilling Method: <b>Air Rotary</b>	Borehole Diameter: <b>8"</b>	TOC Elevation:	Ground Elevation: <b>ND</b>
Sampling Method: <b>Split Spoon</b>		Diameter and Type of Well Casing: <b>NA</b>	
Comments:		Slot Size: <b>NA</b>	Filter Material: <b>NA</b>
		Development Method: <b>NA</b>	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings Sampled Interval Recovery (feet)	Sample ID	Remarks
0				Drilled Without Sampling			
2							
4							
6							
8							
10							
12							
14							
16							
18							
20		SM		Silty Sand (SM) light brown, dry, vfg-fine grained.	0 2		
22							
24							
26		SM		Slightly Silty Sand (SM) light brown to brown, vfg, dry.	0 2		
28							
30		SP		Sand (SP) brown, vfg, dry.	10 2		
32							



Project Name: **BJ Services**

Project Number: 12832.023

Sheet 1 of 2

Project Location: <b>Hobbs, New Mexico</b>		Logged By: <b>Cory Green</b>	Approved: <b>Rick Rexroad</b>
Drilling Contractor: <b>Harrison &amp; Cooper</b>		Date Started: <b>7/23/01</b>	Date Finished: <b>7/23/01</b>
Drilling Equipment: <b>TD-60</b>	Driller: <b>Lenard Hennon</b>	Total Boring Depth: (feet) <b>54.0</b>	Depth to Static Water: (feet) <b>53.5</b>
Drilling Method: <b>Air Rotary</b>	Borehole Diameter: <b>8"</b>	TOC Elevation:	Ground Elevation: <b>ND</b>
Sampling Method: <b>Split Spoon</b>		Diameter and Type of Well Casing: <b>NA</b>	
Comments:		Slot Size: <b>NA</b>	Filter Material: <b>NA</b>
		Development Method: <b>NA</b>	

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings Sampled Interval Recovery (feet)	Sample ID	Remarks
0				Drilled Without Sampling			
2							
4							
6							
8							
10							
12							
14							
16							
18							
20		SM		Silty Sand (SM) light brown, vfg, dry.	0 2		
22							
24							
26		SM		Silty Sand (SM) light brown, vfg, dry.	0 2		
28							
30		SP		Sand (SP) light brown, fine grained, dry.	0 2		
32							



Project Number:

Sheet 2 of 2

Depth (feet)	Depth to Water	USC Soil Type	Lithology	Description	Readings Sampled Interval Recovery (feet)	Sample ID	Remarks
34					0 2		
36					0 2		
38					0 2		
40		SP		Sand (SP) light brown, vfg, dry.	0 2		
42					0 2		
44					0 2		
46		SP		Sand (SP) brown, vfg, slightly moist to dry.	0 2		Sample CSB-3-45-47
48					0 2		
50					0 2		
52		SP		Sand (SP) brown, vfg, becomes moist @ 53.5'.	0 2		Sample CSB-3-52-54
54					0 2		





D



## **APPENDIX D**

### **Laboratory Analytical Report for Confirmation Soil Samples**



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

## Brown & Caldwell

Certificate of Analysis Number:

01070914

<u>Report To:</u> Brown & Caldwell Rick Rexroad 1415 Louisiana Suite 2509 Houston TX 77002- ph: (713) 759-0999      fax: (713) 308-3886	<u>Project Name:</u> BJ Hobbs <u>Site:</u> Hobbs, NM <u>Site Address:</u>  <u>PO Number:</u> <u>State:</u> New Mexico <u>State Cert. No.:</u> <u>Date Reported:</u> 8/9/01
---	---

This Report Contains A Total Of 22 Pages

Excluding This Page

And

Chain Of Custody

8/9/01

Date



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

Case Narrative for:  
**Brown & Caldwell**

Certificate of Analysis Number:  
**01070914**

<b>Report To:</b>  Brown & Caldwell Rick Rexroad 1415 Louisiana Suite 2509 Houston TX 77002- ph: (713) 759-0999      fax: (713) 308-3886	<b>Project Name:</b> BJ Hobbs <b>Site:</b> Hobbs, NM <b>Site Address:</b>  <b>PO Number:</b> <b>State:</b> New Mexico <b>State Cert. No.:</b> <b>Date Reported:</b> 8/9/01
---	---

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

8/9/01

Date



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

## Brown & Caldwell

Certificate of Analysis Number:

01070914

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  
Site: Hobbs, NM  
Site Address:

PO Number:  
State: New Mexico

State Cert. No.:

Date Reported: 8/9/01

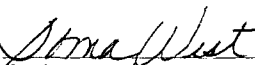
Fax To:

Brown & Caldwell

Rick Rexroad

fax : (713) 308-3886

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD
CSB-4-45-47	01070914-01	Soil	7/23/01 10:56:00 AM	7/25/01 10:00:00 AM	095728	<input type="checkbox"/>
CSB-4-54-56	01070914-02	Soil	7/23/01 11:23:00 AM	7/25/01 10:00:00 AM	095728	<input type="checkbox"/>
CSB-3-45-47	01070914-03	Soil	7/23/01 12:32:00 PM	7/25/01 10:00:00 AM	095728	<input type="checkbox"/>
CSB-3-52-54	01070914-04	Soil	7/23/01 12:43:00 PM	7/25/01 10:00:00 AM	095728	<input type="checkbox"/>
CSB-2-35-37	01070914-05	Soil	7/23/01 1:33:00 PM	7/25/01 10:00:00 AM	095728	<input type="checkbox"/>
CSB-2-54-56	01070914-06	Soil	7/23/01 2:10:00 PM	7/25/01 10:00:00 AM	095728	<input type="checkbox"/>
CSB-1-45-47	01070914-07	Soil	7/23/01 3:39:00 PM	7/25/01 10:00:00 AM	095728	<input type="checkbox"/>
CSB--1-54-56	01070914-08	Soil	7/23/01 3:51:00 PM	7/25/01 10:00:00 AM	095728	<input type="checkbox"/>
CSB-RB	01070914-09	Water	7/23/01 4:05:00 PM	7/25/01 10:00:00 AM	095728	<input type="checkbox"/>

  
Sonia West

Senior Project Manager

Joel Grice  
Laboratory Director

Ted Yen  
Quality Assurance Officer

8/9/01

Date

8/9/01 6:04:58 PM





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

Client Sample ID CSB-4-45-47

Collected: 7/23/01 10:56:00 SPL Sample ID: 01070914-01

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8100M</b>	<b>Units: mg/Kg</b>		
Diesel Range Organics	ND	5.0		1	08/08/01 2:42 AM		781562
Surr: n-Pentacosane	72.8 %	20-154		1	08/08/01 2:42 AM		781562

Prep Method	Prep Date	Prep Initials
SW3550B	07/30/2001 15:54	EE

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/Kg</b>		
Gasoline Range Organics	ND	0.10		1	07/27/01 22:11 TM		765890
Surr: 1,4-Difluorobenzene	94.7 %	63-122		1	07/27/01 22:11 TM		765890
Surr: 4-Bromofluorobenzene	107 %	39-150		1	07/27/01 22:11 TM		765890

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/Kg</b>		
Benzene	ND	1		1	07/27/01 22:11 TM		765540
Ethylbenzene	ND	1		1	07/27/01 22:11 TM		765540
Toluene	ND	1		1	07/27/01 22:11 TM		765540
Xylenes, Total	ND	1		1	07/27/01 22:11 TM		765540
Surr: 1,4-Difluorobenzene	93.3 %	59-127		1	07/27/01 22:11 TM		765540
Surr: 4-Bromofluorobenzene	106 %	48-156		1	07/27/01 22:11 TM		765540

**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

8/9/01 6:05:00 PM



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

Client Sample ID CSB-4-54-56

Collected: 7/23/01 11:23:00 SPL Sample ID: 01070914-02

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8100M</b>	<b>Units: mg/Kg</b>		
Diesel Range Organics	ND	5.0		1	08/08/01 4:37 AM		781567
Surr: n-Pentacosane	94.8 %	20-154		1	08/08/01 4:37 AM		781567

Prep Method	Prep Date	Prep Initials
SW3550B	07/30/2001 15:54	EE

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/Kg</b>		
Gasoline Range Organics	ND	0.10		1	07/27/01 22:39 TM		765891
Surr: 1,4-Difluorobenzene	93.7 %	63-122		1	07/27/01 22:39 TM		765891
Surr: 4-Bromofluorobenzene	106 %	39-150		1	07/27/01 22:39 TM		765891

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/Kg</b>		
Benzene	ND	1		1	07/27/01 22:39 TM		765541
Ethylbenzene	ND	1		1	07/27/01 22:39 TM		765541
Toluene	ND	1		1	07/27/01 22:39 TM		765541
Xylenes, Total	ND	1		1	07/27/01 22:39 TM		765541
Surr: 1,4-Difluorobenzene	92.8 %	59-127		1	07/27/01 22:39 TM		765541
Surr: 4-Bromofluorobenzene	106 %	48-156		1	07/27/01 22:39 TM		765541

**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

8/9/01 6:05:00 PM



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

Client Sample ID CSB-3-45-47

Collected: 7/23/01 12:32:00 SPL Sample ID: 01070914-03

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8100M</b>	<b>Units: mg/Kg</b>		
Diesel Range Organics	ND	5.0		1	08/08/01 5:16 AM		781568
Surr: n-Pentacosane	96.3 %	20-154		1	08/08/01 5:16 AM		781568

Prep Method	Prep Date	Prep Initials
SW3550B	07/30/2001 15:54	EE

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/Kg</b>		
Gasoline Range Organics	ND	0.10		1	07/27/01 23:07 TM		765892
Surr: 1,4-Difluorobenzene	94.7 %	63-122		1	07/27/01 23:07 TM		765892
Surr: 4-Bromofluorobenzene	107 %	39-150		1	07/27/01 23:07 TM		765892

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/Kg</b>		
Benzene	ND	1		1	07/27/01 23:07 TM		765542
Ethylbenzene	ND	1		1	07/27/01 23:07 TM		765542
Toluene	ND	1		1	07/27/01 23:07 TM		765542
Xylenes, Total	ND	1		1	07/27/01 23:07 TM		765542
Surr: 1,4-Difluorobenzene	93.5 %	59-127		1	07/27/01 23:07 TM		765542
Surr: 4-Bromofluorobenzene	105 %	48-156		1	07/27/01 23:07 TM		765542

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

8/9/01 6:05:01 PM



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

Client Sample ID CSB-3-52-54

Collected: 7/23/01 12:43:00 SPL Sample ID: 01070914-04

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8100M</b>	<b>Units: mg/Kg</b>		
Diesel Range Organics	ND	5.0	1		08/08/01 5:54 AM		781570
Surr: n-Pentacosane	96.6 %	20-154	1		08/08/01 5:54 AM		781570

Prep Method	Prep Date	Prep Initials
SW3550B	07/30/2001 15:54	EE

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/Kg</b>		
Gasoline Range Organics	ND	0.10	1		07/27/01 23:36 TM		765893
Surr: 1,4-Difluorobenzene	93.7 %	63-122	1		07/27/01 23:36 TM		765893
Surr: 4-Bromofluorobenzene	106 %	39-150	1		07/27/01 23:36 TM		765893

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/Kg</b>		
Benzene	ND	1	1		07/27/01 23:36 TM		765543
Ethylbenzene	ND	1	1		07/27/01 23:36 TM		765543
Toluene	ND	1	1		07/27/01 23:36 TM		765543
Xylenes, Total	ND	1	1		07/27/01 23:36 TM		765543
Surr: 1,4-Difluorobenzene	93.0 %	59-127	1		07/27/01 23:36 TM		765543
Surr: 4-Bromofluorobenzene	104 %	48-156	1		07/27/01 23:36 TM		765543

**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

8/9/01 6:05:01 PM



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

Client Sample ID CSB-2-35-37

Collected: 7/23/01 1:33:00

SPL Sample ID: 01070914-05

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8100M</b>	<b>Units: mg/Kg</b>		
Diesel Range Organics	25	5.0		1	08/08/01 6:32 AM		781571
Surr: n-Pentacosane	97.8 %	20-154		1	08/08/01 6:32 AM		781571

Prep Method	Prep Date	Prep Initials
SW3550B	07/30/2001 15:54	EE

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/Kg</b>		
Gasoline Range Organics	0.23	0.10		1	07/28/01 5:44 TM		768102
Surr: 1,4-Difluorobenzene	98.7 %	63-122		1	07/28/01 5:44 TM		768102
Surr: 4-Bromofluorobenzene	121 %	39-150		1	07/28/01 5:44 TM		768102

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/Kg</b>		
Benzene	ND	1		1	07/28/01 5:44 TM		767651
Ethylbenzene	ND	1		1	07/28/01 5:44 TM		767651
Toluene	ND	1		1	07/28/01 5:44 TM		767651
Xylenes, Total	ND	1		1	07/28/01 5:44 TM		767651
Surr: 1,4-Difluorobenzene	97.2 %	59-127		1	07/28/01 5:44 TM		767651
Surr: 4-Bromofluorobenzene	118 %	48-156		1	07/28/01 5:44 TM		767651

**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

8/9/01 6:05:01 PM



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

Client Sample ID CSB-2-54-56

Collected: 7/23/01 2:10:00

SPL Sample ID: 01070914-06

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8100M</b>	<b>Units: mg/Kg</b>		
Diesel Range Organics	33	5.0		1	08/08/01 7:11 AM		781573
Surr: n-Pentacosane	103	% 20-154		1	08/08/01 7:11 AM		781573

Prep Method	Prep Date	Prep Initials
SW3550B	07/30/2001 15:54	EE

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/Kg</b>		
Gasoline Range Organics	ND	0.10		1	07/28/01 6:12 TM		768103
Surr: 1,4-Difluorobenzene	94.0	% 63-122		1	07/28/01 6:12 TM		768103
Surr: 4-Bromofluorobenzene	110	% 39-150		1	07/28/01 6:12 TM		768103

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/Kg</b>		
Benzene	ND	1		1	07/28/01 6:12 TM		767652
Ethylbenzene	ND	1		1	07/28/01 6:12 TM		767652
Toluene	ND	1		1	07/28/01 6:12 TM		767652
Xylenes, Total	ND	1		1	07/28/01 6:12 TM		767652
Surr: 1,4-Difluorobenzene	92.3	% 59-127		1	07/28/01 6:12 TM		767652
Surr: 4-Bromofluorobenzene	106	% 48-156		1	07/28/01 6:12 TM		767652

**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

8/9/01 6:05:01 PM



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

Client Sample ID CSB-1-45-47

Collected: 7/23/01 3:39:00

SPL Sample ID: 01070914-07

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8100M</b>	<b>Units: mg/Kg</b>		
Diesel Range Organics	6.6	5.0		1	08/08/01 5:54	AM	781611
Surr: n-Pentacosane	96.5 %	20-154		1	08/08/01 5:54	AM	781611

Prep Method	Prep Date	Prep Initials
SW3550B	07/30/2001 15:54	EE

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/Kg</b>		
Gasoline Range Organics	0.12	0.10		1	07/28/01 6:41	TM	768104
Surr: 1,4-Difluorobenzene	97.0 %	63-122		1	07/28/01 6:41	TM	768104
Surr: 4-Bromofluorobenzene	116 %	39-150		1	07/28/01 6:41	TM	768104

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/Kg</b>		
Benzene	ND	1		1	07/28/01 6:41	TM	767653
Ethylbenzene	1.3	1		1	07/28/01 6:41	TM	767653
Toluene	ND	1		1	07/28/01 6:41	TM	767653
Xylenes, Total	11.8	1		1	07/28/01 6:41	TM	767653
Surr: 1,4-Difluorobenzene	93.4 %	59-127		1	07/28/01 6:41	TM	767653
Surr: 4-Bromofluorobenzene	108 %	48-156		1	07/28/01 6:41	TM	767653

**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

8/9/01 6:05:01 PM



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

Client Sample ID CSB--1-54-56

Collected: 7/23/01 3:51:00

SPL Sample ID: 01070914-08

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8100M</b>	<b>Units: mg/Kg</b>		
Diesel Range Organics	ND	5.0	1		08/08/01 6:32 AM		781612
Surr: n-Pentacosane	96.1 %	20-154	1		08/08/01 6:32 AM		781612

Prep Method	Prep Date	Prep Initials
SW3550B	07/30/2001 15:54	IEE

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/Kg</b>		
Gasoline Range Organics	ND	0.10	1		07/28/01 7:09 TM		768105
Surr: 1,4-Difluorobenzene	94.0 %	63-122	1		07/28/01 7:09 TM		768105
Surr: 4-Bromofluorobenzene	107 %	39-150	1		07/28/01 7:09 TM		768105

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/Kg</b>		
Benzene	ND	1	1		07/28/01 7:09 TM		767654
Ethylbenzene	ND	1	1		07/28/01 7:09 TM		767654
Toluene	ND	1	1		07/28/01 7:09 TM		767654
Xylenes, Total	ND	1	1		07/28/01 7:09 TM		767654
Surr: 1,4-Difluorobenzene	92.4 %	59-127	1		07/28/01 7:09 TM		767654
Surr: 4-Bromofluorobenzene	107 %	48-156	1		07/28/01 7:09 TM		767654

**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

8/9/01 6:05:02 PM





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

Client Sample ID CSB-RB

Collected: 7/23/01 4:05:00

SPL Sample ID: 01070914-09

Site: Hobbs, NM

Analyses/Method	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
<b>DIESEL RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Diesel Range Organics	ND	0.2		1	08/04/01 7:58 AM		777652
Surr: n-Pentacosane	82.2 %	18-120		1	08/04/01 7:58 AM		777652

Prep Method	Prep Date	Prep Initials
SW3510B	07/27/2001 15:37	KL

<b>GASOLINE RANGE ORGANICS</b>			<b>MCL</b>	<b>SW8015B</b>	<b>Units: mg/L</b>		
Gasoline Range Organics	ND	0.1		1	08/03/01 18:44 D_R		775091
Surr: 1,4-Difluorobenzene	89.0 %	74-121		1	08/03/01 18:44 D_R		775091
Surr: 4-Bromofluorobenzene	92.3 %	55-150		1	08/03/01 18:44 D_R		775091

<b>PURGEABLE AROMATICS</b>			<b>MCL</b>	<b>SW8021B</b>	<b>Units: ug/L</b>		
Benzene	ND	1		1	08/03/01 18:44 D_R		775062
Ethylbenzene	ND	1		1	08/03/01 18:44 D_R		775062
Toluene	ND	1		1	08/03/01 18:44 D_R		775062
Xylenes, Total	ND	1		1	08/03/01 18:44 D_R		775062
Surr: 4-Bromofluorobenzene	100 %	48-156		1	08/03/01 18:44 D_R		775062
Surr: 1,4-Difluorobenzene	96.6 %	72-137		1	08/03/01 18:44 D_R		775062

**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

8/9/01 6:05:02 PM

# *Quality Control Documentation*



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

## Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Diesel Range Organics  
Method: SW8015B

WorkOrder: 01070914  
Lab Batch ID: 13744a

### Method Blank

### Samples in Analytical Batch:

RunID: HP\_V\_010804B-777647 Units: mg/L  
Analysis Date: 08/04/2001 1:35 Analyst: AM  
Preparation Date: 07/27/2001 15:37 Prep By: KL Method SW3510B

Lab Sample ID 01070914-09B  
Client Sample ID CSB-RB

Analyte	Result	Rep Limit
Diesel Range Organics	ND	0.20
Surr: n-Pentacosane	87.8	18-120

### Laboratory Control Sample (LCS)

RunID: HP\_V\_010804B-777648 Units: mg/L  
Analysis Date: 08/04/2001 2:13 Analyst: AM  
Preparation Date: 07/27/2001 15:37 Prep By: KL Method SW3510B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	2.5	2.2	87	21	175

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

Sample Spiked: 01070903-02  
RunID: HP\_V\_010804B-777650 Units: mg/L  
Analysis Date: 08/04/2001 4:08 Analyst: AM  
Preparation Date: 07/27/2001 15:37 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	2.5	1.8	69.2	2.5	1.8	68.1	1.54	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.

8/9/01 6:05:03 PM



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

## Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Diesel Range Organics  
Method: SW8100M

WorkOrder: 01070914  
Lab Batch ID: 13826

### Method Blank

RunID: HP\_V\_010808B-781559 Units: mg/Kg  
Analysis Date: 08/08/2001 1:26 Analyst: AM  
Preparation Date: 07/30/2001 15:54 Prep By: EE Method SW3550B

Analyte	Result	Rep Limit
Diesel Range Organics	ND	5.0
Surr: n-Pentacosane	101.0	20-154

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01070914-01B	CSB-4-45-47
01070914-02B	CSB-4-54-56
01070914-03B	CSB-3-45-47
01070914-04B	CSB-3-52-54
01070914-05B	CSB-2-35-37
01070914-06B	CSB-2-54-56
01070914-07B	CSB-1-45-47
01070914-08B	CSB--1-54-56

### Laboratory Control Sample (LCS)

RunID: HP\_V\_010808B-781560 Units: mg/Kg  
Analysis Date: 08/08/2001 2:04 Analyst: AM  
Preparation Date: 07/30/2001 15:54 Prep By: EE Method SW3550B

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Diesel Range Organics	83	83	100	50	150

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

Sample Spiked: 01070914-01  
RunID: HP\_V\_010808B-781563 Units: mg/Kg  
Analysis Date: 08/08/2001 3:21 Analyst: AM  
Preparation Date: 07/30/2001 15:54 Prep By: EE Method SW3550B

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	166	78	45.5	166	42	23.962.2 *		50	21	175

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, TEXAS 77054  
(713) 660-0901

## Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Purgeable Aromatics  
Method: SW8021B

WorkOrder: 01070914  
Lab Batch ID: R40180

### Method Blank

RunID: HP\_J\_010727A-765523 Units: ug/Kg  
Analysis Date: 07/27/2001 11:42 Analyst: TM

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01070914-01A	CSB-4-45-47
01070914-02A	CSB-4-54-56
01070914-03A	CSB-3-45-47
01070914-04A	CSB-3-52-54

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	88.3	59-127
Surr: 4-Bromofluorobenzene	96.0	48-156

### Laboratory Control Sample (LCS)

RunID: HP\_J\_010727A-765520 Units: ug/Kg  
Analysis Date: 07/27/2001 8:52 Analyst: TM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	51	101	60	120
Ethylbenzene	50	49	97	68	127
Toluene	50	50	99	64	122
Xylenes, Total	150	145	97	68	129

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

Sample Spiked: 01070905-14  
RunID: HP\_J\_010727A-765521 Units: ug/Kg  
Analysis Date: 07/27/2001 9:49 Analyst: TM

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	93.6	20	18	88.3	5.85	34	35	139
Ethylbenzene	ND	20	18	88.2	20	16	80.9	8.71	35	31	137
Toluene	ND	20	18	89.5	20	17	84.0	6.39	28	31	137
Xylenes, Total	ND	60	53	88.3	60	48	80.0	9.90	38	19	144

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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



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## Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Gasoline Range Organics  
Method: SW8015B

WorkOrder: 01070914  
Lab Batch ID: R40190

### Method Blank

RunID: HP\_J\_010727C-765888 Units: mg/Kg  
Analysis Date: 07/27/2001 11:42 Analyst: TM

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	93.0	63-122
Surr: 4-Bromofluorobenzene	99.7	39-150

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01070914-01A	CSB-4-45-47
01070914-02A	CSB-4-54-56
01070914-03A	CSB-3-45-47
01070914-04A	CSB-3-52-54

### Laboratory Control Sample (LCS)

RunID: HP\_J\_010727C-765876 Units: mg/Kg  
Analysis Date: 07/27/2001 9:20 Analyst: TM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	1.1	110	70	130

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

Sample Spiked: 01070905-14  
RunID: HP\_J\_010727C-765880 Units: mg/Kg  
Analysis Date: 07/27/2001 10:45 Analyst: TM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	1.3	0.9	2.3	108	0.9	2.1	93.8	14.1	50	26	147

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

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## Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Purgeable Aromatics  
Method: SW8021B

WorkOrder: 01070914  
Lab Batch ID: R40268

### Method Blank

RunID: HP\_J\_010728B-767649 Units: ug/Kg  
Analysis Date: 07/28/2001 4:48 Analyst: TM

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01070914-05A	CSB-2-35-37
01070914-06A	CSB-2-54-56
01070914-07A	CSB-1-45-47
01070914-08A	CSB--1-54-56

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	88.8	59-127
Surr: 4-Bromofluorobenzene	92.8	48-156

### Laboratory Control Sample (LCS)

RunID: HP\_J\_010728B-767646 Units: ug/Kg  
Analysis Date: 07/28/2001 1:57 Analyst: TM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	51	102	60	120
Ethylbenzene	50	51	102	68	127
Toluene	50	51	102	64	122
Xylenes, Total	150	151	101	68	129

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

Sample Spiked: 01070994-01  
RunID: HP\_J\_010728B-767647 Units: ug/Kg  
Analysis Date: 07/28/2001 2:54 Analyst: TM

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	17	85.0	20	19	95.3	11.5	34	35	139
Ethylbenzene	ND	20	16	82.4	20	18	89.0	7.73	35	31	137
Toluene	ND	20	16	81.1	20	18	90.6	11.0	28	31	137
Xylenes, Total	ND	60	50	83.3	60	53	88.3	5.83	38	19	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.



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## Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Gasoline Range Organics  
Method: SW8015B

WorkOrder: 01070914  
Lab Batch ID: R40298

### Method Blank

RunID: HP\_J\_010728E-768100 Units: mg/Kg  
Analysis Date: 07/28/2001 4:48 Analyst: TM

### Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
01070914-05A	CSB-2-35-37
01070914-06A	CSB-2-54-56
01070914-07A	CSB-1-45-47
01070914-08A	CSB--1-54-56

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	92.0	63-122
Surr: 4-Bromofluorobenzene	96.7	39-150

### Laboratory Control Sample (LCS)

RunID: HP\_J\_010728E-768097 Units: mg/Kg  
Analysis Date: 07/28/2001 2:26 Analyst: TM

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.91	91	70	130

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

Sample Spiked: 01070994-01  
RunID: HP\_J\_010728E-768098 Units: mg/Kg  
Analysis Date: 07/28/2001 3:51 Analyst: TM

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	ND	0.9	0.69	76.8	0.9	0.81	89.6	15.3	50	26	147

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

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## Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Purgeable Aromatics  
Method: SW8021B

WorkOrder: 01070914  
Lab Batch ID: R40642

### Method Blank

### Samples in Analytical Batch:

RunID: HP\_S\_010803A-775055 Units: ug/L  
Analysis Date: 08/03/2001 13:10 Analyst: D\_R

Lab Sample ID 01070914-09A  
Client Sample ID CSB-RB

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	72-137
Surr: 4-Bromofluorobenzene	99.5	48-156

### Laboratory Control Sample (LCS)

RunID: HP\_S\_010803A-775054 Units: ug/L  
Analysis Date: 08/03/2001 11:51 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	52	103	70	130
Ethylbenzene	50	55	109	70	130
Toluene	50	53	106	70	130
Xylenes, Total	150	164	109	70	130

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

Sample Spiked: 01070990-02  
RunID: HP\_S\_010803A-775058 Units: ug/L  
Analysis Date: 08/03/2001 15:09 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	27	137	20	27	134	2.05	21	32	164
Ethylbenzene	ND	20	27	137	20	27	134	2.19	19	52	142
Toluene	ND	20	27	134	20	26	132	1.69	20	38	159
Xylenes, Total	ND	60	81	135	60	79	132	2.50	18	53	144

Qualifiers: ND/U - Not Detected at the Reporting Limit  
B - Analyte detected in the associated Method Blank  
J - Estimated value between MDL and PQL

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

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## Quality Control Report

Brown & Caldwell

BJ Hobbs

Analysis: Gasoline Range Organics  
Method: SW8015B

WorkOrder: 01070914  
Lab Batch ID: R40643

### Method Blank

RunID: HP\_S\_010803B-775087 Units: mg/L  
Analysis Date: 08/03/2001 1:10 Analyst: D\_R

### Samples in Analytical Batch:

Lab Sample ID      Client Sample ID  
01070914-09A      CSB-RB

Analyte	Result	Rep Limit
Gasoline Range Organics	ND	0.10
Surr: 1,4-Difluorobenzene	91.7	74-121
Surr: 4-Bromofluorobenzene	96.3	55-150

### Laboratory Control Sample (LCS)

RunID: HP\_S\_010803B-775086 Units: mg/L  
Analysis Date: 08/03/2001 12:17 Analyst: D\_R

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Gasoline Range Organics	1	0.75	75	70	130

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

Sample Spiked: 01070990-03  
RunID: HP\_S\_010803B-775088 Units: mg/L  
Analysis Date: 08/03/2001 16:02 Analyst: D\_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Gasoline Range Organics	ND	0.9	0.88	97.2	0.9	0.9	99.5	2.29	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

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*Sample Receipt Checklist  
And  
Chain of Custody*



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

Sample Receipt Checklist

Workorder: 01070914

Received By: DS

Date and Time Received: 7/25/01 10:00:00 AM

Carrier name: FedEx

Temperature: 2

Chilled by: Water Ice

- |  |   |                             |   |
|--|---|-----------------------------|---|
| 1. Shipping container/cooler in good condition?            | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Present <input type="checkbox"/>            |
| 2. Custody seals intact on shipping container/cooler?      | Yes <input type="checkbox"/>            | No <input type="checkbox"/> | Not Present <input checked="" type="checkbox"/> |
| 3. Custody seals intact on sample bottles?                 | Yes <input type="checkbox"/>            | No <input type="checkbox"/> | Not Present <input checked="" type="checkbox"/> |
| 4. Chain of custody present?                               | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 5. Chain of custody signed when relinquished and received? | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 6. Chain of custody agrees with sample labels?             | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 7. Samples in proper container/bottle?                     | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 8. Sample containers intact?                               | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 9. Sufficient sample volume for indicated test?            | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 10. All samples received within holding time?              | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 11. Container/Temp Blank temperature in compliance?        | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |   |
| 12. Water - VOA vials have zero headspace?                 | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Applicable <input type="checkbox"/>         |
| 13. Water - pH acceptable upon receipt?                    | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> | Not Applicable <input type="checkbox"/>         |

SPL Representative:

Contact Date & Time:

Client Name Contacted:

Non Conformance Issues:

Client Instructions:





