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# MONITORING REPORTS



## BROWN AND CALDWELL

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To:	Mr. Wayne Price	Date: February 3, 2000	Job No: 12832
	State of New Mexico	Subject: Hobbs, New Mexic	o Facility
	Energy, Minerals, and Natural Resources Dept.	Contract No.:	
	Oil Conservation Division	Equipment No:	
	2040 Pacheco St., State Land Office Bldg.	Spec. Ref:	
	Santa Fe, New Mexico 87505	Submittal No:	
WE .	ARE SENDING:	nder separate cover via Certified	Mail the following items:

WE ARE SEIN	DING.		Under separate cover via Certified Man the following items:
Shop Drawing	s	Prints	Plans Samples Specifications
Copy of letter		Change Order	Other: Groundwater Sampling Report
☐ Second su ⊠ For your u	ubmittal Ise	AS CHECKED BELOV	No exceptions taken     Make revisions
	vai / and comme hittal review a		Amend and resubmit Rejectedsee Remarks None
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1	1/31/00		December 1999 Groundwater Sampling Report, BJ Services Company, U.S.A., Hobbs, New Mexico

#### **REMARKS:**

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

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**Richard Rexroad** 

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BROWN AND CALDWELL

### DECEMBER 1999 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY

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

**JANUARY 31, 2000** 

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#### DECEMBER 1999 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY BJ SERVICES COMPANY, U.S.A.

Prepared for

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

BC Project Number: 12832.015

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January 31, 2000

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

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

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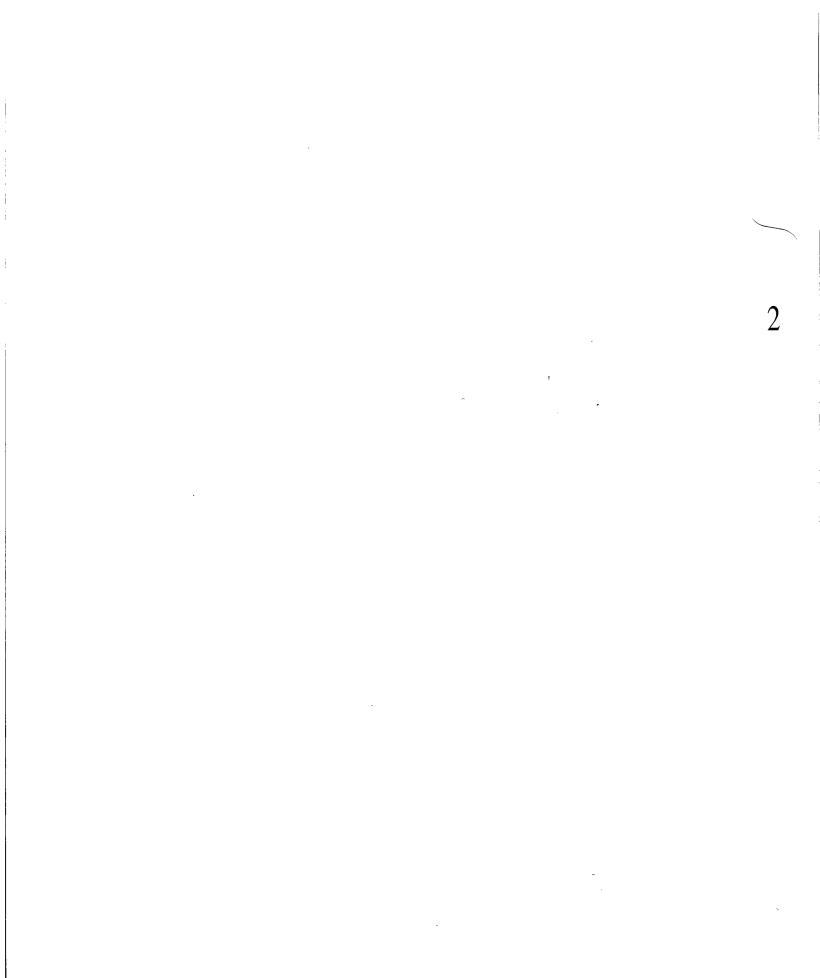
#### **1.0 INTRODUCTION**

Brown and Caldwell conducted field activities associated with the December 1999 quarterly groundwater sampling event at the BJ Services Company, U.S.A. (BJ Services) facility located at 2708 West County Road in Hobbs, New Mexico on December 9, 1999. Groundwater samples were analyzed for the quarterly monitoring constituents specified in by the New Mexico Oil Conservation Division (NMOCD) in NMOCD Permit GW-072. Samples from selected wells were also analyzed for dissolved methane/ethylene/ethane, sulfate, and nitrate to evaluate the potential for natural attenuation of hydrocarbons at the facility. 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.

The facility formerly operated an above-grade on-site fueling system. A layout of the facility is shown in Figure 1. Subsurface impact near the former diesel fueling system was first detected by the NMOCD during an on-site inspection on February 7, 1991. The fueling system was taken out of operation in July 1995. The NMOCD has required a quarterly groundwater monitoring program to assess the concentration of hydrocarbon constituents in groundwater as a result of the diesel fuel release. BJ Services removed three field waste tanks at the facility on March 6-7, 1997. The ongoing monitoring of groundwater conditions at the site is being performed to address both the former fuel island and the former field waste tanks areas of the facility, as directed by NMOCD in correspondence dated January 21, 1999.

A biosparging system was activated in November 1995 to remediate soil and groundwater at the facility. Expansions of the biosparging system were performed in March/April 1997 and February/March 1998. 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.

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#### 2.0 FIELD ACTIVITIES AND RESULTS

On December 9, 1999, Brown and Caldwell purged and sampled 10 of the 13 existing groundwater monitor wells at and adjacent to the BJ Services Hobbs facility to determine concentrations of dissolved-phase hydrocarbons in groundwater. Monitor wells MW-1, MW-8, and MW-9 were not sampled during the December 1999 sampling event because benzene had not been detected in groundwater samples from these wells for at least four quarterly sampling events preceding the December 1999 groundwater sampling event. All monitor wells at and adjacent to the BJ Services Hobbs facility will be sampled during the upcoming March 2000 groundwater sampling event at the facility. The locations of the monitor wells at the facility are shown in the site map presented as Figure 1. The following subsections describe the field activities conducted by Brown and Caldwell at the facility in December 1999 and present the results of the groundwater analyses.

#### 2.1 Groundwater Measurements and Sampling

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

Groundwater samples were collected after purging of the wells with a submersible pump was completed. Field parameter measurements for pH, conductivity, oxidation-reduction (redox) potential, dissolved oxygen, and temperature were typically collected during and upon completion of well purging. In addition to using these parameters as indicators of stability of produced groundwater, they are also important for evaluating the potential for natural attenuation of dissolved-phase hydrocarbons at the facility. Ferrous iron and alkalinity were measured in selected wells upon conclusion of purging activities to further assist in assessment of natural attenuation

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potential. Turbidity of groundwater was also typically measured upon conclusion of purging activities.

The field parameter readings were recorded in the groundwater sampling forms included in Appendix A. Field readings for the groundwater sampling event are presented in Table 3.

Groundwater samples were collected after completion of purging operations, typically through the submersible pump discharge. Monitor wells MW-7, MW-10, and MW-12 were pumped dry during purging operations, so samples were collected from these wells with decontaminated 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 the on-site water reclamation system for re-use by BJ Services.

#### 2.2 Results of Groundwater Analyses

Groundwater samples collected during this sampling event were analyzed for diesel- and gasolinerange total petroleum hydrocarbons (TPH-D and TPH-G) by EPA Method 8015 Modified and for benzene, toluene, ethylbenzene, and xylene (BTEX) by EPA Method 8021B. The laboratory analytical reports and chain-of-custody records for the groundwater samples collected during the December 1999 field activities are included in Appendix B.

Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 4. Six monitor wells (MW-5, MW-10, MW-11A, MW-12, MW-12D and OW-4) were sampled for

methane/ethylene/ethane, nitrate, and sulfate to evaluate natural attenuation processes. The results of these analyses are presented in Table 5.

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

Benzene concentrations in monitor wells MW-1, MW-3, and MW-4, which are located near the former source area, have decreased since the modification of the biosparging system in February/March 1998. Benzene was not detected in any of these wells during the September 1999 or December 1999 sampling events. Benzene concentrations in a nearby off-site monitor well, MW-9, have not exceeded 0.01 mg/L since March 1997. Benzene has not been detected in monitor wells MW-1 or MW-9 since September 1998. Benzene has not been detected in monitor wells MW-3 and MW-4 since June 1999 and March 1999, respectively.

The vertical decrease in benzene concentration from 0.064 mg/L in monitor well MW-12 (screened at a depth of 50 feet to 65 feet bgs) to less than 0.001 mg/L in monitor well MW-12D (screened at a depth of 77.5 feet to 87.5 feet bgs) suggests that benzene impact to groundwater, where present, is limited vertically to the uppermost portion of the aquifer. Similar vertical gradients in benzene concentrations at the MW-12/MW-12D location have been observed during each groundwater sampling event since the installation of monitor well MW-12D prior to the June/July 1999 sampling event at the facility. There have been no detections of BTEX constituents, TPH-D, or TPH-G throughout the monitoring history of monitor well MW-12D.

Benzene was detected at a concentration of 1.5 mg/L in a groundwater sample collected from monitor well MW-13 on July 2, 1999. Adjustments to the biosparging system were made on

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July 14, 1999 to increase air flow to biosparging system Lateral No. 1, located in the eastern portion of the plume associated with the former fueling system (i.e., the western plume).

These adjustments resulted in decreases in the concentration of benzene in monitor well MW-13 from 1.5 mg/L on July 2, 1999 to 0.860 mg/L on September 14, 1999 and to 0.430 mg/L on December 9, 1999. Similarly, total BTEX concentration in monitor well MW-13 decreased 2.331 mg/L on July 2, 1999 to 0.8969 mg/L on December 9, 1999.

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

#### 2.3 Natural Attenuation Evaluation

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

The primary evidence of natural attenuation is plume behavior. Natural attenuation of hydrocarbons is occurring at a rate greater than hydrocarbon loading from the source area when a hydrocarbon plume is decreasing in size or concentration. Conversely, increases in size or hydrocarbon concentrations of a plume indicate that rates of hydrocarbon loading exceed the natural attenuation capacity in the area.

The former field waste tanks in the eastern portion of the facility were removed in March 1997. Concentrations of total dissolved-phase BTEX stabilized following removal of the field waste tanks and have not exceeded 100 mg/L in any of the wells in the area of the former field waste tanks since September 1998. Occasional increases in total BTEX concentrations between quarterly sampling events have been observed in monitor wells MW-10 and MW-12 since March 1997. These increases may be attributed to sporadic loading rates from the vadose zone in excess of the natural attenuation rate of the area.

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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.

December 1999 dissolved oxygen data for the eastern plume (i.e., in the former field waste tanks area) is incomplete and inconclusive due to the low groundwater yield from hydrocarbon-impacted monitor wells MW-10 and MW-12 during this sampling event. Historic evidence submitted to the NMOCD in previous quarterly groundwater monitoring reports for the facility has indicated that dissolved oxygen concentrations are typically depressed in monitor wells MW-10 and MW-12 relative to monitor well MW-11A (which is located at the fringe of the eastern plume and which displays lower to non-detectable hydrocarbon concentrations) and to background monitor wells at the facility.

The dissolved oxygen concentration measured in monitor well MW-13, which contains the highest hydrocarbon concentrations observed in the western plume, is depressed relative to dissolved oxygen concentrations observed in other monitor wells located in the vicinity of the western plume and relative to the background monitor well at the facility.

Dissolved oxygen concentrations measured at the facility during this and previous sampling events therefore suggest that natural attenuation of hydrocarbons is occurring at the facility.

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

Nitrate concentrations were measured at less than 0.1 mg/L in monitor wells MW-11A, MW-12, and MW-12D and at 0.49 mg/L in monitor well MW-10 during the December 1999 sampling event. These concentrations are less than the background nitrate concentration of 4.2 mg/L measured in monitor well MW-5 (see Table 5). The low nitrate concentrations in monitor wells MW-10, MW-11A, MW-12, and MW-12D suggest that natural attenuation of hydrocarbons is occurring in the former field waste tanks area of the facility.

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No BTEX constituents were detected in downgradient well OW-4. The nitrate concentration of 3.4 mg/L in OW-4 is comparable to the nitrate concentration of 4.2 mg/L observed in background in well MW-5. The combination of a non-detectable BTEX concentration and a near-background nitrate concentration in downgradient well OW-4 supports the contention that the low nitrate concentrations observed in monitor wells MW-10, MW-11A, MW-12, and MW-12D reflect natural attenuation of hydrocarbons in the former field waste tanks area rather than a simple eastward decrease in nitrate content of groundwater at the facility.

- 3. Redox is a measure of chemical energy in groundwater. Redox in background well MW-5 was measured at 137.5 millivolts (mV), as shown in Table 3. Redox values in the vicinity of former field waste tanks area wells MW-10, MW-11A, MW-12, and MW-12D ranged from -61.4 mV to -155.2 mV. The negative redox values in the former field waste tank area monitor wells suggest that electron acceptors other than dissolved oxygen and nitrate (e.g., carbon dioxide) are being utilized in these areas.
- 4. Methane is a reaction product generated during utilization of carbon dioxide as an electron acceptor, and its concentration should therefore increase in areas where depletion of electron acceptors such as dissolved oxygen and nitrate has occurred.

The concentration of methane is elevated in former field waste tanks area monitor wells MW-10, MW-11A, and MW-12 relative to the methane concentrations in background well MW-5 and downgradient well OW-4 (see Table 5), suggesting that utilization of carbon dioxide as an electron acceptor during natural attenuation processes may be occurring in the area of the former field waste tanks.

The sulfate data presented in Table 5 displays no discernable trend, indicating that sulfate is not being utilized during intrinsic bioremediation. Similarly, the ferrous iron and alkalinity data presented in Table 3 are inconclusive.

In conclusion, geochemical evidence from this and previous groundwater sampling events suggests that dissolved oxygen, nitrate, and carbon dioxide are acting as electron acceptors during natural attenuation processes that are ongoing at the facility. It is recommended that monitoring for natural attenuation evaluation parameters continue in the former field waste tanks area wells, downgradient well OW-4, and background well MW-5.

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#### 3.0 **REMEDIATION SYSTEM**

Brown and Caldwell submitted a Remedial Action Plan (RAP) to the NMOCD in May 1994. Based on the results of previous investigations conducted by Brown and Caldwell and Roberts/Schornick and Associates, Inc., Brown and Caldwell recommended the installation of a biosparging system. The biosparging system simultaneously treats volatile and semivolatile contaminants adsorbed directly to the soil (i.e., residual) as well as contaminants present in soil moisture (i.e., dissolved phase) within the capillary fringe and vadose zone. Additionally, the biosparging system removes volatile and semivolatile contaminants from the saturated zone. The biosparging system operates by injecting air into the saturated zone and extracting air from the vadose zone through a network of wells and piping. The continuous flushing of air through the saturated zone increases the dissolved oxygen concentration in groundwater and in soil moisture present in the capillary fringe and vadose zone. The elevated dissolved oxygen content facilitates the activities of indigenous microorganisms to accelerate biodegradation of contaminants. The flushing of air also strips volatile and semivolatile contaminants.

#### 3.1 System Installation and Effectiveness

The NMOCD approved the RAP on August 11, 1994. Installation activities for the biosparging system were conducted on August 2 through August 24, 1995. Nineteen combined injection and extraction wells, three vacuum extraction wells, one extraction blower, one injection blower, and associated piping were installed. An additional vapor extraction well, VE-4, was installed and connected to the vapor extraction system in April 1997. Five additional injection wells, AI-20 through AI-24, were installed in February 1998. Injection wells AI-20 through AI-24 were installed at locations near the center of the western plume, which is associated with the former fueling system. These injection wells were constructed such that a 10-foot screen submergence was achieved, thereby providing treatment to an expanded vertical interval of the aquifer in that area. Injection wells AI-20 through AI-24 are supplied by a separate blower than the one used to supply injection wells AI-1 through AI-19 in order to avoid short-circuiting of air to wells with less screen submergence. Three additional vapor extraction wells, VE-5 through VE-7, were also installed in \\BCHOU01\PROJECTS\Wp\BJSERV\12832\058r.doc 8

February 1998. The new injection and extraction wells were brought on-line on March 10, 1998, and operation of injection wells AI-1 through AI-19, which had been suspended on February 19, 1998, was resumed on March 24, 1998.

Benzene, TPH, and total BTEX concentrations measured in monitor well MW-1 during the September 1999 groundwater sampling event displayed a decline relative to concentrations of these parameters prior to installation of injection wells AI-20 through AI-24 in February 1998. Benzene concentrations dropped from 7.6 mg/L in December 1997 to less than 0.001 mg/L during the December 1998 through September 1999 sampling events. Total BTEX concentrations have dropped from 30.6 mg/L to non-detectable levels between December 1997 and September 1999. TPH concentrations in MW-1 decreased from 82 mg/L to non-detectable levels during this time period. Monitor well MW-1 was not sampled during the December 1999 sampling event.

Benzene concentrations in monitor well MW-3 have decreased from 0.240 mg/L in December 1997 to less than 0.001 mg/L in September 1999 and December 1999. Similarly, total BTEX concentrations in monitor well MW-3 have decreased from 1.930 mg/L in December 1997 to non-detectable levels in September 1999 and December 1999. TPH concentrations in monitor well MW-3 dropped from 5.89 mg/L to non-detectable levels during this time period. These decreases are attributable to increased air flow being applied to the aquifer through air injection wells AI-20 through AI-24.

In monitor well MW-4, benzene concentrations have decreased from 0.230 mg/L in December 1997 to less than 0.001 mg/L in the June 1999 through December 1999 sampling events. Total BTEX concentrations in monitor well MW-4 dropped from 4.250 mg/L to less than 0.025 mg/L over the same period, and TPH concentrations have decreased by an order of magnitude from 19.7 mg/L to less than 3 mg/L. These decreases are also attributable to the effects of the increased air flow supplied by air injection wells AI-20 through AI-24.

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Similarly, the application of increased air flow to Lateral No. 1 injection wells AV-16 and AV-17 in mid-July 1999 has resulted in a substantial decrease in the concentrations of benzene and total BTEX in monitor well MW-13 between July 2, 1999 and December 9, 1999.

A graph showing the calculated dissolved-phase benzene mass in the western plume versus time is presented in Figure 5. This graph shows that the plume mass was increasing up until December 1995, when the biosparging system was installed. This increase was probably due to benzene loading to groundwater from vadose zone soils. The benzene mass then decreased steadily after installation of the biosparging system. The plume mass has continued to decrease since the system modifications were implemented in February 1998. This indicates that the system modifications have been effective in increasing benzene removal from groundwater in the center of the former western plume area.

#### 3.2 Air Emissions

The vapors recovered during the extraction process are discharged to the atmosphere in accordance with the State of New Mexico Air Quality Regulations. Following initial system startup operations, effluent air samples were collected on a monthly basis from the recovered vapors to monitor the bioremediation process and emission rate. Upon receiving a determination from the State of New Mexico that an air permit was not required, effluent air samples were collected and analyzed voluntarily on a quarterly basis through July 1997. The air samples were analyzed for TPH using EPA Method Modified 8015A (Air) and for total volatile aromatic hydrocarbons (BTEX) using EPA Method 5030/8020 (modified).

The analytical results demonstrated a substantial reduction in hydrocarbon vapor concentrations and emissions rates between November 1995 and July 1997. Total BTEX concentrations decreased from 391 parts per million by volume (ppmv) in November 1995 to 17.3 ppmv in July 1997. The corresponding BTEX emissions decreased from 0.77 pound per hour (lb/hour) to 0.03 lb/hour. TPH concentrations decreased from 1,870 ppmv in November 1995 to 65 ppmv in July 1997. The

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corresponding TPH - volatile organic compound (VOC) emissions rate decreased from 3.21 lb/hour to 0.08 lb/hour. These emission rates were well below the regulatory limit of 10 lb/hour for VOCs. Therefore, use of a field monitoring instrument utilizing a flame ionization detector (FID) to measure the VOC concentration in the vapors commenced in September 1997. The VOC measurements collected using the FID correspond to TPH concentrations previously determined in the analytical laboratory. The VOC concentration measured using the FID during the December 1999 sampling event was 5.9 ppmv.

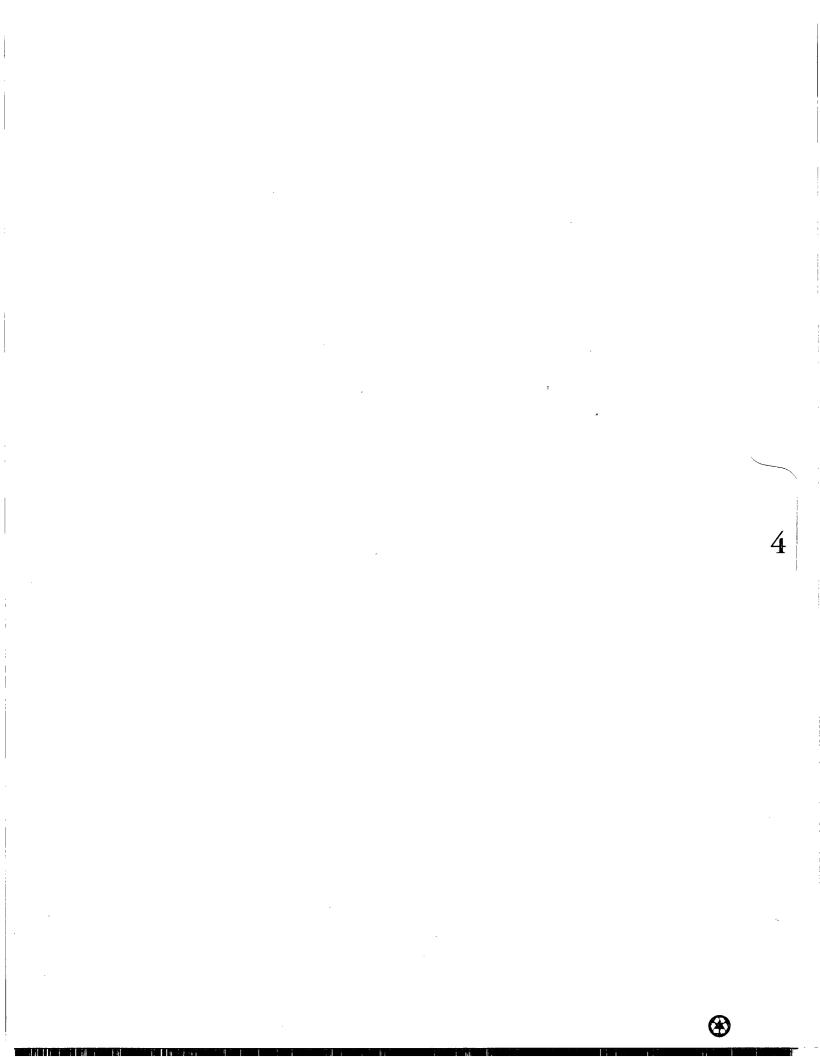
The TPH concentration of 5.9 ppmv measured during the December 1999 sampling event is substantially less than the 1500 ppmv TPH discharge rate calculated for the March 24, 1998 groundwater sampling event. The TPH discharge rate of 5.9 ppmv in December 1999 is comparable to TPH concentrations measured during the time period from August 1996 through December 1997, prior to the system modifications performed in February/March 1998. The increased TPH concentration observed in the March 1998 event relative to the time period from August 1997 through December 1997 is believed to be a result of the addition of air injection wells AI-20 through AI-24 to the biosparging system and associated adjustments to air injection rates. Discharge rates have returned to more typical levels during the period from June 1998 through December 1999.

The VOC emissions rate calculated for the December 1999 groundwater sampling event was 0.003 lb/hour, which is less than the regulatory limit of 10 lb/hour for VOCs. The December 1999 VOC emissions rate is typical of VOC emissions rates during the time period of August 1996 through December 1997, and represents a substantial drop from the 1.91 lb/hour VOC emissions rate calculated for the March 1998 sampling event. Discharge rates have varied between 0.003 lb/hour and 0.33 lb/hour during the time period of June 1998 through December 1999.

A cumulative summary of analytical results for air emissions monitoring is included in Table 6. These results are based on both laboratory and field analyses.

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The initial increase in mass transfer rates after the February/March 1998 system modification is indicative of increased stripping of hydrocarbons within soil and groundwater from pathways that were not in contact with injected air prior to the system modification. The subsequent decrease in mass transfer, in concert with plume mass calculations shown in Figure 5, indicate that the overall contaminant mass has been reduced by operation of the biosparging system.



#### 4.0 CONCLUSIONS AND RECOMMENDATIONS

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

#### 4.1 Conclusions

- Groundwater flow was to the east at a hydraulic gradient of 0.006 ft/ft.
- Dissolved benzene, BTEX, and TPH concentrations in monitor wells located near the center of the former fueling system source area are below applicable standards.
- Benzene concentrations in all monitor wells at the facility except MW-10, MW-12, and MW-13 are less than the New Mexico WQCC standard of 0.01 mg/L for benzene.
- Increases in air flow rates to biosparge injection wells AI-16 and AI-17 have resulted in substantially decreased benzene and total BTEX concentrations in monitor well MW-13 between July 2, 1999 and December 9, 1999.
- No BTEX or TPH constituents have been detected in monitor well MW-12D, which is screened at a depth of approximately 20 to 30 feet below the top of the uppermost aquifer at the facility. Comparison of this data to BTEX and TPH concentrations in adjacent monitor well MW-12, which is screened in the uppermost portion of the aquifer, suggests that hydrocarbon impact to groundwater, where present at the facility, is limited to the uppermost portion of the aquifer.
- Natural attenuation processes appear to be occurring in the vicinity of the former field waste tanks that were removed in March 1997.

#### 4.2 **Recommendations**

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

- Discontinue sampling and analysis of monitor well MW-12D following annual sampling of all wells at the facility for the complete suite of WQCC groundwater parameters in March 2000.
- Continue monitoring for natural attenuation parameters in monitor wells MW-5, MW-10, MW-11A, MW-12, OW-4, and (in March 2000 only) MW-12D.
- Continue monitoring hydrocarbon emissions on a quarterly basis using a calibrated field FID.

#### DISTRIBUTION

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January 31, 2000

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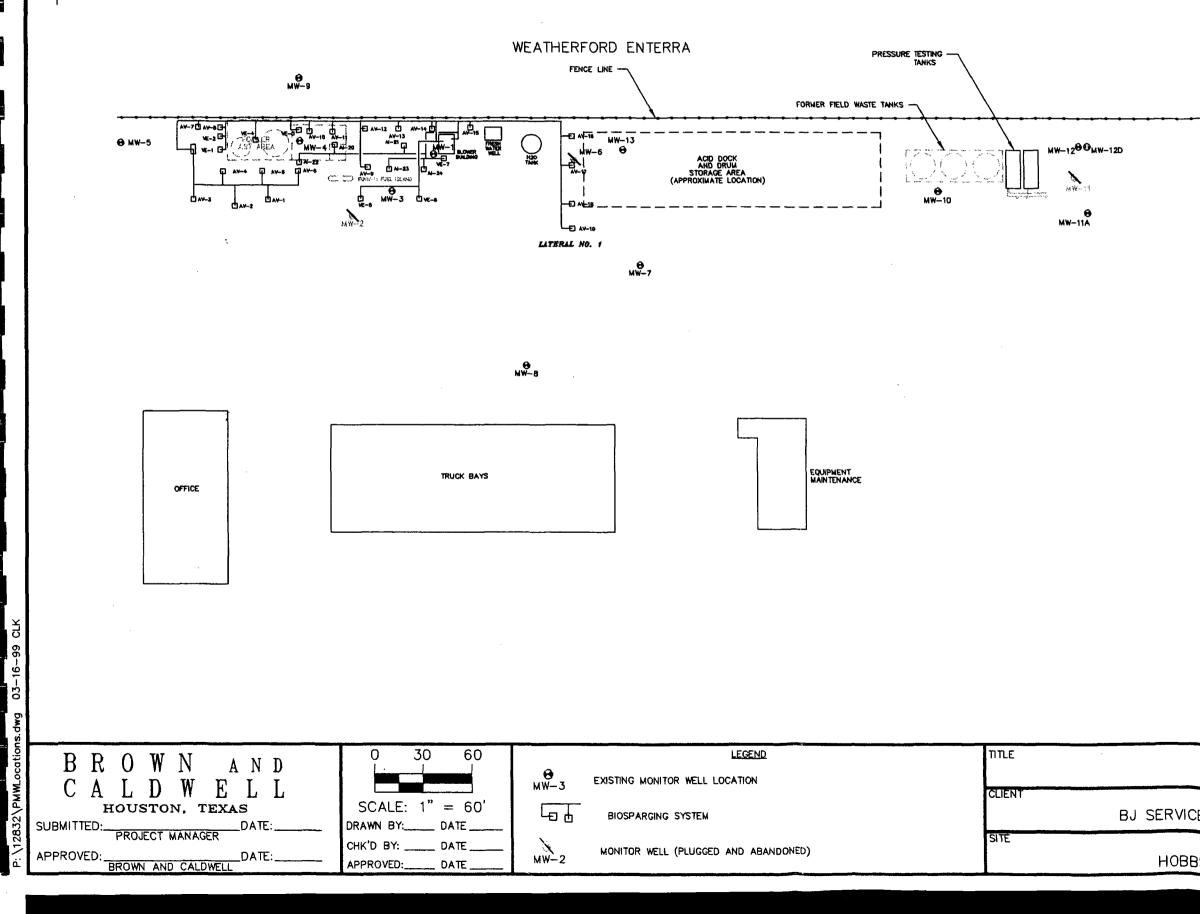
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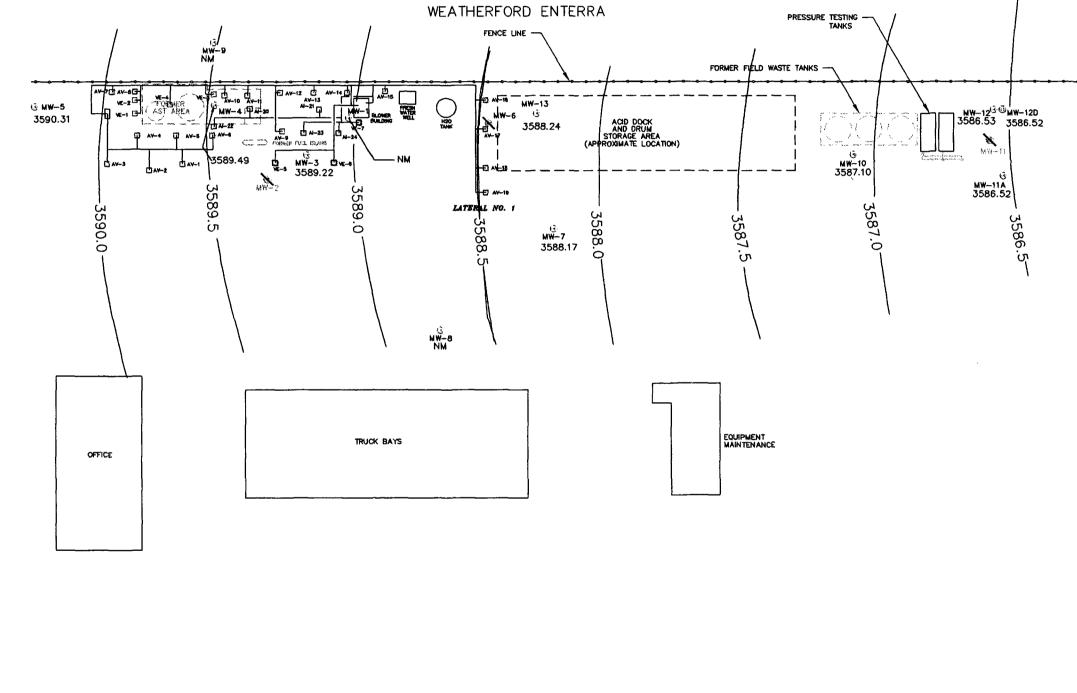
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BS, NEW MEXICO	FIGURE NUMBER	

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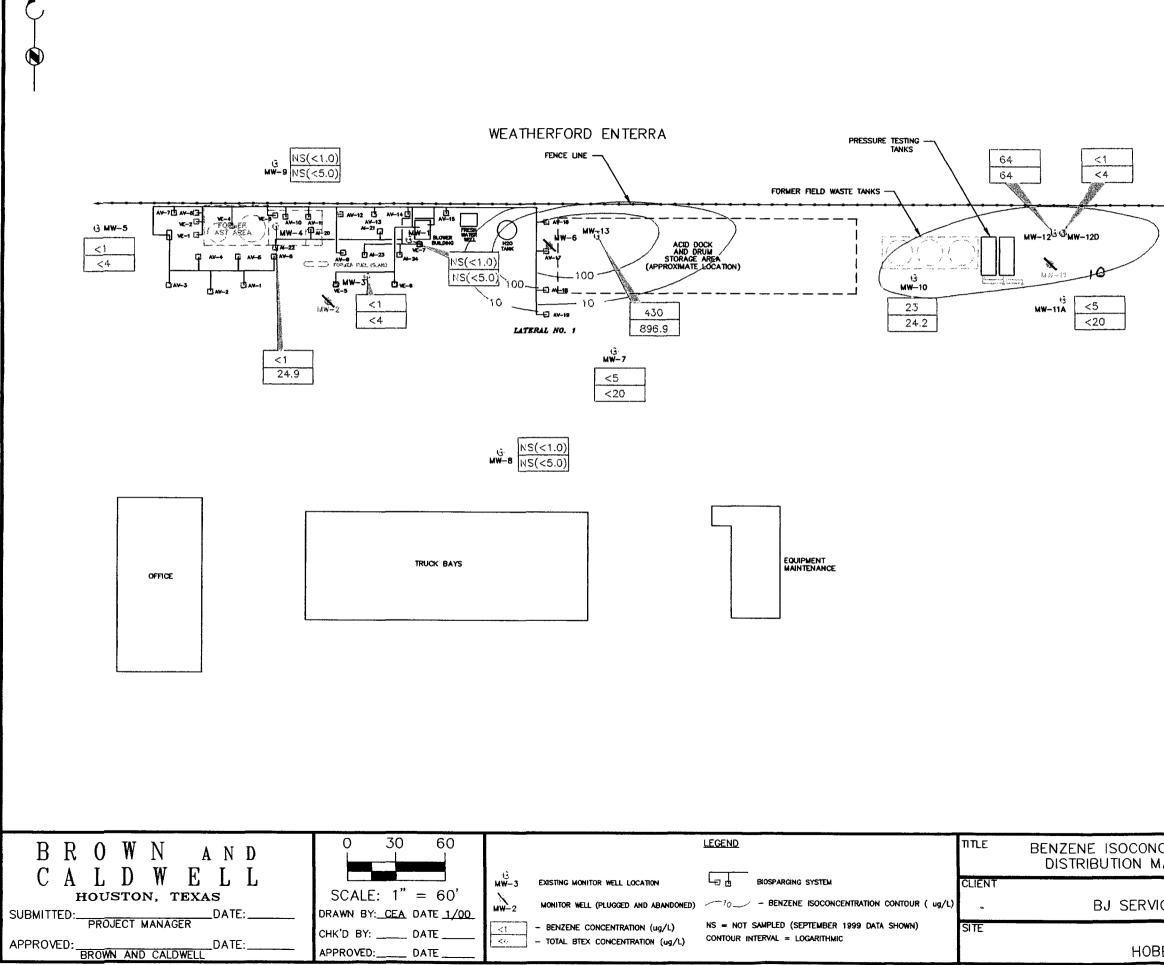
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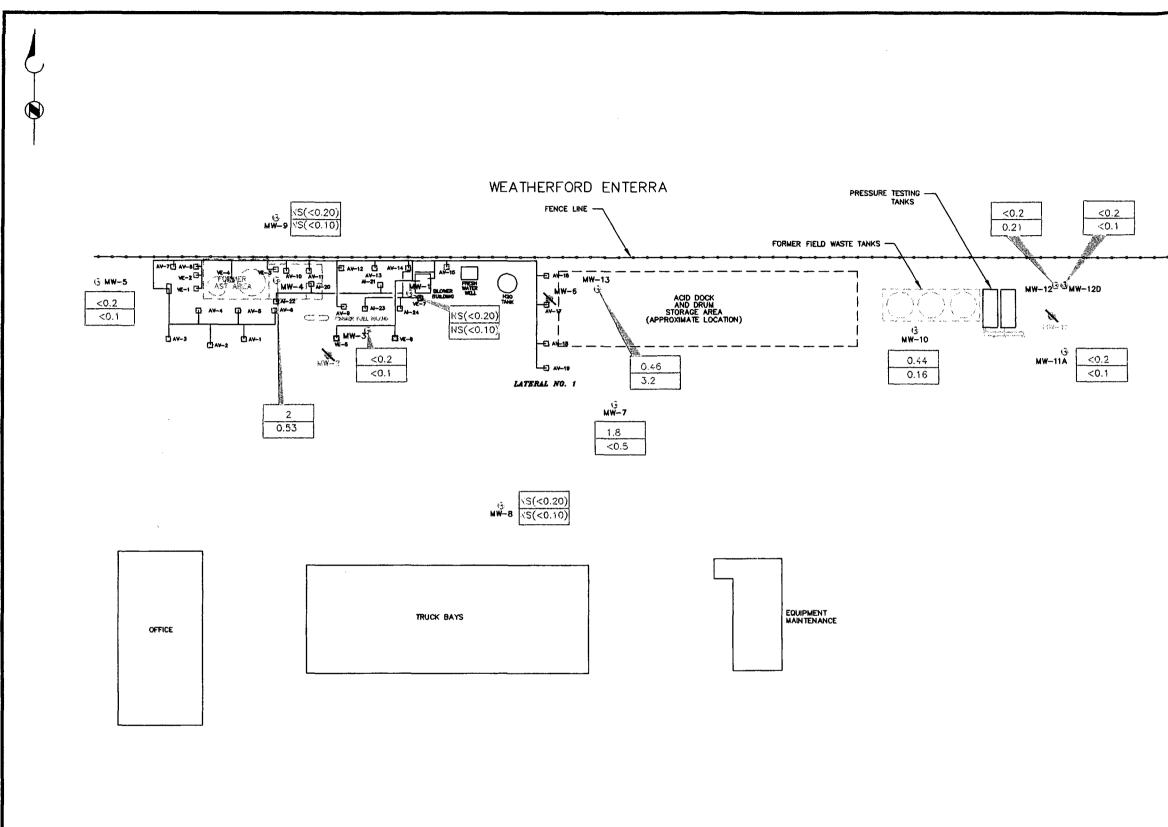
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ł	BULK PLANT
	(APPROXIMATE LOCATION)
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CENTRATION AND TOTAL BTEX	DATE
MAP FOR DECEMBER 9, 1999	01/10/00
	PROJECT NUMBER
ICES COMPANY, U.S.A.	12832.015
	FIGURE NUMBER
BS, NEW MEXICO	3



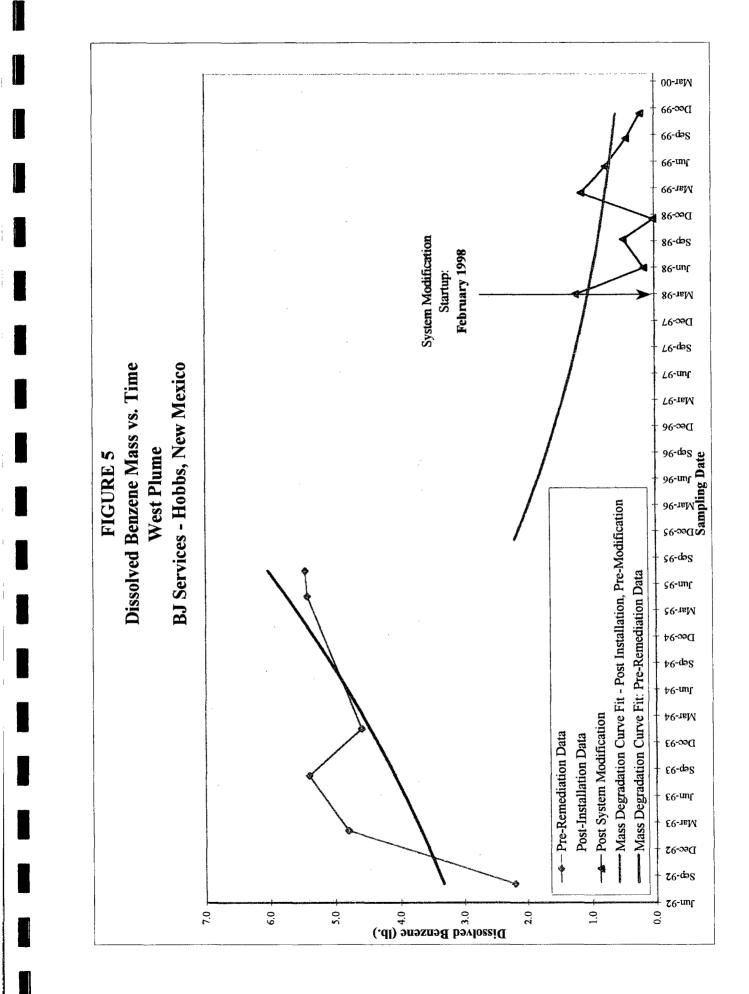
BROWN AND	0 30 60	LEGEND	TITLE	TOTAL PET DISTRIBUTION N
CALDWELL HOUSTON, TEXAS	SCALE: 1" = 60'	MW-3 Existing monitor well location $H$ biosparging system MW-2 monitor well (plugged and abandoned) MW-2 Not sampled (september 1999 data shown)	CLIENT	BJ SERV
APPROVED:	CHK'D BY: DATE APPROVED: DATE	<0.2	SITE	HO

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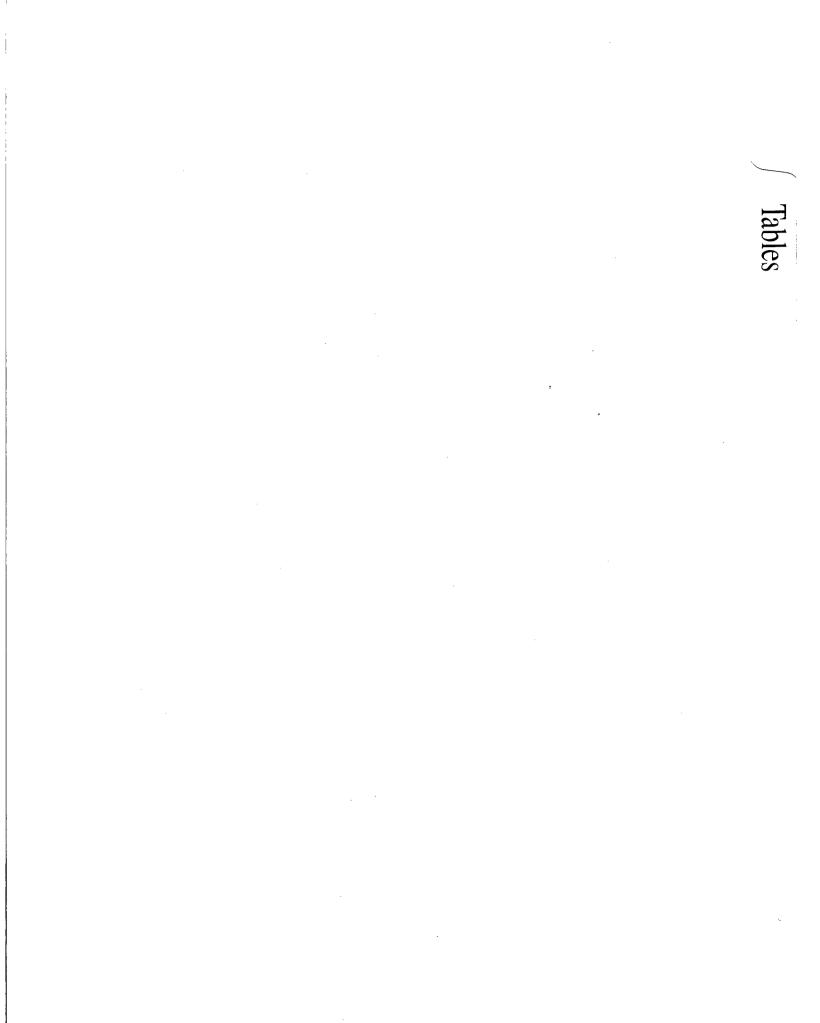
TROLEUM HYDROCARBONS	DATE
MAP FOR DECEMBER 9, 1999	01/10/00
	PROJECT NUMBER
VICES COMPANY, U.S.A.	12832.015
	FIGURE NUMBER
DBBS, NEW MEXICO	4

BULK PLANT (APPROXIMATE LOCATION)

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**TABLES** 

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

Date	Activity
February 7, 1991	The State of New Mexico Oil Conservation Division (OCD) conducted an on-site inspection, including sampling of the on-site fresh water well.
August 6, 1991	OCD requested submittal of an investigation work plan.
September 5, 1991	Roberts/Schornick and Associates, Inc. (RSA) submitted Technical Work Plan for soil and groundwater investigation to the OCD.
November 15, 1991	The OCD approved Technical Work Plan submitted by RSA.
December 16, 1991	RSA sampled the fresh water well. Analytical results were submitted to the OCD.
February 21, 1992	Western sampled the fresh water well. Analytical results were submitted to the OCD.
July 29 - August 10, 1992	Brown and Caldwell conducted a soil and groundwater investigation according to the approved Technical Work Plan. Investigation included drilling and sampling 9 soil borings, sampling 6 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.

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

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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.

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

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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.
January 21, 1999	NMOCD requested submittal of a work plan by March 22, 1999 to

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

Date	Activity
	perform additional groundwater delineation in the area of the former field waste tanks and the former AST/MW-6 area.
March 9-10, 1999	Brown and Caldwell conducted the March 1999 groundwater sampling event.
March 19, 1999	Brown and Caldwell submitted the work plan for groundwater delineation activities that was requested on January 22, 1999 to NMOCD.
May 19, 1999	NMOCD approved the groundwater delineation work plan.
June10, 1999	Brown and Caldwell performed sampling of existing monitor wells for the June /July 1999 groundwater sampling event.
July 2, 1999	Brown and Caldwell completed plugging and abandonment of monitor wells MW-2, MW-6, and MW-11; installed and developed monitor wells MW-12D and MW-13; and sampled monitor wells MW-12D and MW-13 to complete the June/July 1999 groundwater sampling event.
July 14, 1999	Brown and Caldwell redirected air discharge from the shallow well injection system to Lateral No. 1 and optimized air flow to injection wells AI-16 and AI-17 to apply increased remedial pressure to the eastern potion of the west plume.
September 13-14, 1999	Brown and Caldwell conducted the September 1999 groundwater sampling event.
December 9, 1999	Brown and Caldwell conducted the December 1999 groundwater sampling event.

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Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
		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	
MW-1	3,647.53	03/12/97	55.70	0.27	3,592.05	
101 00 - 1	5,047.35	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		0.00		(3)
	3,644.84	08/10/92	52.82	0.00	3,592.02	(1)
		02/09/93	49.60	0.00	3,595.24	
MW-2		3,644.84	08/18/93	49.71	0.00	3,595.13
		01/26/94	49.97	0.00	3,594.87	715 765
·		05/03/95	52.99	0.00	2 502 01	(4),(5)
		08/10/92	52.99	0.00	3,592.01	(1)
		02/09/93	52.82	0.00	3,592.28	
		08/18/93 01/26/94	53.05	0.00	3,592.18	
		05/03/95	54.31	0.00	3,591.95 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		
		05/31/96	51.66	0.00	3,593.32 3,593.55	
		08/23/96	51.45	0.00	3,593.45	
	1	12/02/96	52.23	0.00	3.592.77	
		03/12/97	52.67	0.00	3,592.33	
MW-3	3,645.00	06/12/97	52.68	0.00	3,592.33	
		09/11/97	52.08	0.00	3,592.29	
		12/10/97	52.89	0.00	3,592.11	
	1	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	
	1	06/10/99	55.17	0.00	3,589.83	
		07/02/99	55.15	0.00	3,589.85	
		09/14/99	55.42	0.00	3,589.58	
	1	12/09/99	55.78	0.00	3,589.22	
	<u> </u>	08/10/92	50.55	0.00	3,594.73	(1)
	1	02/09/93	50.26	0.00	3,595.02	(1)
		08/18/93	50.38	0.00	3,594.90	
MW-4	3,645.28	01/26/94	50.90	0.30	3,594.63	
		05/03/95	51.51	0.30	3,594.03	
	1	07/31/95	51.74	0.45	3,593.75	

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Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
		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	
N 4337 A	2 (15 20	12/10/97	52.89	0.00	3,592.39	PSH Sheen
MW-4	3,645.28	03/24/98	53.20	0.25	3,592.29	
		06/23/98	53.82	0.22	3,591.64	
		09/30/98	53.96	0.00	3,591.32	200 ml PSH
		12/09/98	54.27	0.00	3,591.01	
		03/10/99	54.69	0.04	3,590.62	
		06/10/99	55.07	0.00	3,590.21	
		07/02/99	55.10	0.00	3,590.18	
		09/14/99	55.33	0.00	3,589.95	
		12/09/99	55.79	0.00	3,589.49	
		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	
	f	05/03/95	53.57	0.00	3,594.15	
		07/31/95	53.27	0.00	3,594.45	
		T1/14/95	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 12/02/96	53.41 53.98	0.00	3,594.31 3,593.74	
		03/12/97	54.44	0.00	3,593.28	
MW-5	3,647.72	06/12/97	54.44	0.00	3,593.28	
		09/12/97	54.29	0.00	3,593.43	
		12/10/97	54.66	0.00	3,593.06	
		03/23/98	55.05	0.00	3,592.67	
		06/23/98	55.44	0.00	3,592.28	
		09/30/98	55.65	0.00	3,592.07	
		12/09/98	56.00	0.00	3,591.72	
		03/09/99	56.45	0.00	3,591.27	
		06/10/99	56.91	0.00	3,590.81	
	1	07/02/99	56.93	0.00	3,590.79	
		09/14/99	57.12	0.00	3,590.60	
		12/09/99	57.41	0.00	3,590.31	
		02/09/93	50.58	0.00	3,594.16	(1)
	1	08/18/93	50.78	0.00	3,593.96	·
		01/26/94	51.00	0.00	3,593.74	
		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	
MW-6	3,644.74	08/23/96	51.63	0.00	3,593.11	
	1	12/02/96	52.85	0.00	3,591.89	
	1	03/12/97	53.55	0.00	3,591.19	
	1	06/12/97	52.08	0.00	3,592.66	
		09/11/97	53.72	0.00	3,591.02	
	1	12/10/97	53.27	0.00	3,591.47	
		03/23/98	53.56	0.00	3,591.18	
		06/23/98	52.88	0.00	3,591.86	
		09/30/98	54.89	0.00	3,589.85	

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Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
		12/09/98	54.57	0.00	3,590.17	
MW-6	3,644.74	03/10/99	55.10	0.00	3,589.64	
	, ,	07/02/99				(5),(6)
		02/09/93	50.53	0.00	3,594.02	(1)
		08/18/93	50.74	0.00	3,593.81	
		01/26/94	51.01	0.00	3,593.54	
		05/03/95	52.25	0.00	3,592.30	
		07/31/95	51.92	0.00	3,592.63	
		11/14/95	51.48	0.00	3,593.07	
		02/23/96	52.15	0.00	3,592.40	
		05/31/96 08/23/96	51.78 52.02	0.00	3,592.77 3,592.53	
		12/02/96	52.52	0.00	3,592.03	
		03/12/97	52.99	0.00	3,591.56	
MW-7	3,644.55	06/12/97	53.08	0.00	3,591.50	
IVI VV - /	5,044.55	09/11/97	53.00	0.00	3,591.55	
		12/10/97	53.28	0.00	3,591.27	
	1	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	
		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 07/31/95	52.15 51.77	0.00	3,592.72 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	
MW-8	3,644.87	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 03/09/99	54.60 55.00	0.00	3,590.27	
		06/10/99	55.56	0.00	3,589.87 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			5,507.15	(3)
		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	
MANYO	2 644 70	05/03/95	51.35	0.00	3,593.43	
MW-9	3,644.78	07/31/95	50.97	0.00	3,593.81	
		11/14/95	50.43	0.00	3,594.35	
		02/23/96	51.12	0.00	3,593.66	
		05/31/96	50.89	0.00	3,593.89	
	1	08/23/96	50.98	0.00	3,593.80	

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Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
interior and a second second		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
1		12/10/97	52.37	0.00	3,592.41	PSH Sheen
		03/23/98 06/23/98	52.68 53.08	0.00	3,592.10 3,591.70	PSH Sheen PSH Sheen
MW-9	3,644.78	09/30/98	53.39	0.00	3,591.40	PSH Sheen
		12/09/98	53.68	0.00	3,591.10	1 511 Sheen
		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		0.00		(3)
		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	
	3,644.47	03/12/97	54.21	0.00	3,590.26	
MW-10		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	
		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	
MW-11	3,643.78	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)
		03/23/98	54.79	0.00	3,589.45	(7)
N / XX / + + +	264.04	06/23/98	55.43	0.00	3,588.81	
MW-11A	3,644.24	09/30/98	55.96	0.00	3,588.28	
		12/09/98	56.13	0.00	3,588.11	

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Monitor Well	Top-of-Casing Elevation (MSL)	Date Measured	Depth to Groundwater (feet)	Free Product Thickness (feet)	Groundwater Elevation (MSL)	Comments
		03/10/99	56.43	0.00	3,587.81	
		06/10/99	56.94	0.00	3,587.30	
MW-11A	3,644.24	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	
		03/23/98	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	
MW-12	3,644.29	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	
		07/02/99	57.13	0.00	3,587.25	(8)
MW-12D	3,644.38	09/14/99	57.74	0.00	3,586.64	
		12/09/99	57.86	0.00	3,586.52	
		07/02/99	56.60	0.00	3,588.92	(9)
MW-13	3,645.52	09/14/99	56.92	0.00	3,588.60	
		12/09/99	57.28	0.00	3,588.24	
		07/02/99	58.18	0.00	3,585.88	(8)
ow-4	3,644.06	09/14/99	58.63	0.00	3,585.43	
		12/09/99	58.92	0.00	3,585.14	

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

(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.

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

- <sup>(4)</sup> Monitor well MW-2 could not be located after January 1994.
- <sup>(5)</sup>- Well plugged and abandoned July 2, 1999.
- <sup>(6)</sup> Monitor well MW-11 could not be located after September 12, 1997.
- <sup>(7)</sup> TOC elevations for MW-11A and MW-12 estimated relative to TOC elevation for MW-10.

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

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

# Table 3December 9, 1999 Field Screening Results for Groundwater SamplesHobbs, New Mexico FacilityBJ Services Company, U.S.A.

Monitor Well	Cumulative Gallons Removed	pН	Temperature (°C)	Conductivity (umhos)	Redox (mV)	Dissolved Oxygen (meter) (mg/L)	Dissolved Oxygen (Hach kit) (mg/L)	Ferrous Iron (mg/L)	Alkalinity (mg/L)	Turbidity NTUs <sup>(1)</sup>
MW-3	0	6.22	16.57	1173	-30.6	5.72	NM	NM	NM	NM
Ì	NM	7.08	17.67	1229	8.4	3.11	NM	NM	NM	NM
	NM	7.11	17.36	1221	14.7	3.08	NM	NM	NM	NM
	NM	7.17	17.28	1224	13.4	3.10	NM	NM	NM	28
MW-4	0	5.11	15.19	1001	357.8	7.22	NM	NM	NM	NM
	NM	7.38	18.17	1110	127.4	6.02	NM	NM	NM	NM
	NM	7.40	18.28	1140	120.1	5.89	NM .	NM	NM	NM
	NM	7.41	18.40	1195	111.8	5.67	6.0	NM	NM	7.2
MW-5	0	5.48	15.26	1248	279.6	7.95	NM	NM	NM	NM
	NM	7.22	17.42	1330	159.6	4.36	NM	NM	NM	NM
	NM	7.28	16.51	1296	138.7	2.80	NM	NM	NM	NM
	NM	7.28	16.47	1295	137.5	2.74	3.0	0.0	260	95
MW-7 <sup>(2)</sup>	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW-10 <sup>(3)</sup>	0	6.41	17.73	1583	-45.1	4.99	NM	NM	NM	NM
MW-11A	0	6.83	15.95	5306	-21.1	6.24	NM	NM	NM	NM
	NM	6.80	18.96	6053	-56.5	2.31	NM	NM	NM	NM
	NM	6.80	19.71	6079	-59.1	1.81	NM	NM	NM	NM
	NM	6.81	20.31	6243	-61.4	8.73	0.0	0.0	770	NM
MW-12 <sup>(3)</sup>	0	7.15	17.36	1788	-62	4.40	NM	NM	NM	NM
MW-12D	0	6.93	15.78	1064	-9.5	4.64	NM	NM	NM	NM
	NM	7.54	17.47	1196	-128.5	0.75	NM	NM	NM	NM
	NM	7.59	19.37	1204	-150.2	0.48	NM	NM	NM	NM
	NM	7.58	20.25	1206	-155.2	0.43	NM	3.0	280	39
MW-13	0	4.71	16.42	2259	-12.1	4.08	NM	NM	NM	NM
	1.5	6.72	17.93	1968	-78.1	1.08	NM	NM	NM	NM
	3.0	7.13	18.22	1829	-86.8	0.96	NM	NM	NM	NM
	4.5	7.21	18.64	1821	-78.5	0.71	NM	NM	NM	343
OW-4	0	7.39	17.51	1611	34.6	7.40	NM	NM	NM	> 1000

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

<sup>(2)</sup> Well pumped dry after removal of less than 1 well volume.

<sup>(3)</sup> Well pumped dry after removal of well volume.

Monitor wells MW-1, MW-8, and MW-9 not sampled 12/9/99.

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

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8/1/95         Regular         390         1300         230         800         NA         5.7           11/1/595         Regular         880         1800         300         970         NA         6.8           5/3196         Regular         1100         1700         380         990         NA         7.5           8/2396         Regular         1100         1700         380         990         NA         7.5           8/2396         Regular         5600         9600         2100         9600         100         64           3/1297         Regular         5500         9700         2600         8200         2.2         62           6/1297         Regular         1800         4400         1000         3000         2.3         2.1           12/1097         Regular         7.5         660         580         1400         1.4         9.2           0/3/098         Regular         5.2         90         280         970         2.5         3.6           0/1099         Duplicate         -1.0         1.5         17         110         1.4         0.3           0/1099         Regular         <1.0	Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
8/10/02         Regular         5550         12/990         21/60         7370         NA         NA           2/9/93         Regular         2100         6500         1300         7400         NA         NA           1/2794         Regular         190         4500         7500         1200         3700         NA         NA           1/2794         Regular         1930         4580         672         2390         NA         NA           8/1055         Regular         1900         1300         230         800         NA         57.           11/1595         Regular         1800         3000         970         NA         6.8.           5/3166         Regular         1100         1700         380         990         NA         7.5.           12/296         Regular         1500         3700         2600         8200         110         140           12/297         Regular         5000         9600         2100         9600         110         140           9/1297         Regular         5100         3400         7200         1800         140         14         92           9/1297         Regular <th>Well</th> <th>Date</th> <th>Туре</th> <th></th> <th>microgram</th> <th>1s per liter, ug/l</th> <th></th> <th>milligrams pe</th> <th>r liter, mg/L</th>	Well	Date	Туре		microgram	1s per liter, ug/l		milligrams pe	r liter, mg/L
29/93         Regular         2100         6500         1300         7400         NA         NA           8/19/93         Regular         3200         7300         1200         3700         NA         NA           57/95         Regular         1300         HSP         NSP         NSP         NSP         NSP         NA         NSP           11/1595         Regular         1500         3700         620         2200         NA         63           273/96         Regular         1500         3700         620         2200         NA         61           11/1595         Regular         1500         3700         620         2200         NA         61           12/296         Regular         1500         3700         2600         8200         221         62           6/12977         Regular         5500         9700         2600         8200         11         71           32496         Regular         500         7200         1200         2800         620         121           12/1097         Regular         7600         1200         2800         820         11         71         364         360	MW-1								
8/19/93         Regular         3200         7300         1200         3700         NA         NA           1/27/94         Regular         1930         4580         672         2390         NA         NA           8/1/55         Regular         390         1300         230         800         NA         57.           8/1/55         Regular         390         1300         230         800         NA         57.           1/1/1595         Regular         1500         3700         620         2200         NA         21.           5/31/66         Regular         1100         1700         380         990         NA         7.5.           1/2/297         Regular         5500         9500         2100         9600         100         64           9/12/97         Regular         5300         34000         7500         27000         120         400         4.2         38           9/12/97         Regular         32         90         280         970         2.5         3.6           12/1098         Regular         3.2         90         280         970         2.5         3.6         1.0         1.1         <		8/10/92	Regular	5550	12090	2160	7370	NA	NA
I/27/94         Regular         1930         4580         672         2390         NA         NA           5/3/95         Regular         NSP         NSA         NSP           11/15/95         Regular         1500         3700         620         2200         NA         21           2/2396         Regular         1100         1700         380         990         NA         21           2/2396         Regular         1600         1700         380         990         NA         121           2/2396         Regular         1600         1700         380         990         NA         17           12/2976         Regular         5300         9700         2600         8200         120         120         160         160           3/1297         Regular         530         680         12000         2400         4.2         38         662398         Regular         3.2         90         2800         970         2.5         3.6           12/1097         Regular         1.0         1.		2/9/93	Regular	2100	6500	1300	7400	NA	NA
S/3/95         Regular         NSP         NSP         NSP         NSP         NSP         NSP         NSP           8/105         Regular         390         1300         230         800         NA         5.7.           8/105         Regular         1500         3700         620         2200         NA         21.           5/31/96         Regular         1100         1700         380         990         NA         7.1           12/2.96         Regular         1500         3700         2600         8200         2.2         6.2         6.1/17         1.2         2.96         Regular         1500         9600         2.100         9600         100         6.4         1.00         1.00         300         2.2         6.2         6.1/17         1.2         2.96         Regular         1500         4400         1000         3000         2.2         2.1         1.1         1.1         1.1         1.1         1.1         1.1         1.1         1.1         1.1         1.1         1.4         0.33         0.55           031099         Regular         <1.0	1	8/19/93	Regular	3200	7300	1200	3700	NA	NA
8/1/95         Regular         390         1300         230         800         NA         5.7           11/1595         Regular         880         1800         300         970         NA         6.8           5/31/96         Regular         1100         1700         380         990         NA         7.5           8/23/96         Regular         1800         3300         570         2100         NA         17.5           8/23/96         Regular         1500         9700         2600         8200         12.0         66           3/12/97         Regular         5500         9700         2600         8200         11         71           12/1097         Regular         7600         12000         2800         8200         11         71           12/1097         Regular         3.2         90         280         9700         2.5         3.6           6/23/98         Regular         4.0         1.5         1.7         110         0.66         0.84           03/1099         Depticate         <1.0		1/27/94	Regular	1930	4580	672	2390	NA	NA
III/1595         Regular         880         1800         300         970         NA         6.8           22396         Regular         1500         3700         620         2200         NA         21           82396         Regular         1800         3300         570         2100         NA         7.5           82396         Regular         5500         9700         2600         8200         22         62           6/1297         Regular         5500         9700         2600         3600         180         160           12/1097         Regular         1500         4400         10000         36000         23         21           12/1097         Regular         1500         4400         10000         36060         2400         4.2         38           67298         Regular         3.2         90         280         970         2.5         3.6           12/1098         Regular         4.10         1.5         1.7         110         0.66         0.84           03/1099         Duplicate         <1.0		5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
2/23/96         Regular         1500         3700         620         2200         NA         21           573196         Regular         1100         1700         380         990         NA         17.5           822396         Regular         5500         9600         2100         9600         100         64           3/12/97         Regular         5500         9700         2600         8200         22         62           6/12/97         Regular         1500         14000         7500         27000         180         160           9/12/97         Regular         1500         12000         2800         8200         11         71           3/24/98         Regular         53         680         580         1400         1.4         92           09/30/98         Regular         4.10         1.5         17         110         1.4         0.31           03/10/99         Regular         <1.0		8/1/95	Regular	390	1300	230	800	NA	5.7
S/31/96         Regular         1100         1700         380         990         NA         7.5           8/23/96         Regular         1800         3300         570         2100         NA         17           12/2/96         Regular         5500         9700         26600         8200         22         62           6/12/97         Regular         5300         34000         7500         27000         180         160           12/10/97         Regular         1800         14400         10000         3300         140         1.4         92           971/97         Regular         4800         7200         1200         2400         4.2         38           90/30/88         Regular         3.2         90         280         970         2.5         3.6           12/10/98         Regular         -1.0         1.5         17         110         1.4         9.2           907(0/99         Duplicate         -1.0         -1.1         <1.0		11/15/95	Regular	880	1800	300	970	NA	6.8
8/23/96         Regular         1800         3300         570         2100         NA         17           12/296         Regular         5600         9600         2100         9600         100         64           3/12/97         Regular         5300         34000         7500         27000         180         160           9/12/97         Regular         5300         34000         7500         27000         180         160           9/12/97         Regular         4800         7200         1200         2400         42         38           6/23/98         Regular         53         680         580         1400         1.4         92           09/30/98         Regular         5.1         68         580         1400         1.4         92           09/10/99         Regular         <1.0		2/23/96	Regular	1500	3700	620	2200	NA	21
MW-2 <sup>1</sup> 12/2/96         Regular         5600         9600         2100         9600         100         64           3/12/97         Regular         5500         9700         2600         8200         22         62           9/12/97         Regular         1800         4400         1000         3000         23         21           12/10/97         Regular         7600         12000         2800         8200         11         71           12/10/97         Regular         53         680         580         1400         1.4         92           09/30/98         Regular         3.2         90         280         970         2.5         3.6           03/10/99         Regular         <1.0		5/31/96	Regular	1100	1700	380	990	NA	7.5
MW-2 <sup>1</sup> S1/12/97         Regular         5500         9700         2600         8200         22         62           6/12/97         Regular         5500         34000         7500         27000         180         160           9/12/97         Regular         1600         14000         1000         2800         8200         11         71           3/24/98         Regular         7600         12000         2800         8200         11         71           3/24/98         Regular         3.2         90         280         970         2.5         3.6           09/30/98         Regular         <1.0		8/23/96	Regular	1800	3300	570	2100	NA	17
6/12/97         Regular         5300         34000         7500         27000         180         160           9/12/97         Regular         1800         4400         1000         3000         2.3         21           12/10/97         Regular         7600         12000         2800         8200         11         71           3/24/98         Regular         53         680         580         1400         1.4         92.           0/970/98         Regular         5.2         90         280         970         2.5         3.6           12/10/98         Regular         <1.0		12/2/96	Regular	5600	9600	2100	9600	100	64
9/12/97         Regular         1800         4400         1000         3000         23         21           12/10/97         Regular         7600         12000         2800         8200         11         71           3/24/98         Regular         53         680         580         1400         1.4         92           09/30/98         Regular         5.2         90         280         970         2.5         3.6           12/10/98         Regular         3.2         90         280         970         2.5         3.6           13/10/99         Regular         <1.0		3/12/97	Regular	5500	9700	2600	8200	22	62
MW-2 <sup>1</sup> Regular         7600         12000         2800         8200         11         71           3/2/398         Regular         4800         7200         1200         2400         4.2         38           6/23/98         Regular         3.2         90         280         970         2.5         3.6           12/10/99         Regular         <1.0		6/12/97	Regular	5300	34000	7500	27000	180	160
3/24/98         Regular         4800         7200         1200         2400         4.2         38           6/3798         Regular         53         680         580         1400         1.4         92.           09/30/98         Regular         3.2         90         280         970         2.5         3.6           12/10/98         Regular         <1.0		9/12/97	Regular	1800	4400	1000	3000	23	21
6/23/98         Regular         53         680         580         1400         1.4         9.2           09/30/98         Regular         3.2         90         280         970         2.5         3.6           12/10/98         Regular         <1.0		12/10/97	Regular	7600	12000	2800	8200	11	71
09/30/98         Regular         3.2         90         280         970         2.5         3.6           12/10/98         Regular         <1.0		3/24/98	Regular	4800	7200	1200	2400	4.2	38
MW-2 <sup>1</sup> 12/10/98         Regular         <1.0         1.5         17         110         1.4         0.31           03/10/99         Regular         <1.0		6/23/98	Regular	53	680	580	1400	1.4	9.2
MW-2 <sup>1</sup> 12/10/98         Regular         <1.0         1.5         17         110         1.4         0.31           03/10/99         Regular         <1.0		09/30/98	Regular	3.2	90	280	970	2.5	3.6
MW-2 <sup>1</sup> Outplicate 06/10/99         Regular Regular         <1.0         <1.0         7.9         110         0.66         0.84           06/10/99         Duplicate         <1.0		12/10/98		<1.0	1.5	17	110	1.4	0.31
06/10/99         Regular         <1.0         1.1         <1.0         28         0.53         0.55           06/10/99         Duplicate         <1.0		03/10/99	Regular	<1.0	<1.0	8.2	110	0.62	0.85
06/10/99         Regular         <1.0         1.1         <1.0         28         0.53         0.55           06/10/99         Duplicate         <1.0		03/10/99	Duplicate	<1.0	<1.0	7.9	110	0,66	0.84
06/10/99         Duplicate         <1.0         1.8         <1.0             0.76           09/14/99         Regular         <1.0		Ó6/10/99		<1.0	1.1	<1.0	28	0.53	0.55
09/14/99         Regular         <1.0         <1.0         <1.0         <1.0         <2.0         <0.20         <0.10           MW-2 <sup>1</sup> 8/10/92         Regular         14.9         <4		06/10/99	-	<1.0	1.8	<1.0	1 1	0.69	0,76
I2/09/99         -         NS         NS         NS         NS         NS         NS         NS           MW-2 <sup>1</sup> 8/10/92         Regular         14.9         <4		09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
20/93         Regular		12/09/99	-	NS	NS	NS	NS	NS	NS
29/93         Regular         -         -         -         -         -         -         -         -         -         -         NA         NA           8/19/93         Regular         100         12         3         13         NA         NA         NA           1/27/94         Regular         <1									
8/19/93         Regular         100         12         3         13         NA         NA           MW-3         1/27/94         Regular         <1	MW-2 <sup>1</sup>	8/10/92	Regular	14.9	< 4	< 4	< 4	NA	NA
MW-3         1/27/94         Regular         < 1         1.2         2         2.5         NA         NA           MW-3         8/10/92         Regular         304.9         2099         6760         1586         NA         NA           2/9/93         Regular         130         < 10		2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
MW-3         8/10/92         Regular         304.9         2099         6760         1586         NA         NA           2/9/93         Regular         130         <10		8/19/93	Regular	100	12	3	13	NA	NA
8/10/92         Regular         304.9         2099         6760         1586         NA         NA           2/9/93         Regular         130         <10		1/27/94	Regular	< 1	1.2	2	2.5	NA	NA
2/9/93         Regular         130         < 10         < 10         190         NA         NA           8/19/93         Regular         560         3100         630         1900         NA         NA           1/27/94         Regular         1070         5380         510         3120         NA         NA           5/4/95         Regular         1070         5380         510         3120         NA         NA           8/1/95         Regular         1070         5380         470         1800         NA         NA           8/1/95         Regular         490         2900         890         1600         NA         NA           11/15/95         Regular         250         1000         180         440         NA         2.9           2/23/96         Regular         120         810         170         560         NA         12           8/23/96         Regular         330         2200         590         1500         NA         12           12/2/96         Regular         370         2000         960         1400         1.8         11           6/12/197         Regular         770         30	MW-3			1					
8/19/93Regular56031006301900NANA1/27/94Regular107053805103120NANA5/4/95Regular77033004701800NANA8/1/95Regular49029008901600NA1411/15/95Regular2501000180440NA2.92/23/96Regular120810170560NA45/31/96Regular670390012002300NA158/23/96Regular33022005901500NA1212/2/96Regular370200096014001.8116/12/97Regular7703000160019001.61612/10/97Regular2407405004500.595.33/24/98Regular1406303603100.563.96/23/98Regular1406303603100.404.909/30/98Regular132201602901.30.42		8/10/92	Regular	304.9	2099	6760	1586	NA	NA
I/27/94         Regular         1070         5380         510         3120         NA         NA           5/4/95         Regular         770         3300         470         1800         NA         NA           8/1/95         Regular         490         2900         890         1600         NA         14           11/15/95         Regular         250         1000         180         440         NA         2.9           2/23/96         Regular         120         810         170         560         NA         4           5/31/96         Regular         670         3900         1200         2300         NA         15           8/23/96         Regular         330         2200         590         1500         NA         12           12/2/96         Regular         220         1800         670         1000         0.89         7.4           3/12/97         Regular         370         2000         960         1400         1.8         11           6/12/97         Regular         770         3000         1600         1900         1.6         16           12/10/97         Regular         140         <		2/9/93	Regular	130	< 10	< 10	190	NA	NA
5/4/95         Regular         770         3300         470         1800         NA         NA           8/1/95         Regular         490         2900         890         1600         NA         14           11/15/95         Regular         250         1000         180         440         NA         2.9           2/23/96         Regular         120         810         170         560         NA         4           5/31/96         Regular         670         3900         1200         2300         NA         15           8/23/96         Regular         330         2200         590         1500         NA         12           12/2/96         Regular         220         1800         670         1000         0.89         7.4           3/12/97         Regular         370         2000         960         1400         1.8         11           6/12/97         Regular         770         3000         1600         1900         1.6         16           12/10/97         Regular         140         630         360         310         0.56         3.9           6/23/98         Regular         140         <		8/19/93	Regular	560	3100	630	1900	NA	NA
8/1/95         Regular         490         2900         890         1600         NA         14           11/15/95         Regular         250         1000         180         440         NA         2.9           2/23/96         Regular         120         810         170         560         NA         4           5/31/96         Regular         670         3900         1200         2300         NA         15           8/23/96         Regular         330         2200         590         1500         NA         12           12/2/96         Regular         220         1800         670         1000         0.89         7.4           3/12/97         Regular         370         2000         960         1400         1.8         11           6/12/97         Regular         770         3000         1600         1900         1.6         16           12/10/97         Regular         240         740         500         450         0.59         5.3           3/24/98         Regular         140         630         360         310         0.56         3.9           6/23/98         Regular         140		1/27/94	Regular	1070	5380	510	3120	NA	NA
I1/15/95         Regular         250         1000         180         440         NA         2.9           2/23/96         Regular         120         810         170         560         NA         4           5/31/96         Regular         670         3900         1200         2300         NA         15           8/23/96         Regular         330         2200         590         1500         NA         12           12/2/96         Regular         220         1800         670         1000         0.89         7.4           3/12/97         Regular         370         2000         960         1400         1.8         11           6/12/97         Regular         860         4800         1700         2600         1.9         20           9/11/97         Regular         770         3000         1600         1900         1.6         16           12/10/97         Regular         140         630         360         310         0.56         3.9           3/24/98         Regular         140         630         360         310         0.56         3.9           6/23/98         Regular         140		5/4/95	Regular	770	3300	470	1800	NA	NA
2/23/96         Regular         120         810         170         560         NA         4           5/31/96         Regular         670         3900         1200         2300         NA         15           8/23/96         Regular         330         2200         590         1500         NA         12           12/2/96         Regular         220         1800         670         1000         0.899         7.4           3/12/97         Regular         370         2000         960         1400         1.8         11           6/12/97         Regular         860         4800         1700         2600         1.9         20           9/11/97         Regular         770         3000         1600         1900         1.6         16           12/10/97         Regular         240         740         500         450         0.59         5.3           3/24/98         Regular         140         630         360         310         0.56         3.9           6/23/98         Regular         100         720         350         490         0.40         4.9           09/30/98         Regular         13		8/1/95	Regular	490	2900	890	1600	NA	14
5/31/96         Regular         670         3900         1200         2300         NA         15           8/23/96         Regular         330         2200         590         1500         NA         12           12/2/96         Regular         220         1800         670         1000         0.89         7.4           3/12/97         Regular         370         2000         960         1400         1.8         11           6/12/97         Regular         860         4800         1700         2600         1.9         20           9/11/97         Regular         770         3000         1600         1900         1.6         16           12/10/97         Regular         240         740         500         450         0.59         5.3           3/24/98         Regular         140         630         360         310         0.56         3.9           6/23/98         Regular         100         720         350         490         0.40         4.9           09/30/98         Regular         13         220         160         290         1.3         0.43		11/15/95	Regular	250	1000	180	440	NA	2.9
8/23/96         Regular         330         2200         590         1500         NA         12           12/2/96         Regular         220         1800         670         1000         0.89         7.4           3/12/97         Regular         370         2000         960         1400         1.8         11           6/12/97         Regular         860         4800         1700         2600         1.9         20           9/11/97         Regular         770         3000         1600         1900         1.6         16           12/10/97         Regular         240         740         500         450         0.59         5.3           3/24/98         Regular         140         630         360         310         0.56         3.9           6/23/98         Regular         100         720         350         490         0.40         4.9           09/30/98         Regular         13         220         160         290         1.3         0.43		2/23/96	Regular	120	810	170	560	NA	4
12/2/96         Regular         220         1800         670         1000         0.89         7.4           3/12/97         Regular         370         2000         960         1400         1.8         11           6/12/97         Regular         860         4800         1700         2600         1.9         200           9/11/97         Regular         770         3000         1600         1900         1.6         16           12/10/97         Regular         240         740         500         450         0.59         5.3           3/24/98         Regular         140         630         360         310         0.56         3.9           6/23/98         Regular         100         720         350         490         0.40         4.9           09/30/98         Regular         12         470         450         530         1.0         3.8           12/10/98         Regular         13         220         160         290         1.3         0.4		5/31/96	Regular	670	3900	1200	2300	NA	15
12/2/96         Regular         220         1800         670         1000         0.89         7.4           3/12/97         Regular         370         2000         960         1400         1.8         11           6/12/97         Regular         860         4800         1700         2600         1.9         20           9/11/97         Regular         770         3000         1600         1900         1.6         16           12/10/97         Regular         240         740         500         450         0.59         5.3           3/24/98         Regular         140         630         360         310         0.56         3.9           6/23/98         Regular         100         720         350         490         0.40         4.9           09/30/98         Regular         12         470         450         530         1.0         3.8           12/10/98         Regular         13         220         160         290         1.3         0.4		8/23/96	Regular	330	2200	590	1500	NA	12
3/12/97         Regular         370         2000         960         1400         1.8         11           6/12/97         Regular         860         4800         1700         2600         1.9         200           9/11/97         Regular         770         3000         1600         1900         1.6         16           12/10/97         Regular         240         740         500         450         0.59         5.3           3/24/98         Regular         140         630         360         310         0.56         3.9           6/23/98         Regular         100         720         350         490         0.40         4.9           09/30/98         Regular         12         470         450         530         1.0         3.8           12/10/98         Regular         13         220         160         290         1.3         0.42		12/2/96	Regular	1	1800	670	1	1	7.4
6/12/97         Regular         860         4800         1700         2600         1.9         20           9/11/97         Regular         770         3000         1600         1900         1.6         16           12/10/97         Regular         240         740         500         450         0.59         5.3           3/24/98         Regular         140         630         360         310         0.56         3.9           6/23/98         Regular         100         720         350         490         0.40         4.9           09/30/98         Regular         12         470         450         530         1.0         3.8           12/10/98         Regular         13         220         160         290         1.3         0.42		3/12/97	Regular	370	2000	960	1400	1	
9/11/97         Regular         770         3000         1600         1900         1.6         16           12/10/97         Regular         240         740         500         450         0.59         5.3           3/24/98         Regular         140         630         360         310         0.56         3.9           6/23/98         Regular         100         720         350         490         0.40         4.9           09/30/98         Regular         42         470         450         530         1.0         3.8           12/10/98         Regular         13         220         160         290         1.3         0.43		6/12/97		860	4800		1	i	20
12/10/97         Regular         240         740         500         450         0.59         5.3           3/24/98         Regular         140         630         360         310         0.56         3.9           6/23/98         Regular         100         720         350         490         0.40         4.9           09/30/98         Regular         42         470         450         530         1.0         3.8           12/10/98         Regular         13         220         160         290         1.3         0.43			Regular		1				16
3/24/98         Regular         140         630         360         310         0.56         3.9           6/23/98         Regular         100         720         350         490         0.40         4.9           09/30/98         Regular         42         470         450         530         1.0         3.8           12/10/98         Regular         13         220         160         290         1.3         0.43			-				1		5.3
6/23/98         Regular         100         720         350         490         0.40         4.9           09/30/98         Regular         42         470         450         530         1.0         3.8           12/10/98         Regular         13         220         160         290         1.3         0.43			-				1		
09/30/98         Regular         42         470         450         530         1.0         3.8           12/10/98         Regular         13         220         160         290         1.3         0.43		1	1 -	1	1	1			•
12/10/98 Regular 13 220 160 290 1.3 0.4		1	-	1	1	1			[
		1	-	1	1	1			
03/10/99 Regular 3.2 7.4 42 32 0.2 0.44			-	3.2	7.4				0.43

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	ТРН-Д	TPH-G
Well	Date	Туре		microgra	ms per liter, ug/l		milligrams p	er liter, mg/L
	06/10/99	Regular	1.7	3.1	<1.0	36	< 0.20	0.18
1	09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/09/99	Regular	< 1	<1	< 1	<1	< 0.2	< 0.1
MW-4								
	8/10/92	Regular	2594	10360	2160	6740	NA	NA
	2/9/93	Regular	5200	15000	2200	10000	NA	NA
	8/19/93	Regular	3000	12000	< 2000	7000	NA	NA
	1/27/94	Regular	NSP	NSP	NSP	NSP	NA	NSP
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	5700	17000	3500	13000	NA	120
-	11/15/95	Regular	490	1600	310	1100	NA	5.2
	2/23/96	Regular	360	2800	560	2500	NA	18
	5/31/96	Regular	84	830	280	1100	NA	6.2
	8/23/96	Regular	110	1400	430	1800	NA	9.8
	12/2/96	Regular	190	2000	1800	7200	56	43
	3/12/97	Regular	220	1500	1500	4400	27	27
	6/12/97	Regular	47	270	360	950	2.5	6.2
	9/12/97	Regular	92	840	670	2100	15	7.6
	12/10/97	Regular	230	750	970	2300	3.7	16
	3/24/98	Regular	150	510	270	620	1.2	5.6
	6/23/98	Regular	160	890	590	1600	0.69	10
	09/30/98	Regular	80	180	370	840	2.0	3.9
	12/10/98	Regular	28	70	210	960	9.3	4.3
	12/10/98	Duplicate	26	62	180	830	3.9	4.3
	03/10/99	Regular	8	20	250	1400	13.0	. 13
	06/10/99	Regular	<1.0	<1,0	12	12	0.44	0.63
	09/14/99	Regular	< 1.0	< 1.0	3.3	13.1	0.35	0.17
	12/09/99	Regular	< 1	2.5	2.3	20.1	2	0.53
MW-5								
	8/10/92	Regular	< 4	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94	Regular	8.7	29.9	4	11.3	NA	NA
	5/3/95	Regular	3.7	5.3	0.92	4.6	NA	NA
	8/1/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	11/15/95	Regular	< 0.3	1.2	< 0.3	1.5	NA	NA
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	5/31/96	Regular	31	86	10	20	NA	NA
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	<1	< 1	< 1	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	<1	< 0.1	< 0.1
	9/12/97	Regular	< 1	<1	< 1	< 1	< 0.1	< 0.1
	12/10/97	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	<1	<1	< 1	< 1	< 0.2	< 0.1
	09/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	03/09/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.1
	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.1
	09/14/99	Regular	<1.0	<1.0	<1.0	<2.0	<0.20	<0.10
	12/09/99	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1

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Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgram	ms per liter, ug/l		milligrams p	er liter, mg/L
MW-6 '								
	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	7000	19000	3100	7200	NA	NA
	8/19/93	Regular	8100	19000	3500	6400	NA	NA
	1/27/94	Regular	7960	20200	3830	6150	NA	NA
	5/4/95	Regular	11000	17000	2900	6000	NA	NA
	8/1/95	Regular	8300	12000	2500	5100	NA	60
	11/15/95	Regular	8900	17000	2900	5500	NA	57
	2/23/96	Regular	8100	10000	2300	4000	NA	58
MW-6 <sup>1</sup>	5/31/96	Regular	83	150	15	51	NA	0.57
1	5/31/96	Duplicate	87	160	13	47	NA	0.52
	8/23/96	Regular	31	28	9.4	7.9	NA	0.46
	12/2/96	Regular	< 1	< 1	<1	1.7	5.6	< 0.1
	3/12/97	Regular	12	< 5	6.8	18	12	< 0.5
	6/12/97	Regular	1900	1400	410	310	7.8	7.4
	9/11/97	Regular	11	1.3	3.4	< 1	1	< 0,1
	12/10/97	Regular	3	4.2	1.2	3.9	1.7	0.14
	3/23/98	Regular	3.6	< 1	4	< 1	< 0.2	< 0.1
	6/23/98	Regular	170	4.1	15	7.2	1.2	0.51
	09/30/98	Regular	1000	420	140	270	4.0	3.3
	12/10/98	Regular	7.6	6.6	1.7	5.8	2.0	< 0.1
	03/10/99	Regular	2500	930	590	1400	11.0	13
MW-7		-						15
	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	3	< 2	< 2	NA	NA
	1/27/94	Regular	1.1	<1	< 1	< 1	NA	NA
	5/3/95	Regular	52	3.4	0.67	2.8	NA	NA
	8/1/95	Regular	22	2.2	0.85	2.8	NA	< 0.1
	11/15/95	Regular	8.4	0.77	< 0.3	0.93	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Duplicate	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	29	83	10	21	NA	0.25
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	<1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	<1	<1	<1	< 0.1	< 0.1
	6/12/97	Regular	< 1	<1	< 1	<1	< 0.1	< 0.1 < 0.1
	9/11/97	Regular	<1	<1	<1	<1	< 0.1	< 0.1
	12/10/97	Regular	<1	<1	< 1	<1	< 0.1	< 0.1
	3/23/98	Regular	<1	<1	<1	<1	< 0.2	< 0.1
	6/23/98	Regular	<1	<1	<1	<1 <1	< 0.2	< 0.1
	09/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.2	< 0.1 < 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0 < 1.0		
	03/09/99	Regular	<1.0	<1.0	<1.0	<1.0 <1.0	< 0.20	< 0.1
	06/10/99	Regular	<1.0	<1.0	<1.0		4.7	< 0.1
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	<1.0	< 0.20	< 0.1
	12/09/99	Regular	< 5	< 5	< 1.0 < 5	< 2.0	< 0.20	<0.10
MW-8		Rogulai	·	~ 5	<b>`</b> >	< 5	1.8	< 0.5
	8/10/92	Regular	NS	NS	NP	NO		
	2/9/93	Regular	NS < 2		NS	NS	NA	NS
	8/19/93	Regular Regular		< 2	< 2	< 6	NA	NA
	8/19/93 1/27/94	Regular Regular	< 2	< 2	< 2	< 2	NA	NA
	1121/94	regular	< 1	< 1	< 1	< 1	NA	NA

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgram	ns per liter, ug/l		milligrams pe	er liter, mg/L
	5/3/95	Regular	3	4.9	0.75	3.7	NA	NA
	8/1/95	Regular	3.1	1.2	0.47	1.6	NA	< 0.001
	8/1/95	Duplicate	3.6	1.5	0.51	1.5	NA	< 0.1
	11/15/95	Regular	< 0.3	0.52	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	<1	<1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	1.8	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	<1	<1	< 0.1	< 0.1
	9/11/97	Regular	< 1	< 1	< 1	< 1	0.1	< 0.1
	12/10/97	Regular	< 1	< 1	< 1	<1	0.3	< 0.1
	3/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	09/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0,1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	03/09/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.1
	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.1
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
MW-8	12/09/99	-	NS	NS	NS	NS	NS	NS
MW-9	4/22/93	Regular	570	380	< 50	870	NA	NA
	7/15/93	Regular	121	7.3	3	458	NA	NA
	8/19/93	Regular	390	290	40	250	NA	NA
	1/27/94	Regular	327	357	51.1	293	NA	NA
1	5/3/95	Regular	380	110	19	120	NA	NA
	8/1/95	Regular	660	410	91	310	NA	6.2
	11/15/95	Regular	240	24	11	140	NA	1.5
	11/15/95	Duplicate	170	18	10	120	NA	1.9
1	2/23/96	Regular	170	18	2.3	160	NA	4.3
	5/31/96	Regular	120	16	3	200	NA	NA
	8/23/96	Regular	82	13	6	270	NA	4
	8/23/96	Duplicate	76	14	4.8	250	NA	4.4
	12/2/96	Regular	61	< 25	< 25	210	2.6	2.8
	12/2/96	Duplicate	86	13	2.4	270	3.7	2.9
	3/12/97	Regular	30	48	420	880	8.2	19
	6/12/97	Regular	4.7	2.1	11	97	2.6	2.2
	6/12/97	Duplicate	< 5	< 5	6.6	69	5.2	1.9
	9/12/97	Regular	2.1	2.3	2.1	120	1.2	1.9
]	12/10/97	Regular	4.9	9	6.8	62	0.86	0.92
	3/24/98	Regular	< 1	<1	< 1	26	0.9	1
1	6/23/98	Regular	2.4	22	10	36	< 0.2	0.25
1	09/30/98	Regular	1.1	5.5	21	59	0.27	0.27
	12/10/98	Regular	< 1.0	1.9	17	79	5.1	0.25
	03/10/99	Regular	<1.0	<1.0	5.7	68	<0.2	0.22
	06/10/99	Regular	<1.0	1.8	1.8	71	<0.20	0.43
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/09/99	-	NS	NS	NS	NS	NS	NS
MW-10								
	8/19/93	Regular	190	460	< 200	240	NA	NA
	1/27/94	Regular	13.4	400	5.5	33.6	NA	NA
	5/4/95	Regular	980	15	11	84	NA	NA
L	1		L	1	L	1 07		

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgran	ns per liter, ug/l		milligrams pe	r liter, mg/L
	8/1/95	Regular	1300	32	32	100	NA	3.6
	11/15/95	Regular	1000	24	15	36	NA	1.7
	2/23/96	Regular	810	23	27	44	NA	2.4
	5/31/96	Regular	700	24	34	28	NA	2
	8/23/96	Regular	290	3.4	6.4	13	NA	1.4
	12/2/96	Regular	280	1.3	17	8	0.94	0.97
	3/12/97	Regular	110	< 5	17	< 5	0.61	0.57
	6/12/97	Regular	150	12	30	< 5	0,68	< 0.5
	9/12/97	Regular	87	2.3	26	2.7	0.76	0.33
	9/12/97	Duplicate	87	2.4	26	2.8	0.79	0.33
	12/10/97	Regular	41	9.8	12	7.7	1.1	0.28
	12/10/97	Duplicate	36	8.5	10	6.7	1.2	0.24
	3/23/98	Regular	36	< 5	5.9	< 5	1.6	< 0.5
	3/23/98	Duplicate	36	<1	5.3	1.3	1.7	0.18
	6/23/98	Regular	37	< 5	< 5	< 5	2.1	< 0.5
	09/30/98	Regular	84	3.2	30	2.2	1.4	0.36
	12/10/98	Regular	29	1.0	7.0	1.0	0.86	0.18
	03/09/99	Regular	28	<5.0	5.8	<5.0	0.92	<0.5
	06/10/99	Regular	17	<1.0	<1.0	<1.0	0.30	0.16
	09/14/99	Regular	10	< 1.0	< 1.0	< 2.0	< 0.20	<0.10
	12/09/99	Regular	23	< 1	< 1	1.2	0.44	0.16
MW-11 <sup>1</sup>		-						
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	<1	NA	NA
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	8/1/95	Regular	44	29	5.5	13	NA	0.2
	11/15/95	Regular	190	2.8	6.2	11	NA	0.4
	2/23/96	Regular	49	1.2	0.51	4	NA	0.25
	5/31/96	Regular	300	83	12	28	NA	0.8
	8/23/96	Regular	100	1.2	0.3	4.7	NA	0.26
	12/2/96	Regular	970	< 5	6	8.1	2	1.3
1	3/12/97	Regular	130	< 5	13	5.8	0.42	< 0.5
	3/12/97	Duplicate	100	< 5	10	5.1	0.43	< 0.5
	6/12/97	Regular	150	23	19	< 5	1.1	0.55
	9/12/97	Regular	220	15	27	13	1	0.46
MW-11A								
	3/24/98	Regular	24	5	< 5	< 5	0.28	0.14
	6/23/98	Regular	9.9	· <5	< 5	< 5	< 0.2	< 0.5
	09/30/98	Regular	9.3	3.7	2.2	7.0	<0.20	0.1
	12/10/98	Regular	1.7	<1.0	<1.0	<1.0	<0.20	<0.1
	03/10/99	Regular	<5	<5	<5	<5	0.3	<0.5
	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.10
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/09/99	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
MW-12							1	
	3/24/98	Regular	100	11	6	8	0.29	0.41
	6/23/98	Regular	88	< 5	< 5	< 5	< 0.2	< 0.5
	6/23/98	Duplicate	89	< 5	< 5	< 5	0.31	< 0.5
	09/30/98	Regular	260	3.0	1.2	7.9	<0.20	0.62
	12/10/98	Regular	160	<1.0	<1.0	1.2	0.21	0.36
	03/10/99	Regular	160	1.1	<1.0	2.9	0.38	0.45
	06/10/99	Regular	49	1.4	<1.0	<1.0	0.22	0.13

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Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	ТРН-G
Well	Date	Туре		microgram	ns per liter, ug/l		milligrams p	er liter, mg/L
	09/14/99	Regular	75	< 1.0	< 1.0	< 2.0	<0.20	0.23
	12/09/99	Regular	64	< 1	< 1	<1	< 0.2	0.21
MW-12D			,					
	07/02/99	Regular	< 5	< 5	< 5	< 5	<0.20	<0.10
	09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/09/99	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
MW-13								]
	07/02/99	Regular	1500	23.0	750	58	2.2	5.1
	09/14/99	Regular	860	16	450	34.4	2.1	3.1
	12/09/99	Regular	430	16	410	40.9	0.46	3.2
OW-4								
	06/10/99	Regular	<1.0	<1.0	<1.0	4.4	<0.2	<0.10
	09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
	12/09/99	Regular	< 1	< 1	< 1	< 1	<0.2	<0.1

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

NA=Not Analyzed NS=Not Sampled

NSP=Not Sampled due to Phase Separated Hydrocarbons

#### Table 5

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

Hobbs, New Mexico

				Dissolved Methane
Well	Date	Nitrate <sup>1</sup> (mg/L)	Sulfate <sup>1</sup> (mg/L)	(mg/l)
1	3/23/98	3.87	190	< 0.0012
ſ	3/9/99	<0.1	195	< 0.0012
MW-5	6/10/99	4.73	209	< 0.0012
ľ	9/14/99	4.3	210	<0.0012
	12/9/99	4.2	210	<0.0012
	3/23/98	0.07	320	0.91
	6/23/98	<0.1	325	0.55
	9/30/98	<0.1	204	0.81
MW-10	12/10/98	<0.1	180	0.091
WIW-10	2/0/00	-0.1	142	0.025
	3/9/99	<0.1	223 <sup>3</sup>	0.035
	9/14/99	<0.10	160	0.0049
	12/9/99	0.49	170	0.0039
	3/23/98	< 0.05	190	0.14
	6/23/98	<0.1	225	0.11
	9/30/98	0.4	196	0.043
	12/10/98	0.7	188	0.033
MW-11A	2/10/00	<0.1	164	0.004
	3/10/99	<0.1 <sup>2</sup>	227 <sup>3</sup>	0.094
	6/10/99	<0.1	181	0.0036
	9/13/99	0.22	250	< 0.0012
	12/9/99	<0.1	290	0.0079
	3/23/98	< 0.05	240	< 0.0012
	6/23/98	<0.1	240	< 0.0012
	9/30/98	<0,1	168	< 0.0012
	12/10/98	<0.1	202	< 0.0012
MW-12	2/10/00	<0.1	137	<0.0012
	3/10/99	<0.1 <sup>2</sup>	193 <sup>3</sup>	<0.0012
	6/10/99	<0.1	217	< 0.0012
	9/14/99	<0.10	230	<0.0012
	12/9/99	<0.1	180	< 0.0012
	7/2/99	2.1	249	0.0015
MW-12D		<0.10	200	0.0065
	12/9/99	<0.1	210	0.0015
	6/10/99	3.96	192	< 0.0012
OW-4	9/14/99	3.5	200	<0.0012
	12/9/99	3.4	200	<0.0012
L	<u> </u>	excent as noted	1	1

1=By EPA Method 300, except as noted

2=By EPA Method 353.3

3=By EPA Method 375.4

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

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							Discharge	Benzene	Total BTEX	HAI
Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	HdT	Rate,	Emission	Emission	Emission
Number	Date		parts per	parts per million by volume, ppmv	e, ppmv		scfm	Rate, lb/hr	Rate, lb/hr	Rate, Ib/hr
Extraction-1	9/19/95	790	1100	340	920	0026	132.47	1.235	5.943	16.31
Effluent-1	9/20/95	066	2500	560	1600	16000	135.76	1.575	10.939	27.37
Effluent-2	9/28/95	13	28	9	18	2533	123.56	0.019	0.112	3.89
Effluent-4	11/7/95	15	58	12	36	1500	131.10	0.024	0.239	2.59
Effluent 111595-01	11/15/95	39	180	42	130	1870	133.33	0.062	0.773	3.21
Effluent 121995-01	12/19/95	10	45	11	33	530	129.64	0.016	0.191	0.89
Effluent 12996-01	1/29/96	12	61	17	53	1200	128.45	0.018	0.271	1.95
Effluent 032296-01	3/22/96	9	44	12	40	066	124.68	0.009	0.189	1.56
Effluent 042496-01	4/25/96	4	37	10	36	900	118.34	0.005	0.147	1.29
Effluent 053196-01	5/31/96	3.7	40	10	33	670	124.11	0.005	0.158	1.04
Effluent 082396-01	8/23/96	Ş	12	Ş	Ş	200	126.18	0.007	0.047	0.31
Effluent 120296-01	12/2/96	⊽	⊽	∠	∼	Ş	129.04	0.002	0.008	0.01
Eff-31297-1	3/12/97	2.1	15	4.6	15	250	110.56	0.003	0.057	0.33
Effluent 070297-01	7/2/97	⊽	6.3	2.4	8.6	65	109.90	0.001	0.028	0.08
Monitor 970912 (1)	9/12/97	NA	NA	NA	NA	340	105.40	NA	NA	0.39
Eff-1-2832	12/10/97	<0.001	0.013	0.009	0.031	210	106.27	0.000	0.000	0.28
Monitor 980324 (1)	3/24/98	NA	NA	NA	NA	1500	108.97	NA	NA	1.91
Monitor 980622 (1)	6/22/98	NA	NA	NA	NA	190	108.16	NA	NA	0.24
Monitor 980930 (1)	9/30/98	NA	NA	NA	NA	200	123.74	NA	NA	0.33
Monitor 981210 (1)	12/10/98	NA	NA	NA	NA	180	111.14	NA	NA	0.24
Monitor 990310 (1)	3/10/99	NA	NA	NA	NA	80	111.14	NA	NA	0.11
Monitor 990610 (1)	6/10/99	NA	NA	NA	NA	140	73.68	NA	NA	0.12
Monitor 990914 (1)	9/14/99	NA	NA	NA	NA	12.5	116.24	NA	NA	0.02
Monitor 991209 (1)	12/9/99	NA	NA	NA	NA	5.9	42.14	NA	NA	0.003

NA = Not Analyzed (1) All analysis based on field FID readings

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Appendices

APPENDICES

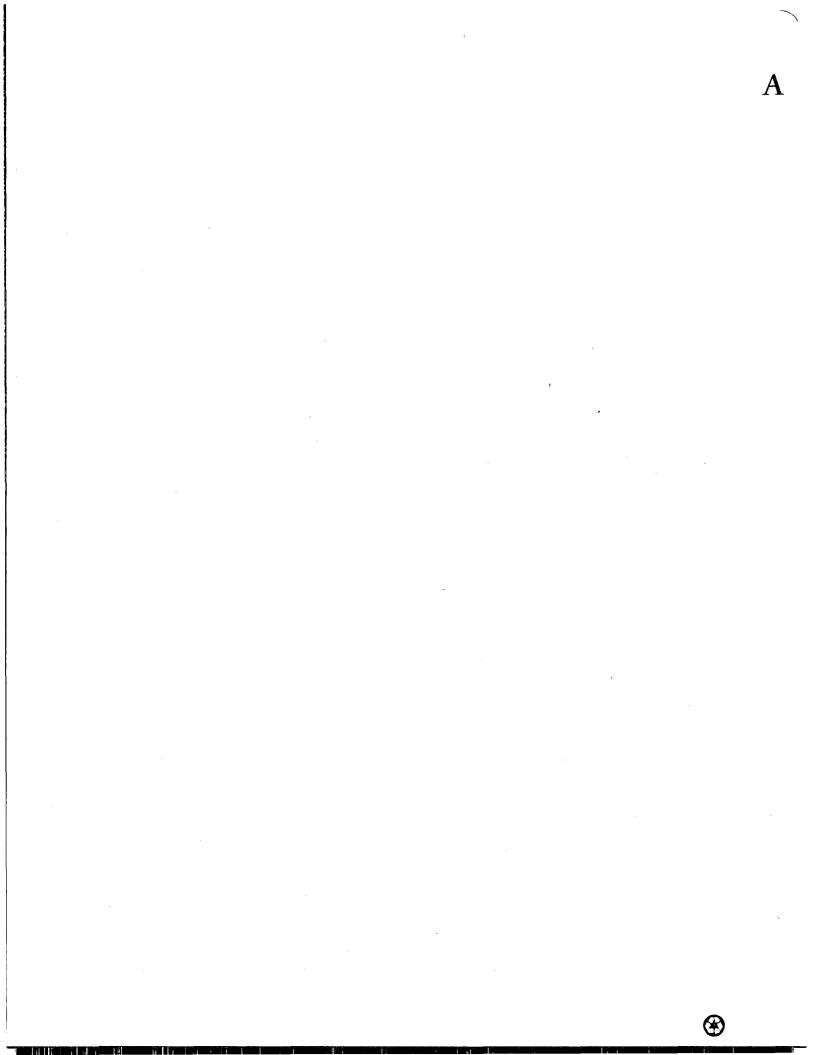
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### **APPENDIX A**

### **Groundwater Sampling Forms**

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## GROUNDWATER SAMPLING FIELD DATA SHEET

(WELLID: MM 3.

	Number: 128 BJSV					Personnel:	OEN	V TETAG	Time:_/ L	
	t Locallon:							1		
2. WELL	DATA									
	Dlanieter:		:95	Туре: ор	VC 🗆 Stain	ess Li Goly, S	Steel D Tello	on® L: Other:	······································	
	Diameter:		105		·			on@ Li Other:_		
	epth of Well:_(				· · · · · · · · · · · · · · · · · · ·			otect: a Casing		
	to Static Water			From:	op of Well Co	asing (TOC)		otecti o Casin(	g 🛛 Olhei.	
Depth	to Product:	fe	et	From: a 1	lop of Well C	asing (IOC)		otecti: 9 Casing	g 🗆 Other:	
Length	of Water Colu	mn:	feet	Well Volun	ne:			Inter 31 (from well - 3,167 gc	,	∵ell = 0.66
3. PURC	<b>JE DATA</b>		inite estimation di					ويوالي المراجع		****
Purge	□ Balle Method:□ Cent	r, Sizə: Tifuqal Pur	_ U Blade	stattic Pump	2" Submersibi	e Purnip 🔲 4 Pump 🖾 Othe	" Submersible er:	Pumj	East	
1	als: Pump/Balle	, 🛛 Staini	ess 🖸 PV(	C 🛛 Teflon	🕲 🖸 Other:_				Equi	ent Mod
	•	. C Dedk		•		Cleaned D MBD Olher:		1		
- Materia	als: Rope/Tubln					Cleaned C		2		
Was we	ell purged dry?	C) Yes	U No	Pump	Ing Rute:	gc	ıl/min	3		
Ime	Curn. Gallons Removed	рН	lemp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	c	ments
14:55		6.22	1657	1173	-32.6	5.72	-	-	ele	_
18:57		7.58	17.67	1229	8.4	3.11	-	-	ela	
15: 52		7.11	17.36	1221	14.7	3.08		-	Cu-	
15.5		7.17	17-28	12-2-4	13.4	7.10	28			
				<u>'</u>		+				
	<u> </u>			)	<u> </u>			<u>}</u>		
∕4, SAM	PLING DA								aochemicai.	A lyses
Method				2* Si Pump 🖬 Ott		ump 🖬 4" Sul	bmersible Pu	<sup>mp</sup> Fe	rrous Iron:	m
Materla	als: Pump/Balle					Cleaned D	Disposable		D:	
Motoria	als: Tubing/Rop	_ 🛛 Polye	ibliene C	D Polypropyle	ne 🗆 Tellor	no Li Other:_	·	-   NI	irate:	
						Cleaned C				~
	to Water at Time 10: $M W$								llate:	m
							10913:	-   All	kalinity:	mç
Duplica	ate Sample Co	1901907								*********
5.CON	AMENTS									
·								- <u>-</u> , - <u>-</u> , - <u>-</u> ,, -		



## GROUNDWATER SAMPLING FIELD DATA SHEET

(WELL ID: MW-4

	: t Location:	THUT.	2				· · · · · · · · ·		
2 VA/EL							, in the second s		
	Diameter:	5	· 95			es Li Calv S		n® L: Other:	
	n Dlameter:	3	105 105					no Li Olher:	
	Depth of Well:_(							tect a Casing	
	to Stalle Wate			·				lecti o Casing	
	to Product:			From: ם ז	op of Well Co	using (10C)	Top of Pro	itectl: 9 Casing	Other:
i.engti	n of Water Colu	mn:	feet	Well Volum	าย;			nter: 31 (from ( well ), 167 gal/i	,
3. PUR	GE DATA								
1-Aater	als: Pump/Balle als: Rupe/Tubli ell purged do/2	I <sup>r</sup> , D Dedic D Dedic D Dedic	coled Ω Pre Ihγlene Ω coled Ω P	epared Off-S I Polypropyle Irepared Off-	Other:_ Ite D Field C ne D Teflon Site D Field	Cleaned D D D Other:_ Cleaned D	Disposable	1 2	
Was w	ell purged dry?	<del>,</del>	LI No	· · · · · · · · · · · · · · · · · · ·	Ing Rute:		i/min	3	
Ime	Curn. Gallons Removed	рН	lemp	Spec. Cond,	Eh	Dissolved Oxygen	Turbidity	Other:	C r
15:15		5.11	15-19	اردر	357.8	7.42		-	clouch
15:18		7.38	15.17	1110	127.4	6.02			cla
15'21		7.40	18-28		120.1	5.89		-	cla-
15:25		7.41	18.40		111.8	5.67	7.2		cia
1				11 12	111.0	<u> </u>	1.2	<u> </u>	
Metho		re: C c Pump Q r Q Staini g Dedic Dedic Dedic Dedic	licential Uff as: D PVC catad D Pr licena D catad D P	Pump Q Off C Q Teflon epared Off-S	D D Other:_ ille D Fleid ( ine D Teflon Site D Fleid	Cleaned C & L) Other:_ Cleaned C	Disposable 1 Disposable	np Ferro DO: Nitro	



### GROUNDWATER SAMPLING FIELD DATA SHEET

(WELL ID: MW-S

3. PURGE DATA         Purge Method: © Centrifugal Pump © Pertstatilic Pump © Inertial Ult Pump © Other:		Number: 12		-lask Nun	nber: <u>0</u>					Time: 112.50
2. WELL DATA         Cading Diameter:       2.         icaren Diameter:       1	-									
Cading Diamieter:       2       is       IVPE: O/PVC © Stahles U Galv. Steel © Tellone U. Other:         Screen Diamieter:       1       iss       Type: O/PVC © Stahles U Galv. Steel © Tellone U. Other:         Total Depth of Welt.       44.6.5 (set       From: & Top of Welt Cading (TOC) © Top of Protect © Cading © Other         Depth to Static Water.       feet       From: © Top of Welt Cading (TOC) © Top of Protect © Cading © Other         Inegih of Water Column:       feet       From: © Top of Welt Cading (TOC) © Top of Protect © Cading © Other         Inegih of Water Column:       feet       Welt Volume:       get Screened Inter J (Tom GS);         Inegih of Water Column:       feet       Blodder Pump D 2* Submershile Pum; D 4* Subminishie Pum;         Purge Method:       Definition © Definition © Definition © Other:       Eculi         Moterials:       Rupp // Definition © Definition © Other       Eculi       eD         Materials:       Rupp // Definition ©	l'roject	Locallon:					Weather:	sunn	Ymild -	
Izreen Dlamster:       1	2. WELL	DATA								
Total Depth of Well (24,6.5 feet       From: all top of Well Casing (IOC)       I top of Protect = Casing II Other         Depth to Stotic Water.       feet       From: II op of Well Casing (IOC)       I top of Protect = Casing II Other         Teght to Product:       feet       From: II op of Well Casing (IOC)       I top of Protect = Casing II Other         Teght to Product:       feet       From: II op of Well Casing (IOC)       I top of Protect = Casing II Other         Teght to Product:       feet       From: II op of Well Casing (IOC)       I top of Protect = Casing II Other         Teght to Product:       feet       Vell Volume:       get       Screened International Other         Teget Method:       II obded Pump II of Vell Volume II of Vell Volume II Other       Get Vell Volume II Other       Equility III Other         Purge Method:       II obded Propose Offstein II Other       III obded III Propose Offstein III Other       Equility IIII Other       IIII obded IIII Other         Materials:       Rupe/Tubhing III Polyphytee III Polyphytee IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Casing	Dlameter:	2	195	Түрө: сүр	VC 🛛 Stain	less U Galv. S	Steel C Tello	n@ L/ Olher:	
Depth to Stolic Water.≤7.4         feat         From: it po of Well Casing (IOC) □ Top of Protect: 1 Casing □ Other:           Tepth to Product:         feat         from: □ top of Well Casing (IOC) □ Top of Protect: 1 Casing □ Other:         □           Length of Water Column:         lead         feat         from: □ top of Well Casing (IOC) □ Top of Protect: 1 Casing □ Other:         □           Length of Water Column:         lead         Well Volume:	Screen	Diameter:	2	1.62	Туре: дур	VC 🗆 Staln	less () Galv. S	Steel Q Teflo	n@ L; Other:	
Inglit to Product:       From:       Top of Well Cosing (IOC)       Top of Protect:       Cosing       Display         Isingth of Water Column:       Teet       Well Volume:       grid       Screened Inten # (from GS):       Note: 24rbch well       Ut2 partification         3. PURGE DATA       Balled, Stac       Display Exponential Pump       Display Expo	Total D	epth of Well:	4.65	eet	From: gr	op of Well C	asing (IOC)		tect a Casing	Q Other
Langth of Water Column:       Leet       Well Volume:       grid       Screened Internal II (from GS):       Note: 24nch well       LI32 gal/ff       44n       Addition (GS):         Billedder DATA       Balent, Staz:       Disledder Fump	Depth	o Stolle Wate	1:57.4	feet	From: d T	op of Well C	asing (TOC)		tecti a Casing	Olher.
Note: 24ch weil - 1/37 gol/ff 44n : refl         Note: 24ch weil - 1/37 gol/ff 44n : refl         Purge Method: a Centrifuge Pump in Perifabile Pump in Perifab	()epth	o Product:	fe	et	From: DT	op of Well C	asing (IOC)	C Top of Pro	otectl a Casing	D Olher:
Purge Method:       Baller, Star:       U Bladder Pump D 2* Submersible Pump D 4* Submersible Pump       Equil: em         Materials:       Pump/Baller       Stahles:       PVC       Defande D Oher:       Image: Default of	Length	of Water Colu	.mn:	leet	Well Volun	าย:			•	
Pruge Method: Centrituge Dump: Dieristallic Pump Dieristallic Pump / Baller       Equit: 191         Malerials: Pump/Baller       Distalliss DPVC       Tellane Distallic Pump distallic Cenned       Disposable       1.         Malerials: Pump/Baller       Dedicated Direptated Off:Still E InflactGened Disposable       1.	3. PURC	SE DATA								
Materials: Pump/Bailer       Disposable       1	Purge	Balle Aethod: D Con	ər, Sizə:	U Bladd	ler Fump	2" Submersib		" Subrnersible	Pum	<b>-</b> .
Materials: Pump/adiler       Dedicated B Prepared Off-Site       Field Cleaned       Disposable       1			C Stala					96:		Equit ent
Materials: Roperius       Bedicuted @ Prepared Off-Site @ Field Cleaned @ Disposable       2		• •	Pr. D Dedk	caled D Pr	epared Off-S	ite 🗅 Fleid	Cleaned D			
Was well purged dry?       Pres Li No       Pumping Rate:gal/min       3	i Aateria	als: Rope/Tubli	ng 🗆 Polye Q Dedic	ihylene C culed OP	1 Polypropyle Prepared Off-	ne 🖾 Tefloi Site 🖾 Fielo	not Di Other: i Cleaned - D	1 Disposable	2	
Imme       Curn. Gallons       pH       iemp       Spec. Cond.       Eh       Disolved Oxygen       Turbidity       Other:       C       n $12.30$ $5.45$ $15.56$ $12.43$ $7.55$ $ 5.47.43$ $12.30$ $ 5.45$ $17.55$ $ 5.47.43$ $12.30$ $ 5.47.43$ $17.42$ $17.92$ $13.7.5$ $17.55$ $ 5.47.43$ $12.37$ $7.32$ $17.92$ $13.7.5$ $17.52$ $   -$ <						•				
Image       Removed       pH       lemp       Cond.       En       Oxygen       Iubidity       Cond.       Iubidity $12.30$ $5.49$ $15.6$ $12.49$ $275.6$ $7.55$ $ 5.494$ $17.94$ $17.94$ $17.95$ $ 5.494$ $17.94$ $17.94$ $17.95$ $ CC_{41}$ $12.50$ $7.35$ $17.94$ $17.94$ $17.95$ $17.55$ $ CC_{41}$ $12.50$ $7.35$ $16.91$ $12.56$ $135.7$ $2.52$ $ CC_{41}$ $131.30$ $7.35$ $16.97$ $12.55$ $137.5$ $2.744$ $ CC_{41}$ $131.30$ $7.35$ $16.97$ $12.55$ $137.5$ $2.744$ $ CC_{41}$ $131.30$ $7.35$ $16.97$ $12.55$ $2.744$ $ CC_{41}$ Method(s):       Boller, Size: $0.97$ $0.97$ $0.97$ $0.97$ $0.97$ $0.97$ $0.97$ $0.97$ $0.97$ $0.97$ $0.97$ $0.97$ $0.97$ $0.97$ $0.97$ <td< td=""><td></td><td>Curn. Gallon:</td><td>5</td><td><u> </u></td><td></td><td><u> </u></td><td></td><td><u> </u></td><td></td><td></td></td<>		Curn. Gallon:	5	<u> </u>		<u> </u>		<u> </u>		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		1	рн		Cond.	+	Oxygen			
12:57       7:25       -       -       CCA				1	1000	<u> </u>				5 andy
13:32       1:32       1:43       1:37:5       2:74       -       CLA         13:32       1:32       1:37:5       2:74       -       CLA         A. SAMPLING DATA       55       55       55       Geochemical Act         Method(s):       Boiler, Size:       Divider Pump       2* Submersible Pump       4* Submersible Pump       Ferrous Iron:       3         Materials:       Pump/Bailer       Boiler:       Dedicar ed       Prepared Off-Site       Disposable       DO:       3:0         Materials:       1ubing/Rope       Polyelitolene       Deptyropylene       Tellon® Disposable       Nitrate:       Sulfate:       Sulfate:       Sulfate:       Sulfate:       Geochemical Act       Aikalinity:       2:60         Depth       to Water at Time of Samping:       Field Filtered?       Yes       No       Sulfate:       Aikalinity:       2:60         Duplicate       3ample Collected?       Yes       No       ID:       Sulfate:	12:51	 	17.22	17.42	1350	15 5.6	4.16		ļ	
A. SAMPLING DATA         Method(s):       Boller, Size:       Drudder Pump       2" Submersible Pump       4" Submersible Pump         Method(s):       Peristaltic Pump       It wild Uff Pump       0 ther:       Ferrous Iron:       2" Submersible Pump         Materials:       Pump/Baller       Stainles:       PVC       Tetlon®       Other:       DO:       3: 0         Materials:       Pump/Baller       Stainles:       PVC       Tetlon®       Other:       DO:       3: 0         Materials:       Tubing/Rope       Polyetholene       Polypropylene       Tetlon® It Other:       DO:       3: 0         Materials:       Tubing/Rope       Polyetholene       Prepared Off-Site       Field Clearned       Disposable       Nitrate:          Depth to Water at Time of Sampling:       Field Filtered?       Yes       No       Sulfate:          Sample ID       As Winds       Sulfate:       Gample Time:       15', 35       # of Containers:       Alkalinity:       26 or         Stample Collected?       Yes       No       ID:            Sample ID       Assume Collected?       Yes       No       ID:           5.       COMM	12:57		7.25	16.51	12-56	138.7	2.50		-	
A. SAMPLING DATA       Geochemical.A. A         Method(s):       Baller, Size:       Dirudder Pump       2" Submersible Pump       4" Submersible Pump         Materials:       Pump/Baller       Stahles:       PVC       Terlon®       Other:       Do:       3.         Materials:       Pump/Baller       Stahles:       PVC       Terlon®       Other:       Do:       3.       0.         Materials:       Pump/Baller       Stahles:       PVC       Terlon®       Other:       Do:       3.       0.         Materials:       Pump/Baller       Stahles:       PVC       Terlon®       Other:       DO:       3.       0.         Materials:       Pump/Rope       Polyelt clene       Polypropylene       Terlon® U Other:       DO:       3.       0.         Depth       to Water at Time of Sampling:       Field Filtered?       Yes       No       Sulfate:       Alkolinity:       2.6         Sample ID       M:       Yes       No       ID:       Alkolinity:       2.6         Sulfate:       Sample Collected?       Yes       No       ID:       Alkolinity:       2.6         Sourcetter       Sample Collected?       Yes       No       ID:       Alkolinity: </td <td>13100</td> <td>1</td> <td>7.28</td> <td>16.47</td> <td>1295</td> <td>137.5</td> <td>2.74</td> <td>-</td> <td>-</td> <td>Sun-</td>	13100	1	7.28	16.47	1295	137.5	2.74	-	-	Sun-
A. SAMPLING DATA       Geochemical A         Method(s):       Boller, Size:       Dirudder Pump       2" Submersible Pump       4" Submersible Pump         Materials:       Peristaltic Pump       Iteratial Uff Pump       Other:	- <u>*-</u>		1					5		
Method(s):       Baller, Size:       Divider Pump       2" Submersible Pump       4" Submersible Pump       Ferrous Iron:       0         Materials:       Pump/Baller       Stainles:       PVC       Terlor®       Other:       0			<u></u>	L	1	L			<u> </u>	
Materials: Pump/Baller       Distance of an proposable       DO:       3.0         Materials: Pump/Baller       Dedictioned       Prepared Off-Site       Field Cleaned       Disposable       Nitrate:         Materials: Tubing/Rope       Dodictioned       Prepared Off-Site       Field Cleaned       Disposable       Nitrate:	A. SAM	-LING DA	IA	<b>~ , , , -</b>		)			1	_
Materials: 1ubing/Rope       Polyeticlene       Polypropylene       Tetlon® U Other:		d(s): D Baller, Sl D Peristalti	28: [ c Pump []	u Houdder P Hoerllal Uff	ump 🖬 2" Si Pump 🖾 Oth	net:	ump Li 4" Sul	omersible Pur	<sup>np</sup> Ferro	bus Iron:
Materials: 1ubing/Rope       Polyeticlene       Polypropylene       Tetlon® U Other:	Method	ils: Pump/Bolle						Discosti	DO:	3. 0
Materials: Tubing/Rope     Dedice od     Prepared Off-Site     Field Cleaned     Disposable       Depth to Water at Time of Sampling:		and a state of the control of the co					<b>A</b> () <b>O</b> ()		KR4	
Sample ID: <u>Alkalinity:</u> <u>Alkalinity:</u> <u>Alkalinity:</u> <u>Alkalinity:</u> <u>Alkalinity:</u> Duplicate 3ample Collected? <u>U</u> <u>Yes</u> <u>No</u> ID:	Materic		U Polve	and <b>D</b>	Prepared Off	Site Q Field	d Cleuned	Disposable		iia
Duplicate 3ample Collected? u     Yes I     No     ID:	Materic		De Ci Polya Ci Dadk					~	Sulle	ite:
Duplicate 3ample Collected? u       Yes I       No       ID:	Materic Materic Depth	uls: Tubing/Rop to Water at Tin	ne of San	np#n <b>g:</b>				-	1	
	Materic Materic Depth	uls: Tubing/Rop to Water at Tin	ne of San	np#n <b>g:</b>				-	- Alka	
	Materic Materic Depth Sample	ols: Tubing/Rop o Water at Tin ID: <u>/h W</u> -	ne of San	np®n <b>g:</b> Sample 1	Ilme: 13.	ور	# of Conta	-	- Alka	
Note: include comments such as well condition, odor, presence of NAPL, or other litems not on the field data sheet.	Materic Materic Depth Sample Duplicc	uls: Tubing/Rop o Water at Tin ID: <u>As W</u> ite Sample Co	ne of San	np®n <b>g:</b> Sample 1	Ilme: 13.	ور	# of Conta	-	- Alka	
Note: Include comments such as well coordition, odor, presence of NAPL, or other liems not on the field data sheet.	Materic Materic Depth Sample Dupilco	uls: Tubing/Rop o Water at Tin ID: <u>As W</u> ite Sample Co	ne of San	np®n <b>g:</b> Sample 1	Ilme: 13.	ور	# of Conta	-	- Alko	
Note: Include comments such as well condition, odor, presence of NAPL, or other litems not on the field data sheet.	Materic Materic Depth Sample Dupilco	uls: Tubing/Rop o Water at Tin ID: <u>As W</u> ite Sample Co	ne of San	np®n <b>g:</b> Sample 1	Ilme: 13.	ور	# of Conta	-	- Alko	
	Materic Materic Depth Sample Dupilco	uls: Tubing/Rop o Water at Tin ID: <u>As W</u> ite Sample Co	ne of San	np®n <b>g:</b> Sample 1	Ilme: 13.	ور	# of Conta	-	- Alko	



## GROUNDWATER SAMPLING FIELD DATA SHEET

(WELL ID: MIN-7

	JECT INFO	· .	Number		Data 12	- 5.99	Ŧ	ma: 1117	ن{
1		-				11			
ļ	t Location:		······						
		~	Tupol					·	
	Dlameter:	2 195				Steel C Teflon® L Steel C Teflon® L			- <u>-</u>
	n Dlameter:					D Top of Protect			····-
	bepth of Well: <u>(a</u> to Static Water		<u> </u>						
	to Product:	feet		· · · · · · · · · · · · · · · · · · ·				·····	
	of Water Colu				gcil	Screened Inter Note: 2-Inch well	ul (from GS	;):	= 0.66)
	GE DATA							and an	
	D Baller Method: D Centr als: Pump/Baller	, 🛱 Stainless 🗆	adder Pump Peristaltic Pump PVC II Teflor Prepared Off-1	🖲 🖬 Offiner:		" Submersible Pum er: Disposable		Equir 10	
Mater	als: Rope/Tubin			ne 🛛 Teflon®	0 0 Other:_		/		
		- U Dealcaiga	Prepared Off	-Site CI Field (	Cleaned C	Disposable	2		
Was w	ell purged dry?			ing Rate:	gc	nim/li	3		
Ime	Cum. Gallons Removed	pH lem	np Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	C	ments
· · · · ·	+								
				<u>  </u>					· ····································
				<u> </u>					· <u></u>
/ SAM	PLING DAT	ГА ГА					Geoch	nemical A	ulyses
Metho	dra), 🖸 Bailer, Siz	e: D kudo			np 🗆 4" Su	bmersible Pump	Ferrou	s Iron:	ma
		Pump O Institu							'''\ <del>\</del>
Mater	als: Pump/Ballei	<b>a</b> 060,00,00					DO:		m
Mater	als: Tubing/Rop	e 🖬 Polyeli vlene 🖬 Dedica nd	<ul> <li>Polypropyle</li> <li>Prepared Off</li> </ul>	one 🗆 Teflon@ -Site 🖾 Field (	DL:Other:_ Cleaned C	Disposable	Nltrate	r:	m
	to Water at Tim						Sulfate	);	m
	BID: MALWS		ole Time:			Ilners:	Alkalin	ity:	mg
Duplic	ate Sample Col	llacted? U Ye	s GX No ID:_					,	· · · /2
			<u>,</u>		and "Standingstation"		1		
5. CO	IMENTS	well	_d-7(			L U ULM	ب ر گ	<u>m Lluc</u> Te	eM
		5.5-5 S	CAMPE'L	41/D	miller			• ·	
Materia	Va commercia		an oder ster		athoritom	of on the field dat	atheat		
Note: Inclu	de comments suc	h as well co. ditte	on, odor, presen	ce of NAPL, or o	other items r	not on the field dat	a sheet.		***



## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MV-13

· · · · · · · · · · · · · · · · · · ·										
4	JECT INFO	-					7	_	. (	70
1	Number: 128		Task Nurr	nber: <u>0</u> [5				7		
	BUSU					Personnel:_	DEKK	1 TEAC	<u>ue</u>	
Project	Locallon:	206 65				Weather:_	SURN	y, mild	[	
2. WELL	DATA									
Casing	Dlameter:2		195	Туре: фр	VC 🛛 Stalnl	ess Li Galv. S	iteel 🛛 Tellor	No La Olher:		
Screen	Diameter:	<u> </u>	105	Type: gp	VC 🛛 Staini	ess Li Galv. S	iteel 🛛 Teflor	18 Li Other:		······································
Total D	epth of Well:	28	eet	From: gr	op of Well Co	using (IOC)	C Top of Pro	lect <sup>i</sup> a Casing	Olher _	
	to Stalle Water		_	From: of T	op of Well Co	using (TOC)	C Top of Pro	lecti n Casing	Olher.	
Depth	to Product:	fee	∋t	From: a t	op of Well Co	asing (TOC)	C Top of Pro	tectl: 9 Casing	D Olher:	·
Length	of Water Colur	mn: <u>5.4</u>	B_feet	Well Volum	اھ: <u>ک</u> ، ج			nten ut (from G vell - 1, 167 gal/fi		vell = 0.667 gal/ft
3. PURC	ge data								······································	
	Dethod: D Centr	, Size:	U Bladd		2" Submersible	e Punip 04	' Submersible	Pumj		
		of states		italtic Pump			ər:	× 1		ent Model(s)
Materic	als: Pump/Bailer	🛛 🖸 Dedic	caled 🗅 Pr	epared Off-S	te 🖞 Field (	Cleaned 🛛		1. <u> </u>	I-610	0
1-Aateria	als: Rope/Tublng	g CrPolyel Dedic	lhylene C aled QP	1 Polypropyle Prepared Off-	ne 🛛 Teflon Site 🗳 Field	® D Other: Cleaned	I Disposable	2		
	ell purged dry?					. 4 . 90		3		-
imə	Curn. Gallons Removed	рН	lemp	Spec. Cond.	Eh	Dissolved Oxygen	Turbldity	Other:	с	ments
15:40		6.41	17.73	1583	-45.1	4.59	-	ر ر	<1,00	4
15:42						}				/
15:46										
15:50						<b></b>				· · · · · · · · · · · · · · · · · · ·
A SAM	PLING DAT	Δ		<u>[</u>	[			Geo	chemical A	A lyses
Methor	Baller, Size	e:∠`` c	) Hudder P	ստբ 🗅 2" Տւ	ıbmersible Pu	imp 🗅 4" Sul	omersible Purr			mg/L
			i. maren	Pump II Oth						
	als: Pump/Bailer		a'ed 🗆 Pr	epared Off-S	ite D Field (		UVLan	DO:		mg/L
Materic	als: Tubing/Rope	e 🗆 Polye Dedic	ndene C sebd CIF	repared Off-	ne u leflor Site Q Field	® IN Other:	Disposable	- Nitra	te:	mg/L
	to Water at Tlm							Sulfa	te: _	mg/L
Sample	10:MW-1	<u> </u>	5 imple 1	îme:		# of Conta	lneis:	- Alkal	inity:	mg/L
Duplico	ate Sample Col	lected?	U Yes 🛛	No ID:						
5 CON	AMENTS						الفي الثان ميرمين فالفرد ، ويرتبع التار مين المان عليم بين القام من عليه التي			
	HVILINIO .			P 1s	<u>.</u> U)	twitt		- 8		
				(- 1)	· 7 he	INTEL		····		·
Note: Incluc	de comments suc	h as well c	condition, c	odor, presenc	e of NAPL of	other items n	ot on the field	i dala sheet.		
							/	,		• •
CODM CIN	1 man hilling							hand		



## GROUNDWATER SAMPLING FIELD DATA SHEET

(WELL ID: MW-11A

Frolect		REATION			(3	15.61			111	13
		Task N			Date: 12				Time:_[4[	
		·			Personnel:					
					Wenther:					
. WELI	DATA									
Casing	Dian eter:	2 . (35	Туре: фр	VC 🗆 Staini	ess Li Galv. S	Steel Q Tello	h991:O	ther:		,
	Dlameter:		Type: g/p	VC 🗆 Stalni	ess Li Golv. S	Steel 🗅 Teflo	180 Li O	ther:		
	epth of Well:_(		From: 21	Top of Well Co	asing (10C)	Top of Pro	tect: a C	Casing	DOther	
Depth	to Stolle Water	1:57.7 Lieet	From: D	Top of Well Co	asing (TOC)	Top of Pro	tecll o C	Casing	Olhei.	
	to Product:		l		osing (TOC)					·
Length	of Water Colu	mn: lee	t Well Volur	ne;		Screened   Note: 2-Inch		-		∵ell = 0.667 g
Materi	Balle Methiod: □ Cent als: Pump/Balle als: Rupe/Tubln		PVC	189 🖬 Other:_ Site 🛄 Field ( ane 🖾 Teflor	Cleaned D 18 D Other:_	Disposable	1.		Equi	:ent Mode
Was we	əll purgəd dry?	🖸 Yes 🗐 N	o Pump	Ing Rute:	gc	nim'n	3.			
ime	Curn. Gallons Removed	pH tem	p Spec. Cond.	Eh	Dissolved Oxygen	Tuibidity	Oth	ner:	C	ments
11:35	-	6.83 15.9	5 5326	-21.1	6.24				Sumich	V
<i>q:38</i>		6.80 18.9	6 6053 -	-56 5	2.31		-		clear	
4:41		6-50 14.71	1 6579	-55.1	1.51	-	-		cla~	
14:4S		6.81 223	1 62.03	-61.4	873				cim	
	+						   			· ····
	L PLING DAT	<u>———</u> —— ГА						Geo	chemical /	
.SAM		e: Dibudd	er Pump 🗅 2" S		ump 🖸 4" Sul	bmersibl <mark>e</mark> Pur	np	Ferro	us Iron: <u>G</u>	mg/L
. SAM Method		Pump Cilicottal	Lift Pump D Of	her:			1			
Melho		c Pump □ l⊨ortlal , □ Stainles: □ I	PVC LI Tellor	® D Other:_				DO:	: 	ی . mgi
Methoo Materio	u(s): a Peristatik als: Pump/Balle	Pump Dicertial C Stainles: D I D Dedicated C	PVC D Tellor D Prepared Off-	v® 🗆 Other: Site 🗆 Fleid (		Disposable		DO: Nitra		mg/
Method Materia Materia	als: Pump/Baile als: Tubing/Rop	e Pump C Inertial r C Stainles: C I C Dedicated C e C Polyethelene C Dedicated	PVC I Tetlor Prepared Off- Polypropyle Prepared Off	n® 🗆 Other: Site 🔲 Fleid ( ene 🗋 Teflor '-Site 🔲 Fleid	Cleaned D MotiOther: Cleaned D	Disposable Disposable		Nitra	te:	mg/
Method Materia Materia Depth	als; Pump/Balle als: Tubing/Rop to V/ater at Tim	e Pump C Incertal r C Stainles: C I C Dedicated C Polyetholene D Dedicated ne of Sampling:	PVC D Tetlor 1 Prepared Off- D Polypropyle D Prepared Off	n® □ Other: Site □ Fleid ( ene □ Teflor -Site □ Fleid Fleid Filtere	Cleaned D Brite Other: I Cleaned D ed? D Yes	Disposable Disposable Disposable		Nitra Sulfa	te:	mg/
Method Materia Materia Depth Sample	als): Denistallic als: Pump/Balle als: Tubing/Rop to V/ater at Tim a ID: <u>/1112 - [ ]</u>	Pump Disatial Stainles: Di Dedicated D Polyeth-lene Dedicated ne of Samping: A	PVC D Tetlor D Prepared Off- D Polypropyle D Prepared Off Prepared Off	NO Other: Site Field ( ene Field filor -Site Field Field Filtere 	Cleaned D MB Li Other: I Cleaned D ad7 D Yes # of Conta	Disposable Disposable Disposable		Nitra Sulfa	te:	mg/
Method Materia Materia Depth Sample	als): Denistallic als: Pump/Balle als: Tubing/Rop to V/ater at Tim a ID: <u>/1112 - [ ]</u>	e Pump C Incertal r C Stainles: C I C Dedicated C Polyetholene D Dedicated ne of Sampling:	PVC D Tetlor D Prepared Off- D Polypropyle D Prepared Off Prepared Off	NO Other: Site Field ( ene Field filor -Site Field Field Filtere 	Cleaned D MB Li Other: I Cleaned D ad7 D Yes # of Conta	Disposable Disposable Disposable		Nitra Sulfa	te:	mg/
Method Materia Materia Depth Sample Duplica	als): Denistallic als: Pump/Balle als: Tubing/Rop to V/ater at Tim a ID: <u>/1112 - [ ]</u>	Pump Disatial Stainles: Di Dedicated D Polyeth-lene Dedicated ne of Samping: A	PVC Tetlor Prepared Off Prepared Off Prepared Off Prepared Off It Time: //	NO Other: Site Field ( ene Field filor -Site Field Field Filtere 	Cleaned D Do Li Other:_ I Cleaned D ad? D Yes # of Conta	Disposable Disposable Disposable	-	Nitra Sulfa	te:	mg/
Method Materia Materia Depth Sample Duplica	als; Pump/Balle als; Pump/Balle als; Tubing/Rop to Water at Tim e ID: <u>Mtw-1</u> ate Sample Co	Pump Disatial Stainles: Di Dedicated D Polyeth-lene Dedicated ne of Samping: A	PVC Tetlor Prepared Off Prepared Off Prepared Off Prepared Off It Time: //	NB COther:_ Site Field ( ane Teflor -Site Field Field Filtere	Cleaned D Do Li Other:_ I Cleaned D ad? D Yes # of Conta	Disposable Disposable Disposable		Nitra Sulfa	te:	mg/
Method Materia Materia Depth Sample Duplica	als; Pump/Balle als; Pump/Balle als; Tubing/Rop to Water at Tim a ID: <u>Mtw-1</u> ate 3ample Co	Pump Disatial Stainles: Di Dedicated D Polyeth-lene Dedicated ne of Samping: A	PVC Tetlor Prepared Off Prepared Off Prepared Off Prepared Off	NB C Other: Site Field ( ane Tellor -Site Field Filtere Field Filtere	Cleaned D DB L: Other:_ I Cleaned D ed? D Yes # of Conta	Disposable Disposable No		Nitra Suifa Aikal	te:	mg/



## GROUNDWATER SAMPLING FIELD DATA SHEET

(WELL ID: MWJ-J2

2. WELL DATA         Coding Diameter:	Project	BJ51C	A13555				Weother:	Sunny	realise	
Bicreen Diameter:	2. WELL	DATA								
Total Depth of Well: (b 2 4 7 freet       From: (a) top of Well Casing (IOC) □ top of Protect a Casing □ Other         Depth to Static Water: (2 2 2 b) rest       From: (a) top of Well Casing (IOC) □ top of Protect a Casing □ Other         Tepth to Product:       rest       From: □ top of Well Casing (IOC) □ top of Protect a Casing □ Other         tength of Water Column: (2 b)       rest       Well Volume: (2 c)       □ top of Protect a Casing □ Other         1 ength of Water Column: (2 b)       rest       Well Volume: (2 c)       □ top of Protect a Casing □ Other         1 ength of Water Column: (2 b)       rest       Well Volume: (2 c)       □ top of Protect a Casing □ Other         1 ength of Water Column: (2 b)       rest       Well Volume: (2 c)       □ top of Protect a Casing □ Other         1 and top of Water Column: (2 b)       I blodder Fump □ 2 submersible Pump □ 4 submersible Pump       Purge Method: □ Continue □ Performed Of Site □ Field Cleaned □ Disposoble       1	Casing	Dlameter:	<u> </u>	-95	Туре: р	VC 🗆 Stoln	ess Li Galv.	Steel D Tellon	@ L Olher:	
Depth to Storile Water: S 2.7 b feet       From: id top of Well Casing (IOC)       Dip of Protecti ::: Casing D Other:         Inepth to Product::::::::::::::::::::::::::::::::::::					Туре: бр	VC 🗆 Stain	ess L) Galv.	Steel D Teflon	BLi Olher:	
Itepit to Product:       reet       From:       Itep of Weil Casing (IOC)       Itep of Protecti + Casing Ite Other:         Length of Water Column:       Itel       Feet       Weil Volume:       Itel Casing (IOC)       Ite of of Protecti + Casing Itel Other:         Note:       24nch well       1187 gol/ft       44nch well       1187 gol/ft       44nch well         Purge Methyod:       Bioler:       Itel Bioler       Itel Bioler       Itel Bioler       1187 gol/ft       44nch well         Moterial:       Purge Methyod:       Bioler:       Itel Bioler       <	Total D	epth of Well:_(	12.5710	et	From: d t	op of Well Co	using (IOC)	Top of Prot	ect' e Casing	0 Ofher
Length of Water Column: []]]       Let Well Volume: ]]       Screened Internal (from GS):	Depth	to Stulic Water	57.76	<u>leet</u>	From: 21	op of Well Co	asing (TOC)	D Top of Prot	ectl o Casing	0 Olhei.
A. PURGE DATA         Purge Method:       Baller. Ste:	the second s					·		Top of Prot	ectl 9 Casing	Other:
Purge Method:       Baller, Stor       Debadder Pump       Devisitatilite Pump       Definition       Equil:       etcl         Materials:       Pump/Baller       Stolniss       DPVC       Definition       Definition       Definition       Equil:       etcl         Materials:       Pump/Baller       Stolniss       DPVC       Definition	i.ength	of Water Colu	mn: <u>了</u> 法	feet	Well Volum	ne: <u>23</u>			•	
Purge Method:       Baller, Stor       Debadder Pump       Devisitatilite Pump       Definition       Equil:       etcl         Materials:       Pump/Baller       Stolniss       DPVC       Definition       Definition       Definition       Equil:       etcl         Materials:       Pump/Baller       Stolniss       DPVC       Definition	3. PURC	SF DATA								
Materials: Pump/Baller       Biolnies:       D PVC       D Flore       D Flore <td< td=""><td></td><td></td><td>r, Size:</td><td>U Blade</td><td>ler Pump Q 2</td><td>2" Submersibl</td><td>e Pump 04</td><td>" Submersible i</td><td>Pumj</td><td></td></td<>			r, Size:	U Blade	ler Pump Q 2	2" Submersibl	e Pump 04	" Submersible i	Pumj	
Midletidis, Pump/Baller       Dedicaled Diepared Off-Site       Dielid Cleaned       Disposable       1		•								
Materials: Roperius       Dedicated       Prepared Off-Site       Disposable       2	Materia	s: Fump/Balle			repared Off-S	ite 🖸 Fleid	Cleaned D	Disposable	1. <u>Y</u> S	IE-610K
Was well purged dry?       A Yes IJ No       Pumping Rate: 2 ad/min       3	Materic	als: Rope/Tubin							- 2.	
Imme       Cum, Gallons Removed       pH       temp       Spec. Cond.       Eh       Dissolved Oxygen       Tuibidity       Other:       C       m         16/05       7,15       17,36       17,86       -(62       4,40	Was we	ell puraed drv?								. <u> </u>
Imme       Removed       pH       temp       Cond.       Eh       Oxygen       Turbidity       C       m         16/:05       7,15       17:36       17:86       -(02       4,40       - <th></th> <th></th> <th>·······</th> <th>~</th> <th>· -···</th> <th></th> <th></th> <th></th> <th></th> <th></th>			·······	~	· -···					
A. SAMPLING DATA       Geochemical A: Ib         Method(s):       Baller, Size:       I:::udder Pump II 2* Submersible Pump II 4* Submersible Pump         Method(s):       I:::Depitstattic Pump II tortital Uff Pump II 0 ther:       Ferrous Iron:         Materials:       Pump/Baller       I:::Depitstattic Pump II tortital Uff Pump II 0 ther:       OI         Materials:       Pump/Baller       I:::Depitstattic Pump II tortital Uff Pump II 0 ther:       OI       OI         Materials:       Pump/Baller       I::Depitstattic Pump II tortital Uff Pump II 0 ther:       Disposable       OI         Materials:       Iubing/Rope       IPolypin/ene II Polypropylene II Tellon® (Mother:       MyLin       Nitrate:         Depth to Water at Time of Sampling:       Fleid Filtered?       Yes A No       Sulfate:         Sample ID:       Multing:       Iumple Time:       Iumple Time:       Aikolinity:         Duplicate 3ample Collected?       Yes II No       No       Iumple Time:       Iumple Time:         5. COMM/ENTS       Imple Filtered?       Volume 3 to punct.       Multinity:	.]Ime		pН	lemp		Eh		Turbidity	Uner:	C r
A. SAMPLING DATA       Geochemical A: Ib         Method(s):       Baller, Size:       I:::udder Pump II 2* Submersible Pump II 4* Submersible Pump         Method(s):       I:::Depitstattic Pump II tortital Uff Pump II 0 ther:       Ferrous Iron:         Materials:       Pump/Baller       I:::Depitstattic Pump II tortital Uff Pump II 0 ther:       OI         Materials:       Pump/Baller       I:::Depitstattic Pump II tortital Uff Pump II 0 ther:       OI       OI         Materials:       Pump/Baller       I::Depitstattic Pump II tortital Uff Pump II 0 ther:       Disposable       OI         Materials:       Iubing/Rope       IPolypin/ene II Polypropylene II Tellon® (Mother:       MyLin       Nitrate:         Depth to Water at Time of Sampling:       Fleid Filtered?       Yes A No       Sulfate:         Sample ID:       Multing:       Iumple Time:       Iumple Time:       Aikolinity:         Duplicate 3ample Collected?       Yes II No       No       Iumple Time:       Iumple Time:         5. COMM/ENTS       Imple Filtered?       Volume 3 to punct.       Multinity:	16:05		715	7.26	1794	-(0)	440			
Method(s):       Description	70/0-			1.20	1765				<u></u>	
Method(s):       Description	· .	1		·						
Method(s):       Description	·	1						1 1		1
Method(s):       Description					f	ļ				
Method(s):       Description										
Method(s):       Description										
Materials: Pump/Baller       Stainles:       Image: Contrained off-site       Deficition       Deficition </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Georg</td> <td></td>									Georg	
Materials: Public Production       Dedication       Prepared Off-Site       Disposable         Materials: Tubing/Rope       Polyetholene       Delpropylene       Disposable       Nitrate:         Depth to Water at Time of Sampling:       Field Filtered?       Yes       No       Sulfate:         Sample ID:       Munth       Gumple Time:       //6.1.2       # of Containers:       Alkalinity:         Duplicate Sample Collected?       Yes       No       ID:       Modelinity:       Sulfate:         5.       COMINIENTS       If SUFFIC:       Modelinity:       Modelinity:       Sulfate:       Sulfate:	A. SAM	PLING DA	TA •2 D			ibmersible Pi		bmersible Pum	un l	
Materials: Tubing/Rope       Polyetholene       Polypropylene       Distribution       Nitrate:	A, SAM	Baller, Siz		certial Uff	Pump D Oth	ner:		bmersible Pum	un l	
Depth to Water at Time of Sampling:       Field Filtered? I Yes & No       Sulfate:         Sample ID: MWYJ       Sumple Time: 16:13       # of Containers:       Alkalinity:         Duplicate 3ample Collected? U Yes I No       ID:       ID:         5. COMMENTS       Im SUFFIC:       Weth Weth Volume to purse With	Method	d(s): Denistation		rential Uff st – 🕰 PV	Pump C Oth	nər:			PP Ferro	
Sample 10: <u>MW11</u> (umple Time: <u>16:15</u> # (Containers: Alkalinity: Duplicate Sample Collected? U Yes D No ID: 5. COMNENTS <u>INSUFFICIENT</u> well bolling to purse With	Məłhoc Matəric	d(s): Denistation Denistation als: Pump/Baile	r D Stainles	ानावि Uff s: 🛛 🕰 PV इ. चे 🖸 P	Pump D Oth C D Tellond repared Off-S	® 🗆 Other: Ite 🖸 Fleid	Cleaned A	Disposable	PP Ferro DO:	us Iron:
5. COMNENTS INSUFFICIENT well bollows to purse with	Method Materic Materic	d(s): Di Boller, Siz Di Peristattio als: Pump/Balle als: Tubing/Rop	Pump = h Pump = h = Stainles = Dedica = Dedica	icential Uff s: Q PV stad D P sciene C sciene C sciene C	Pump 🖬 Oth C 🔲 Tellonx repared Off-S J Polypropyle Prepared Off-	ner:	Cleaned point Month (Altherian) Cleaned (Altherian)	Disposable WYC2M Disposable	PP Ferro DO: - Nitrol	us Iron:
5. COMMENTS Insufficient well bolding to purse with	Method Materic Materic Depth 1	d(s): DBaller, Siz DPeristation als: Pump/Balle als: Tubing/Rop to Water at Tim	e: A Dedico	Contiol Uff s: Q PV stad D P plane C 2nd D C 2nd D C	Pump D Oth C D Tellork repared Off-S D Polypropyle Prepared Off-	ner:	Cleaned A Mo (A Other: I Cleaned A ed? II Yes	Disposable LYLIN Disposable Á No	PP Ferro DO: - Nitrat Sulfa	us Iron: te:
	Method Materic Materic Depth 1 Somple	d(s): DBaller, Siz DPeristation als: Pump/Balle als: Tubing/Rop to Water at Tim DD: MW1	Pump I in Pump I in Stainles Dedica Polyett Dedica ne of Samp	ential Uff s: Q(PV) stad DP stane C stad Dt stang: umpte	Pump D Oth C D Tellonx repared Off-S D Polypropyle Prepared Off- Time: <u>/6</u> .	ner: D Other: Ite D Field ne D Tellor Site D Field Field Filter J J	Cleaned A Mo (A Other: I Cleaned A ed? II Yes	Disposable LYLIN Disposable Á No	PP Ferro DO: - Nitrat Sulfa	us Iron: te:
	Method Materic Materic Depth 1 Somple	d(s): DBaller, Siz DPeristation als: Pump/Balle als: Tubing/Rop to Water at Tim DD: MW1	Pump I in Pump I in Stainles Dedica Polyett Dedica ne of Samp	ential Uff s: Q(PV) stad DP stane C stad Dt stang: umpte	Pump D Oth C D Tellonx repared Off-S D Polypropyle Prepared Off- Time: <u>/6</u> .	ner: D Other: Ite D Field ne D Tellor Site D Field Field Filter J J	Cleaned A Mo (A Other: I Cleaned A ed? II Yes	Disposable LYLIN Disposable Á No	PP Ferro DO: - Nitrat Sulfa	us Iron: te:
puny. Concerna Erus shipping rust	Method Materic Materic Depth Somple Duplicc	d(s): Denistatik als: Pump/Balle als: Tubing/Rop to Water at Tim b ID: <u>M W V</u> ate Sample Co	e: Pump = In Stainles Dedica e = Polyett Dedica ne of Samp } }	ential Uff s: Q PV a'ed Q P elene Q a'ng: gample ) Yes Q	Pump D Oth C D Tellorx repared Off-S D Polypropyle Prepared Off- Time: <u>16</u>	ner:	Cleaned A to A Other: I Cleaned A ed? II Yes # of Conto	Disposable AYAIN Disposable A No Iners:	PP Ferro DO: - Nitrat Sulfat	us Iron: te: te:
	Method Materic Depth Somple Duplico	d(s): Denistatik als: Pump/Balle als: Tubing/Rop to Water at Tim b ID: <u>M W V</u> ate Sample Co	$\frac{2}{2} \frac{2}{2} \frac{2}$	SUPPOR	Pump $\Box$ Oth repared Off-s Polypropyle Prepared Off- Time: <u>16</u> . No ID: $\Box \geq 1^{1} \Box \rightarrow 1$	ner: D Other: Ite D Field ne D Tellor Site D Field Field Filter J J - Wel	Cleaned A No (A Other: I Cleaned A ed? II Yes II of Conto II of Conto	Disposable LYL: Disposable Mo iners: L L L L L L L L L L L L L	PP Ferro DO: Nifrat Sulfat Alkal	us Iron: te: te:



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## GROUNDWATER SAMPLING FIELD DATA SHEET

(WELLID: MW-MD

1. PRO.	JECT INFO	RI: ATI	ON						
l'roject	Number:		Task Nun	nber:		Dale: 12	. 1.99		Time: 14'.00
Client:_						Personnel:			
Project	Location:					Wenther:			
2. WELL	DATA								
Casing	Dlan eter:	·	:95	Туре: ор	VC 🛛 Stainle	ess Li Galv. S	Steel 🛛 Tefloi	no La Olher:	
Screen	Dlameter:		':es	Туре: ор	VC 🗅 Stainli	ess Li Galv. S	Steel 🗆 Tefloi	n@ L; Olher:	
Total De	epth of Well:	-7.80 h	eet	From: D T	op of Well Co	using (10C)	Top of Pro	tect: a Casing	0 Other
	o Stalle Water			From:	op of Well Co	ising (TOC)	C Top of Pro	lecti o Casing	D Other.
Depth t	o Product:	fee	<u>ət</u>	From: a 1	fop of Well Co	osing (IOC)		tectl: + Casing	D Other:
Length	of Water Colu	mn:	leet	Well Volun	ne;			nter: 31 (from ( well = 2.167 gal/)	
3, HURG	SE DATA								
Purge N	D Ballei Aethod: D Cent	r, Size:	U Blada	ler Fump	2" Submersible		* Submersible	Pump	
					@ Other:_		JI		Equir :ent Model(
Materic	ils: Pump/Balle	r 🖸 Dedic	coled CIP	repared Off-S	lite 🖸 Field C	Cleaned Q	•	١	
Nateric	als: Rope/Tubin	<u>n</u>	,		one D Teflon -Site D Field			2	
Was we	Il purged dry?	🗆 Yes	LI No	Pump	Ing Rate:	QC	al/min		
Ime	Curn. Gallons Removed	рН	lemp	Spec. Cond.	Eh	Dissolved Oxygen	Turbldity	Other:	C ments
14.55	Kantovad	6-53	15.8	Ten inter	-9.5	4.64			Clei,-
14:13		7.51	17.47	- <u>`</u>	-128-5	J-75			Clein-
14:15		7.59	18.37		-150.2	2.48		~	Clas
14:20				1		2.43	39		CL CL C
17,20		7.58	22.25	1200	-155.2		124		
	I PLING DAT	ΓΔ						Geo	chemical A: ulyses
			) Hodder P	Pump 🖬 2" Si	ubmersible Pu	imp 🗆 4" Sul	bmersible Pur		bus tron: $3^{-3}$ mg/L
Methoc		Pump 🛛	Ir artial Lift	Pump D Ott	her:			rend	
Materla	ıls: Pump/Ballei				® 🖸 Other: Site 🖸 Field (		Disposable	DO:	mg/L
Materic	als: Tubing/Rop	e Dedie	liulene C	Delypropyle Prepared Off	-Site D Teflon	® L! Other:_ Cleuned E		- Nitro	ite:mg/L
	o Water at Tim							Sulfo	ite:mg/L
Depth f								- All	11nity: 3-5-0_mg/L
	ID MIN VI	~,_		·	•				mary, <u>mg/L</u>
Sample	ID: <u>MIN 1/2</u> Ite Sample Col			No ID'					
Sample	10: <u>M I~ 1)</u> Ite Sample Col			No ID:					
Sample Duplica	•			No ID:					
Sample Duplica	ate Sample Col			No ID;					
Sample Duplica	ate Sample Col			No ID:					
Sample Duplica 5, CON	ate Sample Col	llected?	U Yes D				ot on the field	t data sheet.	



## GROUNDWATER SAMPLING FIELD DATA SHEET

(WELLID: MNO-1)

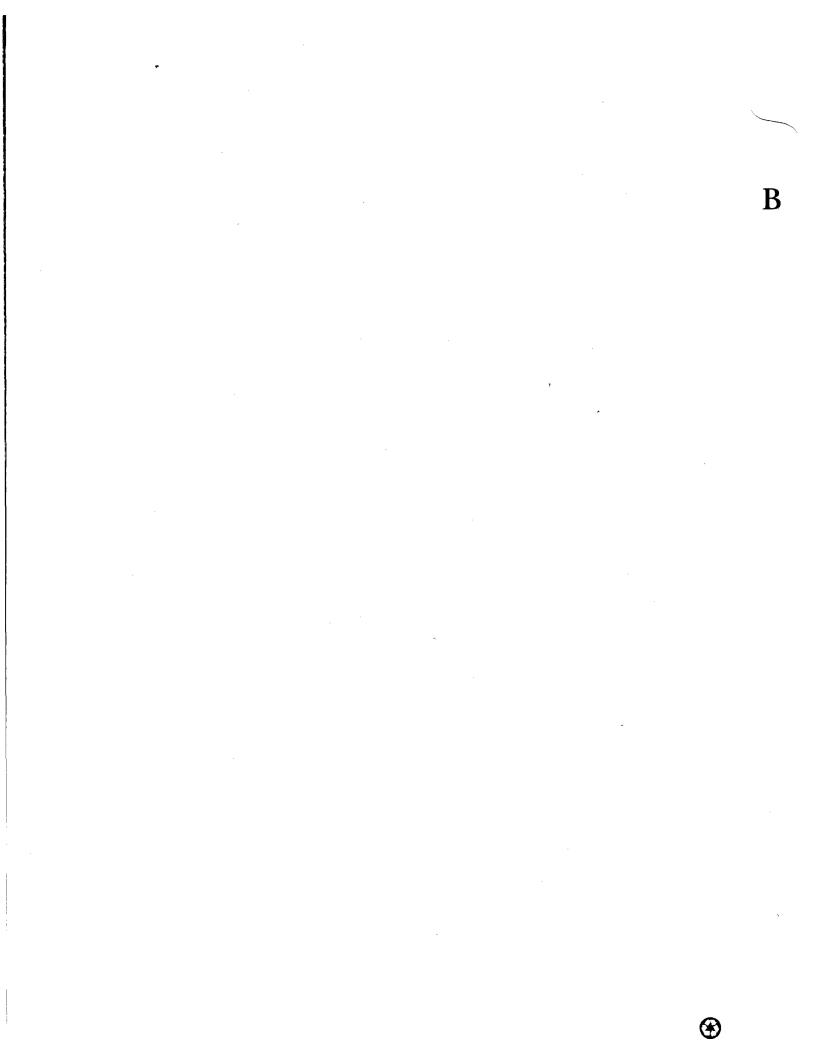
	t Locailon: <u>(</u>	=					surry,		
	LDATA		· <del></del>						
}	Dian eter:		195					on 1/ Other:	
	Dlameter:	1/18	'ies					Drag Li Olher:	
	epth of Well:			i				otect" a Casing	
	to Static Wate			1				otect) is Casing	
	to Product: of Water Colu			L	ne: /-4			Inter al (from	
. origi								well - ),167 gal/	
3. PUR	<b>JE DATA</b>								
Purge	⊡ Balle Method:∭Cen	er, Slze:		ier Fump 🔏	2" Submersib	le Punip D 4 Punip D Oth	i" Submersible er:	Pump	<b>F</b> .
	cen als: Pump/Balle	innugui rui Bi Staini		C 🛛 Teflon	olinemolium Molio Other:		81, <u></u>		
Materi	ais: Pump/Balle	A					Disposable	1Y	SI-610
hetoM	als: Rope/Tubir		ihylene C culed D F	2 Polypropyle Prepared Off	one 🗆 Tefloi -Sile 🗳 Fleic	10 DOINer:_ Cleaned	Disposable	2	
Wasw	ell purged dryf		A No			2.33 g			
	Curn. Gallon:		r	Spec.	T	Dissolved	1	3 Other:	
Ime	Removed	PH	lemp	Cond.	Eh	Oxygen	Turbidity		( r
16:30	<u> </u>	4.71	16.42	2259	-12-1	4.08	<u> </u>	<u> </u>	Cle-
16 34	1.5	6.72	17.45	1568	-78-1	1.05		-	CLEON
16:37	ى .3	7.13	18.12	1829	-86.8	3.46	-	-	cla-
16:40	4.5	7.2.1	18.64	1821	-185	0.71	343	1	
10.10	14.						343		· / · · · ·
		<u> </u>						<u> </u>	
A, SAM	PLING DA			v					<u>chemical Assis</u>
Melho				Pump 121.2" Si Pump 12 Ott		ump 🖾 4* Su	bmersiblə Pur	mp Ferre	ous Iron:
Materia	als; Pump/Balle	, pastaini	es: D PVC	C 🗆 Tellon	n Di Olher:			DO:	
			il inne F		ne Citele			Nitro	
	als: Tubing/Rop	Ded D Dedk	aolad <b>⊡</b> ∤	Prepared Off	-Site 🛛 Field	l Cleuned 🛛	Disposable		_
Denth	to Water at Tin							Sulfo	ote:
	ID MW	15	S imple 1	lime: <u>16</u>	40	# of Confe	ilneis:	– Alko	alinity:
		llected?	U Yes 🛱	No ID:	<b></b>	a			
Sample	ate Sample Co								
Sample Duplice				همان النبي مريد المراجع المراجع المريد الناسي معني من المراجع ال					
Sample Duplice	ate 3ample Co MNENTS								



## GROUNDWATER SAMPLING FIELD DATA SHEET

(WELL ID: \_\_\_\_\_\_\_

1		JECT INFC						. ९ ४९८		.7	20
		Number:						-		TIme:_/3_	
ļ,	roject	Location:				*					
2. \	NELL	DATA									
	Casing	Dlan eter:	'	i:95	Түрө: ор	VC 🗆 Stainl	ess U Galv.	Steel I Tellon® L	Olher:		. <u></u>
5	creen	Dlameter:		' <del>'</del> 05	Туре: ор	VC 🖸 Stalni	ess LI Galv.	Steel C Teflon® L	Olher:		
T	otal De	epth of Well: (	61.45 1	et	From: 1	op of Well Co	asing (IOC)	Top of Protect!	a Casing	Other	
פ	epih t	o Stolle Wate	158.97	Lleet	From: DT	op of Well Co	using (TOC)	Top of Protect	o Casing	Other.	
_ <u>D</u>	epth t	o Product:	fea	ət	From: DIT	op of Well Co	osing (IOC)	D Top of Protect	э Casing	Other:	
1,1	angth	of Water Colu		feet	Well Volum	10:	ġcit	Screened Inter Note: 2-Inch well -			vell = 0.667
3.1-	URG	E DATA									
P	urge N	La Balle Aethod: D Cer	ər, Sizə: ətrifuqqi Pur	, 🗘 Blade	der Pump 🛛 : stallic Pump	2" Submersible D Inertial Lift	e Purrip 🔲 4 Purrip 🗔 Oth	4" Submersible Pum er:	Ľ	<b>F</b> !:	. فقال من
			Stainle	ess 🔾 PV	C 🛛 Teflon	🕲 🛛 Other:_	······			Equi	ent_Mod
		ils: Pump/Balle			repared Off-S				۱		<u></u>
- M	1aterla	ils: Rupe/Tubli			2 Polypropyle Prepared Off-				2		
N	∕as we	ill purged dry	? 🗅 Yes	U No	Pumpi	ing Rule:		al/min	3		
76	me	Curn. Gallon	IS DH	lemp	Spec.	Eh	Dissolved	Turbidity	Other:	(	ments
		Removed			Cond.		Oxygen				
			7.39	17,51	1611	34.6	7.40	71000			
ĺ											
						1					
			+		+			+			· • <u></u>
	<u> </u>				<u> </u>	·					
1	ļ					1		1 1		ļ	
		L				1				<u></u>	
		L PLING DA			ىرىيە بىرى بىلەر مىيى يىسىلەر سىيە قىرى خىرىي سى تەكرە				Geo	l chemical A	ii ilyses
		Baller, S	lze: C	1 Isudder F	Pump 🛛 2" Su	ubmersible Pu		ubmersible Pump			
N	lethod	d(s): D Baller, S D Pertstalt	lze: C	in an an an				ubmersible Pump	Ferro	us Iron:	mg
N	lethod	Baller, S	ilze: D lic Pump Q er Q Staink Q Dedic	est DIPV cotad DIP	C 🛛 Tellon repared Off-S	(8) [] Olher:_ Site [] Field (	Cleaned C	1 Disposable		us Iron:	mg
N N	1ethod 1ateria	d(s): D Baller, S D Peristalt als: Pump/Balle	lize: C lic Pump Q er Q Staink Q Dedic	es: DIPV corad DIP	C C Tellon repared Off-S	(8) [2] Olher:_ Site [2] Field (		l Disposable	Ferro	us Iron:	mg
N N N	1ethod 1ateria 1ateria	d(s): Peristalt als: Pump/Balle als: Tubing/Rop	lize: D lic Pump Q er Q Staink Q Dedic pe Q Polye Q Dedic	est <b>DPV</b> caled <b>DP</b> thetene <b>C</b> caled <b>D</b>	C D Teflon repared Off-S D Polypropyle Prepared Off-	Other:	Cleaned D Ma Li Other: I Cleaned	Disposable	Ferro DO: Nitro	us Iron:	mg m
N N N D	1ethod 1ateria 1ateria	d(s): D Baller, S D Peristalt als: Pump/Balle	lize: D lic Pump Q er Q Staining Q Dedic pe Q Polye D Dedic me of Sam	est <b>DPV</b> coted <b>D</b> P thetene C coted <b>D</b> T	C D Teflory repared Off-S Polypropyle Prepared Off-	D Other:_ Site D Field ( ene D Teflor -Site D Field Field Filtere	Cleaned C NB Li Other: I Cle med ed? C Yes	Disposable Disposable No	Ferro DO: Nitro Sulfa	te:	m
N N D Sa	1ethod 1ateria 1ateria 1epth ti ample	al(s): Baller, S Pertstalt als: Pump/Balle als: Tubing/Rop o Water at Tir ID: <u>D</u>	lize: D lic Pump Q er Q Staink Q Dedic pe Q Polye Q Dedic me of Sam L/	es: DPV( cored DP) tholene C cored DI tholene C cored DI np?(ng)	C D Tellow repared Off-S Polypropyle Prepared Off- Time: 13:	® □ Other:_ Site □ Fleid ( ane □ Teflor -Site □ Fleid Fleid filtere	Cleaned D Ab Li Other: I Cleaned ed? D Yes # of Conta	Disposable Disposable No	Ferro DO: Nitro Sulfa	us Iron:  te:	mg m m
N N D S	1ethod 1ateria 1ateria 1epth ti ample	d(s): Baller, S Peristalt als: Pump/Balle als: Tubing/Rop o V/ater at Tir	lize: D lic Pump Q er Q Staink Q Dedic pe Q Polye Q Dedic me of Sam L/	es: DPV( cored DP) tholene C cored DI tholene C cored DI np?(ng)	C D Tellow repared Off-S Polypropyle Prepared Off- Time: 13:	® □ Other:_ Site □ Fleid ( ane □ Teflor -Site □ Fleid Fleid filtere	Cleaned D Ab Li Other: I Cleaned ed? D Yes # of Conta	Disposable Disposable No	Ferro DO: Nitro Sulfa	te:	mg mg mg
N N D S D	Aethod Aateria Aateria Neptin ti ample	al(s): Baller, S Pertstalt als: Pump/Balle als: Tubing/Rop o Water at Tir ID: <u>D</u>	lize: D lic Pump Q er Q Staink Q Dedic pe Q Polye Q Dedic me of Sam L/	es: DPV( cored DP) tholene C cored DI tholene C cored DI np?(ng)	C D Tellow repared Off-S Polypropyle Prepared Off- Time: <u>1</u> ?: No ID:	® □ Other:_ Site □ Fleid ( ane □ Teflor -Site □ Fleid Fleid filtere	Cleaned D At Other: I Cleaned ad? I Yes # I Conta	Disposable Disposable Disposable No diners:	Ferro DO: Nitro Sulfa	te:	mg m m
N N D S D	Aethod Aateria Aateria Neptin ti ample	d(s): Baller, S Peristalt als: Pump/Balle als: Tubing/Rop o V/ater at Tir ID: <u>O Lo</u> ate Sample Co	lize: D lic Pump Q er Q Staink Q Dedic pe Q Polye Q Dedic me of Sam L/	es: DPV( cored DP) tholene C cored DI tholene C cored DI np?(ng)	C D Tellow repared Off-S Polypropyle Prepared Off- Time: <u>1</u> ?: No ID:	® □ Other: Site □ Field ( ane □ Teflor -Site □ Field Field Filtere √ J	Cleaned D At Other: I Cleaned ad? I Yes # I Conta	Disposable Disposable Disposable No diners:	Ferro DO: Nitro Sulfa	te:	mg m mg
N N D 5. C	Aethod Aateria Aateria Aeptin t ample Duplica	d(s): Baller, S Peristalt als: Pump/Balle als: Tubing/Rop to Water at Thr HD: OLO the Sample Co	Ize: D Ic Pump Q er Q Staink pe Q Polys pe Q Dedic me of Sam L/ 	es: DPV cared DP Itolene C cared DP Itolene C cared D Itolene C cared D Itolene C cared D Itolene C cared DP Itolene C	C D Tellony repared Off-S Polypropyle Prepared Off- Time: <u>1</u> ?: No ID:	® □ Other: Site □ Field ( ane □ Teflor -Site □ Field Field filtere √ J	Cleaned D At Other: I Cleaned ad? I Yes # I Conta	Disposable	Ferro DO: Niltro Sulfa Alkal	te:	mg m m
N N D 5. C	Aethod Aateria Aateria Aeptin t ample Duplica	d(s): Baller, S Peristalt als: Pump/Balle als: Tubing/Rop to Water at Thr HD: OLO the Sample Co	Ize: D Ic Pump Q er Q Staink pe Q Polys pe Q Dedic me of Sam L/ 	es: DPV cared DP Itolene C cared DP Itolene C cared D Itolene C cared D Itolene C cared D Itolene C cared DP Itolene C	C D Tellony repared Off-S Polypropyle Prepared Off- Time: <u>1</u> ?: No ID:	® □ Other: Site □ Field ( ane □ Teflor -Site □ Field Field filtere √ J	Cleaned D At Other: I Cleaned ad? I Yes # I Conta	Disposable Disposable Disposable No diners:	Ferro DO: Niltro Sulfa Alkal	te:	mg m m



### **APPENDIX B**

Laboratory Analytical Report for Groundwater Samples

\\BCHOU01\PROJECTS\Wp\BJSERV\12832\058r.doc "Use or disclosure of data contained on this sheet is subject to the restriction specified at the beginning of this document."



### Case Narrative for: Brown & Caldwell

Certificate of Analysis Number:

### <u>99120268</u>

Report To:		Project Name:	BJ- HOBBS
Brown & Caldwell		<u>Site:</u>	BJ-Hobbs
Rick Rexroad		Site Address:	
1415 Louisiana			
Suite 2500 Houston		PO Number:	
TX		<u>State:</u>	New Mexico
77002-		State Cert. No.:	N/A
ph: (713) 759-0999	fax: (713) 308-3886	Date Reported:	

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

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

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

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

let li Ini Fini, Bernadette

Project Manager

1/3/00



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

#### **Brown & Caldwell**

		Cer		Analysis Number: 20268			
<u>Report To:</u>	Brown & Caldwell Rick Rexroad 1415 Louisiana Suite 2500 Houston			<u>Project Name:</u> <u>Site:</u> <u>Site Address:</u>	BJ-Hobbs		
	TX 77002- ph: (713) 759-0999	fax: (713) 308	-3886	<u>PO Number:</u> <u>State:</u> State Cert. No	New Mexico		
Fax To:	Brown & Caldwell Rick Rexroad	fax: (713) 308	-3886	Date Reported			
CI	ent Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD

1W-7	99120268-01	Water	12/9/99 12:18:00 PM	12/10/99 10:00:00 AM	093156
1W-5	99120268-02	Water	12/9/99 1:05:00 PM	12/10/99 10:00:00 AM	093156
OW 4	99120268-03	Water	12/9/99 1:40:00 PM	12/10/99 10:00:00 AM	093156
MW 12D	99120268-04	Water	12/9/99 2:20:00 PM	12/10/99 10:00:00 AM	093156
1W 11A	99120268-05	Water	12/9/99 2:45:00 PM	12/10/99 10:00:00 AM	093156
1W 3	99120268-06	Water	12/9/99 3:05:00 PM	12/10/99 10:00:00 AM	093156
MW 4	99120268-07	Water	12/9/99 3:25:00 PM	12/10/99 10:00:00 AM	093156
NW 10	99120268-08	Water	12/9/99 3:50:00 PM	12/10/99 10:00:00 AM	093156
4W 12	99120268-09	Water	12/9/99 4:10:00 PM	12/10/99 10:00:00 AM	093156
MW 13	99120268-10	Water	12/9/99 4:40:00 PM	12/10/99 10:00:00 AM	093156
	99120268-11	Water	12/9/99	12/10/99 10:00:00 AM	093155
rip Blank 12/1/99	99120268-12	Water	12/9/99	12/10/99 10:00:00 AM	093155

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ini Bernadette Project Manager

1/3/00

Date

Joel Grice Laboratory Director

Ted Yen Quality Assurance Officer

> 99120268 Page 1 1/3/00 8:40:20 AM



Client Sample ID MW-	7			Coll	ected:	12/9/99 12:18:00	SPL Sample I	<b>)</b> : 9912	0268-01
				Site	: BJ-	Hobbs			
Analyses/Method	1	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGA	NICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics		1.8		0.2		1	12/20/99 21:37	RR	138614
Surr: Pentacosane		41	%	20-131		1	12/20/99 21:37	RR	138614
Run ID/Seq #: HP_	V_991215B-138	614				······································	······		
Prep Method	Prep Date			Prep Initials					
SW3510B	12/12/1999 8:54			KL					
GASOLINE RANGE ORGANICS			MCL	SW8015B	Units: mg/L				
Gasoline Range Organic	S	ND		0.5		5	12/11/99 18:31	D_R	128129
Surr: 1,4-Difluorobenz	ene	96	%	62-144		5	12/11/99 18:31	D_R	128129
Surr: 4-Bromofluorobe	nzene	110	%	44-153		5	12/11/99 18:31	D_R	128129
PURGEABLE AROMAT	rics				MCL	SW8021B	Units: ug	ı/L	
Benzene		ND		5		5	12/11/99 18:31	D_R	128106
Ethylbenzene		ND		5		5	12/11/99 18:31	D_R	128106
Toluene		ND		5		5	12/11/99 18:31	D_R	128106
Xylenes, Total		ND		5		5	12/11/99 18:31	D_R	128106
Surr: 1,4-Difluorobenz	ene	85	%	72-137		5	12/11/99 18:31	D_R	128106
Surr: 4-Bromofluorobe	nzene	100	%	48-156		5	12/11/99 18:31	D_R	128106

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

> 99120268 Page 2 1/3/00 8:40:22 AM



Client Sample ID MV	V-5			Col	lected:	12/9/99 1:05:00	SPL Sample II	<b>D:</b> 9912	20268-02
				Site	: BJ-	Hobbs			
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	. Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORG	BANICS				MCL	SW8015B	Units: m	g/L	
Diesel Range Organics	3	ND		0.2		1	12/20/99 22:21	RR	138615
Surr: Pentacosane		62	%	20-131		1	12/20/99 22:21	RR	13861
Run ID/Seq #: Hf	P_V_991215B-138	615							
Prep Method	Prep Date			Prep Initials					
SW3510B	12/12/1999 8:54	, 		KL					
GASOLINE RANGE	ORGANICS				MCL	SW8015B	Units: m	g/L	
Gasoline Range Organ	lics	ND		0.1		1	12/11/99 17:36	D_R	12812
Surr: 1,4-Difluorober	nzene	93	%	62-144		1	12/11/99 17:36	D_R	12812
Surr: 4-Bromofluorol	benzene	120	%	44-153		1	12/11/99 17:36	D_R	12812
HEADSPACE GAS A	NALYSIS				MCL	RSK147	Units: m	g/L	
Ethane		0.0025		0.0025		1	12/27/99 13:01	DR	14023
Ethylene		ND		0.0032		1	12/27/99 13:01	DR	14023
Methane		ND		0.0012		1	12/27/99 13:01	DR	14023
NITROGEN, NITRATE	E (AS N)				MCL	E300	Units: m	g/L	
Nitrogen, Nitrate (As N)	)	4.2		0.1		1	12/10/99 11:47	ES	13112
PURGEABLE AROM	ATICS				MCL	SW8021B	Units: ug	у/L	
Benzene		ND		1		1	12/11/99 17:36	D_R	12810
Ethylbenzene		ND		1		1	12/11/99 17:36	D_R	12810
Toluene		ND		1		1	12/11/99 17:36	D_R	12810
Xylenes, Total		ND		1		1	12/11/99 17:36	D_R	12810
Surr: 1,4-Difluorober	nzene	110	%	72-137		1	12/11/99 17:36	D_R	12810
Surr: 4-Bromofluoro	benzene	100	%	48-156		1	12/11/99 17:36	D_R	12810
SULFATE					MCL	E300	Units: m	g/L	
Sulfate		210		5		25	12/13/99 11:17	ES	13109

Qualifiers:

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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

> 99120268 Page 3 1/3/00 8:40:23 AM



Analyses/Method								
Analyses/Method				Site	: BJ-	Hobbs		
		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed An	alyst Seq. #
DIESEL RANGE ORGA	NICS				MCL	SW8015B	Units: mg/L	
Diesel Range Organics		ND		0.2		1	12/20/99 23:04 RR	138616
Surr: Pentacosane		28	%	20-131		1	12/20/99 23:04 RR	138616
Run ID/Seq #: HP_	V_991215B-138	616						
Prep Method	Prep Date			Prep Initials				
SW3510B	12/12/1999 8:54	ţ		KL				
GASOLINE RANGE OF	SOLINE RANGE ORGANICS Basoline Range Organics ND 0.1				MCL	SW8015B	Units: mg/L	
Gasoline Range Organic	S	ND		0.1		1	12/11/99 18:59 D_R	12813
Surr: 1,4-Difluorobenz	ene	92	%	62-144		1	12/11/99 18:59 D_R	12813
Surr: 4-Bromofluorobe	nzene	110	%	44-153		1	12/11/99 18:59 D_R	12813
HEADSPACE GAS AN	ALYSIS				MCL	RSK147	Units: mg/L	
Ethane		ND		0.0025		1	12/27/99 13:16 DR	14023
Ethylene		ND		0.0032		1	12/27/99 13:16 DR	14023
Methane		ND		0.0012		1	12/27/99 13:16 DR	14023
NITROGEN, NITRATE	(AS N)				MCL	E300	Units: mg/L	
Nitrogen, Nitrate (As N)		3.4		0.1	<u> </u>	1	12/10/99 11:47 ES	13113
PURGEABLE AROMAT	TICS				MCL	SW8021B	Units: ug/L	
Benzene		ND		1		1	12/11/99 18:59 D_R	12810
Ethylbenzene		ND		1		1	12/11/99 18:59 D_R	12810
Toluene		ND		1		1	12/11/99 18:59 D_R	12810
Xylenes,Total		ND		1		1	12/11/99 18:59 D_R	12810
Surr: 1,4-Difluorobenz	ene	91	%	72-137		1	12/11/99 18:59 D_R	12810
Surr: 4-Bromofluorobe	enzene	110	%	48-156		1	12/11/99 18:59 D_R	12810
SULFATE					MCL	E300	Units: mg/L	
Sulfate		200		4	· · ·	20	12/13/99 11:17 ES	13109

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

99120268 Page 4 1/3/00 8:40:24 AM



Client Sample ID MW 1	2D			Col	lected:	12/9/99 2:20:00	SPL Sample ID:	99120268-04
				Site	ə: BJ-	Hobbs		
Analyses/Method	Resu	lt		Rep.Limit		Dil. Factor QUAL	Date Analyzed An	alyst Seq. #
DIESEL RANGE ORGAN	NICS				MCL	SW8015B	Units: mg/L	
Diesel Range Organics	N	D		0.2		1	12/20/99 23:48 RR	13861
Surr: Pentacosane	e	3	%	20-131		1	12/20/99 23:48 RR	13861
Run ID/Seq #: HP_V	/_991215B-138617							
Prep Method	Prep Date			Prep Initials	]			
SW3510B	12/12/1999 8:54			KL	]			
ASOLINE RANGE ORGANICS Gasoline Range Organics ND 0.1			MCL	SW8015B	Units: mg/L			
Gasoline Range Organics	i N	D		0.1		1	12/11/99 19:26 D_F	12813
Surr: 1,4-Difluorobenze	ene 9	4	%	62-144		1	12/11/99 19:26 D_F	12813
Surr: 4-Bromofluorober	nzene 11	0	%	44-153		1	12/11/99 19:26 D_F	12813
HEADSPACE GAS ANA					MCL	RSK147	Units: mg/L	
Ethane	0.002	27		0.0025		1	12/27/99 13:28 DR	14023
Ethylene	0.00	)4		0.0032		1	12/27/99 13:28 DR	14023
Methane	0.001	5		0.0012		1	12/27/99 13:28 DR	14023
NITROGEN, NITRATE (A	AS N)				MCL	E300	Units: mg/L	
Nitrogen, Nitrate (As N)	N	D		0.1		1	12/10/99 11:47 ES	13113
PURGEABLE AROMAT	ICS				MCL.	SW8021B	Units: ug/L	
Benzene	N	D		1		1	12/11/99 19:26 D_F	R 12810
Ethylbenzene	N	D		1		1	12/11/99 19:26 D_F	R 12810
Toluene	N	D		1		1	12/11/99 19:26 D_F	R 12810
Xylenes, Total	N	D		1		1	12/11/99 19:26 D_F	12810
Surr: 1,4-Difluorobenze	ene S	96	%	72-137		1	12/11/99 19:26 D_F	R 12810
Surr: 4-Bromofluorober	nzene 10	00	%	48-156		1	12/11/99 19:26 D_F	R 12810
SULFATE					MCL	E300	Units: mg/L	
Sulfate	2	0		4		20	12/13/99 11:17 ES	13110

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

> 99120268 Page 5 1/3/00 8:40:24 AM



Client Sample ID MW 11A			Coll	ected:	12/9/99 2:45:00	SPL Sample ID:	99120268-05
			Site	: BJ-	Hobbs		
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: mg/L	
Diesel Range Organics	ND		0.2		1	12/21/99 0:32 R	R 138618
Surr: Pentacosane	33	%	20-131		1	12/21/99 0:32 R	R 13861
Run ID/Seq #: HP_V_991	215B-138618						
Prep Method Prep [	Date		Prep Initials				
SW3510B 12/12	1999 8:54		KL				
GASOLINE RANGE ORGAN	ICS			MCL	SW8015B	Units: mg/l	
Gasoline Range Organics	ND		0.5		5	12/11/99 19:54 D	_R 12813
Surr: 1,4-Difluorobenzene	95	%	62-144		5	12/11/99 19:54 D	R 12813
Surr: 4-Bromofluorobenzene	120	%	44-153		5	12/11/99 19:54 D	_R 12813
HEADSPACE GAS ANALYS	IS			MCL	RSK147	Units: mg/l	
Ethane	ND		0.0025		1	12/27/99 13:38 D	R 14023
Ethylene	ND		0.0032		1	12/27/99 13:38 D	R 14023
Methane	0.0079		0.0012		1	12/27/99 13:38 D	R 14023
NITROGEN, NITRATE (AS N	)			MCL	E300	Units: mg/l	
Nitrogen, Nitrate (As N)	ND		0.1		1	12/10/99 11:47 E	S 13113
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug/L	•
Benzene	ND		5		5	12/11/99 19:54 D	
Ethylbenzene	ND		5		5	12/11/99 19:54 D	_R 12810
Toluene	ND		5		5	12/11/99 19:54 D	R 12810
Xylenes, Total	ND		5		5	12/11/99 19:54 D	_R 12810
Surr: 1,4-Difluorobenzene	100	%	72-137		5	12/11/99 19:54 D	_R 12810
Surr: 4-Bromofluorobenzene	99	%	48-156		5	12/11/99 19:54 D	_R 12810
SULFATE				MCL	E300	Units: mg/l	L
Sulfate	290		4		20	12/13/99 11:17 E	

Qualifiers:

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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

> 99120268 Page 6 1/3/00 8:40:25 AM



Client Sample ID MV	V 3			Coll	ected:	12/9/99 3:05:00	SPL Sample ID:	99120268-06
				Site	: BJ-	Hobbs		
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed Ar	nalyst Seq. #
DIESEL RANGE OR	GANICS				MCL	SW8015B	Units: mg/L	
Diesel Range Organic	S	ND		0.2		1	12/21/99 1:15 RR	138619
Surr: Pentacosane	·	71	%	20-131		1	12/21/99 1:15 RR	138619
Run ID/Seq #: H	P_V_991215B-13	8619					· · · · · · · · · · · · · · · · · · ·	
Prep Method	Prep Date			Prep Initials				
SW3510B	12/12/1999 8:5	54		KL				
ASOLINE RANGE ORGANICS					MCL	SW8015B	Units: mg/L	
Gasoline Range Organ	nics	ND		0.1		1	12/11/99 18:04 D_F	२ 128128
Surr: 1,4-Difluorobe	nzene	97	%	62-144		1	12/11/99 18:04 D_F	٦ 128128
Surr: 4-Bromofluoro	benzene	110	%	44-153		1	12/11/99 18:04 D_F	٦ 128128
PURGEABLE AROM	ATICS				MCL	SW8021B	Units: ug/L	
Benzene		ND		1		1	12/11/99 18:04 D_F	२ 128105
Ethylbenzene		ND		1		1	12/11/99 18:04 D_F	R 12810
Toluene		ND		1		1	12/11/99 18:04 D_F	R 128105
Xylenes, Total		ND		1		1	12/11/99 18:04 D_F	२ 12810
Surr: 1,4-Difluorobe	nzene	92	%	72-137		1	12/11/99 18:04 D_F	२ 12810
Surr: 4-Bromofluoro	henzene	98	%	48-156		1	12/11/99 18:04 D F	R 128105

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

> 99120268 Page 7 1/3/00 8:40:25 AM



			Colle	ected:	12/9/99 3:25:00	SPL Sample I	<b>):</b> 9912	0268-07
			Site:	BJ-	Hobbs			
R	esult		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
NICS				MCL	SW8015B	Units: m	g/L	
	2		0.2		1	12/11/99 7:03	RR	129318
	26	%	20-131		1	12/11/99 7:03	RR	129318
_991211A-1293	18							
Prep Date			Prep Initials					
12/10/1999 12:25	<u>.</u>		KL					
GANICS				MCL	SW8015B	Units: m	g/L	
	0.53		0.1		1	12/11/99 21:44	D_R	128134
ne	120	%	62-144		1	12/11/99 21:44	D_R	128134
izene	140	%	44-153		1	12/11/99 21:44	D_R	128134
ICS				MCL	SW8021B	Units: ug	/L	
	ND		1		1	12/11/99 21:44	D_R	128111
	2.3		1		1	12/11/99 21:44	D_R	128111
	2.5		1		1	12/11/99 21:44	D_R	128111
	20.1		1		1	12/11/99 21:44	D_R	128111
ne	93	%	72-137		1	12/11/99 21:44	D_R	128111
zene	100	%	48-156		1	12/11/99 21:44	D_R	128111
	R NICS /_991211A-1293 Prep Date 12/10/1999 12:25 GANICS ne izene ICS	Result           NICS         2           26         26           2991211A-129318         2           Prep Date         12/10/1999 12:25           GANICS         0.53           ne         120           zene         140           ICS         ND           2.3         2.5           20.1         93	Result           26         %           26         %           2991211A-129318         %           Prep Date         %           12/10/1993 12:25         %           GANICS         0.53           ne         120         %           zene         140         %           ICS         ND         2.3           2.5         20.1         %           ne         93         %	Result         Rep.Limit           NICS         2         0.2           26         %         20-131           7.991211A-129318         Prep Date         Prep Initials           12/10/1999 12:25         KL         SANICS           0.53         0.1         ne           120         %         62-144           zene         140         %         44-153           ICS         ND         1           2.3         1         2.5         1           20.1         1         1         ne         93         %         72-137	Site:         BJ-           Result         Rep.Limit           NICS         MCL           2         0.2           26         % 20-131           7_991211A-129318         Prep Initials           Prep Date         Prep Initials           12/10/1999 12:25         KL           GANICS         MCL           0.53         0.1           ne         120         % 62-144           zene         140         % 44-153           ICS         MCL           0.53         1           2.3         1           2.3         1           2.5         1           20.1         1           1         93         % 72-137	Result         Rep.Limit         Dil. Factor         QUAL           NICS         MCL         SW8015B         2         0.2         1           26         %         20-131         1         1         1           26         %         20-131         1 <th1< th="">         1         1         &lt;</th1<>	Site:         BJ-Hobbs           Result         Rep.Limit         Dil. Factor         QUAL         Date Analyzed           NICS         MCL         SW8015B         Units:         mg           2         0.2         1         12/11/99 7:03         1           26         % 20-131         1         12/11/99 7:03         1           Zef         % 20-131         1         12/11/99 7:03         2           Zef         MCL         SW8015B         Units: mg           GANICS         MCL         SW8015B         Units: mg           0.53         0.1         1         12/11/99 21:44           zene         140         44-153         1         12/11/99 21:44           ICS         MCL         SW8021B         Units: ug           ND         1         1         12/11/99 21:44           2.5         1	Site:         BJ-Hobbs           Result         Rep.Limit         Dll. Factor         QUAL         Date Analyzed         Analyst           NICS         MCL         SW8015B         Units: mg/L           2         0.2         1         12/11/99 7:03         RR           26         % 20-131         1         12/11/99 7:03         RR           / 991211A-129318         Prep Initials         VL         SW8015B         Units: mg/L           21/10/1999 12:25         KL         MCL         SW8015B         Units: mg/L           GANICS         MCL         SW8015B         Units: mg/L           0.53         0.1         1         12/11/99 21:44         D_R           zene         140         % 44-153         1         12/11/99 21:44         D_R           ICS         MCL         SW8021B         Units: ug/L         1           ND         1         1         12/11/99 21:44         D_R           2.3         1         1         12/11/99 21:44         D_R           2.3         1         1         12/11/99 21:44         D_R           2.5         1         1         12/11/99 21:44         D_R           2.5         1<

Qualifiers:

11

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

99120268 Page 8 1/3/00 8:40:25 AM



Client Sample ID MW 10			Colle	ected:	12/9/99 3:50:00	SPL Sample ID:	99120268-08
			Site:	BJ-	Hobbs		
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed Ar	nalyst Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: mg/L	
Diesel Range Organics	0.44		0.2		1	12/21/99 1:59 RR	138620
Surr: Pentacosane	43	%	20-131		1	12/21/99 1:59 RR	138620
Run ID/Seq #: HP_V_991215B-1	38620						
Prep Method Prep Date			Prep Initials				
SW3510B 12/12/1999 8	:54		KL				
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg/L	· · · · · · · · · · · · · · · · · · ·
Gasoline Range Organics	0.16		0.1		1	12/11/99 22:11 D_F	R 128135
Surr: 1,4-Difluorobenzene	97	%	62-144		1	12/11/99 22:11 D_F	R 128135
Surr: 4-Bromofluorobenzene	120	%	44-153		1	12/11/99 22:11 D_F	R 128135
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: mg/L	
Ethane	ND		0.0025		1	12/27/99 13:46 DR	140236
Ethylene	ND		0.0032		1	12/27/99 13:46 DR	140236
Methane	0.0039		0.0012		1	12/27/99 13:46 DR	140236
NITROGEN, NITRATE (AS N)				MCL	E300	Units: mg/L	
Nitrogen, Nitrate (As N)	0.49		0.1		1	12/10/99 11:47 ES	13113
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug/L	
Benzene	23		1		1	12/11/99 22:11 D_F	र 128112
Ethylbenzene	ND		1		1	12/11/99 22:11 D_F	R 128112
Toluene	ND		1		1	12/11/99 22:11 D_F	R 128112
Xylenes,Total	1.2		1		1	12/11/99 22:11 D_F	R 128112
Surr: 1,4-Difluorobenzene	100	%	72-137		1	12/11/99 22:11 D_F	R 128112
Surr: 4-Bromofluorobenzene	94	%	48-156		1	12/11/99 22:11 D_F	२ 12811:
SULFATE		·· .		MCL	E300	Units: mg/L	
Sulfate	170		4		20	12/13/99 11:17 ES	131102

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

99120268 Page 9 1/3/00 8:40:26 AM



Client Sample ID MW 12			Coll	ected:	12/9/99 4:10:00	SPL Sample ID	): 9912	0268-09
			Site	BJ-	Hobbs			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGANICS				MCL	SW8015B	Units: mg	g/L	
Diesel Range Organics	ND		0.2		1	12/21/99 2:43	RR	13862
Surr: Pentacosane	71	%	20-131		1	12/21/99 2:43	RR	13862
Run ID/Seq #: HP_V_991215B	138621							
Prep Method Prep Date			Prep Initials					
SW3510B 12/12/1999	8:54		KL					
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg	g/L	
Gasoline Range Organics	0.21		0.1		1	12/11/99 22:39	D_R	12813
Surr: 1,4-Difluorobenzene	110	%	62-144		1	12/11/99 22:39	D_R	12813
Surr: 4-Bromofluorobenzene	110	%	44-153		1	12/11/99 22:39	D_R	12813
HEADSPACE GAS ANALYSIS				MCL	RSK147	Units: mg	g/L	
Ethane	ND		0.0025		1	12/27/99 14:02	DR	14023
Ethylene	ND		0.0032		1	12/27/99 14:02	DR	14023
Methane	ND		0.0012		1	12/27/99 14:02	DR	14023
NITROGEN, NITRATE (AS N)				MCL	E300	Units: mg	g/L	
Nitrogen,Nitrate (As N)	ND		0.1		1	12/10/99 11:47	ES	13113
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/L	
Benzene	64		1		1	12/11/99 22:39		12811
Ethylbenzene	ND		1		1	12/11/99 22:39	D_R	12811
Toluene	ND		1		1	12/11/99 22:39	D_R	12811
Xylenes,Total	ND		1		1	12/11/99 22:39	D_R	12811
Surr: 1,4-Difluorobenzene	100	%	72-137		1	12/11/99 22:39	D_R	12811
Surr: 4-Bromofluorobenzene	93	%	48-156		1	12/11/99 22:39	D_R	12811
SULFATE				MCL	E300	Units: mg	g/L	
Sulfate	180		4		20	12/13/99 11:17		13110

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

> 99120268 Page 10 1/3/00 8:40:27 AM



Client Sample ID MW	13		Coll	ected:	12/9/99 4:40:00	SPL Sample ID:	99120268-10
			Site	: BJ	-Hobbs		
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	nalyst Seq. #
DIESEL RANGE ORG	ANICS			MCL	SW8015B	Units: mg/L	
<b>Diesel Range Organics</b>	0.46		0.2		1	12/11/99 7:41 R	R 129319
Surr: Pentacosane	49	%	20-131		1	12/11/99 7:41 R	R 129319
Run ID/Seq #: HP	V_991211A-129319						
Prep Method	Prep Date		Prep Initials				
SW3510B	12/10/1999 12:25		KL				
GASOLINE RANGE O	RGANICS			MCL	SW8015B	Units: mg/l	-
Gasoline Range Organic	cs 3.2		0.5		5	12/11/99 23:06 D	R 128137
Surr: 1,4-Difluorobenz	zene 120	%	62-144		5	12/11/99 23:06 D	R 128137
Surr: 4-Bromofluorobe	enzene 120	%	44-153		5	12/11/99 23:06 D	R 128137
PURGEABLE AROMA	TICS			MCL	SW8021B	Units: ug/L	· · · · · · · · · · · · · · · · · · ·
Benzene	430		5		5	12/11/99 23:06 D	R 128114
Ethylbenzene	410		5		5	12/11/99 23:06 D	R 128114
Toluene	16		5		5	12/11/99 23:06 D	R 128114
Xylenes, Total	40.9	1	5		5	12/11/99 23:06 D	R 128114
Surr: 1,4-Difluorobenz	zene 110	%	72-137		5	12/11/99 23:06 D	R 128114
Surr: 4-Bromofluorob	enzene 99	%	48-156		5	12/11/99 23:06 D	R 128114

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

> 99120268 Page 11 1/3/00 8:40:27 AM



Client Sample ID Du	р			Coll	ected:	12/9/99	SPL Sample ID:	99120268-11
				Site	BJ-	Hobbs		
Analyses/Method		Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst Seq. #
DIESEL RANGE ORG	ANICS				MCL	SW8015B	Units: mg/	L
Diesel Range Organics	3	1.9		0.2		1	12/22/99 17:23 R	RR 138626
Surr: Pentacosane		42	%	20-131		1	12/22/99 17:23 R	RR 138626
Run ID/Seq #: HI	P_V_991215B-1	38626						
Prep Method	Prep Date			Prep Initials				
SW3510B	12/12/1999 8	:54		KL				
ASOLINE RANGE ORGANICS					MCL	SW8015B	Units: mg/	L
Gasoline Range Organ	lics	3.2		0.5		5	12/11/99 23:34 D	_R 128138
Surr: 1,4-Difluorober	nzene	120	%	62-144		5	12/11/99 23:34 D	_R 128138
Surr: 4-Bromofluoro	benzene	120	%	44-153		5	12/11/99 23:34 D	_R 128138
PURGEABLE AROM	ATICS				MCL	SW8021B	Units: ug/L	
Benzene		460		5		5	12/11/99 23:34 D	_R 128115
Ethylbenzene	· · · · · · ·	420		5		5	12/11/99 23:34 D	_R 128115
Toluene		12		5		5	12/11/99 23:34 D	_R 128115
Xylenes, Total		34		5		5	12/11/99 23:34 D	_R 128115
Surr: 1,4-Difluorober	nzene	110	%	72-137		5	12/11/99 23:34 D	_R 128115
Surr: 4-Bromofluoro	benzene	110	%	48-156		5	12/11/99 23:34 D	_R 128115

Qualifiers:

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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

99120268 Page 12 1/3/00 8:40:27 AM



Client Sample ID Trip Blank 12/1	/99		Col	lected:	12/9/99	SPL Sample ID	<b>D:</b> 9912	0268-12
			Site	: BJ-	Hobbs			
Analyses/Method	Result		Rep.Limit		Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
GASOLINE RANGE ORGANICS				MCL	SW8015B	Units: mg	g/L	
Gasoline Range Organics	ND		0.1		1	12/12/99 0:01	D_R	128139
Surr: 1,4-Difluorobenzene	94	%	62-144		1	12/12/99 0:01	D_R	128139
Surr: 4-Bromofluorobenzene	110	%	44-153		1	12/12/99 0:01	D_R	128139
PURGEABLE AROMATICS				MCL	SW8021B	Units: ug	/L	
Benzene	ND		1		1	12/12/99 0:01	D_R	128116
Ethylbenzene	ND		1		1	12/12/99 0:01	D_R	128116
Toluene	ND		1		1	12/12/99 0:01	D_R	128116
Xylenes,Total	ND		1		1	12/12/99 0:01	D_R	128116
Surr: 1,4-Difluorobenzene	98	%	72-137		1	12/12/99 0:01	D_R	128116
Surr: 4-Bromofluorobenzene	100	%	48-156		1	12/12/99 0:01	D_R	128116

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 99120268 Page 13 1/3/00 8:40:28 AM Quality Control Documentation



# **Quality Control Report**

#### Brown & Caldwell BJ- HOBBS

				В	J- HOI	BBS							
Analysis: Method:	Diesel Range Orga SW8015B	nics							(Order: Batch ID:	991 206	20268 8		
	Me	thod Blank				Sai	mples in	Analytical Ba	ch:				
RunID:	HP_V_991211A-12929	98 Units:	mg/L			Lat	o Sample	e ID	<u>Client S</u>	ample	iD		
nalysis Date:	12/11/1999 1:20	Analyst:	RR				120268-0		MW 4				
reparation Date:	12/10/1999 12:25	Prep By:	KL	Method SV	V3510E	<b>3 99</b> 1	120268-1	0B	MW 13				
1	Analyte		Result	Rep Limit									
Diese	el Range Organics		N		1								
Su	rr: Pentacosane		73.	.6 20-131	]								
			Ŀ	aboratory (	Contro	l Sample (I	LCS)						
	Runli	D:	HP_V_9	91211A-1293	109	Units: r	mg/L						
	Analy	/sis Date:	12/11/1	999 1:20	1	Analyst: F	R						
	Prepa	aration Date:	12/10/1	1999 12:25	1	Prep By: I	KL Me	thod SW3510B	•				
•		Analyte	e		Spike Added	Result	Perce Recov		Upper Limit				
	Diesel F	Range Organics	\$			.5 1.9		77 53	148				
·		Matrix	Spike (	MS) / Matri	x Spike	e Duplicate	(MSD)		<u></u>				
	Sar	nple Spiked:	99120	0165-01									
1	Ru	nID:	HP_V	_991211A-12	9301	Units:	mg/L						
	Ana	alysis Date:	12/11	/1999 2:36		Analyst:	RR						
	Pre	paration Date:	12/10	)/1999 12:25	5	Prep By:	KL N	lethod SW3510	)B				
A	nalyte	Sample	MS	MS Re	sult	MS %	MSD	MSD Result	MSD %	RPD	RPD	Low	High
	-	Result	Spike			Recovery	Spike		Recovery		Limit	Limit	Limit
			Adde	u			Added						

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

D - Recovery Unreportable due to Dilution

99120268 Page 14 1/3/00 8:40:31 AM



#### **Quality Control Report**

#### Brown & Caldwell BJ- HOBBS

Analysis: Method:	Diesel Range Org SW8015B	anics						(Order: Batch ID:	991 209	20268 3		
	M	ethod Blank			Sa	mples in	Analytical Bat	ch:				
RunID:	HP_V_991215B-1327	44 Units:	mg/L		La	b Sampl	e ID	Client S	ample	D		
nalysis Date:	12/15/1999 5:47	Analyst:	RR			120268-0		MW-7		<u></u>		
reparation Date:	12/12/1999 8:54	Prep By:	KL N	ethod SW3510		120268-0		MW-5				
					99	120268-0	)3B	OW 4				
	A I . ( .		<u> </u>		99	120268-0	)4B	MW 12D				
Disc	Analyte		Result	Rep Limit	99	120268-0	)5B	MW 11A				
	el Range Organics Irr: Pentacosane		ND 80.6	0.20 20-131	99	120268-0	)6B	MW 3				
					99	120268-0	)8B	MW 10				
					99	120268-0	)9B	MW 12				
					99	120268-1	1B	Dup				
			La	boratory Contro	ol Sample (	LCS}						
	Run	ID:	HP_V_99	1215B-132745	Units:	mg/L						
	Ana	ysis Date:	12/15/19	99 6:25	Analyst:	RR						
	Prep	paration Date:	12/12/19	99 8:54	Prep By:	KL Me	thod SW3510B					
		Analyt	Э	Spike				Upper				
				Adde		Recov		Limit				
	Diesel	Range Organics	5	2	2.5 2.	3	93 53	148				
		Bit - Anites	Delles (M	C) / Matalas Call	. Dunlingt	. (1100)						
		Matrix		S) / Matrix Spik	e Duplicat	e (MSD)						
	Sa	mple Spiked:	991203	305-01								
	Ru	nID:	HP_V_9	91215B-132753	Units:	mg/L						
	An	alysis Date:	12/15/	999 12:08	Analyst:	RR						
	Pri	eparation Date:	12/12/	999 8:54	Prep By:	KL N	lethod SW3510	B				
A	nalyte	Sample	MS	MS Result	MS %	MSD	MSD Result	MSD %	RPD	RPD	Low	Hig
		Result	Spike Added		Recovery	Spike Added		Recovery		Limit		Lim
esel Range Org	anics	NC	5	1.6	32.1	5	1.4	27.7	14.8	39	21	1
Section angle of g				1.0	02.1	J	1.4		1.4.0	59	21	<b>!</b>

Qualifiers:

ND/U - Not Detected at the Reporting Limit

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

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

R 115

99120268 Page 15 1/3/00 8:40:31 AM



## **Quality Control Report**

## Brown & Caldwell BJ- HOBBS

Analysis: Method:	Headspace Gas Analy RSK147	rsis				WorkOrder: Lab Batch ID:	99120268 R6641			
	<u>Method Blank</u>				Samples in Analytical Batch:					
RunID:	VARH_991227A-140201	Units:	mg/L		Lab Sample ID	Client Sa	mple ID			
analysis Date:	12/27/1999 10:46	Analyst:	DR		99120268-02C	MW-5				
					99120268-03C	OW 4				
					99120268-04C	MW 12D				
F		n		<b>D</b>	99120268-05C	MW 11A				
	Analyte		Result	Rep Limit	99120268-08C	MW 10				
- F-	Ethane Ethylene				99120268-09C	MW 12				
	Methane		ND							

#### Sample Duplicate

Original Sample:	99120501-01		
RunID:	VARH_991227A-140202	Units:	mg/L
Analysis Date:	12/27/1999 11:02	Analyst:	DR

Analyte	Sample Result	DUP Result	RPD	RPD Limit
2-Methylpropane	ND	ND	0	50
Butane	ND	ND	0	50
Ethane	0.0032	0.0032	0	50
Ethylene	ND	ND	0	50
Methane	ND	ND	0	50
Propane	0.0041	0.0039	5	50
Propylene	ND	ND	0	50

Qualifiers:

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank D - Recovery Unreportable due to Dilution

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J - Estimated value between MDL and PQL

99120268 Page 16 1/3/00 8:40:31 AM



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# **Quality Control Report**

#### Brown & Caldwell BJ- HOBBS

Analysis: Method:	Purgeable Aromatics SW8021B							99120268 R6008
		d Blank				Samples in Analy	Lab Batch ID:	
i RuniD:	VARE_991211A-128121	Units:	ug/L			Lab Sample ID	Client Sa	ample ID
nalysis Date:	12/11/1999 12:34	Analyst:	D_R		-	99120268-01A	MW-7	
,		,	-		ç	99120268-02A	MW-5	
					9	99120268-03A	OW 4	
					9	99120268-04A	MW 12D	
	Analyte			Rep Limit	9	99120268-05A	MW 11A	
	izene ylbenzene		ND ND	1.0	9	99120268-06A	MW 3	
	Jene		ND	1.0	9	99120268-07A	MW 4	
	enes,Total		ND	1.0	9	99120268-08A	MW 10	
	Surr: 1,4-Difluorobenzene		98.6 103.6	72-137 48-156	9	99120268-09A	MW 12	
			100.0	40-100	9	99120268-10A	MW 13	
					9	99120268-11A	Dup	
					9	99120268-12A	Trip Blan	ik 12/1/99
· · · · · · · · · · · · · · · · · · ·			Lat	oratory Cont	rol Sample	e (LCS)		
	RunID:		VARE_991	I211A-128099	Units:	ug/L		
ł	Analysis	Date:	12/11/19	99 11:38	Analyst:	D_R		
l								

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	54	108	61	119
Ethylbenzene	50	54	107	70	118
Toluene	50	55	110	65	125
Xylenes,Total	150	149	99	72	117

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

Sample Spiked:	99120268-02		
RunID:	VARE_991211A-128102	Units:	ug/L
Analysis Date:	12/11/1999 15:19	Analyst:	D_R

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Benzene	ND	20	21	107	20	20	97.8	8.91	21	32	164
thylbenzene	ND	20	19	97.3	20	18	88.4	9.60	19	52	142
oluene	ND	20	22	109	20	19	97.5	11.2	20	38	159
Xylenes,Total	ND	60	61	102	60	54	90.0	12.2	18	53	144

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\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Recovery Unreportable due to Dilution

J - Estimated value between MDL and PQL



# **Quality Control Report**

## Brown & Caldwell BJ- HOBBS

Method:								Lab			09		
		Meth	od Blank			San	nples in	Analytical Ba	tch:				
RunID:	VARE_99121	1B-128124	Units:	mg/L		Lab	Sample	<u>ID</u>	Client Sa	mple l	ID		
nalysis Date:	12/11/1999	12:34	Analyst:	D_R			20268-0		MW-7				
						991	20268-0	2A	MW-5				
						991	20268-0	3A	OW 4				
	Δr	nalyte	·····	Result F	Ren Limit	991	20268-0	4A	MW 12D				
Ga	asoline Range Orga			ND	0.10		20268-0		MW 11A				
Surr: 1,4-Difluoroben: Surr: 4-Bromofluorob		enzene		90.2	62 <u>-144</u>		20268-0		MW 3				
		obenzene		124.7	44-153		20268-0		MW 4				
							20268-0		MW 10				
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	Gasoline Range Org <u>Matri</u> Sample Spiked:			Add			D_R		Upper Limit 131				
		Gasoline Sam Runl	Analyte Range Organ <u>Matrix S</u> ole Spiked: D:	e ics Spike (MS 9912026 VARE_99	Spike Adder 6) / Matrix Spik 68-06 61211B-128125	Result 1 1.1 Ce Duplicate	Perce Recov		Limit				
	Analyte	Gasoline Sam Runl	Analyte Range Organ <u>Matrix S</u> ole Spiked:	ics Spike (MS 9912026 VARE_99 12/11/11 MS Spike	Spike Adder 5) / Matrix Spik	e Result d 1.1	Perce Recov (MSD) mg/L D_R MSD Spike	ery Limit	Limit	RPD	RPD Limit	Low Limit	
Basoline Rang	Analyte	Gasoline Sam Runl	Analyte Range Organ <u>Matrix S</u> ole Spiked: D: rsis Date: Sample	e ics Spike (MS 9912026 VARE_96 12/11/19 MS Spike Added	Spike Adder 5) / Matrix Spik 58-06 51211B-128125 599 16:14	e Result d 1 1.1 ce Duplicate Units: Analyst: MS % Recovery	Perce Recov (MSD) mg/L D_R MSD Spike Added	ery Limit 107 64	Limit 131 MSD % Recovery		Limit	Limit	High Limi

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J - Estimated value between MDL and PQL

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# **Quality Control Report**

#### Brown & Caldwell BJ-HOBBS

Analysis: Aethod:	Sulfate E300							Order: atch ID:	99120268 R6142A
		d Blank			San	nples in Ana			
RunID:	WET_991213J-131074	Units:	mg/L		Lab	Sample ID		Client Sa	imple ID
nalysis Date:	12/13/1999 11:17	Analyst:	ES			20268-02D		MW-5	
					991	20268-03D		OW 4	
,					991	20268-04D		MW 12D	
		r	<b>D H D</b> 11:		991	20268-05D		MW 11A	
Sulf	Analyte		Result Rep Lin		991	20268-08D		MW 10	
Sui				20	991	20268-09D		MW 12	
t	Analysis		12/13/1999 11:17		alyst: E				
		Analyt		Spike	Result	Percent	Lower	Upper	
<b>)</b> 1				······		Percent Recovery	Lower Limit	Upper Limit	
	Sulfate			Spike	Result				
   		Analyt		Spike Added 10	Result	Recovery 98	Limit	Limit	
   	Sulfate	Analyt	e	Spike Added 10	Result	Recovery 98	Limit	Limit	
   	Sulfate	Analyt <u>Matrix</u> e Spiked:	e Spike (MS) / Mat	Spike Added 10 rix Spike I	Result 9.8 Duplicate Jnits:	Recovery 98	Limit	Limit	

	Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
Sulfat	e	210	250	460	100	250	450	97.7	2.51	20	80	120

Qualifiers:

ND/U - Not Detected at the Reporting Limit

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

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

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# **Quality Control Report**

#### Brown & Caldwell BJ- HOBBS

Analysis: Method:	Nitrogen, Nitrate (As I E300	N)				WorkOrder: Lab Batch ID:	99120268 R6145
·	Metho	d Blank	Nur		Samples in Analy	tical Batch:	
RunID:	WET_991210R-131127	Units:	mg/L	L	ab Sample ID	Client Sa	ample ID
nalysis Date:	12/10/1999 11:47	Analyst:	ES	ç	9120268-02D	MW-5	
				ç	9120268-03D	OW 4	
-				ç	99120268-04D	MW 12D	1
•	Aralita		Desult Dealisait	ę	9120268-05D	MW 11A	
2114	Analyte		Result Rep Limit	9	9120268-08D	MW 10	
INIT	ogen,Nitrate (As N)		ND 0.10	ç	9120268-09D	MW 12	
· · ·			Laboratory Con	trol Sample	e (LCS)	Ndraw	
ĺ	RunID:		WET_991210R-131128	Units:	mg/L		
_	Analysis	Date:	12/10/1999 11:47	Analyst:	ES		

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Nitrogen, Nitrate (As N)	10	9.1	91	90	110

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

Sample Spiked:	99120268-02		
RunID:	WET_991210R-131130	Units:	mg/L
Analysis Date:	12/10/1999 11:47	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
litrogen,Nitrate (As N)	4.2	10	14	96.8	10	14	96.5	0.321	20	86	115

Qualifiers:

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Chain of Custody And Sample Receipt Checklist

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<u>5. R</u>	5. Relinquished by:	:Ai				datc		tianc		6. Roof		aboratory.		T	ole	(iu)

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

# Sample Receipt Checklist

Workorder:	99120268		Received by:		Stelly, D'Anna
Date and Time Received:	12/10/99 10:00:00 AM		Carrier name:		FedEx
Temperature:	4				
Shipping container/cooler in	good condition?	Yes 🗹	No 🗌	Not Present	
Custody seals intact on shipp	pping container/cooler?	Yes 🗌	No 🗌	Not Present	
Custody seals intact on sam	ple bottles?	Yes 🗌	No 🗌	Not Present	
Chain of custody present?		Yes 🗹	No 🗌		
Chain of custody signed whe	en relinquished and received?	Yes 🔽	No 🗔		
Chain of custody agrees with	sample labels?	Yes 🗹	No 🗔		
Samples in proper container/	/bottle?	Yes 🗹	No 🗌		
Sample containers intact?		Yes 🗹	No 🗌		
Sufficient sample volume for	indicated test?	Yes 🗹	No 🗌		
All samples received within h	nolding time?	Yes 🗹	No 🗌		
Container/Temp Blank temp	erature in compliance?	Yes 🗹	No 🗌		
Water - VOA vials have zero	headspace?	Yes 🗹	No 🗌	Not Present	
Water - pH acceptable upon	receipt?	Yes 🗹	No 🗔		

# BROWN AND CALDWELL

Suite 2500, 1415 (713) 759-0999 •	Louisiana, Houston, (713) 308-3886	TX 77002		Т	RANSMITTAI	L MEMORANDUM
To: Wayne	e Price			Date: Nov	ember 29, 1999	Job No: 12832-014
State o	f New Mexico			Subject:	Hobbs, New Mexi	ico Facility
Oil Co	onservation Div	ision		Contract N	0.:	
2040 \$	South Pacheco	Street		Equipment N	0:	·······
State I	State Land Office Building					
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# **REMARKS:**

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DEC 0 1 1999 Environmental Bureau Oil Conservation Division

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

Ruhand Reproved

**Richard Rexroad** 

RECEIVED DEC 0 1 1999 Environmental Bureau Oil Conservation Division

BROWN AND CALDWELL

# SEPTEMBER 1999 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY

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

**NOVEMBER 29, 1999** 

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RECEIVED

DEC 0 1 1999 Environmental Bureau Oil Conservation Division SEPTEMBER 1999 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY BJ SERVICES COMPANY, U.S.A.

Prepared for

BJ Services Company, U.S.A. 8701 New Trails Drive The Woodlands, Texas

BC Project Number: 12832.014

Jukard Rexroad

Richard L. Rexroad, P.G. Principal Geologist

November 29, 1999

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

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

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1.0	INTI	RODUCTION	1
2.0	FIEI	LD ACTIVITIES AND RESULTS	2
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	4.2	Recommendations	

# DISTRIBUTION AND QA/QC REVIEWER'S SIGNATURE

# FIGURES

- 2 Groundwater Elevation Map for September 13-14, 1999
- 3 Benzene Isoconcentration and Total BTEX Distribution Map for September 13-14, 1999
- 4 Total Petroleum Hydrocarbons Distribution Map for September 13-14, 1999
- 5 Dissolved Benzene Mass vs. Time: West Plume

# TABLES

- 1 Site Chronology
- 2 Cumulative Groundwater Elevation Data
- 3 Field Screening Results for Groundwater Samples
- 4 Cumulative Analytical Results for Groundwater Samples
- 5 Current and Historical Nitrate, Sulfate, and Dissolved Methane Data for Monitor Wells MW-5, MW-10, MW-11A, MW-12, MW-12D, and OW-4
- 6 Summary of Analytical Results for Air Emissions

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# APPENDICES

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

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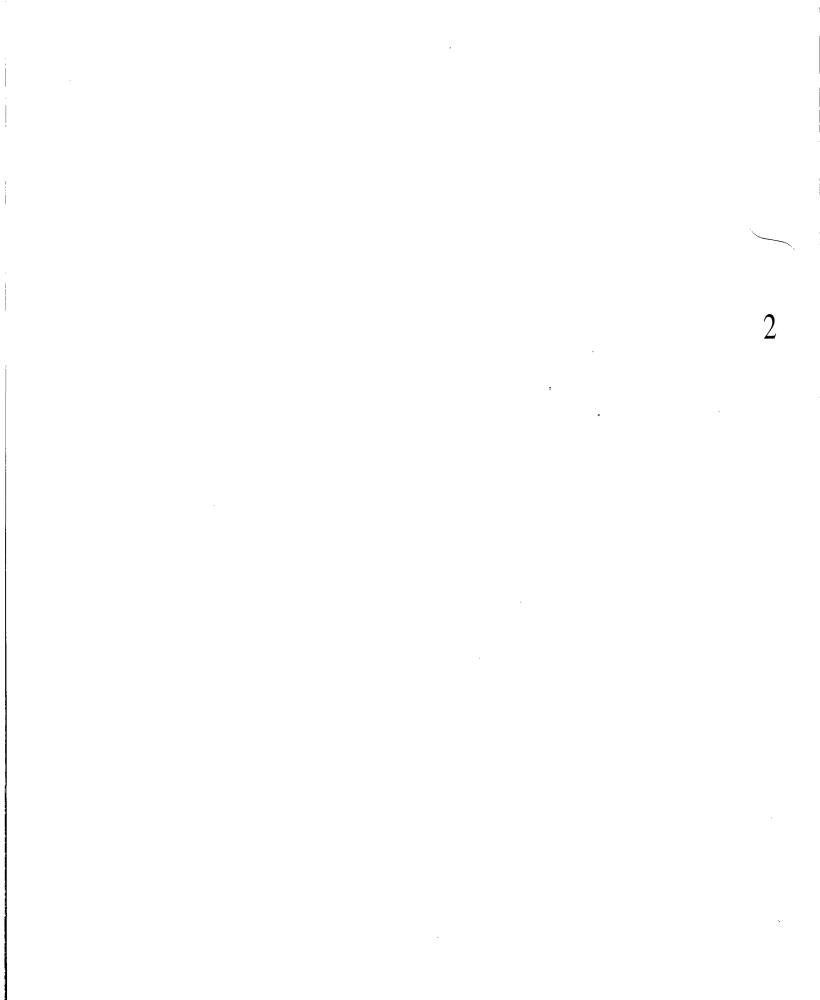
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## **1.0 INTRODUCTION**

Brown and Caldwell conducted field activities associated with the September 1999 quarterly groundwater sampling event at the BJ Services Company, U.S.A. (BJ Services) facility located at 2708 West County Road in Hobbs, New Mexico on September 13-14, 1999. Groundwater samples collected from existing monitor wells at the facility in September 1999 were analyzed for the quarterly monitoring constituents specified in by the New Mexico Oil Conservation Division (NMOCD) in NMOCD Permit GW-072. Samples from selected wells were also analyzed for dissolved methane/ethylene/ethane, sulfate, and nitrate to evaluate the potential for natural attenuation of hydrocarbons at the facility. 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.

The facility formerly operated an above-grade on-site fueling system. The facility layout is shown in Figure 1. Subsurface impact near a diesel fueling system was first detected by the NMOCD during an on-site inspection on February 7, 1991. The fueling system was taken out of operation in July 1995. As the result of the diesel fuel release, the NMOCD has required a quarterly groundwater monitoring program to assess the concentration of hydrocarbon constituents in groundwater. A biosparging system was activated in November 1995 to remediate soil and groundwater at the facility. A site chronology detailing the history of the fueling system, the soil and groundwater remediation system, and previous sampling events is presented in Table 1. Expansions of the biosparging system were performed in March/April 1997 and February/March 1998.

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



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# 2.0 FIELD ACTIVITIES AND RESULTS

On September 13-14, 1999, Brown and Caldwell purged and sampled the groundwater monitor wells at and adjacent to the BJ Services Hobbs facility to determine concentrations of dissolved-phase hydrocarbons in groundwater. The locations of these wells are shown in the site map presented as Figure 1.

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

## 2.1 Groundwater Measurements and Sampling

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

Groundwater samples were collected after purging of the wells with a submersible pump was completed. Field parameter measurements for pH, conductivity, oxidation-reduction (redox) potential, dissolved oxygen (DO), and temperature were collected during and upon completion of well purging. In addition to using these parameters as indicators of stability of produced groundwater, they are also important for evaluating the potential for natural attenuation of dissolved phase hydrocarbons at the facility. Ferrous iron and alkalinity were also measured during the purging and sampling activities to assess natural attenuation potential.

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

The groundwater samples were collected directly after completion of purging operations through the submersible pump discharge. Each sample was transferred to laboratory-prepared, clean glass or plastic containers sealed with Teflon<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 use. Decontamination procedures consisted of washing with fresh water and a non-phosphate detergent and rinsing with deionized water. Purge water generated from the monitor wells was discharged to the on-site water reclamation system for re-use for other purposes by BJ Services.

### 2.2 Results of Groundwater Analyses

Groundwater samples collected during this sampling event were analyzed for diesel- and gasolinerange total petroleum hydrocarbons (TPH-D and TPH-G) by EPA Method 8015 Modified and for benzene, toluene, ethylbenzene, and xylene (BTEX) by EPA Method 8021B. The laboratory analytical reports and chain-of-custody records for the groundwater samples collected during the September 1999 field activities are included in Appendix B.

Current and cumulative analytical results for BTEX, TPH-D, and TPH-G are presented in Table 4. Six monitor wells (MW-5, MW-10, MW-11A, MW-12, MW-12D and OW-4) were sampled for methane/ethylene/ethane, nitrate, and sulfate to evaluate natural attenuation processes. The results of these analyses are presented in Table 5.

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

Benzene concentrations in monitor wells MW-1, MW-3, and MW-4, which are located near the former source area, have continued to decrease since the modification of the biosparging system in February/March 1998. Benzene was not detected in any of these wells during the September 1999 sampling event. Benzene concentrations in a nearby off-site monitor well, MW-9, have not exceeded 0.01 mg/L since March 1997. Benzene has not been detected in monitor wells MW-1 or MW-9 since September 1998.

The decrease in benzene concentration from 0.075 mg/L in monitor well MW-12 (screened at a depth of 50 feet to 65 feet bgs) to less than 0.001 mg/L in monitor well MW-12D (screened at a depth of 77.5 feet to 87.5 feet bgs) suggests that benzene impact to groundwater, where present, is limited vertically to the uppermost portion of the aquifer. A similar vertical gradient in benzene concentration at the MW-12/MW-12D location was observed during the June/July 1999 sampling event at the facility.

Benzene was detected at a concentration of 1.5 mg/L in a groundwater sample collected from monitor well MW-13 on July 2, 1999. Adjustments to the biosparging system were made on July 14, 1999 to increase air flow to biosparging system Lateral No. 1, located in the eastern portion of the plume associated with the former fueling system (i.e., the western plume). Well construction details for the air injection portion of air injection/extraction wells AV-16 through AV-19 that comprise Lateral No.1, located in the downgradient area of the western plume, are as follows:

Well	Screened Interval (ft below grade)	Screened Interval (ft above MSL)	Top of Filter Pack (ft below grade)	Top of Filter Pack (ft above MSL)
AV-16	58.8-61.3	3585.4-3582.9	55.5	3588.7
AV-17	58-60.5	3586.2-3583.7	55.7	3588.5
AV-18	58-60.5	3586.2-3583.7	52.2	3592.0
AV-19	57.9-60.4	3586.3-3583.8	53.2	3591.0

At the time of the installation of the biosparging system in November 1995, the depth to groundwater in monitor wells MW-1, MW-6, MW-7, and MW-8, which are located in the vicinity \\BCHOU01\PROJECTS\Wp\BJSERV\12832\055r.doc 4

of air injection/extraction wells AV-16 through AV-19, ranged from approximately 51.2 to 52.0 feet below grade (i.e., 3593.07 to 3593.84 feet above mean sea level). The depths of submergence of the top of the filter pack surrounding the air injection screened interval of wells AV-16 through AV-19 therefore ranged from approximately 1 to 5 feet below the top of the saturated zone at the time that these wells were installed. Groundwater elevations have declined since November 1995, however, as documented in the June/July 1999 Quarterly Sampling Report for the BJ Services Hobbs, New Mexico Facility (Brown and Caldwell, 1999). Based on data from monitor wells MW-1, MW-7, MW-8, and MW-13 collected on July 2, 1999 (see Table 2), the depths of submergence of the top of the filter pack surrounding the air injection screened interval of wells AV-16 through AV-19 ranged from approximately 2.9 feet above to 0.6 feet below the top of the saturated zone at that time. Therefore, in addition to increasing air flow to Lateral No. 1, air flow was shut off to wells non-submerged wells AV-18 and AV-19, so that all of the air directed to Lateral No.1 would be injected through wells AV-16 and AV-17, which remained submerged.

These adjustments resulted in a decrease in the concentration of benzene in monitor well MW-13 from 1.5 mg/L on July 2, 1999 to 0.860 mg/L on September 14, 1999 and a decrease in total BTEX concentration from 2.331 mg/L to 1.360 mg/L in this well over that time period, a decline of approximately 42% for both of these parameters.

A total petroleum hydrocarbon distribution map for the September 1999 sampling event is presented in Figure 4. Concentrations of TPH-G and/or TPH-D decreased relative to June/July 1999 concentrations or remained at non-detectable levels in all wells except MW-12 during the September 1999 sampling event. In monitor well MW-12, TPH-D dropped from 0.22 mg/L to less than 0.20 mg/L between June 1999 and September 1999, but the TPH-G concentration increased from 0.13 mg/L to 0.23 mg/L during this time period.

### 2.3 Natural Attenuation Evaluation

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

The primary evidence of natural attenuation is plume behavior. Natural attenuation of hydrocarbons is occurring at a rate greater than hydrocarbon loading from the source area when a hydrocarbon plume is decreasing in size or concentration. Conversely, increases in size or hydrocarbon concentrations of a plume indicate that rates of hydrocarbon loading exceed the natural attenuation capacity in the area. Concentrations of total dissolved-phase BTEX stabilized at concentrations generally less than 100 mg/L subsequent to removal of the field waste tanks in March 1997. Dissolved-phase BTEX concentrations in former field waste tanks area monitor wells MW-10 and MW-11A have displayed continuous decreases from September 1998 to the present. Monitor well MW-12 also displayed a decrease in BTEX concentration between September 1998 and June 1999. The increase in BTEX concentration in monitor well MW-12 between June 1999 and September 1999 may be attributed to sporadic loading from the vadose zone in excess of the natural attenuation capacity of the area.

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

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

Monitor well MW-12 contains the highest hydrocarbon concentrations observed in the eastern plume (i.e., in the former field waste tanks area). The DO concentration measured in monitor well MW-12 is depressed relative to monitor wells MW-10 and MW-11A, which are located at the fringe of the eastern plume and display lower to non-detectable hydrocarbon concentrations.

A similar phenomenon was observed in the western plume. The DO concentration measured in monitor well MW-13, which contains the highest hydrocarbon concentrations observed in the western plume, is depressed relative to DO concentrations observed in other monitor wells located in the vicinity of the western plume.

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

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

Nitrate concentrations were measured at less than 0.1 mg/L in monitor wells MW-10, MW-12, and MW-12D and at 0.22 mg/L in monitor well MW-11A. These concentrations are less than the background nitrate concentration of 4.3 mg/L measured in monitor well MW-5 (see Table 5). The decreased nitrate concentrations in monitor wells MW-10, MW-11A, MW-12, and MW-12D provide secondary evidence that natural attenuation of hydrocarbons is occurring at the facility.

No BTEX constituents were detected in downgradient well OW-4. The nitrate concentration of 3.5 mg/L in OW-4 is comparable to the nitrate concentration of 4.3 mg/L observed in background in well MW-5. The combination of non-detectable BTEX concentration and nitrate concentration near that of background in downgradient well OW-4 supports the contention that the decreased nitrate concentrations observed in monitor wells MW-10, MW-11A, MW-12, and MW-12D reflects natural attenuation of hydrocarbons in this area rather than a simple eastward decrease in nitrate content of groundwater at the facility.

3. When DO and nitrate are depleted, anaerobic microbes that utilize other electron acceptors become active. Ferrous iron is the reduction product of ferric iron, a common electron acceptor. Therefore, ferrous iron concentrations should increase in areas where intrinsic bioremediation is occurring. Ferrous iron was measured at concentrations ranging from 6 mg/L to 8 mg/L in monitor wells MW-10, MW-11A, and MW-12 (see Table 3). Ferrous iron was not detected in the background wells at the facility (MW-5, MW-7, and MW-8).

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

4. Redox is a measure of chemical energy in groundwater. Redox values in the vicinity of background wells MW-5, MW-7, and MW-8 ranged from 241.1 millivolts (mV) to 269.2 mV (see Table 3). Redox values in the vicinity of former field waste tanks area wells MW-10, MW-11A, and MW-12 ranged from 30.2 mV to -118.7 mV. The predominantly negative redox values in monitor wells MW-10, MW-11A, and MW-12 indicate that electron acceptors other than dissolved oxygen and nitrate (e.g., ferric iron) are being utilized in these areas.

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

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

6. Fatty acids are formed as hydrocarbons degrade. These fatty acids may dissolve carbonates in saturated zone soils, causing alkalinity to increase where biodegradation is occurring. The alkalinity data generated during the September 1999 groundwater sampling event may also provide evidence that natural attenuation of hydrocarbons is occurring. Former field waste tanks area monitor wells MW-10, MW-11A, and MW-12 displayed elevated alkalinity levels relative to all wells at the facility, suggesting that natural attenuation of hydrocarbons is occurring in the vicinity of these wells.

The sulfate data presented in Table 5 displays no discernable trend, indicating that sulfate in not being utilized during intrinsic bioremediation.

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

It is recommended that monitoring for natural attenuation evaluation parameters continue in the former field waste tanks area wells, downgradient well OW-4, and in background monitor well MW-5.

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### 3.0 **REMEDIATION SYSTEM**

Brown and Caldwell submitted a Remedial Action Plan (RAP) to the NMOCD in May 1994. Based on the results of previous investigations conducted by Brown and Caldwell and Roberts/Schornick and Associates, Inc. (RSA), Brown and Caldwell recommended the installation of a biosparging system. The biosparging system simultaneously treats volatile and semivolatile contaminants adsorbed directly to the soil (i.e., residual) as well as contaminants present in soil moisture (i.e., dissolved phase) within the capillary fringe and vadose zone. Additionally, the biosparging system removes volatile and semivolatile contaminants from the saturated zone. The biosparging system operates by injecting air into the saturated zone and extracting air from the vadose zone through a network of wells and piping. The continuous flushing of air through the saturated zone increases the dissolved oxygen concentration in groundwater and in soil moisture present in the capillary fringe and vadose zone. The elevated dissolved oxygen content facilitates the activities of indigenous microorganisms to accelerate biodegradation of contaminants. The flushing of air also strips volatile and semivolatile contaminants.

### **3.1** System Installation and Effectiveness

The NMOCD approved the RAP on August 11, 1994. Installation activities for the biosparging system were conducted August 2 through 24, 1995. Nineteen combined injection and extraction wells, three vacuum extraction wells, associated piping, one extraction blower, and one injection blower were installed. An additional vapor extraction well, VE-4, was installed and connected to the vapor extraction system in April 1997. Five additional injection wells, AI-20 through AI-24, were installed in February 1998. Injection wells AI-20 through AI-24 were installed at locations near the center of the plume associated with the former fueling system. These injection wells were constructed such that a 10-foot screen submergence was achieved, thereby providing treatment to an expanded vertical interval of the aquifer in that area. Injection wells AI-20 through AI-24 are supplied by a separate blower than the one used to supply injection wells AI-1 through AI-19 in order to avoid short-circuiting to wells with less screen submergence. Three additional vapor extraction wells, VE-5 through VE-7, were also installed in February 1998. The new injection and

extraction wells were brought on-line on March 10, 1998, and operation of injection wells AI-1 through AI-19, which had been suspended on February 19, 1998, was resumed on March 24, 1998.

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

Benzene concentrations have decreased from 0.240 mg/L in monitor well MW-3 and 0.230 mg/L in monitor well MW-4 to less than 0.001 mg/L in both wells between December 1997 and September 1999. Similarly, total BTEX concentrations have decreased from 1.930 mg/L to nondetectable levels in monitor well MW-3 and from 4.250 mg/L to 0.016 mg/L in monitor well MW-4 between December 1997 and September 1999. TPH concentrations in monitor well MW-3 dropped from 5.89 mg/L to non-detectable levels during this time period, and TPH concentrations in MW-4 have declined from 19.7 mg/L to 0.52 mg/L. These decreases are attributable to increased air flow being applied to the aquifer through air injection wells AI-20 through AI-24.

Similarly, the application of increased air flow to Lateral No. 1 injection wells AV-16 and AV-17 in mid-July 1999 resulted in a substantial decrease in the concentrations of benzene and total BTEX in monitor well MW-13 between July 2, 1999 and on September 14, 1999.

A graph showing the calculated dissolved-phase benzene mass in the western plume versus time is presented in Figure 5. This graph shows that the plume mass was increasing up until December 1995, when the biosparging system was installed. This increase was probably due to benzene loading to groundwater from vadose zone soils. The benzene mass then decreased \\BCHOU01\PROJECTS\Wp\BJSERV\12832\055r.doc

steadily after installation of the biosparging system. The plume mass has continued to decrease since the system modifications were implemented in February 1998. This indicates that the system modifications have been effective in increasing benzene removal from groundwater in the center of the former western plume area.

### 3.2 Air Emissions

The vapors recovered during the extraction process are discharged to the atmosphere in accordance with the State of New Mexico Air Quality Regulations. Following initial system startup operations, effluent air samples were collected on a monthly basis from the recovered vapors to monitor the bioremediation process and emission rate. Upon receiving a determination from the State of New Mexico that an air permit was not required, effluent air samples were collected and analyzed voluntarily on a quarterly basis through July 1997. The air samples were analyzed for TPH using EPA Method Modified 8015A (Air) and for total volatile aromatic hydrocarbons (BTEX) using EPA Method 5030/8020 (modified).

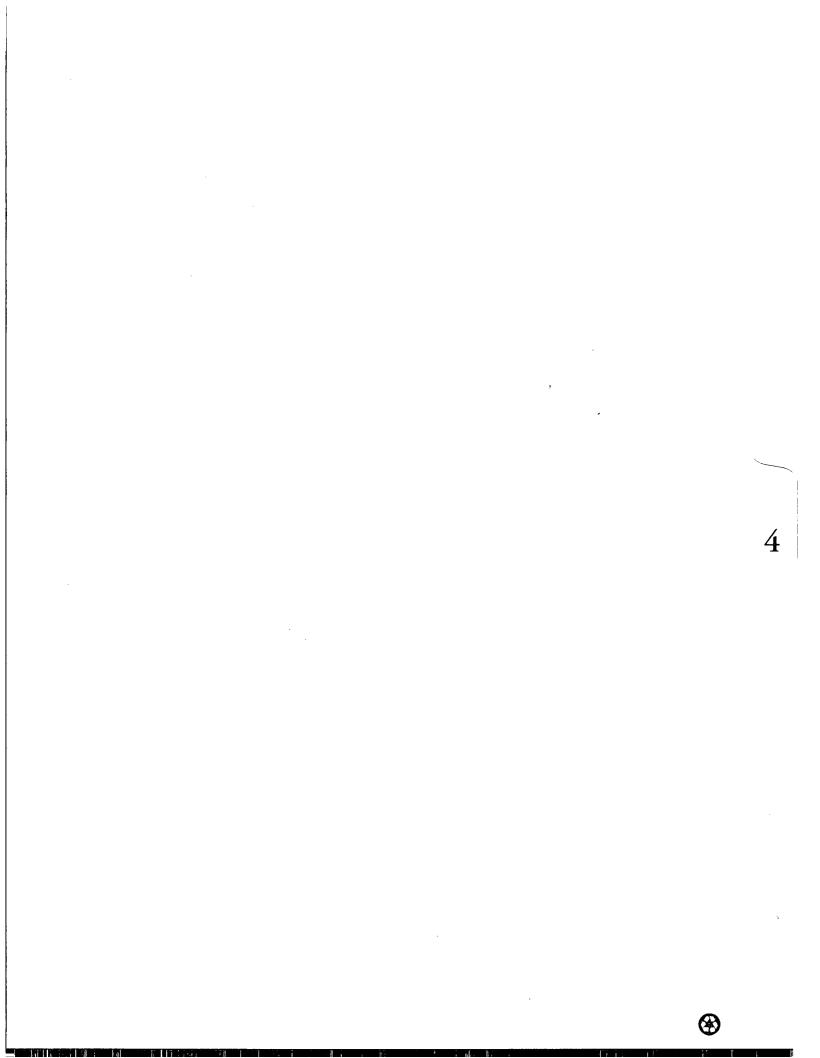
The analytical results demonstrated a significant reduction in hydrocarbon vapor concentrations and emissions rates between November 1995 and July 1997. Total BTEX concentrations decreased from 391 parts per million by volume (ppmv) in November 1995 to 17.3 ppmv in July 1997. The corresponding BTEX emissions decreased from 0.77 lb/hour to 0.03 lb/hour. TPH concentrations decreased from 1,870 ppmv in November 1995 to 65 ppmv in July 1997. The corresponding TPH - Volatile Organic Compound (VOC) emissions rate decreased from 3.21 lb/hour to 0.08 lb/hour. These emission rates were well below the regulatory limit of 10 lb/hour for VOCs. Therefore, use of a field monitoring instrument utilizing a flame ionization detector (FID) to measure the VOC concentration in the vapors commenced in September 1997. The VOC measurements collected using the FID correspond to TPH concentrations previously determined in the analytical laboratory. The VOC concentration measured using the FID during the September 1999 sampling event was 12.5 parts per million by volume (ppmv).

The TPH concentration of 12.5 ppmv measured during the September 1999 sampling event shows a substantial drop from the 1500 ppmv TPH discharge rate observed during the March 24, 1998 groundwater sampling event. The September 1999 TPH discharge rate of 12.5 ppmv is comparable to TPH concentrations measured during the time period from August 1996 through December 1997, prior to the system modifications performed in February and March 1998. The increased TPH concentration observed in the March 1998 event relative to the time period from August 1997 through December 1997 is believed to be a result of the addition of air injection wells AI-20 through AI-24 to the biosparging system. However, discharge rates have returned to more typical levels during the period from June 1998 through September 1999.

The VOC emissions rate calculated for the September 1999 groundwater sampling event was 0.02 pound per hour (lb/hour). This emission rate is below the regulatory limit of 10 lb/hour for VOCs. The September 1999 VOC emissions rate is typical of VOC emissions rates during the time period of August 1996 through December 1997, and represents a substantial drop from the 1.91 lb/hour VOC emissions rate calculated for the March 1998 sampling event. Discharge rates have varied between 0.02 lb/hour and 0.33 lb/hour during the time period of June 1998 through September 1999.

A cumulative summary of analytical results for air emissions monitoring is included in Table 6. These results are based on both laboratory and field analyses.

The initial increase in mass transfer rates after system modification was indicative of increased stripping of hydrocarbons within soil and groundwater from pathways that were not in contact with injected air prior to the system modification. The subsequent decrease in mass transfer, in concert with plume mass calculations shown in Figure 5, indicate that the overall contaminant mass has been reduced by operation of the biosparging system.



# 4.0 CONCLUSIONS AND RECOMMENDATIONS

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

### 4.1 Conclusions

- Groundwater flow was to the east-northeast at an average hydraulic gradient of 0.006 ft/ft.
- Dissolved benzene, BTEX, and TPH concentrations in monitor wells MW-1, MW-3 and MW-4, which are located at the former fueling system area, continued to decline and are below applicable standards.
- Benzene concentrations in all monitor wells at the facility except MW-12 and MW-13 are at or below the New Mexico WQCC standard of 0.01 mg/L for benzene.
- Increases in air flow rates to biosparge injection wells AI-16 and AI-17 have resulted in substantially decreased benzene and total BTEX concentrations in monitor well MW-13 between July 2, 1999 and September 14, 1999.
- No BTEX or TPH constituents have been detected in monitor well MW-12D, which is screened at a depth of approximately 20 to 30 feet below the top of the uppermost aquifer at the facility. Comparison of this data to BTEX and TPH concentrations in adjacent monitor well MW-12, which is screened in the uppermost portion of the aquifer, suggests that hydrocarbon impact to groundwater, where present at the facility, is limited to the uppermost portion of the aquifer.
- Natural attenuation processes appear to be occurring to reduce hydrocarbon concentrations in monitor wells MW-10 and MW-11A, which are located in the vicinity of the former field waste tanks that were removed in March 1997.

# 4.2 Recommendations

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

- Continue monitoring hydrocarbon emissions on a quarterly basis using a calibrated field FID.
- Continue monitoring for natural attenuation parameters in monitor wells MW-5, MW-10, MW-11A, MW-12, MW-12D, and OW-4.
- Convert from quarterly monitoring to annual monitoring for monitor wells MW-1, MW-8, and MW-9. Benzene concentrations in monitor wells MW-1 and MW-9 have not exceeded the New Mexico WQCC benzene standard of 0.01 mg/L for five and ten quarters, respectively; benzene has not been detected in monitor well MW-8 since August 1995.

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### DISTRIBUTION

September 1999 Groundwater Sampling Report BJ Services Company, U.S.A. Hobbs, New Mexico

November 29, 1999

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

Attention: Mr. Wayne Price

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

Attention: Mr. Chris Williams

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

Attention: Ms. Jo Ann Cobb

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Attention: Mr. Roger Sullivan

1 copy to: Brown and Caldwell, Project File

QUALITY CONTROL REVIEWER

Jennings, P.E.

Vice President

RLR/uak/srd

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# FIGURES

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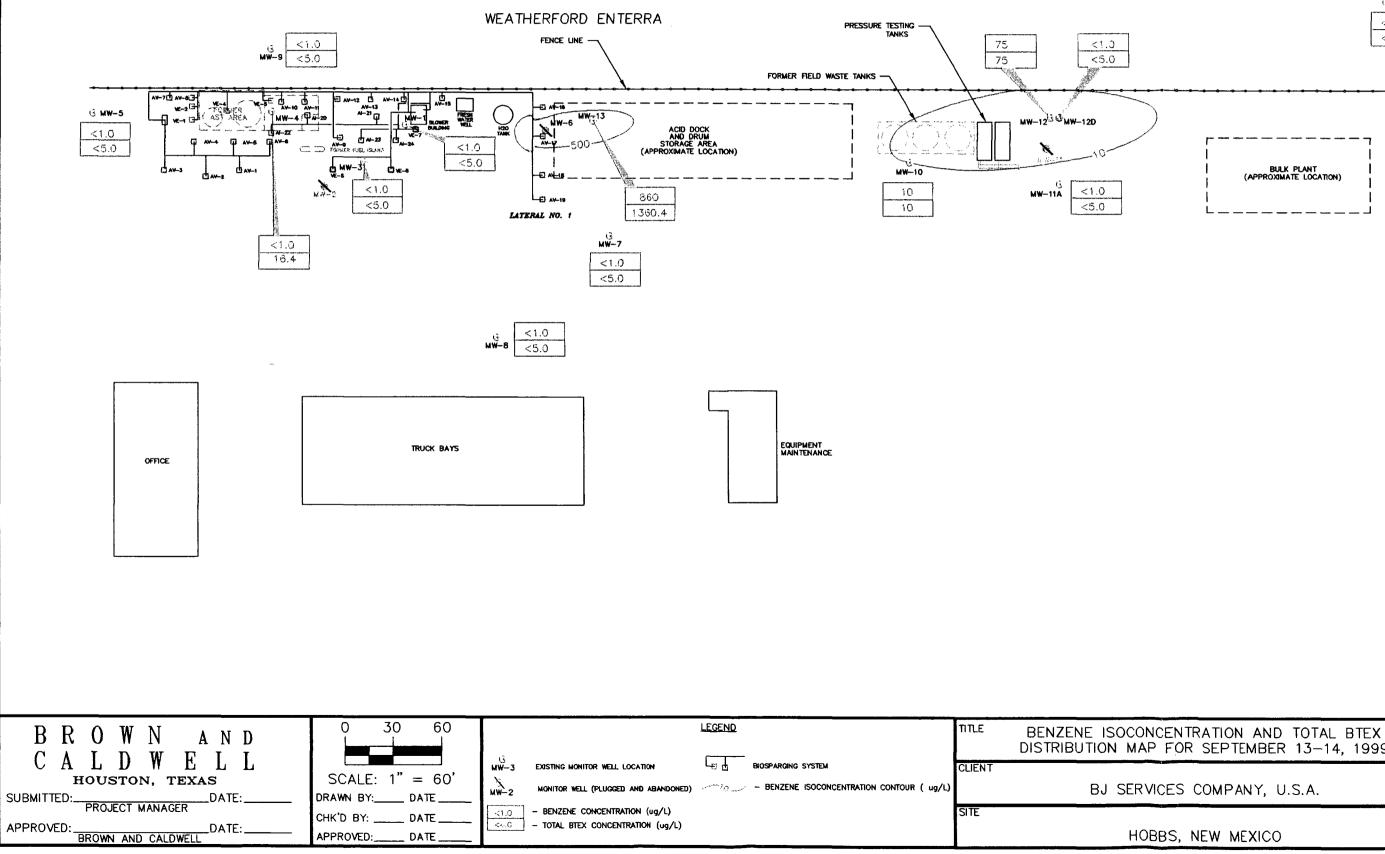
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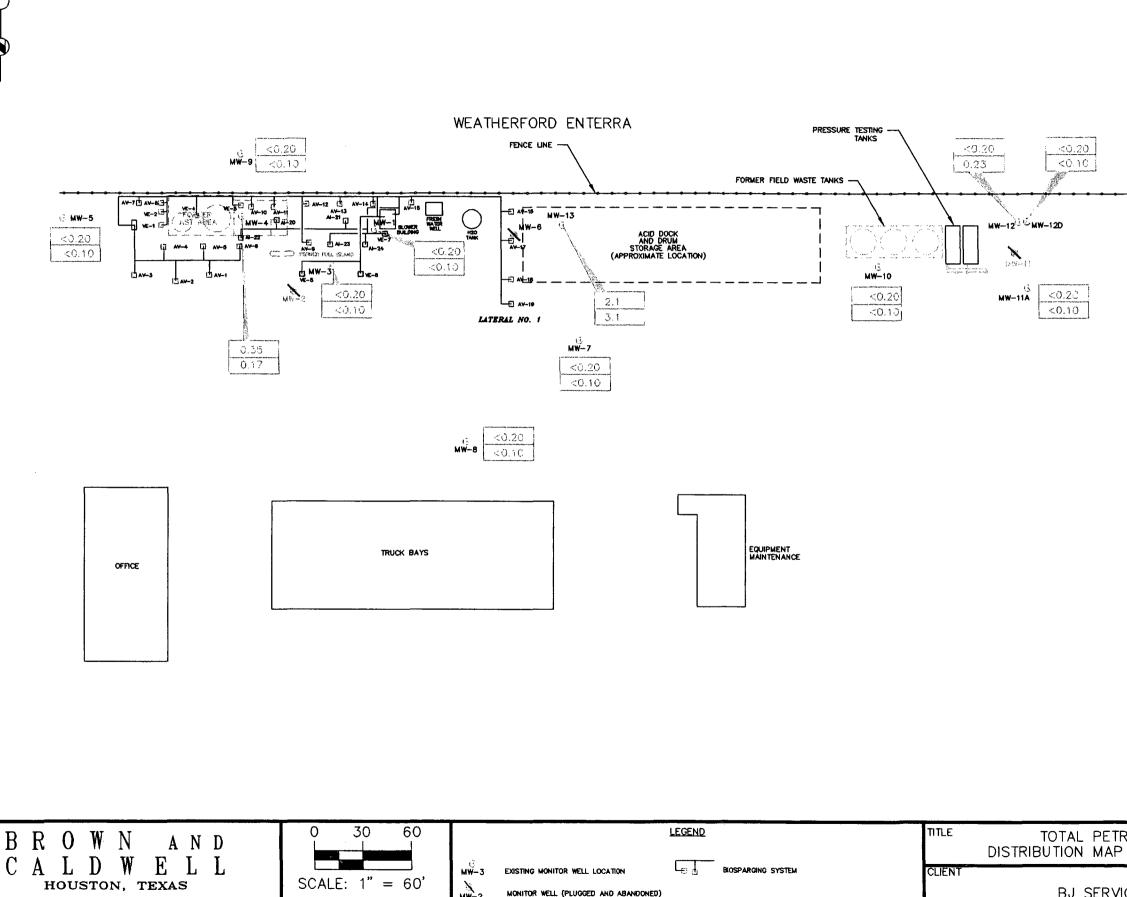
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BULK PLANT (APPROXIMATE LOCATION)





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MONITOR WELL (PLUGGED AND ABANDONED)

MW-3

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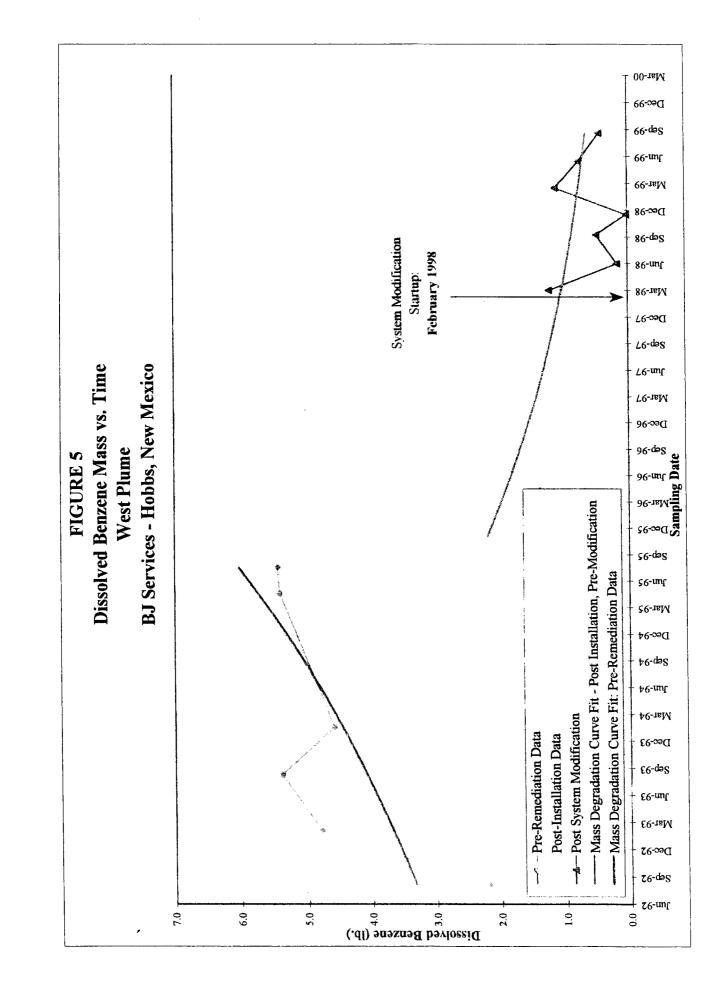
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HOBBS, NEW MEXICO	4



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# Tables

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**TABLES** 

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

Date	Activity
February 7, 1991	The State of New Mexico Oil Conservation Division (OCD) conducted an on-site inspection, including sampling of the on-site fresh water well.
August 6, 1991	OCD requested submittal of an investigation work plan.
September 5, 1991	Roberts/Schornick and Associates, Inc. (RSA) submitted Technical Work Plan for soil and groundwater investigation to the OCD.
November 15, 1991	The OCD approved Technical Work Plan submitted by RSA.
December 16, 1991	RSA sampled the fresh water well. Analytical results were submitted to the OCD.
February 21, 1992	Western sampled the fresh water well. Analytical results were submitted to the OCD.
July 29 - August 10, 1992	Brown and Caldwell conducted a soil and groundwater investigation according to the approved Technical Work Plan. Investigation included drilling and sampling 9 soil borings, sampling 6 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.

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### 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.		

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

Date	Activity				
August 23, 1996	Brown and Caldwell conducted the August 1996 groundwater sampling event.				
December 2, 1996	Brown and Caldwell conducted the December 1996 groundwater sampling event.				
March 6-7, 1997	BJ Services removed the field waste tank and associated hydrocarbon impacted soil.				
March 12, 1997	Brown and Caldwell conducted the March 1997 groundwater sampling event.				
March 14, 1997	Vapor extraction well VE-4 installed.				
April 1997	Vapor extraction well VE-4 connected to the vapor extraction system.				
June 12, 1997	Brown and Caldwell conducted the June 1997 groundwater sampling event.				
September 11-12, 1997	Brown and Caldwell conducted the September 1997 groundwater sampling event.				
December 10, 1997	Brown and Caldwell conducted the December 1997 groundwater sampling event.				
February 3-14, 1998	Air injection wells AI-20 through AI-24, vapor extraction wells VE-5 though VE-7 and monitor wells MW-11A and MW-12 were installed.				
February 19, 1998	Operation of previously existing injection wells suspended in preparation for start-up of injection wells AI-20 through AI-24.				
March 10, 1998	Operation of air injection wells AI-20 through AI-24 commenced.				
March 23-24, 1998	Brown and Caldwell conducted the March 1998 groundwater sampling event.				
March 24, 1998	Operation of previously existing injection wells resumed.				
June 23, 1998	Brown and Caldwell conducted the June 1998 groundwater sampling event.				
September 30, 1998	Brown and Caldwell conducted the September 1998 groundwater sampling event.				
December 9-10, 1998	Brown and Caldwell conducted the December 1998 groundwater sampling event.				
January 21, 1999	NMOCD requested submittal of a work plan by March 22, 1999 to perform additional groundwater delineation in the area of the former field waste tanks and the former AST/MW-6 area.				

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

Date	Activity
March 9-10, 1999	Brown and Caldwell conducted the March 1999 groundwater sampling event.
March 19, 1999	Brown and Caldwell submitted the work plan for groundwater delineation activities that was requested on January 22, 1999 to NMOCD.
May 19, 1999	NMOCD approved the groundwater delineation work plan.
June10, 1999	Brown and Caldwell performed sampling of existing monitor wells for the June /July 1999 groundwater sampling event.
July 2, 1999	Brown and Caldwell completed plugging and abandonment of monitor wells MW-2, MW-6, and MW-11; installed and developed monitor wells MW-12D and MW-13; and sampled monitor wells MW-12D and MW-13 to complete the June/July 1999 groundwater sampling event.
July 14, 1999	Brown and Caldwell redirected air discharge from the shallow well injection system to Lateral No. 1 and optimized air flow to injection wells AI-16 and AI-17 to apply increased remedial pressure to the eastern potion of the west plume.
September 13-14, 1999	Brown and Caldwell conducted the September 1999 groundwater sampling event.

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Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-1						
	3,647.53	8/10/92	53.22	0.00	3,594.31	(1)
	3,647.53	2/9/93	53.03	0.00	3,594.50	
	3,647.53	8/18/93	53.10	0.00	3,594.43	
	3,647.53	1/26/94	53.31	0.00	3,594.22	
	3,647.53	5/3/95	54.64	0.20	3,593.05	(2)
	3,647.53	7/31/95	54.14	0.00	3,593.39	
	3,647.53	11/14/95	53.69	0.00	3,593.84	
	3,647.53	2/23/96	54.32	0.00	3,593.21	
	3,647.53	5/31/96	54.14	0.00	3,593.39	
	3,647.53	8/23/96	56.17	0.00	3,591.36	
	3,647.53	12/2/96	55.27	0.00	3,592.26	
	3,647.53	3/12/97	55.70	0.27	3,592.05	(3)
	3,647.53	6/12/97	55.08	0.02	3,592.47	
	3,647.53	9/12/97	55.64	0.51	3,592.31	
	3,647.53	12/10/97	55.46	0.00	3,592.07	PSH Sheen
	3,647.53	3/24/98	55.81	0.00	3,591.72	PSH Sheen
	3,647.53	6/23/98	56.38	0.06	3,591.20	
	3,647.53	9/30/98	56.82	0.00	3,590.71	PSH Sheen
	3,647.53	12/9/98	57.05	0.00	3,590.48	
	3,647.53	3/10/99	57.45	0.00	3,590.08	
	3,647.53	6/10/99	58.02	0.00	3,589.51	
	3,647.53	7/2/99	57.90	0.00	3,589.63	
<u></u>	3,647.53	9/14/99	58.14	0.00	3,589.39	
MW-2						
	3,647.59	8/10/92	52.82	0.00	3,594.77	(1)
	3,644.84	2/9/93	49.60	0.00	3,595.24	
	3,644.84	8/18/93	49.71	0.00	3,595.13	
	3,644.84	1/26/94	49.97	0.00	3,594.87	
		5/3/95				(4),(5)

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Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-3						
	3,647.68	8/10/92	52.99	0.00	3,594.69	(1)
	3,647.68	2/9/93	52.72	0.00	3,594.96	
	3,647.68	8/18/93	52.82	0.00	3,594.86	
	3,647.68	1/26/94	53.05	0.00	3,594.63	
	3,647.68	5/3/95	54.31	0.00	3,593.37	
	3,645.00	7/31/95	51.24	0.00	3,593.76	
	3,645.00	11/14/95	51.10	0.00	3,593.90	
	3,645.00	2/23/96	51.68	0.00	3,593.32	
	3,645.00	5/31/96	51.45	0.00	3,593.55	
	3,645.00	8/23/96	51.55	0.00	3,593.45	
	3,645.00	12/2/96	52.23	0.00	3,592.77	
	3,645.00	3/12/97	52.67	0.00	3,592.33	(3)
	3,645.00	6/12/97	52.68	0.00	3,592.32	
	3,645.00	9/11/97	52.71	0.00	3,592.29	
	3,645.00	12/10/97	52.89	0.00	3,592.11	
	3,645.00	3/23/98	53.22	0.00	3,591.78	
	3,645.00	6/23/98	53.66	0.00	3,591.34	
	3,645.00	9/30/98	54.06	0.00	3,590.94	
	3,645.00	12/9/98	54.36	0.00	3,590.64	
	3,645.00	3/10/99	54.72	0.00	3,590.28	
	3,645.00	6/10/99	55.17	0.00	3,589.83	
	3,645.00	7/2/99	55.15	0.00	3,589.85	
	3,645.00	9/14/99	55.42	0.00	3,589.58	

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Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-4						
	3,645.28	8/10/92	50.55	0.00	3,594.73	(1)
	3,645.28	2/9/93	50.26	0.00	3,595.02	
	3,645.28	8/18/93	50.3 <b>8</b>	0.00	3,594.90	
	3,645.28	1/26/94	50.90	0.30	3,594.63	
	3,645.28	5/3/95	51.51	0.45	3,594.14	
	3,645.28	7/31/95	51.74	0.26	3,593.75	
	3,645.28	11/14/95	51.03	0.00	3,594.25	
	3,645.28	2/23/96	51.65	0.01	3,593.64	
	3,645.28	5/31/96	51.48	0.00	3,593.80	
	3,645.28	8/23/96	53.4 <del>9</del>	0.00	3,591.79	
	3,645.28	12/2/96	52.32	0.00	3,592.96	
	3,645.28	3/12/97	52.74	0.05	3,592.58	(3)
	3,645.28	6/12/97	53.08	0.44	3,592.56	
	3,645.28	9/12/97	52.60	0.15	3,592.80	
	3,645.28	12/10/97	52.8 <del>9</del>	0.00	3,592.39	PSH Sheen
	3,645.28	3/24/98	53.20	0.25	3,592.29	
	3,645.28	6/23/98	53.82	0.22	3,591.64	
	3,645.28	9/30/98	53.96	0.00	3,591.32	200 ml PSH
	3,645.28	12/9/98	54.27	0.00	3,591.01	
	3,645.28	3/10/99	54.69	0.04	3,590.62	
	3,645.28	6/10/99	55.07	0.00	3,590.21	
	3,645.28	7/2/99	55.10	0.00	3,590.18	
	3,645.28	9/14/99	55.33	0.00	3,589.95	

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

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Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-5						
	3,647.72	8/10/92	52.38	0.00	3,595.34	(1)
	3,647.72	2/9/93	52.06	0.00	3,595.66	
	3,647.72	8/18/93	52.16	0.00	3,595.56	
	3,647.72	1/26/94	52.50	0.00	3,595.22	
	3,647.72	5/3/95	53.57	0.00	3,594.15	
	3,647.72	7/31/95	53.27	0.00	3,594.45	
	3,647.72	11/14/95	52.83	0.00	3,594.89	
	3,647.72	2/23/96	53.57	0.00	3,594.15	
	3,647.72	5/31/96	53.16	0.00	3,594.56	
	3,647.72	8/23/96	53.41	0.00	3,594.31	
	3,647.72	12/2/96	53.98	0.00	3,593.74	
	3,647.72	3/12/97	54.44	0.00	3,593.28	(3)
	3,647.72	6/12/97	<b>54.48</b>	0.00	3,593.24	
	3,647.72	9/12/97	54.2 <del>9</del>	0.00	3,593.43	
	3,647.72	12/10/97	54.66	0.00	3,593.06	
	3,647.72	3/23/98	55.05	0.00	3,592.67	
	3,647.72	6/23/98	55.44	0.00	3,592.28	
	3,647.72	9/30/98	55.65	0.00	3,592.07	
	3,647.72	12/9/98	56.00	0.00	3,591.72	
	3,647.72	3/9/99	56.45	0.00	3,591.27	
	3,647.72	6/10/99	56.91	0.00	3,590.81	
	3,647.72	7/2/99	56.93	0.00	3,590.7 <del>9</del>	
	3,647.72	9/14/99	57.12	0.00	3,590.60	

Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-6		<u></u>				
	3,644.74	2/9/93	50.58	0.00	3,594.16	(1)
	3,644.74	8/18/93	50.78	0.00	3,593.96	
	3,644.74	1/26/94	51.00	0.00	3,593.74	
•	3,644.74	5/3/95	52.63	0.00	3,592.11	
	3,644.74	7/31/95	51.90	0.00	3,592.84	
	3,644.74	11/14/95	51.19	0.00	3,593.55	
	3,644.74	2/23/96	52.10	0.00	3,592.64	
	3,644.74	5/31/96	51.76	0.00	3,592.98	
	3,644.74	8/23/96	51.63	0.00	3,593.11	
	3,644.74	12/2/96	52.85	0.00	3,591.89	
	3,644.74	3/12/97	53.55	0.00	3,591.19	(3)
	3,644.74	6/12/97	52.08	0.00	3,592.66	
	3,644.74	9/11/97	53.72	0.00	3,591.02	
	3,644.74	12/10/97	53.27	0.00	3,591.47	
	3,644.74	3/23/98	53.56	0.00	3,591.18	
	3,644.74	6/23/98	52.88	0.00	3,591.86	
	3,644.74	9/30/98	54.89	0.00	3,589.85	
	3,644.74	12/9/98	54.57	0.00	3,590.17	
	3,644.74	3/10/99	55.10	0.00	3,589.64	
		7/2/99				(5)

Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-7						
	3,644.55	2/9/93	50.53	0.00	3,594.02	(1)
	3,644.55	8/18/93	50.74	0.00	3,593.81	
	3,644.55	1/26/94	51.01	0.00	3,593.54	
	3,644.55	5/3/95	52.25	0.00	3,592.30	
	3,644.55	7/31/95	51.92	0.00	3,592.63	
	3,644.55	11/14/95	51.48	0.00	3,593.07	
	3,644.55	2/23/96	52.15	0.00	3,592.40	
	3,644.55	5/31/96	51. <b>78</b>	0.00	3,592.77	
	3,644.55	8/23/96	52.02	0.00	3,592.53	
	3,644.55	12/2/96	52.52	0.00	3,592.03	
	3,644.55	3/12/97	52.99	0.00	3,591.56	(3)
	3,644.55	6/12/97	53.08	0.00	3,591.47	
	3,644.55	9/11/97	53.00	0.00	3,591.55	
	3,644.55	12/10/97	53.28	0.00	3,591.27	
	3,644.55	3/23/98	53.59	0.00	3,590.96	
	3,644.55	6/23/98	54.20	0.00	3,590.35	
	3,644.55	9/30/98	54.54	0.00	3,590.01	
	3,644.55	12/9/98	54.74	0.00	3,589.81	
	3,644.55	3/9/99	55.15	0.00	3,589.40	
	3,644.55	6/10/99	55.66	0.00	3,588.89	
	3,644.55	7/2/99	55.73	0.00	3,588.82	
	3,644.55	9/13/99	55.94	0.00	3,588.61	

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Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-8						
	3,644.87	2/9/93	50.48	0.00	3,594.39	(1)
	3,644.87	8/18/93	50.67	0.00	3,594.20	
	3,644.87	1/26/94	50.96	0.00	3,593.91	
	3,644.87	5/3/95	52.15	0.00	3,592.72	
	3,644.87	7/31/95	51.77	0.00	3,593.10	
	3,644.87	11/14/95	51.37	0.00	3,593.50	
	3,644.87	2/23/96	52.17	0.00	3,592.70	
	3,644.87	5/31/96	51.55	0.00	3,593.32	
	3,644.87	8/23/96	51.92	0.00	3,592.95	,
	3,644.87	12/2/96	52.43	0.00	3,592.44	
	3,644.87	3/12/97	52.93	0.00	3,591.94	(3)
	3,644.87	6/12/97	53.96	0.00	3,590.91	
	3,644.87	9/11/97	52.73	0.00	3,592.14	
	3,644.87	12/10/97	53.15	0.00	3,591.72	
	3,644.87	3/23/98	53.51	0.00	3,591.36	
	3,644.87	6/23/98	54.01	0.00	3,590.86	
	3,644.87	9/30/98	54.35	0.00	3,590.52	
	3,644.87	12/9/98	54.60	0.00	3,590.27	,
	3,644.87	3/9/99	55.00	0.00	3,589.87	
	3,644.87	6/10/99	55.56	0.00	3,589.31	
	3,644.87	7/2/99	55.57	0.00	3,589.30	
	3,644.87	9/13/99	55.72	0.00	3,589.15	

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Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-9						
	3,644.78	4/22/93	49.73	0.00	3,595.05	(1)
	3,644.78	7/15/93	49.65	0.00	3,595.13	
	3,644.78	8/18/93	49.85	0.00	3,594.93	
	3,644.78	1/26/94	50.02	0.00	3,594.76	
	3,644.78	5/3/95	51.35	0.00	3,593.43	
	3,644.78	7/31/95	50.97	0.00	3,593.81	
	3,644.78	11/14/95	50.43	0.00	3,594.35	
	3,644.78	2/23/96	51.12	0.00	3,593.66	
	3,644.78	5/31/96	50.8 <del>9</del>	0.00	3,593.89	
	3,644.78	8/23/96	50.98	0.00	3,593.80	
	3,644.78	12/2/96	51.58	0.00	3,593.20	
	3,644.78	3/12/97	52.21	0.05	3,592.61	(3)
	3,644.78	6/12/97	52.10	0.00	3,592.68	PSH Sheen
	3,644.78	9/12/97	51.95	0.00	3,592.83	PSH Sheen
	3,644.78	12/10/97	52.37	0.00	3,592.41	Slight Sheen
	3,644.78	3/23/98	52.68	0.00	3,592.10	Slight Sheen
	3,644.78	6/23/98	53.08	0.00	3,591.70	PSH Sheen
	3,644.78	9/30/98	53.39	0.01	3,591.40	PSH Sheen
	3,644.78	12/9/98	53.68	0.00	3,591.10	
	3,644.78	3/10/99	54.15	0.00	3,590.63	
	3,644.78	6/10/99	54.68	0.00	3,590.10	
	3,644.78	7/2/99	54.71	0.00	3,590.07	
	3,644.78	9/13/99	54.71	0.00	3,590.07	

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

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Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-10		<u></u>				
	3,644.47	8/18/93	51.54	0.00	3,592.93	(1)
	3,644.47	1/26/94	51.90	0.00	3,592.57	
	3,644.47	5/3/95	52.97	0.00	3,591.50	
	3,644.47	7/31/95	52.87	0.00	3,591.60	
	3,644.47	11/14/95	52.51	0.00	3,591.96	
	3,644.47	2/23/96	53.05	0.00	3,591.42	
	3,644.47	5/31/96	52.79	0.00	3,591.68	
	3,644.47	8/23/96	53.03	0.00	3,591.44	
	3,644.47	12/2/96	53.41	0.00	3,591.06	
	3,644.47	3/12/97	54.21	0.00	3,590.26	(3)
	3,644.47	6/12/97	53.99	0.00	3,590.48	
	3,644.47	9/12/97	53.94	0.00	3,590.53	
	3,644.47	12/10/97	54.12	0.00	3,590.35	
	3,644.47	3/23/98	54.51	0.00	3,589.96	
	3,644.47	6/23/98	55.12	0.00	3,589.35	
	3,644.47	9/30/98	55.61	0.00	3,588.86	
	3,644.47	12/9/98	55.80	0.00	3,588.67	
	3,644.47	3/9/99	56.09	0.00	3,588.38	
	3,644.47	6/10/99	56.60	0.00	3,587.87	
	3,644.47	7/2/99	56.64	0.00	3,587.83	
	3,644.47	9/14/99	56.91	0.00	3,587.56	
MW-11						
	3,643.78	8/18/93	51.92	0.00	3,591.86	(1)
	3,643.78	1/26/94	52.32	0.00	3,591.46	
	3,643.78	5/3/95	53.38	0.00	3,590.40	
	3,643.78	7/31/95	53.35	0.00	3,590.43	
	3,643.78	11/14/95	52.96	0.00	3,590.82	
	3,643.78	2/23/96	53.50	0.00	3,590.28	
	3,643.78	5/31/96	53.25	0.00	3,590.53	
	3,643.78	8/23/96	53.49	0.00	3,590.29	
	3,643.78	12/2/96	53.79	0.00	3,589.99	
	3,643.78	3/12/97	53.81	0.00	3,589.97	(3)
	3,643.78	6/12/97	53.96	0.00	3,589.82	
	3,643.78	9/12/97	52.93	0.00	3,590.85	
		12/10/97				(5),(6)

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

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Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-11A						
	3,644.24	3/23/98	54.79	0.00	3,589.45	(7)
	3,644.24	6/23/98	55.43	0.00	3,588.81	
	3,644.24	9/30/98	55.96	0.00	3,588.28	
	3,644.24	12/9/98	56.13	0.00	3,588.11	
	3,644.24	3/10/99	56.43	0.00	3,587.81	
	3,644.24	6/10/99	56.94	0.00	3,587.30	
	3,644.24	7/2/99	57.01	0.00	3,587.23	
	3,644.24	9/14/99	57.36	0.00	3,586.88	
MW-12						
	3,644.29	3/23/98	54.72	0.00	3,589.57	(7)
	3,644.29	6/23/98	55.48	0.00	3,588.81	
	3,644.29	9/30/98	56.02	0.00	3,588.27	
	3,644.29	12/9/98	56.17	0.00	3,588.12	
	3,644.29	3/10/99	56.45	0.00	3,587.84	
	3,644.29	6/10/99	56.97	0.00	3,587.32	
	3,644.29	7/2/99	56.99	0.00	3,587.30	
	3,644.29	9/14/99	57.41	0.00	3,586.88	
MW-12D						······
	3,644.38	7/2/99	57.13	0.00	3,587.25	(8)
	3,644.38	9/14/99	57.74	0.00	3,586.64	
MW-13						
	3,645.52	7/2/99	56.60	0.00	3,588.92	(9)
	3,645.52	9/14/99	56.92	0.00	3,588.60	
OW-4		1. Brite Barry				
	3,644.06	7/2/99	58.18	0.00	3,585.88	(8)
	3,644.06	9/14/99	58.63	0.00	3,585.43	

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

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

(2) For wells with a hydrocarbon layer the groundwater elevation was calculated as follows:
 Groundwater Elevation = (TOC elevation) - (Depth to groundwater) + [(Free product thickness) X (SG of free product)]
 Note: The specific gravity (SG) for the free product was 0.82.

(3) Top of casing elevations and groundwater elevations relative to MSL after March 1997.

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

(5) Well plugged and abandonned July 2, 1999.

(6) 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 3Field Screening Results for Groundwater SamplesHobbs, New Mexico FacilityBJ Services Company, U.S.A.

		Cumulative					Dissolved	Ferrous	
Monitor	Date	Gallons	pН	Temperature	Conductivity	Redox	Oxygen	Iron	Alkalinity
Well	Measured	Removed	hu	oC	(umhos)	(mV)	(mg/L)	(mg/L)	(mg/L)
MW-1	9/14/99	0	7.76	21.12	970	150.4	5.22	NM	NM
141 44 - 1	3/14/33	0.5	7.62			160.9		NM	
				22.74	921		3.87		NM
		1.0	7.55	21.21	897	165.2	3.86	NM	NM
		1,5	7.55	20.87	916	165.5	3.78	NM	NM
	0011 1/00	2.0	7.56	20.56	912	165.9	3.89	0,0	120
MW-3	09/14/99	0	7.61	20.20	1361	26.6 74.5	5,44	NM	NM
		0.5 1.0	7.27 7.17	19.42 19.60	1394 1407	74.5 100.9	3.60 3.32	NM NM	NM NM
1		1.5	7.15	19.00	1407	108.6	3.39	NM	NM
		2.0	7.15	20.10	1433	109.8	3.27	0.0	280
MW-4	09/14/99	0	7.68	22.61	1371	103.2	7.12	NM	NM
		0.5	7.51	19.23	1321	27.4	3.35	NM	NM
		1.0	7.37	20.10	1301	3.4	3.19	NM	NM
		1.5	7.36	20.22	1304	9.4	3.31	NM	NM
ļ		2.0	7.36	20.49	1290	13.1	3.65	0.0	220
MW-5	09/14/99	0	7.68	18.88	1403	256.2	8.39	NM	NM
		1.0	7.58	19.02	1399	258.9	8.28	NM	NM
		2.0	7.48	19.04	1398	261.7	8.06	NM	NM
		2.5	7.31	19.13	1364	269.0	7.39	NM	NM
		3.0	7.31	19.16	1360	269.2	7.36	0.0	240
MW-7	09/13/99	0	7.68	24.11	1420	237	7.83	NM	NM
		0.5	7.04	23.16	1585	249	6.88	NM	NM
1		1.0	6.82	23.05	1644	259.1	6.19	NM	NM
		1.5 1.7	6.79 6.79	23.21 23.25	1646 1644	261 262.7	6.27 6.34	NM 0	NM 360
MW-8	09/13/99	0	6.91	27.50	1656	259.2	6.22	NM	NM NM
141 44 -0	0,10,55	0.5	7.27	23.40	1650	240.7	7.33	NM	NM
		1.0	7.14	22.80	1667	244.1	5.89	NM	NM
		1.5	6.96	22.18	1661	240.9	2.92	NM	NM
		2.0	6.97	22.17	1658	241.1	2.88	0.0	300
MW-9	09/13/99	0	8.15	23.09	1388	257.2	5.31	NM	NM
		0.5	7.24	20.56	1311	256.5	2.97	NM	NM
		1.0	7.22	21.08	1310	256.7	3.04	NM	NM
		1.5	7,21	21.15	1311	257.9	2.91	NM	NM
		2.0	7.25	21.79	1284	258	5.29	2.0	320
MW-10	09/14/99	0	7.05	23.73	2423	-80.8	4.87	NM	NM
		0.5	7.02	23.25	2449	-84.1	4.76	NM	NM
		1.0	6.99 6.96	22.12	2476	-90.8	4.58	NM	NM
		2.0	6.96	22.36	2456 2456	-92.2 -92.1	4.63 4,98	NM 6.0	NM 1665
MW-11A	09/13/99	0	6.69	23.18	4334	71.8	5.12	NM	NM
	0,11,1,7,7	NM	6.69	23.0	4566	55.1	4.97	NM	NM
		NM	6.69	23.1	4683	36.2	6.20	NM	NM
		NM	6.69	23.21	4693	33.3	6.13	NM	NM
		NM	6.69	23.36	4698	30.2	6.07	8.0	1665
MW-12	09/14/99	0	7.51	23.74	1193	32.3	6.27	NM	NM
		0.5	7.14	22.31	1939	-89.7	4.99	NM	NM
		1.0	7.11	21.19	2005	-110.2	3.14	NM	NM
		1.5	7.09	21.30	2061	-116.7	2.69	NM	NM
		2.0	7.06	21.34	2180	-118.7	2.41	6	1665
MW-12D	09/14/99	0	7.73	20.93	893	259.7	7.64	NM	NM
		1.0	7.81	20.36	1215	-58.2	1.49	NM	NM
		2.5	7.81	20.49	1237	-92.1	1.04	NM	NM
		4.0	7.78	20.60	1247	-152.5	0.94	NM	NM
MW-13	09/14/99	5.5	7.77	20.65	1248	-155.4	0.84	0.0	340
141 44 - [ 3	07/14/99	0.5	7.50	24.09	2106 2146	-87.0 -95.9	5.07 3.07	NM NM	NM NM
		1.0	7.35	20.64	2146	-95.9	1.40	1	NM NM
		1.0	7.35	20.64	2156	-98.4	1.40	NM NM	NM NM
		2.0	7.31	20.43	2131	-105.7	1.28	NM	NM NM
OW-4	09/14/99	0	7.40	22.16	1624	139.6	7.63	NM	NM
	5710177	1.0	7.13	19.15	1734	165.9	7.67	NM	NM NM
		2.0	7.08	19.15	1738	175.0	7.67	NM	NM
		3.0	7.06	19.42	1730	182.1	7.74	NM	NM
	1	4.0	7.05	19.80	1722	185.9	7.73	0.0	340

MW-2 not operative after January 1994; P&A'd 7/1/99. MW-6 P&A'd 7/1/99. MW-11 not operative after September 1997; P&A'd 7/1/99.

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NM=Not Measured

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgram	ns per liter, ug/l		milligrams p	er liter, mg/L
MW-1								
	8/10/92	Regular	5550	12090	2160	7370	NA	NA
	2/9/93	Regular	2100	6500	1300	7400	NA	NA
	8/19/93	Regular	3200	7300	1200	3700	NA	NA
	1/27/94	Regular	1930	4580	672	2390	NA	NA
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	390	1300	230	800	NA	5.7
	11/15/95	Regular	880	1800	300	970	NA	6.8
	2/23/96	Regular	1500	3700	620	2200	NA	21
	5/31/96	Regular	1100	1700	380	990	NA	7.5
	8/23/96	Regular	1800	3300	570	2100	NA	17
	12/2/96	Regular	5600	9600	2100	9600	100	64
	3/12/97	Regular	5500	9700	2600	8200	22	62
	6/12/97	Regular	5300	34000	7500	27000	180	160
	9/12/97	Regular	1800	4400	1000	3000	23	21
	12/10/97	Regular	7600	12000	2800	8200	11	71
	3/24/98	Regular	4800	7200	1200	2400	4.2	38
	6/23/98	Regular	53	680	580	1400	1.4	9.2
	09/30/98	Regular	3.2	90	280	970	2.5	3.6
	12/10/98	Regular	<1.0	1.5	17	110	1.4	0.31
	03/10/99	Regular	<1.0	<1.0	8.2	110	0.62	0.85
	03/10/99	Duplicate	<1.0	<1.0	7.9	110	0.66	0.84
	06/10/99	Regular	<1.0	1.1	<1.0	28	0.53	0.55
	06/10/99	Duplicate	<1.0	1.8	<1.0	41	0.69	0.76
	09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0,10
MW-2 <sup>1</sup>								
	8/10/92	Regular	14.9	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	100	12	3	13	NA	NA
	1/27/94	Regular	< 1	1.2	2	2.5	NA	NA
MW-3								
	8/10/92	Regular	304.9	2099	6760	1586	NA	NA
	2/9/93	Regular	130	< 10	< 10	190	NA	NA
	8/19/93	Regular	560	3100	630	1900	NA	NA
	1/27/94	Regular	1070	5380	510	3120	NA	NA
	5/4/95	Regular	770	3300	470	1800	NA	NA
	8/1/95	Regular	490	2900	890	1600	NA	14
	11/15/95	Regular	250	1000	180	440	NA	2.9
	2/23/96	Regular	120	810	170	560	NA	4
	5/31/96	Regular	670	3900	1200	2300	NA	15
	8/23/96	Regular	330	2200	590	1500	NA	12
	12/2/96	Regular	220	1800	670	1000	0.89	7.4
	3/12/97	Regular	370	2000	960	1400	1.8	11
	6/12/97	Regular	860	4800	1700	2600	1.9	20
	9/11/97	Regular	770	3000	1600	1900	1.6	16
	12/10/97	Regular	240	740	500	450	0.59	5,3
	3/24/98	Regular	140	630	360	310	0.59	3.9
	6/23/98	Regular	100	720	350	490	0.30	
	09/30/98	Regular	42	470	450	490 530		4.9
	12/10/98	Regular	42 13	220	160	530 290	1.0	3.8
	03/10/99	Regular	3.2	7.4			1.3	0.43
	06/10/99	Regular	3.2 1.7		42	32	0.2	0.44
	09/14/99	Regular Regular	1./ <1.0	3.1 < 1.0	<1.0 < 1.0	36 < 2.0	<0.20 <0.20	0.18 <0.10

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgram	ns per liter, ug/l		milligrams p	er liter, mg/l
MW-4								
	8/10/92	Regular	2594	10360	2160	6740	NA	NA
	2/9/93	Regular	5200	15000	2200	10000	NA	NA
	8/19/93	Regular	3000	12000	< 2000	7000	NA	NA
	1/27/94	Regular	NSP	NSP	NSP	NSP	NA	NSP
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	5700	17000	3500	13000	NA	120
	11/15/95	Regular	490	1600	310	1100	NA	5.2
	2/23/96	Regular	360	2800	560	2500	NA	18
	5/31/96	Regular	84	830	280	1100	NA	6.2
	8/23/96	Regular	110	1400	430	1800	NA	9.8
	12/2/96	Regular	190	2000	1800	7200	56	43
	3/12/97	Regular	220	1500	1500	4400	27	27
	6/12/97	Regular	47	270	360	950	2.5	6.2
	9/12/97	-	92	270 840	670			1
	12/10/97	Regular Regular	230	840 750	970	2100	15	7.6
	3/24/98	Regular				2300	3.7	16
	•	Regular	150	510	270	620 1600	1.2	5.6
	6/23/98	Regular	160	890	590	1600	0.69	10
	09/30/98	Regular	80	180	370	840	2.0	3.9
	12/10/98	Regular	28	70	210	960	9.3	4.3
	12/10/98	Duplicate	26	62	180	830	3.9	4.3
	03/10/99	Regular	8	20	250	1400	13.0	13
	06/10/99	Regular	<1.0	<1.0	12	12	0.44	0.63
	09/14/99	Regular	< 1.0	< 1.0	3.3	13.1	0.35	0.17
MW-5								
	8/10/92	Regular	< 4	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94	Regular	8.7	29.9	4	11.3	NA	NA
	5/3/95	Regular	3.7	5.3	0.92	4.6	NA	NA
	8/1/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	11/15/95	Regular	< 0.3	1.2	< 0.3	1.5	NA	NA
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	5/31/96	Regular	31	86	10	20	NA	NA
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	<1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	<1	< 0,1	< 0.1
	6/12/97	Regular	< 1	< 1	< 1	<1	< 0.1	< 0.1
	9/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	12/10/97	Regular	< 5	< 5	< 5	< 5	< 0.2	< 0.1
	3/23/98	Regular	<1	<1	< 1	<1	< 0.2	< 0.1
	6/23/98	Regular	<1	<1	<1	<1	< 0.2	< 0.1
	09/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	03/09/99	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20 <0.20	< 0.1
	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0		1
	09/14/99	-	<1.0 <1.0	<1.0			<0.20	<0.1
MW-6 <sup>1</sup>	07/14/99	Regular	~1.0	<b>\</b> 1.0	<1.0	<2.0	<0.20	<0.10
1/1 // -0	8/10/02	Decular	NC	NE	NC	NO	Хг.4	1
	8/10/92	Regular	NS	NS	NS 2100	NS	NA	NS
	2/9/93	Regular	7000	19000	3100	7200	NA	NA
	8/19/93	Regular	8100	19000	3500	6400	NA	NA
	1/27/94	Regular	7960	20200	3830	6150	NA	NA
	5/4/95	Regular	11000	17000	2900	6000	NA	NA
	8/1/95	Regular	8300	12000	2500	5100	NA	60
	11/15/95	Regular	8900	17000	2900	5500	NA	57

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgra	ns per liter, ug/l		milligrams p	er liter, mg/L
	2/23/96	Regular	8100	10000	2300	4000	NA	58
	5/31/96	Regular	83	150	15	51	NA	0.57
	5/31/96	Duplicate	87	160	13	47	NA	0.52
MW-6 <sup>1</sup>	8/23/96	Regular	31	28	9.4	7.9	NA	0.46
	12/2/96	Regular	< 1	< ]	<1	1.7	5.6	< 0.1
	3/12/97	Regular	12	< 5	6.8	18	12	< 0.1
	6/12/97	Regular	1900	1400	410	310	7.8	7.4
	9/11/97	Regular	11	1.3	3.4	<1	1	< 0.1
	12/10/97	Regular	3	4.2	1.2	3.9	1.7	0.14
	3/23/98	Regular	3.6	4.2 <1	4	<1	< 0.2	< 0.14
	6/23/98	Regular	170	4.1	15	7.2	1.2	0.51
	09/30/98	Regular	1000	420	140	270	4.0	3.3
	12/10/98	Regular	7.6	6.6	1.7	5.8	2.0	< 0.1
	03/10/99	Regular	2500	930	590	1400	11.0	13
MW-7	03/10/77	Regular	2500	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	570	1400	11.0	15
	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	<6	NA	NA
	8/19/93	Regular	< 2	3	< 2	< 2	NA	NA
	1/27/94	Regular	1.1	<1	<1	< 1	NA	NA
	5/3/95	Regular	52	3.4	0.67	2.8	NA	NA
	8/1/95	Regular	22	2.2	0.85	2.8	NA	< 0.1
	11/15/95	Regular	8.4	0.77	< 0.3	0.93	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Duplicate	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	29	83	10	21	NA	0.25
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	<1	<1	< 1	<1	< 0.1	< 0.1
•	3/12/97	Regular	< 1	<1	< 1	<1	< 0.1	< 0.1
	6/12/97	Regular	< 1	< 1	<1	<1	< 0.1	< 0,1
	9/11/97	Regular	< 1	<1	< 1	<1	< 0.1	< 0.1
	12/10/97	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	3/23/98	Regular	< 1	< 1	< 1	<1	< 0.2	< 0.1
	6/23/98	Regular	< 1	<1	< 1	<1	< 0.2	< 0.1
	09/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	03/09/99	Regular	<1.0	<1.0	<1.0	<1.0	4.7	< 0.1
	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0	< 0.20	< 0.1
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
MW-8								
	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	3	4.9	0.75	3.7	NA	NA
	8/1/95	Regular	3.1	1.2	0.47	1.6	NA	< 0.001
	8/1/95	Duplicate	3.6	1.5	0.51	1.5	NA	< 0,1
	11/15/95	Regular	< 0.3	0.52	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	<1	< 1	<1	< 1	< 0.1	< 0.1
	3/12/97	Regular	<1	<1	< 1	1.8	< 0.1	< 0.1
	6/12/97	Regular	<1	<1	<1	<1	< 0.1	< 0.1
		1	1	1	1 1	1 1	~ v.r	<u>∖</u> \.1

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

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgram	ns per liter, ug/l		milligrams pe	er liter, mg/L
	12/10/97	Regular	< 1	<1	< 1	< 1	0.3	< 0.1
	3/23/98	Regular	< 1	< 1	<1	< 1	< 0.2	< 0.1
	6/23/98	Regular	< 1	< 1	< 1	< 1	< 0.2	< 0.1
	09/30/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	12/10/98	Regular	< 1.0	< 1.0	< 1.0	< 1.0	< 0.20	< 0.1
	03/09/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.1
	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.1
MW-8	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
		-						
MW-9	4/22/93	Regular	570	380	< 50	870	NA	NA
	7/15/93	Regular	121	7.3	3	458	NA	NA
	8/19/93	Regular	390	290	40	250	NA	NA
	1/27/94	Regular	327	357	51.1	293	NA	NA
	5/3/95	Regular	380	110	19	120	NA	NA
	8/1/95	Regular	660	410	91	310	NA	6.2
	11/15/95	Regular	240	24	11	140	NA	1.5
	11/15/95	Duplicate	170	18	10	120	NA	1.9
	2/23/96	Regular	170	18	2,3	160	NA	4.3
	5/31/96	Regular	120	16	3	200	NA	NA
	8/23/96	Regular	82	13	6	270	NA	4
	8/23/96	Duplicate	76	14	4.8	250	NA	4.4
	12/2/96	Regular	61	< 25	< 25	210	2.6	2.8
	12/2/96	Duplicate	86	13	2.4	270	3.7	2.9
	3/12/97	Regular	30	48	420	880	8.2	19
	6/12/97	Regular	4.7	2.1	11	97	2.6	2.2
	6/12/97	Duplicate	< 5	< 5	6.6	69	5.2	1.9
	9/12/97	Regular	2.1	2.3	2.1	120	1.2	1.9
	12/10/97	-	4.9	9	6.8	62		
	3/24/98	Regular	4.9 <1	<1	1		0.86	0.92
		Regular			< 1	26	0.9	1
	6/23/98	Regular	2.4	22	10	36	< 0.2	0.25
	09/30/98	Regular	1.1	5.5	21	59	0.27	0.27
	12/10/98	Regular	< 1.0	1.9	17	79	5.1	0.25
	03/10/99	Regular	<1.0	<1.0	5.7	68	<0.2	0.22
	06/10/99	Regular	<1.0	1.8	1.8	71	<0.20	0.43
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
MW-10	8/19/93	Domitor	190	460	< 200	240		
		Regular			< 200	240	NA	NA
	1/27/94	Regular	13.4	4	5.5	33.6	NA	NA
	5/4/95	Regular	980	15	11	84	NA	NA
	8/1/95	Regular	1300	32	32	100	NA	3.6
	11/15/95	Regular	1000	24	15	36	NA	1.7
	2/23/96	Regular	810	23	27	44	NA	2.4
	5/31/96	Regular	700	24	34	28	NA	2
	8/23/96	Regular	290	3.4	6.4	13	NA	1.4
	12/2/96	Regular	280	1.3	17	8	0.94	0.97
	3/12/97	Regular	110	< 5	17	< 5	0.61	0.57
	6/12/97	Regular	150	12	30	< 5	0.68	< 0.5
	9/12/97	Regular	87	2.3	26	2.7	0.76	0.33
	9/12/97	Duplicate	87	2.4	26	2.8	0.79	0.33
	12/10/97	Regular	41	9.8	12	7.7	1.1	0.28
	12/10/97	Duplicate	36	8.5	10	6.7	1.2	0.24
	3/23/98	Regular	36	< 5	5.9	< 5	1.6	< 0.5
	3/23/98	Duplicate	36	<1	5.3	1.3	1.7	0.18
	6/23/98	Regular	37	< 5	< 5	< 5	2.1	< 0.5
	1	1	1 57	1 1	1	1	11	1 20.5

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Table 4
Cumulative Analytical Results for Groundwater Samples
Hobbs, New Mexico Facility
<b>BJ Services Company, U.S.A.</b>

Monitor	Sample	Sample	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
Well	Date	Туре		microgram	ns per liter, ug/l		milligrams p	er liter, mg/L
	12/10/98	Regular	29	1.0	7.0	1.0	0.86	0.18
	03/09/99	Regular	28	<5.0	5.8	<5.0	0.92	<0.5
	06/10/99	Regular	17	<1.0	<1.0	<1.0	0.30	0.16
	09/14/99	Regular	10	< 1.0	< 1.0	< 2.0	<0.20	<0.10
MW-111								
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	8/1/95	Regular	44	29	5.5	13	NA	0.2
	11/15/95	Regular	190	2.8	6.2	11	NA	0.4
MW-111	2/23/96	Regular	49	1.2	0.51	4	NA	0.25
	5/31/96	Regular	300	83	12	28	NA	0.8
	8/23/96	Regular	100	1.2	0.3	4.7	NA	0.26
	12/2/96	Regular	970	< 5	6	8.1	2	1.3
	3/12/97	Regular	130	< 5	13	5.8	0.42	< 0.5
	3/12/97	Duplicate	100	< 5	10	5.1	0.43	< 0.5
	6/12/97	Regular	150	23	19	< 5	1.1	0.55
	9/12/97	Regular	220	15	27	13	1	0.46
MW-11A								
	3/24/98	Regular	24	5	< 5	< 5	0.28	0.14
	6/23/98	Regular	9.9	< 5	< 5	< 5	< 0.2	< 0.5
	09/30/98	Regular	9.3	3.7	2.2	7.0	<0.20	0.1
	12/10/98	Regular	1.7	<1.0	<1.0	<1.0	<0.20	<0.1
	03/10/99	Regular	<5	<5	<5	<5	0.3	<0.5
	06/10/99	Regular	<1.0	<1.0	<1.0	<1.0	<0.20	<0.10
	09/13/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
MW-12			1			ļ		
	3/24/98	Regular	100	11	6	8	0.29	0.41
	6/23/98	Regular	88	< 5	< 5	< 5	< 0.2	< 0.5
	6/23/98	Duplicate	89	< 5	< 5	< 5	0.31	< 0.5
	09/30/98	Regular	260	3.0	1.2	7.9	<0.20	0.62
	12/10/98	Regular	160	<1.0	<1.0	1.2	0.21	0.36
	03/10/99	Regular	160	1.1	<1.0	2.9	0.38	0.45
	06/10/99	Regular	49	1.4	<1.0	<1.0	0.22	0.13
	09/14/99	Regular	75	< 1.0	< 1.0	< 2.0	<0.20	0.23
MW-12D								
	07/02/99	Regular	< 5	< 5	< 5	< 5	<0.20	<0.10
	09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10
MW-13								
	07/02/99	Regular	1500	23.0	750	58	2.2	5.1
	09/14/99	Regular	860	16	450	34.4	2,1	3.1
OW-4				·				
	06/10/99	Regular	<1.0	<1.0	<1.0	4.4	<0.2	<0.10
	09/14/99	Regular	< 1.0	< 1.0	< 1.0	< 2.0	<0.20	<0.10

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

NA=Not Analyzed NS=Not Sampled

NSP=Not Sampled due to Phase Separated Hydrocarbons

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#### Table 5

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

#### Hobbs, New Mexico

				Dissolved Methane
Well	Date	Nitrate <sup>1</sup> (mg/L)	Sulfate <sup>1</sup> (mg/L)	(mg/l)
	3/23/98	3.87	190	< 0.0012
MW-5	3/9/99	<0.1	195	<0.0012
101 00-5	6/10/99	4.73	209	< 0.0012
	9/14/99	4.3	210	<0.0012
	3/23/98	0.07	320	0.91
	6/23/98	<0.1	325	0.55
	9/30/98	<0.1	204	0.81
MW-10	12/10/98	<0.1	180	0.091
	3/9/99	<0.1	142	0.035
	317177	<b>\0.1</b>	223 <sup>3</sup>	0.035
	9/14/99	<0.10	160	0.0049
	3/23/98	< 0.05	190	0.14
(	6/23/98	<0.1	225	0.11
	9/30/98	0.4	196	0.043
MW-11A	12/10/98	0.7	188	0.033
MW-HA	3/10/99	<0.1	164	0.094
		<0.1 <sup>2</sup>	227 <sup>3</sup>	0.094
	6/10/99	<0.1	181	0.0036
	9/13/99	0.22	250	< 0.0012
	3/23/98	< 0.05	240	< 0.0012
	6/23/98	<0.1	240	< 0.0012
	9/30/98	<0.1	168	<0.0012
MW-12	12/10/98	<0.1	202	< 0.0012
IVI W-12	3/10/99	<0.1	137	<0.0010
	3/10/99	< 0.1 <sup>2</sup>	193 <sup>3</sup>	<0.0012
	6/10/99	<0.1	217	< 0.0012
	9/14/99	<0.10	230	< 0.0012
MW-12D	7/2/99	2.1	249	0.0015
1VI W~12D	9/14/99	<0.10	200	0.0065
OW-4	6/10/99	3.96	192	< 0.0012
0w-4	9/14/99	3.5	200	<0.0012

1=By EPA Method 300, except as noted

2=By EPA Method 353.3

3=By EPA Method 375.4

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

Rate, lb/hr Emission TPH 27.37 16.31 3.89 2.59 0.89 0.08 0.39 0.28 1.29 0.31 0.33 1.91 0.24 0.33 0.24 0.02 1.95 1.56 1.04 0.01 0.11 0.12 3.21 Emission rates reported for 12/02/96 sampling event were calculated using the detection limits. The actual emissions were Benzene <0.001 lb/hr, BTEX, <0.01 lb/hr and TPH <0.01 lb/hr. Fotal BTEX Rate, lb/hr Emission 10.939 0.112 0.239 0.008 5.943 0.773 0.189 0.147 0.158 0.047 0.057 0.028 NA 0.000 0.191 0.271 ΝA NA NA NA NA NA NA Rate, lb/hr Emission Benzene 0.019 1.575 0.000 1.235 0.024 0.062 0.016 0.018 0.009 0.005 0.007 0.002 0.003 0.001 0.005 NA ΝA NA AN NA NA NA NA Discharge 35.76 23.56 131.10 133.33 129.64 28.45 124.68 18.34 126.18 129.04 110.56 109.90 105.40 106.27 108.97 108.16 123.74 111.14 111.14 116.24 124.11 73.68 132.47 Rate, scfm 16000 1500 TPH 2533 1870 990 990 900 1500 12.5 9700 530 200 340 210 670 Ŷ 250 190 200 180 80 140 65 Xylenes 0.031 600 18 130 33 33 33 53 33 53 33 53 33 53 33 53 8.6 ΝA ٨N ٨A NA NA NA 920 36 NA NA 15  $\overline{\vee}$ parts per million by volume, ppmv Ethylbenzene 0.009 2.4 NA NA 340 560 4.6 NA NA NA Ν NA NA 12 9 4  $\overline{\vee}$ Toluene 0.013 1100 2500 NA NA NA NA NA 180 NA ΝA 6.3 28 58 45 19 4 5 1 5 4 0 5 1 2 1 2 1 2 15 Benzene <0.001 NA NA 790 990 NA NA NA 2.1 ΝA NA NA 13 15 39 10 9  $\mathbf{\hat{v}}$  $\overline{\vee}$  $\overline{\nabla}$ 4 1/15/95 2/19/95 2/10/97 2/10/98 Sample 9/20/95 9/28/95 11/7/95 /29/96 3/22/96 1/25/96 5/31/96 8/23/96 12/2/96 3/12/97 9/12/97 3/24/98 6/22/98 3/10/99 66/01/9 9/30/98 9/14/99 9/19/95 7/2/97 Date Monitor 990610 (1) Monitor 970912 (1) Monitor 980324 (1) Monitor 980622 (1) Monitor 980930 (1) Monitor 981210 (1) Monitor 990310 (1) Monitor 990914 (1) Effluent 070297-01 Effluent 111595-01 Effluent 032296-01 Effluent 053196-01 Effluent 120296-01 Effluent 121995-01 Effluent 042496-01 Effluent 082396-01 Effluent 12996-01 Eff-31297-1 Eff-1-2832 Effluent-2 Effluent-4 Extraction-Effluent-1 Sample Number

NA = Not Analyzed

(1) All analysis based on field FID readings

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# Appendices

#### **APPENDICES**

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#### APPENDIX A

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#### **Groundwater Sampling Forms**

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## GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-1

1. PROJE	ECT INFOR	MATIC	DN						
-	lumber: 128	-		per:	_ C	Date: S	14-99		Time: 12:15
						ersonnel:		·····	
Project L	ocation:				V	Veather:		·····	
2, WELL	DATA								
	Diameter:	inci	hes	Туре: орус	C 🛛 Stainles	is 🛛 Galv. Str	eel 🛛 Teflon(	8 🖬 Other:	
	Diameter:							80 D Other:	
	pth of Well:			From: 🖬 To	p of Weil Cas	ing (TOC)	Top of Prote	ective Casing	Q Other:
	o Static Water:			From: D To	p of Well Cas	ing (TOC)	Top of Prote	ective Casing	C Other:
	p Product:			From: To	p of Well Cas	ing (TOC) (	Top of Prot	ective Casing	© Other:
Length o	of Water Colun	nn:	feet	Well Volume	ə:			nterval (from ( /efi = 0.167 gal/i	
3. PURG	E DATA			<u></u>				<u>i: ]::-:::::::::::::::::::::::::::::::</u>	
Purge M	D Baller, Lethod: D Centr	, Size: ifugal Purr	D. Bladd p D. Perls	er Pump 🖸 2 taltic Pump 🕻	" Submersible ) Inertial Lift P	Pump 🖬 4" ump 🖬 Othe	Submersible f	Pump	Equipment Model(s)
	ls: Pump/Baller	🗅 Stainle	ess 🖸 PVC	c Q Teflon® epared Off-Sil	🛛 🖬 Other:				
Materia	ls: Rope/Tubing	_ 🛛 Polyet	hylene C	Polypropyler	ve 🖸 Tefloni	0 D Other:			
				Prepared Off-S	Site 🗆 Field	Cleaned 🛛	Disposable	2	
Waswe	Il purged dry?	Q Yes	D No	· · · · · · · · · · · · · · · · · · ·	ng Rate:		l/min	3	T
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
12:2	1	7.71	21.12	570	150.4	5.22	ر	~	eler
12:30	5.5	7-62	27-74	921	160.7	3.57	ر ا	-	CLEAN
12:35	1.0	7-55	21.21	897	165.2	3.86	ر	-	clar
12:42	1.5	7-55	27.8	716	165.5	3.78	-		<lc.1< td=""></lc.1<>
N:45	2-0	7.56	2236	912	165.5	3.87		-	Clan
	PLING DA								ochemical Analyses
Method	d(s): D Bailer, Si	ze: (	D Bladder	Pump 🖬 2" Si t Pump 🖬 Otl	ubmersible Pi	ump 🗔 4" Su	Ibmersible Pu	mp Fen	rous Iron: mg/L
Materia	als: Pump/Baile			C D Teflor				DO	1.5 mg/
	-	U Dedi		Prepared Off-S			•		
Materio	ols: Tubing/Rop			Prepared Off				Niti	rate:mg/L
	to Water at Tir							Sul	fote:mg/L
Sample	= 10: Mm -1		Sample	Time: 12	,43	# of Conto	ainers: <u> </u>	Alk	calinity: 12 - mg/L
Duplic	ate Sample Co	ollected?	CL Yes C	No ID:		-			
5. CON	AMENTS								
Note: Inclu	de comments su	ich as wel	l condition	, odor, preser	ICE OF NAPL	or other items	not on the fie	eld data sheet.	

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#### GROUNDWATER SAMPLING FIELD DATA SHEET

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WELL ID: MW-3

	ORMATIC					1.16		···
Project Number:	<u>1832</u> 1	ask Numt	oer:	C	Date:	4.21		Time:
Client:	<u> </u>							
Project Location:				\ <u>`</u>	Neather:			
. WELL DATA			-					
Casing Diameter:		nes	Type: y/pv	C 🛛 Stainle:	ss 🛛 Galv. St	eel 🛛 Tefloni	B D Other:	
Screen Dlameter:	1		Type: D/PV	C 🛛 Stainle:	ss 🖸 Galv. St	eel 🛛 Teflon(	B C Other:	
Total Depth of Weil		<u> </u>	From: 🖬 To	p of Well Cas	ing (TOC)	Top of Prote	ective Casing	Other:
Depth to Static Wa	ter: <u>55.44</u>			p of Well Cas		Top of Prote	ective Casing	Q Other:
Depth to Product:		L		p of Well Ca		•		Q Other:
Length of Water C	olumn:	feet	Well Volum	e:			iterval (from 6 /ell = 0.167 gal/f	
. PURGE DATA					**************************************			
B Purge Method: C Materials: Pump/B Materials: Rope/Tu	aller 🛛 Stainle 🕞 Dedic	ated DPVC	D Teflon@ epared Off-Si Polypropyler	) () Other: te ()/Flekk () ne () Teflon(		Disposable	1. <u>¥5</u>	Equipment Model(s
Was well purged c	ry? 🗅 Yes	D No	Pumpi	ng Rate: 0	<u>· </u> ga	il/min	3.	
Time Cum. Gall Remove	nH I	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
10'00	7-61	23.26	1361	26-6	5.41	1	-	cle.
10:05 2.5	7.27	15.42	1384	74.5	3.60	1	1	eenv
19:10 1.0	7-1-1	19.60	1457	100.9	3.32	د	ر	Clar
13:15 1.5	7-15	19.52	1421	138.6	3·3 s	ر	t	eenr
10:20 2.0	7-15	20.10	1433	109.8	3-27	د ا	~	1 Criv
Materials: Pump/f	ar, Size: ( stattle Pump C Bailer _ Stain _ Dedi Rope _ Polye _ Dedi t Time of Sar	a Inertial Lif Iess d'PV cated Q F ethylene icated Q mpling:	t Pump (2) Ot C (2) Teflor Prepared Off- (2) Polypropyle Prepared Off	her: NB I Other:_ Site D Field ene I Teflo f-Site I Field Field Filter	Cleaned n@ D Other: d Cleaned	Disposable Disposable	mp Feri DO Nith Sul	cochemical Analyses         rous Iron:      mg/L         :      mg/L

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# GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-4

Project N	ECT INFOR lumber:_りしど	32_1	ask Numt			Date: <u>9</u> Personnel:				Ime: 1 3 2 3 2
	ocation:					Weather:				
2. WELL	DATA									
Casing D	Diameter: 2	Inct	nes .	Type: Dry	C 🛛 Stainle	ss 🛛 Galv. Ste	eel 🛛 Teflon	8) [] Oth	er:	
	)lameter:		nes	Type: d pv	C 🛛 Stainle	ss 🛛 Galv. St	eel 🛛 Teflon		er:	
Total De	pth of Well: <u>6</u>	1-5_te	et	From: 2 To	p of Well Ca	sing (TOC)	1 Top of Prot	ective Co	sing C	1 Other:
Depth to	Static Water:	<u>55.33</u>	feet	From: DTo	p of Well Ca	sing (TOC)	Top of Prot	ective Co	asing C	1 Other:
Depth to	Product:	<u>ے</u> fee	t	From: 🗅 To	p of Well Co	ising (TOC)	Top of Prot	ective C	asing C	1 Other:
Length o	of Water Colun	nn:	feet	Well Volum	e:		Screened Ir Note: 2-Inch v	-		
3. PURG	E DATA			<u></u>					<u> </u>	
Purge M Materia Materia		ifugal Pum Di Stalnie Di Dedic Di Polyet Di Dedic	ip <b>D</b> Perisi ess <b>D</b> PVC ated <b>D</b> Pro hylene <b>D</b>	taltic Pump C C D Teflon® epared Off-Sit Polypropyler Prepared Off-S	) Inertial Lift F ) D Other: te D Fleid ( ne D Teflor Site D Fleid		r: Disposable Disposable	1. <b>2</b> .		Equipment Model(s)
	Cum. Gallons			Spec.		Dissolved		3. Ott		
Time	Removed	pH	Temp	Cond.	Eh	Oxygen	Turbldity			Comments
,3:35		7.68	12.91	(37)	103.2	7-12	-	<u> </u>		clar
ניטיינו	7.5	7.51	19-23	1321	27.4	3.35	ل ا	<u>ل</u>	<del></del>	eler
1 × '. Y2	1.0	7.50	22.10	1321	3.4	3.13	<u>ب</u>	-		cla-
12:45	1.5	7.36	22.27	1304	9.4	3.311	<u>د</u>			clar
12:50	2.0	7.36	22.49	1230	13.1	3:65	-	-		CLEAR
			22.45	1150	112.1	5'65	-	[	Goo	1
Method	a(s): a Peristalti	ze: ( c Pump C	Inertial Lif	t Pump <sup>,</sup> Q Otl	her:	2ump 🗔 4" Su	bmersible Pu	qm		
Materio	als: Pump/Baile als: Tubing/Rop	D Stain Dedi Dediye	less ØVPV cated 🛛 F ethylene	C I Teflor Prepared Off-: Polypropyle	189 🖬 Other: Site 🌒 Fleid ene 🖬 Teflo	Cleaned Don® D Other: d Cleaned	,		DO: Nitro	<u>/.s</u> mg/L mg/L
1	to Water at Tir = ID: $\mu w$					red? 🗆 Yes # of Conte			Sulfo	ate:mg/L alinity: <u>223</u> mg/L
Duplic	ate Sample Co									my/L
5. COM	AMENTS									
								·		······································
Note: Inclu	de comments su	ich as wel	l condition	, odor, preser	nce of NAPL	or other items	not on the fi	eld data	sheet.	

#### BROWN AND CALDWELL

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#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-3

1. PROJI	ECT INFOR	MATIC	DN						
Project N	Number: 128	34 1	ask Numl	oer:	C	Date: 7.	14.99	. <u> </u>	lime:
Client:					F	Personnel:			
Project L	ocation:				\	Weather:		· · · · · · · · · · · · · · · · · · ·	
2. WELL	DATA								
Casing [	Diameter:	incl	nes		C 🛛 Stainle:	ss 🛛 Galv. St	eel Q Teflond	D D Other:	
Screen (	Diameter:2	inci	hes	Type: gipv	C 🗆 Stoinle	ss 🛛 Galv. St	teel 🛛 Teflori	B 🖬 Other:	
Total De	pth of Well:	4.65 fe	et	From: 🗅 To	p of Well Cas	sing (TOC)	Top of Prote	ective Casing C	] Other:
Depth to	o Statle Water:	57.12	feet	From: D To	p of Well Ca	sing (TOC)	Top of Prote	ective Casing (	□ Other:
Depth to	p Product:	feefee	it	From: D To	p of Well Ca	sing (TOC)	Top of Prot	ective Casing	Other:
Length	of Water Colur	חחי:	feet	Well Volum	e:			iterval (from G rell = 0.167 gal/ft	
3 PURC	E DATA					, 			
	Baller 1ethod: @ Cent	r, Size:	D Bladd	er Pump ) 2	" Submersible		Submersible I	Pump	
		🗆 Stainie	ess di PVO	C C Teflon®	) 🛛 Other:				Equipment Model(s)
Materia	ils: Pump/Bailei	r 🖵 Dedic	ated 🗅 Pr	epared Off-Si	te 🋱 Fleid C	leaned D			E-600
Materia	ls: Rope/Tubin			Polypropyler Prepared Off-S				2	
Waswe	II purged dry?	🗅 Yes	D No	Pumpi	ng Rate: 🗸		ıl∕min	3	
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
8:24	-	7.68	15.22	1423	256.2	8.39	ر ا	~	cent
8:30	1.0	7-58	15.02	1359	158.9	8.25			cl+.v
8:35	2-0	7.48	19-04	1758	261.7	8.06		<u>_</u>	clar
8:40	2.5	7.31	19.13	13611	269.0	7.39		~	sea-
81.45	3,0	7.31	15.16	1360	269.2	7.36			CIENT
4.SAM	PLING DA	TA						Geo	chemical Analyses
Metho				Pump © 2"S †Pump © Ott			ubmersible Pu	mp Ferro	ous Iron: mg/L
Materi	als: Pump/Baile			/C D Teflor				DO:	<. v
				Prepared Off-:			•		mg/L
Materi	als: Tubing/Roj			Prepared Of				Nitro	ate:mg/L
1 · · ·	to Water at Tir						_	Sulf	ate: mg/L
Sample	e ID:		Sample	Time: 8:4	5	# of Cont	ainers: <u>7</u>	— Alko	alinity: <u>240</u> mg/L
Duplic	ate Sample C	ollected	?CI Yes (	No ID:_		_			
5. CON	MMENTS								
	-								
Note: Inclu	ide comments su	uch as we	l condition	, odor, preser	ICE OF NAPL	or other item	s not on the fie	eld data sheet.	

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#### GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-1

	ECT INFOR	AATIC	ואר							
										K150
	Number: <u>174</u>									me:
							<u></u>			
Project l	ocation:				`	Veather:				
2. WELL	DATA									
Casing [	Diameter: <u>2</u>		hes		C 🛛 Stainles	is 🛛 Galv. St	eel Q Teflond	0 🖬 Other		
Screen (	Dlameter:	Inc	hes	Type: g pv	C 🛛 Stainle:	is 🖸 Galv. St	eel 🛛 Teflon(	Billi Other		
Total De	pth of Well: 6	<u>1.5 fe</u>	et	From: 9(To	p of Well Cas	ing (IOC)	1 Top of Prote	ective Cash	ng 🗅	Other:
Depth t	o Static Water:	55.44	l feet	From: Dyto	p of Well Cas	ing (IOC)	Top of Prote	ective Casi	ng 🗆	Other:
Depth t	o Product:	fee	et	From: 🖬 To	p of Well Ca	ing (TOC)	Top of Prot	ective Casi	ng 🗆	0ther:
Length	of Water Colur	nn:	feet	Well Volum	e:		Screened In	•		
						r	Note: 2-Inch w	ен = U. Го7 (	<i>μ</i> αι/π	4-inch well = 0.667 gal/
		. Size:	D Bladd	er Pump 🖸 2	" Submersible	Pump 🖬 4*	Submersible (	omu <sup>c</sup>		
Purge N	Nethod: Centr	ifugal Purr	np 🗅 Peris	taltic Pump E	3 Inertial Lift P	ump 🗅 Othe	r			Equipment Model(s)
Materia	ils: Pump/Bailei			c 🖾 Teflon® epared Off-Si				1		
Materic	Ils: Rope/Tubin			Polypropyler Prepared Off-9						
Was we	ell purged dry?				ng Rate:					
	Cum. Gallons		-	Spec.		Dissolved		3 Other	T	
Time	Removed	рН	Temp	Cond.	Eh	Oxygen	Turbidity		<u> </u>	Comments
js:su		768	24.11	1420	237	7.83	-	-		alap
15'55	3.5	7-24	23-16	1585	249	6.88	-			cler
16:20	1-	6.82	37.05	1644	2.59-1	6.19				elar
16:05	1.5	6.75	23.21	1646	261	60				cle-
16:10	1.7	6.75	23.25	1644	262.7	6.34				4.4.
4. SAM	PLING DA	TA							Geod	chemical Analyses
Metho				Pump 🗳 2" S t Pump 🖵 Ot			Ibmersible Pu	mp	Ferro	us Iron: mg/L
Materi	als: Pump/Baile	ar 🗅 Stair	nless 🖸 PV	C D Teflor	NB D Other:				DO:	<u>ج، ح</u> mg/L
				Prepared Off- Polypropyle			•		_	mg/t
Materi	als: Tubing/Rop			Prepared Off					Nitra	te:mg/L
	to Water at Tir						<u> </u>		Sulfa	ite:mg/L
Sampl	e ID:MW-	, I 	Sample	Time: 16	.12	# of Cont	ainers:	_	Alka	linity: 360 mg/L
Duplic	ate Sample C	ollected	? D. Yes D	No ID:_						
5 0	MMENTS									
					·	· · · · · ·				
<b> </b>										······································

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# GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: 19-8

I. PROJE	CT INFOR	MATIC	DN							
Project N	lumber: 128	· <u>}}_</u>	ask Num	ber:	0	ate: <u></u>	13.99		Ti	me: 16:15
Client:					F	ersonnel:				
Project L	ocation:				\	Veather:				
2. WELL	DATA									
Casing E	)lameter:	Incl	nes	Type: DPV	C 🛛 Stainles	is 🛛 Galv. St	eel 🛛 Tefion(	19 🖬 Oth	er:	
	)lameter:	Incl		Туре: при	C 🖾 Stainle:	is 🛛 Galv. St	eel 🛛 Teflon(	₿⊡ Oth	er:	
Total De	pth of Well: 6	<u>]-]0</u> fe	et	From: 🗅 To	p of Well Cas	ing (TOC)	Top of Prote	ective Co	ising C	I Other:
	Static Water:			From: D To	p of Well Cas	ing (TOC)	Top of Prote	ective Co	ising C	1 Other:
Depth to	Product:	fee	t	From: C To	op of Well Ca	ing (TOC)	Top of Prot	ective Co	osing C	1 Other:
Length o	of Water Colun	nn:	feet	Well Volum	e:		Screened In Note: 2-inch w			5): 4-Inch well = 0.667 gal/fi
Purge M Materia Materia	E DATA Lethod: Lethod: Centr Is: Pump/Baller Is: Rope/Tubing Il purged dry?	g Dedic	ess DPV( ated DPI hylene D	C I Teflon® epared Off-Si Polypropyler Prepared Off-S	) 🖬 Other: te 🛄 Field C ne 🛄 Teflon(	leaned <b>()</b> 19 <b>()</b> Other:_ Cleaned (()	Disposable Disposable	1. 		Equipment Model(s)
	Cum. Gallons			Spec.	Uð kaje:	Dissolved		3. Oth	<u>er.</u>	
Time	Removed	рН	Temp	Cond.	Eh	Oxygen	Turbidity			Comments
16:20	<b>-</b>	6-51	27.50	1656	2 55-2	6.22		مر		CLP
16:25	3.5	アンフ	2340	1660	242.7	7.33	-	-		Claur
16:30	1-0	714	22-80	1667	244.1	5.85		-		Clear
16:35	1.5	6.96	22.18	1661	243.3	2.92		-		Clar
16:40	2.0	6.97	22-17	1658	241.1	2.28	-	-		CLERT
Methoo Materio Materio	PLING DA d(s): Peristalti als: Pump/Baile als: Tubing/Rop to Water at Tir	ze: I c Pump C Stain G Dedi De G Polya De G Dedi	Inertial Li less DP cated D ethylene icated D		her: NB II Other:_ Site II Field ene II Teflo f-Site II Field	Cleaned C n® D Other: d Cleaned	Disposable			
Sample	$\Rightarrow ID: \underline{MW}^{-1}$	8	Sample	Time: 16	243	# of Cont		—		llinity: <u>300</u> mg/L
	AMENTS	uch as wel	l conditior	), odor, preser	nce of NAPL,	or other items	i not on the fie	eld data :	sheet.	

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# GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-S

1 PRO IF	ECT INFOR	MATIC	)N						
	lumber:			ner:	ſ	Date:^``	13:59	T	ime: 14:20
-					-			,	
	ocation:					Neather:			
	· · ·								
2. WELL	·····	2	Ţ	- ì					
Casing D	Diameter: 2	inct						B D Other:	
Screen D	Diameter: 2	inct	103					8 D Other:	
	pth of Well:								1 Other:
	Static Water;								1 Other:
	Product:		·					ective Casing	
Length c	of Water Colun	nn:	feet	well volum	e;			nterval (from G /ell = 0.167 gal/ft	
3 PURC	E DATA					-		-11-11-11-1	
	Baller, lethod: Centr	Size:	🗅 Bladd	er Pump 🙀 2	" Submersible	Pump Q 4"	Submersible I	Pump	
		D Stainia		taltic Pump C C Q Teflon®			r:		Equipment Model(s)
Materia	ls: Pump/Baller	Dedic Dedic	ated 🗅 Pr	epared Off-SI	te 🛛 Field C	leaned 🛛 🕻			F-600
Materia	ls: Rope/Tubing	g D Polyet	hylene Ģ ated □ I	Polypropyler Prepared Off-	ne 🗆 Teflori Site 🗅 Fleid	8 🛛 Other: Cleaned 🗳	Disposable	2	
Waswe	ll purged dry?		) No					3	
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbldity	Other:	Comments
14:30	-	8.15	23-07	1383	257.2	5.31	,	-	«in r
141.35	2.5	7.2Y	27.56	13/1	2565	2-57		-	chr Cler
14:40	100	722	21.55	1310	256-7	3-04	ر	د	clar-
14:45	1.5	7-21	21-15	1311	257-7	2-91			clon
14:58	di - u	7.35	21.79	12.84	255	5.29			cia-
4. SAM	PLING DA	TA						Geo	chemical Analyses
Method				Pump 🛱 2" S ft Pump 🖬 Ot		ump 🖾 4" Su	Ibmersible Pu	mp Ferr	ous Iron:mg/L
Į.				/C D Teflor					2-0
Materia	als: Pump/Baile	Ded 🛛	cated Q	Prepared Off-	Site 🖾 Field	Cleaned 🛛		DO:	mg/L
Materio	als: Tubing/Rop	De Di Poly De De di	ethylene Icated C	U Polypropyle Prepared Of	ene 🛛 Teflo f-Site 🖵 Fiel	in® © Other: d Cleaned	Disposable	Nitro	ate:mg/L
Depth	to Water at Tir	me of Sa	mpling:_		Field Filte	red? 🗅 Yes	DA NO	Sulf	ate: mg/L
Sample	e ID: <u>M1W1</u>	1	Sample	e Time: <u>/-/ ?</u>	45	# of Conte	ainers: <u>5</u>		alinity: 322 mg/L
Duplic	ate Sample C	ollected	? 🖬 Yes	D No ID:_		-			ummy, <u> </u>
5 00	MMENTS							:	
0.001							<u>.</u>		
Note: Inclu	ide comments si	ich as we	Il conditior	n, odor, presei	nce of NAPL	or other items	not on the fi	eld data sheet.	

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# GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MINT )

1 000 1	ECT INFOR									
					_	. e,	nl.cr		-	ime: <u>13!25</u>
	lumber:					Date:				
Project L	ocation:					Weather:				
2. WELL	DATA									
Casing [	Dlameter:	Inct	nes	Туре: цру	C 🛛 Stainle	ss 🛛 Galv. St	eel 🛛 Teflon	6 🖬 Oth	er:	
	Dlameter:			Type: DPV	C 🗅 Stainle	ss 🛛 Galv. St	eel 🛛 Teflon		er:	
	pth of Well: 6.		6	From: D To	p of Well Ca	sing (TOC)	Top of Prot	ective Co	ising C	Other:
Depth to	Static Water;	56.91	feet	From: To	p of Well Ca	sing (TOC)	Top of Prot	ective Co	using C	1 Other:
Depth to	p Product:	fee	t	From: To	p of Well Ca	sing (TOC)	Top of Prot	ective Co	osing C	1 Other:
Length o	of Water Colur	nn:	feet	Well Volum	e:		Screened Ir Note: 2-Inch w	•		
2 0100									, Annu	4-inch well = 0.667 gal/f
		, Size:	🗅 Bladd	er Pump 🖸 2	" Submersible	Pump 🖸 4"	Submersible	Pump		
Purge N	lethod: Cent	ifugal Pum	p 🗅 Perls	taltic Pump C	Inertial Lift F	Pump 🛛 Othe	er:			Equipment Model(s)
Materia	is: Pump/Bailei			C □ Teflon® epared Off-Si			Disposable	1.		
Materia	ls: Rope/Tubin			Polypropylei Prepared Off-						
	Il purged dry?	u Dedic	D No							
WG3WC	· • • •			· · · · · · · · · · · · · · · · · · ·	ng kate:	ga	il/min	-	<u> </u>	
Time	Cum. Gallons Removed	рH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Oth	er:	Comments
13:25	~	7.35	23.33	2423	-8-5	4.57	-	-		clan Clar
13:30	7.5	7-2	23.25	2448	-5-4.1	4.76	-	-		clear
13:35	1.0	6.39	ムル	2476	-925	4.55-		-		cla-
13:42	1.5	6.96	22.36	2456	-92.2	4.63	-	)		clear
13:45	2-0	6.51	2248	2456	-42-1	4.68				cin-
4. SAM	PLING DA	TA							Geo	chemical Analyses
Method				Pump 🖬 2" S t Pump 🗔 Ot			Ibmersible Pu	mp	Ferro	ous Iron: mg/L
Materia	als: Pump/Baile	Staini	less 🖸 PV	C I Teflor	B D Other:				DO:	<u> </u>
				Prepared Off- Prepared Off-						-uu-
Materio	als: Tubing/Rop			Prepared Of					Nitra	ite: mg/L
Depth	to Water at Tir	ne of Sar	npling:		Field Filter	red? 🗅 Yes	🛛 No		Sulfa	ite:mg/L
Sample	D: MW-		Sample	Time: 13	:42	# of Conte	ainers: <u>1</u>	-	Alka	linity: 1665 mg/L
Duplic	ate Sample Co	ollected?	Yes C	No ID:_!	Dyplica	re -				
	AMENTS							· · · · ·		
						<u> </u>				
Note: Inclu	de comments su	ich as well	condition	odor, preser	nce of NAPL,	or other items	not on the fie	eld data s	heet.	

116

# GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MN-11A

I. PRO.	ECT INFOR	RMATIC	DN						<u>-</u>
	Number:			oer:	(	Date:			lime: 16.50
	Location:								
2. WFU	DATA								
	Diameter:	Ínci	hes	Туре: Дру	'C 🛛 Stainie	ss 🛛 Galv. St	reel 🛛 Teflon	B 🖾 Other:	
	Diameter:2							9 🖬 Other:	
	epth of Well: 0	-		From: L to	p of Well Ca	sing (TOC)	Top of Prote	ective Casing	Other:
	to Static Water:	1		From: 🖬 To	op of Well Ca	sing (TOC)	Top of Prot	ective Casing	© Other:
Depth (	to Product:	fee	et	From: C To	op of Well Ca	sing (TOC)	Top of Prot	ective Casing	D Other:
Length	of Water Colur	mn:	feet	Well Volum	e:			iterval (from G	
2 0100	SE DATA						1018. Z-INCN W	rell = 0.167 gal/fl	4-inch well = 0.667 gal,
		r, Size:	🗅 Bladd	er Pump 🖸 2	2" Submersible	Pump Q 4"	Submersible I	ounp	
Purge r	Method: Cent						ər:		Equipment Model(s
Materia	als: Pump/Baile				B 🖬 Other: Ite 🗔 Field C		Disposable	1	
Materie	als: Rope/Tubin				ne 🛛 Teflon Site 🔾 Field			2	
Wasw	ell purged dry?		D No		ing Rate:			3.	
Time	Cum. Gallons	рH	Temp	Spec.	Eh	Dissolved	Turbidity	Other:	Comments
16:55		6.05	23-18	<u>Cond.</u>	71.5	Oxygen 5.12			SILTV
درجر		6.67	22.56	4566	55.1	4.57	,	` هـ	SILTY
17:05		6-6-3	23+4	4683	36.2	6:20	>	-	LLCar
17210		6.69	23:21	4653	33.3	6.13		-	Clear
4.61		1	1	4658		6.07		-	Clar
4. SAM	IPLING DA	TA	, <u>i de la dela Constan</u> , i de la constanta de la const , i de la constanta de la consta					Geo	chemical Analyses
Metho	D Baller, Si	ze: (			iubmersible P		ıbmersible Pur	np Ferr	ous Iron: 8- 4 mg/L
					her: 189 🖸 Other:_				1 /s
Mater	ials: Pump/Baile	Dedl	icated 🛛 P	Prepared Off-	Site 🛛 Field	Cleaned	-	DO:	<u>/-0</u> mg/l
Mater	ials: Tubing/Rop				ene 🛛 Teflo f-Site 🖵 Field			— Nitro	ote:mg/l
Deptr	n to Water at Tir							Sulf	ate:mg/L
Samp	le ID: Mr.W-	IA	Sample	Time:	7:15	# of Cont	ainers:		alinity: 1665 mg/L
1		ollected?	? 🗆 Yes 🕽	No ID:_		-			,
l	cate sample C	011001001	•					<del> </del>	
Duplic									
Duplic	MMENTS			······································					
Duplic				· · · · · · · · · · · · · · · · · · ·				·····	

## BROWN AND CALDWELL

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# GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-12

1. PROJE	CT INFOR	MATIC	)N							
	lumber: 128	<b>A</b> .		per:	D	ate:	14-5	')	Ti	me: 12:55
-						ersonnel:				
	ocation:				v	Veather:				
2. WELL										
	)iameter:	inct			C 🗆 Stainles	s 🗆 Galv. Str	el 🛛 Tefloni		her:	
	Nameter:			<b>^</b>	C 🛛 Stainles					
	pth of Well: 6	*			p of Well Casi					Other:
	o Static Water;									Other:
		fee		From: D To	p of Well Cas	ing (TOC)	Top of Prot	ective C	Casing C	1 Other:
	of Water Colun	nn:	feet	Well Volume	ə:	gai ;	Screened In	terval	(from GS	S):
						^	lote: 2-Inch w	/ell = 0. )	67 gal/ft	4-inch well = 0.667 ga
3. PURG	EDATA	-		_ <b>ب</b> د		D	Paula	<b>D</b>		
Purge M	Lailer, Lethod: La Centr	, Size: ifugal Pum	Bladde Perisi	er Pump 🛛 🖓 2 Caltic Pump C	" Submersible ) Inertlai Lift Pi	rump 🖬 4" ump 🖬 Othe	submersible i r:	-ump		Equipment Model(
	ls: Pump/Baller	🗅 Stainie			) 🗔 Other: hə 🙇 Field C				VSI	-600
Materia	le: Done/Tubio									
	ls: Rope/Tubing							2	•	
Waswe	ll purged dry?	Ci Yes	D No	Pumpii	ng Rate:_ <b>0</b>		l/min		·	······································
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Ot	her:	Comments
13:22	1	7.51	25.74	1185	32.3	6.27	ب _			Clear
13:25	2.5	7.14	22-31	1939	-89.7	4.77			,	CLOAV
13:10	1.0	7-11	21-19	2005	-112.2	3-14		-		LLCN
13:15	1-5	7-09	21.30	2061	-116.7	2-69	-	-		clean
13:20	2-0	7.06	21.34	2180	-118.7	2-41	-	د		<1r./
	PLING DA	TA							Geo	chemical Analyses
Methoo					ubmersible Pu her:		Ibmersible Pu	mp	Ferro	ous Iron: p· u mg/L
Matoria	als: Pump/Baile	Stain	less 🗅 PV	C D Teflor	n® Q Other:_				DO:	<u>1-5</u> mg
					Site 🛛 Fleid ene 🖾 Tefloi					آ مہ
Materio	als: Tubing/Rop				f-Site D Field				Nitro	ate:mg,
	to Water at Tir			_			-		Sulfo	ate: mg/
Sample	= 10: M-W-1		Sample	Time: 15	20	# of Cont	ainers: <u></u>		Alka	linity: 1665 mg/
Duplic	ate Sample C	ollected	? D. Yes C	No ID:_						
5 00	MMENTS									
									<u> </u>	
							<u> </u>			
1	de commonte u	ich as wel	l condition	odor. preser	nce of NAPL	or other item	not on the fi	eld data	sheet.	

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# GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-12P

							··			
1. PROJI	ECT INFOR	MATIC	N			ii	11.00			
Project N	lumber:	T	ask Numt	oer:	_ 0	ate:/		···,	T	ime:
Client:		·			P	ersonnel:				
Project L	ocation:			·	V	Veather:		·		
2. WELL	DATA									
Casing [	Diameter:	inch	ies	lype: DPVC	C 🖸 Stainles	s 🛛 Galv. Ste	el 🛛 Teflon	80 Di Othe	er:	
Screen [	Dlameter:	inct	ies	Type: DPV	C 🛛 Stainles	s 🖸 Galv. Str	eel 🛛 Teflon	🖲 🖬 Othe	я:	······
Total De	pth of Well: 8	7.65 fe	et	From: 🖬 To	p of Well Casi		Top of Prot	ective Ca	sing C	1 Other:
Depth to	o Static Water:	57.74	feet	From: D To	p of Well Cas		Top of Prot	ective Ca	sing C	2 Other:
Depth to	p Product:	fee	r l	From: 🖬 To	p of Well Cas	ing (TOC) [	Top of Prot	ective Ca	sing (	D Other:
Length o	of Water Colun	nn:	feet	Well Volume	ə:		Screened Ir Iote: 2-Inch w	•		·
3. PURG	E DATA									
		Size:	<b>G</b> Bladde		" Submersible		Submersible I	Pump		
	lethod: Centr	C) Stalpia			) D Other:		··			Equipment Model(s)
Materia	ls: Pump/Bailer	<b>D</b> Dedic	ated OPr	epared Off-Sh	ie 🖸 Field C	leaned D	-			
Materia	ls: Rope/Tubing				ite 🛛 Teflon@			2		· · · · · · · · · · · · · · · · · · ·
Waswe	Il purged dry?	🗅 Yes	D No	Pumpli	ng Rate:	ga	l/mln			
Time	Cum. Gallons Removed	pН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Othe	ər:	Comments
5:05	-	7.75	20.53	893	259.7	7-64		-		clar
5:13	1.0	7.81	23.36	1215	-58.2	1-49	-	-		Clar
5:20	2.5	7.81	23.49	ルゴフ	-92-1	1.24	~			Clar
5:30	4.0	7.78	20.60	1247	-152.5	2.54	-	t		clerr
5:45	5.5	7.77	2 = 65	1248	₩-155.4	5.55	U	]_		CLC. r
	PLING DA	TA							Geo	chemical Analyses
Metho	d(s). 🗅 Bailer, Si	ze: (		•	ubmersible Pu her:	•	ibmersible Pu	mp	Ferro	J. J
Materi	als: Pump/Balle	Stain	less 🗅 PV	C D Teflor	® D Other:			*****	DO:	2.5
				iepoied on-	Site 🛛 Fleid ane 🖾 Tefloi		•		-	g/c
Materi	als: Tubing/Rop				-Site D Field				Nitro	ate:mg/L
Depth	to Water at Tir	ne of Sar	npling:	· · · · · · · · · · · · · · · · · · ·	Fleld Filter	ed? 🗅 Yes	🖬 No		Sulfo	ate:mg/L
Sampl	e ID:		Sample	Time:		# of Conte	ainers:		Alkr	alinity: <u>345 mg/L</u>
Duplic	ate Sample Co	ollected?	CL Yes C	No ID:		-				, <u> </u>
5. CO	MMENTS	-								
					<u> </u>					
Note: Inclu	ide comments su	ich as wel	condition	, odor, preser	nce of NAPL	or other items	not on the fi	eld data si	heet.	

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# GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-13

1. PROJEC	CT INFOR	MATIC	DN							
	mber:			ber:	(	Date:G	.14.54		Т	ime: 14:23
						-				
	cation:									
2. WELL D	ATA									
Casing Dic	meter:	Inct	nes	Type: ם PV	'C 🖬 Stainle	ss 🛛 Galv. S	teel 🛛 Teflond	900	ther:	
Screen Dic	ometer:	incl	nes	Туре: при	C 🗆 Stalnle	ss 🖸 Galv. S	teel C Teflon	800	ther:	
Total Dept	h of Well:	5. <u>L</u> fe	et	From: 🖪 To	p of Well Cas	ing (TOC)	Top of Prote	ective (	Casing C	1 Other:
Depth to S	itatic Water:	56.92	feet		p of Well Ca	sing (TOC)	Top of Prot	ective	Casing C	2 Other:
Depth to F	Product:	fee	t		op of Well Ca	sing (TOC)	C Top of Prot	ective	Casing C	3 Other:
Length of	Water Colun	nn:	feet	Well Volum	e:		Screened In Note: 2-Inch w		-	
Materials: Materials:		ifugal Purr D Stainle D Dedic D Polyet D Dedic	ip D Peris ess D PVC ated D Pr hviene D	taltic Pump ( C D Teflond epared Off-Si Polypropyle Prepared Off-	⊒ inertial Lift P ® □ Other: Ite □ Field C ne □ Tefloni	rump 🗅 Othe Cleaned 🗋 ® 🗋 Other;_ Cleaned 🛛	Disposable Disposable	1	2	Equipment Modei(s)
Time C	um. Gallons	рH	Temp	Spec.	Eh	Dissolved			3 ther:	Comments
	Removed			Cond.	<u></u>	Oxygen				
14:25			24.05	2126	-5.7-0	5.07				cim
14'12	3.5	アシフ	2134	2146	- 95.1	3.57				Clein
14:45	1.0	7-35	20.64	2156	- 55-4	1.40	-	-		Cler-
(4:20	1-5	7.31	27.45	2151	-1057	125	L			clean
14:25	2 ~ J	7.31	2042	2/49	4.36.2	has	-	-		cleer
4. SAMP	LING DA	TA							Geo	chemical Analyses
Method(	C 1'			Pump 🖬 2" S 't Pump 🖬 Ot			ubmersible Pu	mp	Ferro	ous Iron: mg/L
Materials	:: Pump/Baile			C D Teflor					DO:	mg/L
Material:	: Tubing/Rop			Prepared Off- Prepared Off Prepared Of			. '		Nitra	ite:mg/L
	Water at Tin								Sulfc	ite:mg/L
Sample	ID:		Sample	Time:		# of Cont	tainers:		Alka	ilinity:mg/L
Duplicat	e Sample Co					-				
5. COM	MENTS									
						·		~		
	e comments su								· · · · · · · · · · · · · · · · · · ·	

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# GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: JW--1

Project N	ECT INFOR lumber: <u>レー</u> Ŷ	32 T	ask Num			Date: Personnel:				Ime: <u>//:&gt;5</u>
Project L	ocation:				\	Veather:				
2. WELL	DATA	,								
Casing D	lameter:	Incl	nes	Type: DPV	C 🛛 Stainles	s 🗅 Galv. St	eel 🛛 Teflon	900	ther:	
	lameter:			Type: pv	C 🛛 Stainles	ss 🖸 Galv. St	eel 🛛 Teflon		ther:	
	pth of Well:_6		-	_	·					3 Other:
Depth to	Static Water:	580	feet	From: D to						1 Other:
<u>_</u>	Product:									1 Other:
Length c	of Water Colun	nn:	feet		e:		Screened Ir Note: 2-Inch w		-	
3. PURG	EDATA									
Purge M	🛛 Bailer, lethod: 🗖 Centr	. Size: ifugal Purr	Di Blada no Di Peri:	ier Pump 🖬 2 italtic Pump 🗖	" Submersible 1 Inertial Lift P	Pump Q.4" Tump D: Othe	Submersible   r:	Pump		
	s: Pump/Bailer	🗅 Stainle		C 🛛 Teflon@	0 🖬 Other:	. <u>.</u>				Equipment Model(s)
	•			repared Off-SI <sup>.</sup> I Polypropyler			•			
Materia	ls: Rope/Tubing			Prepared Off-S	Site 🖸 Fleid	Cleaned 🗆	Disposable	2	!	
Was we	ll purged dry?	Ci Yes	D No	Pumpi	ng Rate:Ĵ	· d 00	l/min		}	
Time	Cum. Gallons Removed	рН	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	0	ther:	Comments
11:25	-	7-40	22-16	1624	13 4.6	7-63	<u>ب</u>	•		clar
11:30	1.0	7.13	19-15	1734	165.9	7-67	_ ر			ciny
11:35	2. "	7.38	19.2)	173-8	175.0	7.67	~	-		llar -
10:40	3-0	7.36	19.12	1730	182-1	7.94	•	5		clari
11.45	4. 0	7-25	19.80	,722	185.9	7.73	~	-		Clar,-
4. SAMI	PLING DA	TA							Geo	chemical Analyses
Method	d(s): 🛛 Baller, Si 🗘 Peristaiti	ze: c Pump (	D Bladder D Inertial Li	Pump 🖬 2" S ft Pump 🖬 Ot	ubmersible Pi her:	ump 🖬 4" Su	ibmersible Pu	mp	Ferro	ous Iron: 💁 🔅 mg/L
	ols: Pump/Baile	, 🗅 Stain	less 🖸 P'	/C 🛛 Teflor Prepared Off-	n® 🛛 Other:_				DO:	<u>Ĺ/、、</u> mg/L
Materio	uls: Tubing/Rop	D Poly	ethylene	Prepared Off-	ene 🛛 Teflo	n® 🛛 Other:			Nitro	
Depth	to Water at Tir								Sulfo	ate:mg/L
	∋ ID:								A 11	alinity: 31/0 mg/L
	ate Sample Co									
5 00	AMENTS								; 	
			•							
Note: Inclu	de comments su	ich as wei	l condition	n, odor, preser	nce of NAPL	or other items	not on the fi	eld dati	a sheet.	

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#### APPENDIX B

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Laboratory Analytical Reports for Groundwater Samples



#### Case Narrative for: Brown & Caldwell

Certificate of Analysis Number:

#### 99090123

Report To:		Project Name:	BJ- HOBBS
Brown & Caldwell		<u>Site:</u>	BJ-HOBBS
Rick Rexroad		Site Address:	
1415 Louisiana			
Suite 2500		PO Number:	
Houston			
тх	×	State:	New Mexico
77002-		State Cert. No .:	
ph (713) 759-0999	fax: (713) 308-3886	Date Reported:	09/30/1999

Your sample ID " Duplicate " (SPL ID:99090123-10 ) was randomly selected for the use in SPL's quality control program for the Purgeable Aromatics analysis by SW846 method 8021B. The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were outside of the advisable quality control limits for Total Xylenes (Batch ID: R2561), due to matrix interference. A Laboratory Control Sample (LCS) was analyzed as a quality control check for the analytical batch and all recoveries were within acceptable limits.

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

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

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

ite G. Ini Lynch, Pat

Project Manager

09/30/1999



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#### Brown & Caldwell

	Certifica	ate of Analysi	s Number:			
		<u>99090123</u>	3			
Report To:			Project Name: B	J- HOBBS		
			<u>Site:</u> B	J-HOBBS		
Brown & Caldwell Rick Rexroad			Site Address;			
1415 Louisiana						
Suite 2500						
Houston			PO Number:			
TX			<u>State:</u> N	ew Mexico		
77002-			State Cert. No .:			
ph: (713) 759-0999	fax: (713) 308-3886		Date Reported: 9	/29/99		
		l				]
Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COCID	н
						_ /
MW-5	99090123-01	Water	09/14/1999 8:45	09/15/1999 10:00	095990	r
MW-12D	99090123-02	Water	09/14/1999 9:45	09/15/1999 10:00	095990	
MW-3	99090123-03	Water	09/14/1999 10:20	09/15/1999 10:00	095990	
MW-4	99090123-04	Water	09/14/1999 10:50	09/15/1999 10:00	095990	
OW-4	99090123-05	Water	09/14/1999 11:45	09/15/1999 10:00	095990	i T
MW-1	99090123-06	Water	09/14/1999 12:45	09/15/1999 10:00	095990	
MW-12	99090123-07	Water	09/14/1999 13:20	09/15/1999 10:00	095990	
MW-10	99090123-08	Water	09/14/1999 13:45	09/15/1999 10:00	095990	
MW-13	99090123-09	Water	09/14/1999 14:25	09/15/1999 10:00	095990	
Duplicate	99090123-10	Water	09/14/1999 0:00	09/15/1999 10:00	095990	
Trip Blank 9/8/99	99090123-11	Water	09/14/1999 0:00	09/15/1999 10:00		ſ

dette l' Ini Lynch, Pat

Project Manager

Joel Grice Laboratory Director

Ted Yen Quality Assurance Officer 9/29/99

Date



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Client Sample ID: MV	V-5		Collec	cted: (	09/14/99 8	:45	SPL Sample ID:	99090	123-01
Analyses/Method		Result	Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORG	ANICS			SW8	015B		Units: mg/	/L	
<b>Diesel Range Organics</b>		ND	0.20		1		09/22/99 21:22	RR	59348
Surr: Pentacosane		75	20-131		1		09/22/99 21:22	RR	59348
Run ID/Seq #: HP	_V_990921B-593	48							
Prep Method	Prep Date		Prep Initials						
SW3510B	09/17/1999 8:4	0	KL						
GASOLINE RANGE C	RGANICS			SW8	015B		Units: mg	/∟	
Gasoline Range Organi	cs	ND	0.10		1		09/16/99 12:56	CJ	61769
Surr: 1,4-Difluoroben	zene	89	62-144		1		09/16/99 12:56	CJ	61769
Surr: 4-Bromofluorob	enzene	70	44-153		1		09/16/99 12:56	CJ	61769
HEADSPACE GAS A	NALYSIS			RSK	147		Units: mg	/L	
Ethane		ND	0.0025		1		09/21/99 14:50	PC	59209
Ethylene		ND	0.0032		1		09/21/99 14:50	PC	59209
Methane		ND	0.0012		1		09/21/99 14:50	PC	59209
NITROGEN, NITRATE	E (AS N)			E30	0		Units: mg	/L	· · · · · · · · · · · · · · · · · · ·
Nitrogen, Nitrate (As N)		4.3	0.10		1		09/15/99 14:45	ES	60819
PURGEABLE AROM	ATICS			SW8	3021B		Units: ug/	<u>الــــــــــــــــــــــــــــــــــــ</u>	
Benzene		ND	1.0		1		09/16/99 12:56	CJ	56214
Ethylbenzene		ND	1.0		1		09/16/99 12:56	CJ	56214
Toluene		ND	1.0		1		09/16/99 12:56	CJ	56214
Xylenes, Total		ND	2.0		1		09/16/99 12:56	CJ	56214
Surr: 1,4-Difluorober	izene	97	72-137		1		09/16/99 12:56	CJ	56214
Surr: 4-Bromofluorot	penzene	78	48-156		1		09/16/99 12:56	CJ	56214
SULFATE		······	· ··· · · · · · · · · · · · · · · · ·	E30	0		Units: mg	j/L	
Sulfate		210	5.0		25		09/27/99 12:13	ES	61589

Qualifiers:

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ND/U - Not Detected at the Reporting Limit B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits



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Client Sample ID: MV	W-12D		Coll	ected:	09/14/99 9	:45	SPL Sample ID:	: 99090	123-02
Analyses/Method		Result	Rep.Limit	MCL	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
DIESEL RANGE ORG	GANICS		· · · · · · · · · · · · · · · · · · ·	SW	8015B		Units: mg	/L	
<b>Diesel Range Organics</b>	;	ND	0.20		1		09/22/99 0:12	RR	59332
Surr: Pentacosane		65	20-131		1	-	09/22/99 0:12	RR	59332
Run ID/Seq #: HF	P_V_990921B-593	32							
Prep Method	Prep Date		Prep Initials						
SW3510B	09/17/1999 8:40	<b>)</b>	KL						
GASOLINE RANGE	ORGANICS			SW	/8015B		Units: mg	/L	
Gasoline Range Organ	lics	ND	0.10		1		09/16/99 13:21	CJ	61770
Surr: 1,4-Difluorober	nzene	91	62-144		1		09/16/99 13:21	CJ	61770
Surr: 4-Bromofluoro	oenzene	67	44-153		1		09/16/99 13:21	CJ	61770
HEADSPACE GAS A	NALYSIS			RS	K147		Units: mg	/L	
Ethane		ND	0.0025		1		09/21/99 15:03	PC	59210
Ethylene		ND	0.0032		1		09/21/99 15:03	PC	59210
Methane		0.0065	0.0012		1		09/21/99 15:03	PC	59210
NITROGEN, NITRAT	E (AS N)			E3	00		Units: mg	/L	
Nitrogen,Nitrate (As N)		ND	0.10		1		09/15/99 14:45	ES	60820
PURGEABLE AROM	ATICS			SM	/8021B		Units: ug	/∟	
Benzene		ND	1.0		1		09/16/99 13:21	CJ	56216
Ethylbenzene		ND	1.0		1		09/16/99 13:21	CJ	56216
Toluene		ND	1.0	<u> </u>	1		09/16/99 13:21	CJ	56216
Xylenes, Total		ND	2.0		1		09/16/99 13:21	CJ	56216
Surr: 1,4-Difluorober	nzene	96	72-137		1		09/16/99 13:21	CJ	56216
Surr: 4 Bromofluorol	benzene	77	48-156		1		09/16/99 13:21	CJ	56216
SULFATE				E3	00		Units: mg	a/L	
Sulfate		200	4.0		20	• •	09/27/99 12:13	ES	61592
					· · · · · · · · · · · · · · · · · · ·				

Qualifiers:

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ND/U - Not Detected at the Reporting Limit B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits



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Client Sample ID: MW	-3		Colle	ected:	09/14/99 1	0:20	SPL Sample ID:	99090	123-03
Analyses/Method	Resu	uit	Rep.Limit	MCL	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORG	ANICS			SW	8015B		Units: mg	Ľ	
Diesel Range Organics	N	D	0.20		1		09/22/99 22:01	RR	59349
Surr: Pentacosane		65	20-131		1		09/22/99 22:01	RR	59349
Run ID/Seq #: HP	V_990921B-59349								
Prep Method	Prep Date		Prep Initials						
SW3510B	09/17/1999 8:40		KL						
GASOLINE RANGE O	RGANICS			SN	/8015B		Units: mg	/L	
Gasoline Range Organic	s N	1D	0.10		1		09/16/99 11:18	CJ	61765
Surr: 1,4-Difluorobenz	ene	87	62-144		1		09/16/99 11:18	CJ	61765
Surr: 4-Bromofluorobe	enzene	80	44-153		1		09/16/99 11:18	CJ	61765
PURGEABLE AROMA	TICS			SW	/8021B		Units: ug/	L	
Benzene	1	ND D	1.0		1		09/16/99 11:18	CJ	55492
Ethylbenzene	1	٧D	1.0		1		09/16/99 11:18	CJ	55492
Toluene	1	ND.	1.0		1		09/16/99 11:18	CJ	55492
Xylenes,Total	1	ND	2.0		1		09/16/99 11:18	CJ	5549
Surr: 1,4-Difluorobenz	tene 1	00	72-137		1		09/16/99 11:18	CJ	55492
Surr: 4-Bromofluorobe	enzene	96	48-156		1		09/16/99 11:18	CJ	55492

Qualifiers:

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ND/U - Not Detected at the Reporting Limit B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits



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

Client Sample ID: MW	-4	Collect	ed: 09/14/99 10:50	SPL Sample ID:	99090	123-04
Analyses/Method	Result	Rep.Limit	Dil. Factor QU/	L Date Analyzed	Analyst	Seq.#
DIESEL RANGE ORG	ANICS		SW8015B	Units: mg/	Ľ	
Diesel Range Organics	0.35	0.20	1 •	09/22/99 14:59	RR	59339
Surr: Pentacosane	69	20-131	1	09/22/99 14:59	RR	59339
Run ID/Seq #: HP_	V_990921B-59339					
Prep Method	Prep Date	Prep Initials				
SW3510B	09/17/1999 8:40	KL				
GASOLINE RANGE O	RGANICS		SW8015B	Units: mg/	/L	
Gasoline Range Organic	s 0.17	0.10	1	09/16/99 11:43	CJ	61766
Surr: 1,4-Difluorobenz	ene 88	62-144	1	09/16/99 11:43	CJ	61766
Surr: 4-Bromofluorobe	nzene 87	44-153	1	09/16/99 11:43	CJ	6176
PURGEABLE AROMA	TICS		SW8021B	Units: ug/	L	
Benzene	ND	1.0	1	09/16/99 11:43	CJ	55493
Ethylbenzene	3.3	1.0	1	09/16/99 11:43	CJ	55493
Toluene	ND	1.0	1	09/16/99 11:43	CJ	5549
Xylenes, Total	13.1	2.0	1	09/16/99 11:43	CJ	5549
Surr: 1,4-Difluorobenz	ene 91	72-137	1	09/16/99 11:43	CJ	5549
Surr: 4-Bromofluorobe	enzene 88	48-156	1	09/16/99 11:43	CJ	5549

Qualifiers:

ND/U - Not Detected at the Reporting Limit B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits



Client Sample ID: OV	V-4	· · · · · · · · · · · · · · · · · · ·	Colle	cted:	09/14/99 1	1:45	SPL Sample ID:	99090	123-05
Analyses/Method		Result	Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORG	SANICS			SW	8015B	-	Units: mg/	/L	
Diesel Range Organics		ND	0.20		1		09/22/99 15:38	RR	59340
Surr: Pentacosane		43	20-131		1		09/22/99 15:38	RR	59340
Run ID/Seq #: HF	-V_990921B-59	340							
Prep Method	Prep Date		Prep Initials						
SW3510B	09/17/1999 8:	40	KL						
GASOLINE RANGE	ORGANICS			SW	8015B		Units: mg	/L	
Gasoline Range Organ	lcs	ND	0.10		1		09/16/99 13:45	CJ	61771
Surr: 1,4-Difluorober	nzene	88	62-144		1		09/16/99 13:45	CJ	61771
Surr: 4-Bromofluorot	penzene	68	44-153		1		09/16/99 13:45	CJ	61771
HEADSPACE GAS A	NALYSIS			RS	K147		Units: mg	/L	
Ethane		ND	0.0025		1		09/21/99 15:13	PC	59211
Ethylene		ND	0.0032		1		09/21/99 15:13	PC	59211
Methane		ND	0.0012		1		09/21/99 15:13	PC	59211
NITROGEN, NITRAT	E (AS N)			E3(	00		Units: mg	<i>I</i> L	
Nitrogen,Nitrate (As N)		3.5	0.10		1		09/15/99 14:45	ES	60818
PURGEABLE AROM	ATICS			SW	8021B		Units: ug/	Ľ	
Benzene		ND	1.0		1		09/16/99 13:45	CJ	56217
Ethylbenzene		ND	1.0		1		09/16/99 13:45	CJ	56217
Toluene		ND	1.0		1		09/16/99 13:45	CJ	56217
Xylenes,Total	······································	ND	2.0		1		09/16/99 13:45	CJ	56217
Surr: 1,4-Difluorober	nzene	96	72-137		1		09/16/99 13:45	CJ	56217
Surr: 4-Bromofluoro	benzene	79	48-156		1		09/16/99 13:45	CJ	56217
SULFATE				E3	00		Units: mg	ı/L	
Sulfate		200	4.0		20		09/27/99 12:13	ES	61593

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Client Sample ID: MW	/-1		Colle	ected:	09/14/99 1	2:45	SPL Sample ID:	99090	123-06
Analyses/Method	Re	suit	Rep.Limit	MCL	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORG	ANICS			SW	/8015B		Units: mg/	/L	
Diesel Range Organics		ND	0.20		1		09/22/99 17:33	RR	59342
Surr: Pentacosane		64	20-131		1		09/22/99 17:33	RR	59342
Run ID/Seq #: HP	V_990921B-59342								
Prep Method	Prep Date		Prep Initials						
SW3510B	09/17/1999 8:40		KL						
GASOLINE RANGE O	RGANICS			SM	/8015B		Units: mg	/L	
Gasoline Range Organic	>S	ND	0.10		1		09/16/99 12:07	CJ	61767
Surr: 1,4-Difluorobenz	zene	85	62-144		1		09/16/99 12:07	CJ	61767
Surr: 4-Bromofluorobe	enzene	86	44-153		1		09/16/99 12:07	CJ	61767
PURGEABLE AROMA	ATICS			SV	/8021B		Units: ug/	Ľ	
Benzene	<u> </u>	ND	1.0		1		09/16/99 12:07	CJ	55494
Ethylbenzene		ND	1.0		1		09/16/99 12:07	CJ	55494
Toluene		ND	1.0		1		09/16/99 12:07	CJ	55494
Xylenes,Total		ND	2.0		1		09/16/99 12:07	CJ	55494
Surr: 1,4-Difluorobenz	zene	95	72-137		1		09/16/99 12:07	CJ	55494
Surr: 4-Bromofluorobe	enzene	92	48-156		1		09/16/99 12:07	CJ	55494

Qualifiers:

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ND/U - Not Detected at the Reporting Limit B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits



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

Client Sample ID: MV	V-12		Collec	cted: 0	9/14/99 1	3:20	SPL Sample ID:	99090	123-07
Analyses/Method		Result	Rep.Limit	C	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
DIESEL RANGE ORG	SANICS			SW80	15B		Units: mg		
Diesel Range Organics		ND	0.20		1		09/22/99 7:17	RR	59335
Surr: Pentacosane		80	20-131		1		09/22/99 7:17	RR	59335
Run ID/Seq #: HP	V_990921B-59	335							
Prep Method	Prep Date		Prep Initials						
SW3510B	09/17/1999 8:	40	KL						
GASOLINE RANGE C	DRGANICS			SW80	15B		Units: mg	/∟	
Gasoline Range Organi	ics	0.23	0.10		1		09/16/99 16:38	CJ	61776
Surr: 1,4-Difluoroben	zene	91	62-144		1		09/16/99 16:38	CJ	61776
Surr: 4-Bromofluorob	penzene	84	44-153		1		09/16/99 16:38	CJ	61776
HEADSPACE GAS A	NALYSIS			RSK1	47		Units: mg	/L	
Ethane		ND	0.0025		1		09/23/99 13:45	PC	59740
Ethylene		ND	0.0032		1		09/23/99 13:45	PC	59740
Methane		ND	0.0012		1		09/23/99 13:45	PC	59740
NITROGEN, NITRATI	E (AS N)			E300			Units: mg	/L	
Nitrogen,Nitrate (As N)		ND	0.10		1		09/15/99 14:45	ES	60821
PURGEABLE AROM	ATICS			SWBC	021B		Units: ug/	L	
Benzene		75	1.0		1		09/16/99 16:38	CJ	56221
Ethylbenzene	<u> </u>	ND	1.0		1		09/16/99 16:38	CJ	56221
Toluene		ND	1.0		1		09/16/99 16:38	CJ	56221
Xylenes,Total		ND	2.0		1		09/16/99 16:38	CJ	56221
Surr: 1,4-Difluorober	nzene	100	72-137		1		09/16/99 16:38	CJ	5622
Surr: 4-Bromofluorot	penzene	90	48-156		1		09/16/99 16:38	CJ	56221
SULFATE				E300			Units: mg	/L	
Sulfate	· · · · · · · · · · · · · · · · · · ·	230	4.0		20		09/27/99 12:13	ES	61594

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ND/U - Not Detected at the Reporting Limit B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits



Client Sample ID: MV	V-10		Coll	ected:	09/14/99 1	3:45	SPL Sample ID:	99090	123-08
Analyses/Method		Result	Rep.Limit	MCL	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq.#
DIESEL RANGE ORG	ANICS			SW	8015B		Units: mg/	Ľ	
<b>Diesel Range Organics</b>		ND	0.20		1		09/22/99 7:56	RR	59336
Surr: Pentacosane		62	20-131		1		09/22/99 7:56	RR	59336
Run ID/Seq #: HP	V_990921B-593	36							
Prep Method	Prep Date		Prep Initials						
SW3510B	09/17/1999 8:4	0	KL						
GASOLINE RANGE C	RGANICS			SW	/8015B		Units: mg/	/L	
Gasoline Range Organi		ND	0.10		1		09/16/99 14:10	CJ	61772
Surr: 1,4-Difluoroben	zene	88	62-144		1		09/16/99 14:10	CJ	61772
Surr: 4-Bromofluorob	enzene	78	44-153		1		09/16/99 14:10	CJ	61772
HEADSPACE GAS A	NALYSIS			RS	K147		Units: mg	/L.	
Ethane	· · · · · · · · · · · · · · · · · · ·	ND	0.0025		1		09/23/99 13:53	PC	59742
Ethylene		ND	0.0032		1		09/23/99 13:53	PC	59742
Methane		0.0049	0.0012		1		09/23/99 13:53	PC	59742
NITROGEN, NITRATE	E (AS N)			E3	00		Units: mg	/L	
Nitrogen, Nitrate (As N)		ND	0.10		1		09/15/99 14:45	ES	60822
PURGEABLE AROM	ATICS			SV	/8021B		Units: ug/	L	
Benzene		10	1.0		1		09/16/99 14:10	CJ	56218
Ethylbenzene		ND	1.0		1		09/16/99 14:10	CJ	56218
Toluene		ND	1.0		1		09/16/99 14:10	CJ	56218
Xylenes, Total		ND	2.0	••••••	1		09/16/99 14:10	CJ	56218
Surr: 1,4-Difluorober	zene	97	72-137		1		09/16/99 14:10	CJ	56218
Surr: 4-Bromofluoro	penzene	89	48-156		1		09/16/99 14:10	CJ	56218
SULFATE				E3	00		Units: mg	/L	
Sulfate		160	2.0		10		09/27/99 12:13	ES	61595

Qualifiers:

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ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits



Client Sample ID: MV	V-13		Colle	ected:	09/14/99 1	4:25	SPL Sample ID:	99090	123-09
Analyses/Method		Result	Rep.Limit	MCL	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORG	BANICS			SW	8015B		Units: mg/	<u>′</u> L	
Diesel Range Organics	; <u> </u>	2.1	0.20		1		09/22/99 9:52	RR	59338
Surr: Pentacosane		60	20-131		1		09/22/99 9:52	RR	59338
Run ID/Seq #: HF	-V_990921B-593	38							
Prep Method	Prep Date		Prep Initials						
SW3510B	09/17/1999 8:4	ю	KL						
GASOLINE RANGE	ORGANICS			SN	/8015B		Units: mg	/∟	
Gasoline Range Organ	ics	3.1	0.50		5		09/16/99 12:32	CJ	61768
Surr: 1,4-Difluorober	nzene	98	62-144		5		09/16/99 12:32	CJ	6176
Surr: 4-Bromofluorot	penzene	91	44-153		5		09/16/99 12:32	CJ	6176
PURGEABLE AROM	ATICS		<u></u>	SV	/8021B		Units: ug/	L	
Benzene		860	5.0		5		09/16/99 12:32	CJ	5550
Ethylbenzene		450	5.0		5		09/16/99 12:32	CJ	5550
Toluene		16	5.0		5		09/16/99 12:32	CJ	5550
Xylenes, Total		34.4	10		5		09/16/99 12:32	CJ	5550
Surr: 1,4-Difluorober	nzene	110	72-137		5		09/16/99 12:32	CJ	5550
Surr: 4-Bromofluorol	benzene	98	48-156		5		09/16/99 12:32	CJ	5550

Qualifiers:

ND/U - Not Detected at the Reporting Limit B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits



Client Sample ID: Duplicat	e	Colle	ected: 09/14	1/99 0:	00	SPL Sample ID:	99090	123-10
Analyses/Method	Result	Rep.Limit	Dil. F	actor	QUAL	Date Analyzed	Analyst	Seq.#
DIESEL RANGE ORGANIC	CS		SW8015	3		Units: mg	/L	
Diesel Range Organics	ND	0.20		1		09/22/99 18:11	RR	59343
Surr: Pentacosane	42	20-131		1		09/22/99 18:11	RR	59343
Run ID/Seq #: HP_V_9	90921B-59343					······································		
Prep Method Pre	ep Date	Prep Initials						
SW3510B 09/	/17/1999 8:40	KL						
GASOLINE RANGE ORGA	ANICS		SW8015	3		Units: mg	/L	
Gasoline Range Organics	ND	0.10		1		09/16/99 16:13	CJ	61775
Surr: 1,4-Difluorobenzene	93	62-144		1		09/16/99 16:13	CJ	61775
Surr: 4-Bromofluorobenzer	ne 80	44-153		1		09/16/99 16:13	CJ	61775
PURGEABLE AROMATIC	S		SW80211	3		Units: ug/	/L	
Benzene	7.3	1.0		1		09/16/99 16:13	CJ	56220
Ethylbenzene	ND	1.0		1		09/16/99 16:13	CJ	56220
Toluene	ND	1.0		1		09/16/99 16:13	CJ	5622
Xylenes, Total	ND	2.0		1		09/16/99 16:13	CJ	5622
Surr: 1,4-Difluorobenzene	97	72-137		1		09/16/99 16:13	CJ	5622
Surr: 4-Bromofluorobenzer	ne 90	48-156		1		09/16/99 16:13	CJ	5622

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ND/U - Not Detected at the Reporting Limit B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits



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

Client Sample ID: Trip Blank 9/8/99		Coll	Collected: 09/14/99 0:00 5		99090123-11	
Analyses/Method	Result	Rep.Limit	Dil. Factor QUAL	Date Analyzed	Analyst	Seq. #
GASOLINE RANGE ORGANICS			SW8015B	Units: mg/	L	
Gasoline Range Organics	ND	0.10	1	09/22/99 20:09	CJ	61344
Surr: 1,4-Difluorobenzene	87	62-144	1	09/22/99 20:09	CJ	61344
Surr: 4-Bromofluorobenzene	74	44-153	1	09/22/99 20:09	CJ	61344
PURGEABLE AROMATICS			SW8021B	Units: ug/l		
Benzene	ND	1.0	1	09/22/99 20:09	CJ	60928
Ethylbenzene	ND	1.0	1	09/22/99 20:09	CJ	60928
Toluene	ND	1.0	1	09/22/99 20:09	CJ	60928
Xylenes, Total	ND	2.0	1	09/22/99 20:09	CJ	60928
Surr: 1,4-Difluorobenzene	96	72-137	1	09/22/99 20:09	CJ	60928
Surr: 4-Bromofluorobenzene	84	48-156	1	09/22/99 20:09	CJ	60928

Qualifiers:

ND/U - Not Detected at the Reporting Limit B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits

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# Quality Control Documentation

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

## **Quality Control Report**

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

Analysis: Viethod:	Diesel Range SW8015B	Organics							Order: atch ID:	9909 854	0123		
		Method Blank				Sa	mples in	Analytical Batc	h:		···		
RunID:	HP_V_9909218		mg/L					-			_		
	09/21/1999 22		RR				<u>b Sample</u> 090123-01		<u>Client Sa</u> MW-5	mple I	د		
Analysis Date: Preparation Date:	09/21/1999 2			fethod SV	/35108		090123-01		MW-12D				
rieparation Date.	03/11/1333 0.	но гіерізу.			100100		090123-02		MW-3				
							090123-04		MW-4				
	Ana			Rep Limit			090123-05		OW-4				
	l Range Organics rr: Pentacosane	s	ND 91.5				090123-06		MW-1				
	II. Perlacosane		31.0	20131			090123-07		MW-12				
						99	090123-08	38	MW-10				
						99	090123-09	9B	MW-13				
						99	090123-10	)B	Duplicate				
·····			La	boratory	Contro	Sample (	LCS)					<u></u>	
		RunID:	HP_V_990	0921B-5933	1 (	Jnits:	mg/L						
		Analysis Date:	09/21/19	99 23:33	,	Analyst:	RR						
		Preparation Date:	09/17/19	99 8:40	I	Prep By:	KL Met	hod SW3510B					
	Γ	Analyt	e		Spike Added	Result	Perce Recov		Upper Limit				
	ſ	Diesel Range Organics	<u> </u>			5 4.		97 53	148				
							<del></del>						
		Matrix	Spike (N	<u>AS) / Matri</u>	<u>x Spik</u>	e Duplicat	e (MSD)						
		Sample Spiked:	990901	123-02									
		RunID:	HP_V_9	990921B-59	333	Units:	mg/L						
		Analysis Date:	09/22/1	1999 6:00		Analyst:	RR						
A	nalyte	Sample Resu	t MS Spike Added	MS Re	esult	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	Hig Lin
Diesel Range Org	anics	N	5 5	5	4.7	93.0	0 5	5.3	106	12.9	39	21	1

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

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D - Surrogate Recovery Unreportable due to Dilution



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

## **Quality Control Report**

## Brown & Caldwell BJ-HOBBS

Analysis: Method:	Headspace Gas Analy RSK147	sis				WorkOrder: Lab Batch ID:	99090123 R2694
<u> </u>	Metho	d Blank			Samples in Analytic	al Batch:	
RuniD:	VARC_990921A-58256	Units:	mg/L		Lab Sample ID	Client S	ample ID
Analysis Date:	09/21/1999 10:41	Analyst:	PC		99090123-01D	MW-5	
-					99090123-02D	MW-120	)
1					99090123-05D	OW-4	
	Analyte		Result	Rep Limit			

Analyte	Result	Rep Limit
Ethane	ND	0.0025
Methane	NC	0.0012

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits

D - Surrogate Recovery Unreportable due to Dilution

9/29/99 10:39:59 AM



## **Quality Control Report**

## Brown & Caldwell BJ-HOBBS

Analysis: Method:	Headspace Gas Analy RSK147	sis			WorkOrder: Lab Batch ID:	99090123 R2779	
	Metho	d Blank		Samples in Analytic	al Batch:		
RuniD:	VARC_990923A-59735	Units:	mg/L	Lab Sample ID	Client S	ample ID	
Analysis Date:	09/23/1999 10:12	Analyst:	PC	99090123-07D	MW-12		
				99090123-08D	MW-10		

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

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

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

9/29/99 10:39:59 AM



## **Quality Control Report**

## Brown & Caldwell BJ-HOBBS

Analysis: Method:	Purgeable Aroma SW8021B	tics	·					Order: atch ID:	99090 R256	0123 61		
	<u> </u>	lethod Blank	<u></u>		Sam	ples in A	nalytical Batc	h:				
RunID:	HP_J_990916A-555	08 Units:	ug/L		iah	Sample I	n	<u>Client Sa</u>	mnie iľ	`		
Analysis Date:		Analyst:	CJ			0123-01/		MW-5		2		
Analysis Date.	09/10/1355 3.51	Analyst.	00			90123-02/		MW-12D				
						0123-03/		MW-3				
-						90123-04/		MW-4				
_	Analyte		Result Rep L			90123-05		OW-4				
	Benzene		ND	1.0		90123-06		MW-1				
-	<u>Ethylbenzene</u> Toluene		ND ND	1.0		90123-07		MW-12				
	Xylenes, Total		ND	2.0		90123-08		MW-10				
	Surr: 1,4-Difluorobenzene			-137		90123-09		MW-13				
l	Surr: 4-Bromofluorobenzo	ene	78.8 48	-156		90123-10		Duplicate				
					500.	50120 10		Dapiloate				
			Laborato	ory Control	Sample (L	CS)						
	Du	nID: +	IP_J_990916A-5	55480 1	Jnits: u	- 4						
						g/L						
	An	alysis Date: 0	9/16/1999 9:5	6 /	Analyst: C	J						
		Analyte		Spike	Result	Percen		Upper				
				Added		Recove	ry Limit	Limit				
	Benz	ene		5	0 52		104 61	119				
	Ethyl	penzene		5	0 52		104 70	118				
	Tolue	ne		5	50 52		104 65	125				
	Xylen	es,Total	· · · · · · · · · · · · · · · · · · ·	15	60 149		99 72	116				
		Matrix	Spike (MS) / N	Jatrix Chik	Duplicato							
		Matrix	Spike (MS) / N	Matrix Spike	e Duplicate	(MSD)						
		<u>Matrix</u> Sample Spiked:	<mark>Spike (MS) / N</mark> 99090123-10		e Duplicate	(MSD)	. <u>.</u>					
				)	e Duplicate Units:	(MSD) ug/L						
	F	ample Spiked:	99090123-10	) A-56532								
	F	ample Spiked: RunID:	99090123-10 HP_J_990916	) A-56532	Units:	ug/L	. <u></u>					
	F	ample Spiked: RunID: Analysis Date:	99090123-10 HP_J_990916/ 09/17/1999 1	) A-56532  1:54	Units: Analyst:	ug/L CJ	MCD D					
	F	ample Spiked: RunID:	99090123-10 HP_J_990916/ 09/17/1999 1	) A-56532	Units:	ug/L	MSD Result	MSD % Recovery	RPD	RPD Limit		Hig Lirr
Benzene	F	ample Spiked: RunID: Analysis Date:	99090123-10 HP_J_990916 09/17/1999 1 MS MS Spike Added	) A-56532  1:54	Units: Analyst: MS %	ug/L CJ MSD Spike	MSD Result				Limit	
Benzene Ethylbenzene	F Analyte	Sample Spiked: RunID: Analysis Date: Sample Result	99090123-10 HP_J_990916, 09/17/1999 1 MS MS Spike Added 20	) A-56532 11:54 S Result	Units: Analyst: MS % Recovery	ug/L CJ MSD Spike Added		Recovery	105*	Limit 21	Limit	Lin 1
1	F Analyte	Sample Spiked: RunID: Analysis Date: Sample Result 7.3	99090123-10 HP_J_990916, 09/17/1999 1 MS MS Spike Added 20 20	) A-56532 I 1:54 S Result 35	Units: Analyst: MS % Recovery 137	ug/L CJ MSD Spike Added 20 20	16	Recovery 43	105* 74.8*	Limit 21 19	Limit 32 52	Lim

Qualifiers:

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ND/U - Not Detected at the Reporting Limit

it \* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank

D - Surrogate Recovery Unreportable due to Dilution

9/29/99 10:40:00 AM

	<b>P2</b>	R						HOUS	ON LAE TERCHA TON, TE) 713) 660-	NGE DRI KAS 770	VE	
		0	Qu	ality Contro	ol Report	t		·				
			E	Brown & Ca BJ-HOB								
Analysis: Method:	Purgeable Aroma SW8021B	itics						Order: atch ID:	9909 R272			
	<u>Þ</u>	lethod Blank			Sam	ples in A	nalytical Batc	h:				
RunID: Analysis Date:	HP_J_990921A-594 09/22/1999 15:10		ug/L CJ			Sample    90123-114	-	<u>Client Sa</u> Trip Blank		-		
Eth Tol Xyl	Analyte nzene nylbenzene luene lenes,Total Surr: 1,4-Difluorobenzene Surr: 4-Bromofluorobenze	,	Result Re ND ND ND 94.8 80.5	ep Limit 1.0 1.0 2.0 72-137 48-156								
			Laboi P_J_990921 9/21/1999			g/L						
			P_J_99092	1A-58639 ( 12:03 A Spike	Jnits: u Analyst: C Result	g/L J Percen		Upper				
	An	alysis Date: 0 Analyte	P_J_99092	14-58639 ( 12:03 A Spike Added	Jnits: u Analyst: C Result	g/L J Percen Recover	y Limit	Limit				
	An Benz	alysis Date: 0 Analyte	P_J_99092	1A-58639 ( 12:03 A Spike	Jnits: u Analyst: C Result 0 52	g/L :J Percen Recover						
	An Benz Ethyl Tolue	alysis Date: 0 Analyte ene penzene ene	P_J_99092	1A-58639 ( 12:03 A Spike Added 5 5 5 5	Jnits: u Analyst: C Result 0 52 0 51 0 52	g/L J Perceni Recover	y Limit 04 61 02 70 04 65	Limit 119 118 125				
	An Benz Ethyl Tolue	alysis Date: 0 Analyte ene penzene	P_J_99092	1A-58639 ( 12:03 A Spike Added 5 5	Jnits: u Analyst: C Result 0 52 0 51 0 52	g/L J Perceni Recover	y Limit 04 61 02 70	Limit 119 118				
	An Benz Ethyl Tolue Xyler	alysis Date: 0 Analyte ene penzene es,Total <u>Matrix S</u>	P_J_99092 9/21/1999 Spike (MS)	1A-58639 U 12:03 A Spike Added 5 5 5 5 15	Jnits: u Analyst: C Result 0 52 0 51 0 52 0 150	g/L J Percen Recover	y Limit 04 61 02 70 04 65	Limit 119 118 125				
	An Benz Ethyl Tolue Xyler	alysis Date: 0 Analyte ene penzene ene es,Total	P_J_99092 9/21/1999 5pike (MS) 99090100	1A-58639 U 12:03 A Spike Added 5 5 5 15 15 ) / Matrix Spike 0-01 1921A-60934	Jnits: u Analyst: C Result 0 52 0 51 0 52 0 150	g/L J Percen Recover	y Limit 04 61 02 70 04 65	Limit 119 118 125				
	An Benz Ethyl Tolue Xyler	alysis Date: 0 Analyte ene benzene es,Total <u>Matrix S</u> Sample Spiked: RunID:	P_J_99092 9/21/1999 9/21/1999 9/21/1999 9/21/1999 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	1A-58639 U 12:03 A Spike Added 5 5 5 15 15 ) / Matrix Spike 0-01 1921A-60934	Units: u Analyst: C Result 0 52 0 51 0 51 0 52 0 51 0 52 0 51 0 52 0 51 0 51 0 52 0 51 0 51 0 51 0 51 0 51 0 51 0 51 0 51	g/L J Percent Recover	y Limit 04 61 02 70 04 65	Limit 119 118 125	RPD	RPD Limit	Low Limit	Hig
Benzene	An Benz Ethyl Tolue Xyler	alysis Date: 0 Analyte ene benzene es,Total <u>Matrix S</u> Sample Spiked: RunID: Analysis Date:	P_J_99092 9/21/1999 9/21/1999 5pike (MS) 99090100 HP_J_990 09/22/199 MS Spike Added 20	1A-58639 U 12:03 A Spike Added 5 5 5 15 15 15 15 15 15 15 1	Jnits: u Analyst: C Result 0 52 0 51 0 52 0 150 e Duplicate Units: Analyst:	g/L J Percent Recover	y Limit 04 61 02 70 04 65 00 72 MSD Result	Limit 119 118 125 116 MSD % Recovery 63	38.1*	Limit 21	Limit 32	Lin
Benzene Ethylbenzene Toluene	An Benz Ethyl Tolue Xyler	alysis Date: 0 Analyte ene benzene es,Total  Matrix S Sample Spiked: RunID: Analysis Date:  Sample Result	P_J_99092 9/21/1999 9/21/1999 Spike (MS) 99090100 HP_J_990 09/22/199 MS Spike Added	1A-58639 U 12:03 A Spike Added 5 5 5 15 15 ) / Matrix Spike 0-01 1921A-60934 99 13:30 MS Result	Units: Units: Units: Analyst: C	g/L J Percent Recover	y Limit 04 61 02 70 04 65 00 72	Limit 119 118 125 116 MSD % Recovery 63 61	38.1* 39.1*	Limit	Limit 32 52	Hig Lin 1 1

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits

D - Surrogate Recovery Unreportable due to Dilution

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1			Ċ.	Quality C			τ						
				Brown BJ	& Calo - HOBBS								
Analysis: Method:	Gasoline Range Or SW8015B	ganics							kOrder: Batch ID:	9909 R284	00123 47		
RunID: Analysis Date:	<u>Me</u> HP_J_990922B-61342 09/22/1999 15:10	<u>thod Blank</u> Units: Analyst:	mg/L CJ			Lab	nples in <i>I</i> Sample 90123-11		tical Batch: <u>Client Sample ID</u> Trip Blank 9/8/99				
	Analyte soline Range Organics Surr: 1,4-Difluorobenzene Surr: 4-Bromofluorobenzene		Result ND 86.7 70.6	Rep Limit 0.10 62-144 44-153									
, 			Lai	boratory C	ontrol S	ampie (L	CS)						
	Runi Analy		IP_J_990 )9/22/199	9228-61339 99 13:05	Uni Ana Spike	ts: n	ng/L :J Percei		Upper				
	Analy	vsis Date: 0	IP_J_990 )9/22/199	9228-61339 99 13:05	Uni Ana	ts: n alyst: C	ng/L :J Percei Recove		Limit				
	Analy	rsis Date: 0 Analyte e Range Organic	1P_J_990 09/22/199	9228-61339 99 13:05	Uni Ana Spike Added 1	ts: n alyst: C Result 0.7	ng/L :J Recove	ery Limit	Limit				
	Anah Gasolin Sa Ru	rsis Date: 0 Analyte e Range Organic	HP_J_990 09/22/199 35 55 55 55 55 55 55 55 55 55 55 55 55	922B-61339 99 13:05	Uni Ana Spike Added 1 : Spike D	ts: n alyst: C Result 0.7	ng/L :J Recove	ery Limit	Limit				
	Anah Gasolin Sa Ru	rsis Date: 0 Analyte e Range Organic <u>Matrix S</u> mple Spiked: nID:	HP_J_990 09/22/199 35 55 55 55 55 55 55 55 55 55 55 55 55	922B-61339 99 13:05 13:05 15) / Matrix 00-02 90922B-613	Uni Ana Spike   1 <u>Spike D</u> 40 L A	ts: n alyst: C Result 0.7 uplicate	ng/L 2.J Recove (MSD) mg/L	ery Limit	Limit	RPD	RPD Limit	Low Limit	Hig Lin

Qualifiers:

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ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits

D - Surrogate Recovery Unreportable due to Dilution

9/29/99 10:40:01 AM

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

# Quality Control Report

#### Brown & Caldwell BJ-HOBBS

nalysis:		ange Organics		BJ- HOE			Work			0123		
lethod:	SW8015B							atch ID:	R287			
		Method Blank			San	ples in An	alytical Batc	h:				
RunID:	HP_J_990916	5C-61764 Units:	mg/L		Lab	Sample ID		Client Sar	mpie il	c		
Analysis Date:	09/16/1999 9	9:31 Analyst:	CJ			90123-01A	•	MW-5		5		
charysis Dute.	03/10/1333	S.GT Analyse.	00			90123-02A		MW-12D				
						90123-03A		MW-3				
_						90123-04A		MW-4				
		nalyte	Result	Rep Limit		90123-05A		OW-4				
<u>[</u>	<b>Basoline Range Orga</b>		ND	0.10		90123-06A		MW-1				
+	Surr: 1,4-Difluorob Surr: 4-Bromofluor		88.3 68.5	62-144 44-153				MW-12				
L.	Sur: 4-bromonuor	openzene	60.5	44-155		90123-07A						
						90123-08A		MW-10				
						90123-09A		MW-13				
					990	90123-10A		Duplicate				
			La	boratory Contro	I Sample (L	CS)					<u> </u>	
		RunID:	HP_J_990	916C-61773	Units: n	ng/L						
		Analysis Date:	09/16/19	99 14:59	Analyst: C	CJ						
		·										
	1	Anal		Spike	Result	Percent	Lower	Upper				
			Jie	Addeo		Recovery		Limit				
		Gasoline Range Orga	nice	· · · · · · · · · · · · · · · · · · ·	1 0.82	-	32 64	131				
		Casonine Mange Orga	1100		1 0.02							
		Matr	ix Spike (N	IS) / Matrix Spik	e Duplicate	(MSD)				<u></u>		
		Sample Spiked:	990901	23-07								
		RunID:		90916C-61778	Units:	mg/L						
		Analysis Date:		999 12:43	Analyst:	CJ						
		Analysis Dale.	03/17/	1999 12.40	Analysi.	00						
	Analyte	Sample Res		MS Result	MS %		MSD Result	MSD %	RPD	RPD	Low	
	Analyte	Sample Res	Spike		MS % Recovery	Spike	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	
	Analyte	Sample Res					MSD Result		RPD		1	Hig Lin

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## **Quality Control Report**

## Brown & Caldwell BJ-HOBBS

Analysis: Method:	Nitrogen, Ni E300	itrate (As	N}						Order: atch ID:	9909 R283			
<u></u>		Meth	od Blank			San	nples in <i>l</i>	Analytical Batc	h:				
RunID:	WET_990915	L-60813	Units:	mg/L		Lab	Sample	D	Client Sa	mple II	2		
Analysis Date:	09/15/1999 <sup>-</sup>	14:45	Analyst:	ES			90123-01		MW-5		•		
····· <b>·</b>			, <b>,</b>			990	90123-02	20	MW-12D				
						990	90123-05	5C	OW-4				
[				Result	Rep Limit	990	90123-07	7C	MW-12				
Nite	Ar rogen,Nitrate (As N	nalyte		ND	0.10	990	90123-08	3C	MW-10				
(1910)	ogen, Milare (As I	<u> </u>			0.10								
			<u></u>	Lab	oratory Con	trol Sample (L	.CS)						
		RuniD:		NET_9909	915L-60814	Units: r	ng/L						
		Analys		09/15/199			ES						
			Analyte	;	Spi Ade	ke Result ded	Percer		Upper Limit				
		Nitrogen	Nitrate (As N)			10 9.3		93 90	110				
					I	l,	- <b>I</b>						
			· · · · · · · · · · · · · · · · · · ·										
			<u>Matrix</u>	<u>Spike (M</u>	S) / Matrix S	pike Duplicate	(MSD)						
		Sam	ple Spiked:	990941	4-01A								
		Runi			0915L-60816	Units:	mg/L						
			ysis Date:	09/15/1	999 14:45	Analyst:	EŠ						
[	Anchéo	T	Comple Dest	MS	MS Result	MS %	MSD	MSD Result	MSD %	RPD	RPD	Low	1.12
	Analyte		Sample Resul	Spike	IVIS Result	Recovery	Spike	wisd result	Recovery	RPU	Limit	Limit	Hig Lin
				Added			Added						
Nitrogen, Nitrate	(As N)		NE	10		9.1 90.6	10	9,1	91	.0772	20	86	1

Qualifiers:

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits

D - Surrogate Recovery Unreportable due to Dilution

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## Quality Control Report

## Brown & Caldwell BJ-HOBBS

Analysis: Method:	Sulfate E300										Order: atch ID:	9909 R287	0123 '3		
<u></u>	····	Met	hod Blank	·		·····	San	ples in A	Analytic	cal Batc	h:				
RunID: Analysis Date:	WET_990923 09/27/1999		Units: Analyst:	mg/L ES			990 990	<u>Sample</u> 90123-01 90123-02 90123-05	с с		<u>Çlient Sa</u> MW-5 MW-12D OW-4	mpie II	<u>2</u>		
Su	Ai Ifate	nalyte		Result ND	Rep Lim 0.2			90123-07 90123-08			MW-12 MW-10				
				Lab	oratory	Control	Sample (L	CS)							
		RuniD Analys		WET_9909 09/27/199				ng/L S							
			Analyte	2		Spike Added	Result	Percer Recove		ower Limit	Upper Limit				
		Sulfate				1	9.9		99	90	110				
		Run	nple Spiked:	990901 WET_99	23-01	1590	Duplicate Units: Analyst:	(MSD) mg/L ES							
	Analyte		Sample Result	MS Spike Added	MS R	Result	MS % Recovery	MSD Spike Added	MSD	Result	MSD % Recovery	RPD	RPD Limit	Low Limit	Hig Lin
Sulfate			210	250		480	106	250		470	104	2.50	20	80	1
Qualifiers:			d at the Reporti I in the associat		d Blank		- Recovery				mits due to Dilutio	on		-	

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Chain of Custody And Sample Receipt Checklist

										Ĩ	لمعنيان القطفات المفعه	j.		
				SPL,	Inc.				A THR	SPL Workarder No.		10	095390	0
	An	Analysis Request &	squest		in of (	Chain of Custody Record	Recon	20	4	440man	$\mathbb{P}$	2	page 1 of	-
Gient Name: AC MAN of Cald Well				matri	matrix bottle	size	prcs.			Re	cqueste	<b>Requested Analysis</b>	/sis	den tinlêrê
Antonezertinone: 14 15 Louisi en vituso	い中へい	713-755-259	-2999		81855		- 11 - 12			en sontjuert	sul z		an canadar II. Shengale II. S	tir 37 million
arm contact. But John ing S	nes				ber	2		بيرا المدند		<u>ر</u> .	47/62	at a state of the local state		23% #3 <b>10</b> 62
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SAMPLE ID	DATE	TIME	comp grab	M	=4	=8				.s .N	w			
5-01W	55.41.5	sh:s		3				א ז	2	$\times$	$\times$			
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01,01	65.41-5	13:45		3				5	$\chi$ $\alpha$	5	×			
X CLMM	5.14.59	14/25		3			~		$\overset{\varkappa}{\prec}$					
Ovolicate	7-14-99			3			ک		X					
Girni Consultant Remarks: \$ 24-15 PUSh 3- BJEX 61	- hr rush 3	- GTEX.	50	Labora	Laboratory remarks	k						Intact?		z
	M. (-WM, 1-	א וו-שא	1m-13									Temp:	m: 50	
Reduceted TAT	Special Reporting Requirements	ng Requireme	nts Fa	Fax Results	8	Raw Data	<u>7</u>	ccial Dct	Special Detection Limits (specify):	its (specify	ų Š		PM REVIEW (INITIAL):	
	Stan	Sundard QC		Level 3 QC		Level 4 QC								
24hr 🕅 72hr 🔲	1. Relinquished by Sampler.	by Sampler.	Z			56-415	-	time 16:35	2. Ko	2. Rocined by:				
(Chr. 🗌 Standard 🛄	3. Relinquished by:	py:		1		datc		Lime	4. Ko	4. Roceived by.				
Other	5. Relinquished by:	- Pa				datc	.3	Link	6.80	I VEN	6. Receiped by Laborardy	J d	1151990	
U: 8830 Interchange Drive, Houston, TX 77054 (713) 660-0901	, Houston, T	K 77054 (7	13) 660-	1060			00 Amt	assado	r Caffer	y Parkv	vay, Scot	t, LA 70:	500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775	775



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

## Sample Receipt Checklist

Workorder:	99090123		Received by:		Stelly, D'Anna
Date and Time Received:	9/15/99 10:00:00 AM		Carrier name:		FedEx
Temperature:	5			. <u>.</u>	
Shipping container/cooler in g	ood condition?	Yes 🔽	No 🗌	Not Present	
Custody seals intact on shipp	ping container/cooler?	Yes 🗌	No 🗌	Not Present	
Custody seals intact on samp	le bottles?	Yes 🗌	No 🗌	Not Present	
Chain of custody present?		Yes 🗹	No 🗌		
Chain of custody signed when	n relinquished and received?	Yes 🗹	Νο		
Chain of custody agrees with	sample labels?	Yes 🗹	No 🗌		
Samples in proper container/	pottle?	Yes 🔽	No 🗌		
Sample containers intact?		Yes 🗹	No 🗌		
Sufficient sample volume for	indicated test?	Yes 🗹	No 🗌		
All samples received within h	olding time?	Yes 🔽	No 🗌		
Container/Temp Blank tempe	rature in compliance?	Yes 🗹	Νο		
Water - VOA vials have zero	headspace?	Yes 🔽	No 🗌	Not Present	
Water - pH acceptable upon	receipt?	Yes 🗹	Νο		



## **Brown & Caldwell**

	Certificat	e of Analysis <u>99090124</u>				
Report To:			Project Name:	BJ- HOBBS		
Brown & Caldwell Rick Rexroad 1415 Louisiana			<u>Site:</u> Site Address:	BJ-Hobbs		
Suite 2500 Houston TX 77002-			<u>PO Number:</u> <u>State:</u> <u>State Cert. No.:</u>	New Mexico		
ph: (713) 759-0999	fax: (713) 308-3886		Date Reported;			
Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	НО

/W-9	99090124-01	Water	09/13/1999 14:45	09/14/1999 10:00	
MW-7	99090124-02	Water	09/13/1999 16:10	09/14/1999 10:00	
MW-8	99090124-03	Water	09/13/1999 16:40	09/14/1999 10:00	
MW-11A	99090124-04	Water	09/13/1999 17:15	09/14/1999 10:00	

2. Lynch RLO.  $\alpha$ Lynch, Pat Project Manager

9/29/99

Date

Joel Grice Laboratory Director

Ted Yen Quality Assurance Officer



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Client Sample ID: MW-9		Colle	cted: 09/13/99 14:45	SPL Sample ID:	99090	124-01
Analyses/Method	Result	Rep.Limit	Dil. Factor QUAL	Date Analyzed	Anaiyst	Seq. #
DIESEL RANGE ORGANICS			SW8015B	Units: mg/	″L	
Diesel Range Organics	ND	0.20	1	09/22/99 18:49	RR	59344
Surr: Pentacosane	55	20-131	1	09/22/99 18:49	RR	59344
Run ID/Seq #: HP_V_990921B	-59344		·····	······		
Prep Method Prep Date		Prep Initials				
SW3510B 09/17/1999	8:40	KL				
GASOLINE RANGE ORGANICS			SW8015B	Units: mg	/L	
Gasoline Range Organics	ND	0.10	1	09/26/99 19:19	WR	60860
Surr: 1,4-Difluorobenzene	89	62-144	1	09/26/99 19:19	WR	60860
Surr: 4-Bromofluorobenzene	96	44-153	1	09/26/99 19:19	WR	60860
PURGEABLE AROMATICS			SW8021B	Units: ug/	L	
Benzene	ND	1.0	1	09/22/99 22:13	CJ	61535
Ethylbenzene	ND	1.0	1	09/22/99 22:13	CJ	61535
Toluene	ŃD	1.0	1	09/22/99 22:13	CJ	61535
Xylenes,Total	ND	2.0	1	09/22/99 22:13	CJ	61535
Surr: 1,4-Difluorobenzene	97	72-137	1	09/22/99 22:13	CJ	61535
Surr: 4-Bromofluorobenzene	85	48-156	1	09/22/99 22:13	CJ	61535

Qualifiers:

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ND/U - Not Detected at the Reporting Limit B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits



Client Sample ID: MW	-7		Collec	ted: 09/13/99	6:10	SPL Sample ID:	99090	124-02
Analyses/Method		Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORGA	ANICS			SW8015B		Units: mg	/L	
Diesel Range Organics	·····	ND	0.20	1		09/22/99 19:28	RR	59345
Surr: Pentacosane		34	20-131	1		09/22/99 19:28	RR	59345
Run ID/Seq #: HP_	V_990921B-5934	5						
Prep Method	Prep Date		Prep Initials					
SW3510B	09/17/1999 8:40		KL					
GASOLINE RANGE O	RGANICS			SW8015B		Units: mg	/L	
Gasoline Range Organic	:S	ND	0.10	1		09/26/99 19:48	WR	60861
Surr: 1,4-Difluorobenz	ene	88	62-144	1		09/26/99 19:48	WR	60861
Surr: 4-Bromofluorobe	enzene	95	44-153	1		09/26/99 19:48	WR	6086
PURGEABLE AROMA	TICS			SW8021B		Units: ug/	<u>الـ</u>	
Benzene	·····	ND	1.0	1		09/22/99 22:42	CJ	61536
Ethylbenzene	····	ND	1.0	1		09/22/99 22:42	CJ	61536
Toluene		ND	1.0	1		09/22/99 22:42	CJ	6153
Xylenes, Total		ND	2.0	1		09/22/99 22:42	CJ	6153
Surr: 1,4-Difluorobenz	zene	96	72-137	1		09/22/99 22:42	CJ	6153
Surr: 4-Bromofluorobe	enzene	82	48-156	1		09/22/99 22:42	CJ	6153

ND/U - Not Detected at the Reporting Limit B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits



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

Client Sample ID: MW	-8		Collec	ted: 09/13/99 16:40	) SPL Sample ID:	99090	124-03
Analyses/Method		Result	Rep.Limit	Dil. Factor QU	AL Date Analyzed	Analyst	Seq.#
DIESEL RANGE ORGA	ANICS			SW8015B	Units: mg/	L	
Diesel Range Organics		ND	0.20	1	09/22/99 20:06	RR	59346
Surr: Pentacosane		42	20-131	1	09/22/99 20:06	RR	59346
Run ID/Seq #: HP	V_990921B-5934	6					
Prep Method	Prep Date		Prep Initials				
SW3510B	09/17/1999 8:40		KL				
GASOLINE RANGE OI	RGANICS			SW8015B	Units: mg/	L	
Gasoline Range Organic	S	ND	0.10	1	09/26/99 20:17	WR	6086
Surr: 1,4-Difluorobenz	ene	90	62-144	1	09/26/99 20:17	WR	6086
Surr: 4-Bromofluorabe	enzene	94	44-153	1	09/26/99 20:17	WR	6086
PURGEABLE AROMA	TICS			SW8021B	Units: ug/		
Benzene		ND	1.0	1	09/22/99 23:07	CJ	6153
Ethylbenzene		ND	1.0	1	09/22/99 23:07	CJ	6153
Toluene	<u></u>	ND	1.0	1	09/22/99 23:07	CJ	6153
Xylenes, Total		ND	2.0	1	09/22/99 23:07	CJ	6153
Surr: 1,4-Difluorobenz	ene	95	72-137	1	09/22/99 23:07	CJ	6153
Surr: 4-Bromofluorobe	enzene	83	48-156	1	09/22/99 23:07	CJ	6153

Qualifiers:

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ND/U - Not Detected at the Reporting Limit B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits



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Client Sample ID: MW	V-11A		Collec	ted: 09/13/99 1	7:15	SPL Sample ID:	99090	124-04
Analyses/Method	I	Result	Rep.Limit	Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
DIESEL RANGE ORG	ANICS			SW8015B		Units: mg/	/L	
Diesel Range Organics		ND	0,20	1		09/22/99 20:44	RR	59347
Surr: Pentacosane		21	20-131	1		09/22/99 20:44	RR	59347
Run ID/Seq #: HP	V_990921B-5934	7				·····		
Prep Method	Prep Date		Prep Initials					
SW3510B	09/17/1999 8:40	· · · · · · · · · · · · · · · · · · ·	KL					
GASOLINE RANGE O	RGANICS			SW8015B		Units: mg	/L	
Gasoline Range Organic	cs	ND	0.10	1		09/26/99 20:46	WR	60863
Surr: 1,4-Difluorobena	zene	88	62-144	1		09/26/99 20:46	WR	60863
Surr: 4-Bromofluorobe	enzene	95	44-153	1		09/26/99 20:46	WR	60863
HEADSPACE GAS A	NALYSIS			RSK147		Units: mg	/L	
Ethane		ND	0.0025	1		09/23/99 14:04	PĆ	59744
Ethylene		ND	0.0032	1		09/23/99 14:04	PC	59744
Methane		ND	0.0012	1	- ·····	09/23/99 14:04	PC	59744
NITROGEN, NITRATE	E (AS N)			E300		Units: mg	/L	
Nitrogen, Nitrate (As N)		0.22	0.10	1		09/14/99 18:50	ES	56565
PURGEABLE AROM	ATICS			SW8021B		Units: ug/	/L	
Benzene		ND	1.0	1		09/22/99 23:31	CJ	61538
Ethylbenzene		ND	1.0	1		09/22/99 23:31	CJ	61538
Toluene		ND	1.0	1		09/22/99 23:31	CJ	61538
Xylenes, Total		ND	2.0	1		09/22/99 23:31	CJ	61538
Surr: 1,4-Difluoroben	izene	95	72-137	1		09/22/99 23:31	CJ	61538
Surr: 4-Bromofluorob	penzene	85	48-156	1		09/22/99 23:31	CJ	61536
SULFATE		-		E300		Units: mg	 ۱/۲	
Sulfate		250	4.0	20		09/17/99 14:00	ES	59383

Qualifiers:

1.1

ND/U - Not Detected at the Reporting Limit B - Analyte detected in the associated Method Blank \* - Surrogate Recovery Outside Advisable QC Limits

Quality Control Documentation

1.1

: 1



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

## **Quality Control Report**

## Brown & Caldwell BJ-HOBBS

Analysis: Method:	Diesel Range Organ SW8015B	ics						Order: atch ID:	9909 854	0124		
¥	Met	hod Blank			Sam	ples in A	nalytical Bato	h:				
	HP_V_990921B-59330 09/21/1999 22:55 09/17/1999 8:40 Analyte Range Organics r: Pentacosane	Units: Analyst: Prep By:	Result Rep Li	.20	<u>Lab</u> 9909 9909 9909	Sample 90124-01 90124-02 90124-03 90124-04	<u>р</u> 3 3 8	<u>Client Sa</u> MW-9 MW-7 MW-8 MW-11A	<u>mpie II</u>	<u>)</u>		
	·····	<u></u>	Laborato	ry Control	Sample (L	CS)					<u> </u>	
l		sis Date: 0	HP_V_9909218-59 09/21/1999 23:3 09/17/1999 8:40	3 A	nalyst: R	ng/L IR IL Meth	od SW3510B					
		Analyte	•	Spike Added	Result	Percen Recove	ry Limit	Upper Limit				
1	Diesel R	ange Organics			5 4.8	<u> </u>	97 53	148				
	Run	ple Spiked:	Spike (MS) / M; 99090123-02 HP_V_990921B 09/22/1999 6;(	-59333	<u>Duplicate</u> Units: Analyst:	(MSD) mg/L RR						
A	nalyte	Sample Result	MS MS Spike Added	Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	Hig Lin
Diesel Range Orga	anics	ND	5	4.7	93.0	5	5.3	106	12.9	39	21	1
Diesel Range Orga	anics	ND		4.7	93.0		5.3	106	12.9	39	21	-

Qualifiers:

l al

i fla

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

D - Surrogate Recovery Unreportable due to Dilution

9/30/99 9:49:54 AM

	PL/®	7	c	Quality Contr	ol Report	6680	ON LABORATORY NTERCHANGE DRIVE STON, TEXAS 77054 (713) 660-0901
				Brown & C BJ-HOE			
Analysis: Method:	Headspace Gas Analy RSK147	sis				WorkOrder: Lab Batch ID:	99090124 R2779
	Metho	d Blank			Samples in Analy	tical Batch:	<u></u>
RunID: Analysis Date:	VARC_990923A-59735 09/23/1999 10:12	Units: Analyst:	mg/L PC		Lab Sample ID 99090124-04D	<u>Client Sa</u> MW-11A	ample ID
	Analyte		Result	Rep Limit			
	1200		ND				
	nylene		ND ND				

Qualifiers:

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ND/U - Not Detected at the Reporting Limit

11.

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits

D - Surrogate Recovery Unreportable due to Dilution

9/29/99 11:01:39 AM



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

## **Quality Control Report**

## Brown & Caldwell BJ-HOBBS

nalysis: Aethod:	Purgeable / SW8021B	Aromatics	5						Order: atch ID:	9909 R286	0124 35		
		Meth	od Blank			Sam	ples in /	Analytical Bate				<u></u>	
RunID:	HP_J_990922			ug/L		Lab	Sample	ם	Client Sa	mnle li	n		
Analysis Date:	09/22/1999	15:10	Analyst:	CJ			90124-01		MW-9		2		
			· · · · · · · · · · · · · · · · · · ·				90124-02		MW-7				
I							90124-03		MW-8				
						990	90124-04	A	MW-11A				
Ba	nzene Ar	nalyte		ND	Rep Limit								
	lybenzene			ND	1.0								
	luene			ND	1.0								
	lenes,Total Surr: 1,4-Difluorobe	enzene		ND 94.8	2.0 72-137								
	Surr: 4-Bromofluor			80.5	48-156								
					oratory Control	Somple /	(2)			- <u></u>			
		RunID:		_			g/L						
		Analysi	s Date: 0	9/22/199	1912:41 A	Analyst: C	, J						
		[	Analyte		Spike	Result	Percer	t Lower	Upper				
			, and y to		Added		Recove	1	Limit				
		Benzene	<u> </u>		5	50 54		108 61	119				
		Denzene											
		Ethylbenz	ene		5	50 53	1	107 70	118				
		Ethylbenz Toluene			5	50 53 50 54		107         70           108         65	118 125				
		Ethylbenz			5	50 53 50 54		107 70	118				
		Ethylbenz Toluene			5	50 53 50 54		107         70           108         65	118 125				
		Ethylbenz Toluene	<sup>r</sup> otal		5 5 15	50 53 50 54 50 162		107         70           108         65	118 125				
		Ethylbenz Toluene	<sup>r</sup> otal	píke (MS	5	50 53 50 54 50 162		107         70           108         65	118 125				
		Ethylbenz Toluene Xylenes,7	<sup>r</sup> otal	pike (MS 9909010	5 5 15 S) / Matrix Spike	50 53 50 54 50 162		107         70           108         65	118 125				
		Ethylbenz Toluene Xylenes,7	Total <u>Matrix S</u> ple Spiked:	990901	5 5 15 S) / Matrix Spike	50 53 50 54 50 162		107         70           108         65	118 125				
		Ethylbenz Toluene Xylenes,T Samp Runll	Total <u>Matrix S</u> ple Spiked:	990901 HP_J_99	5 5 15 5) / Matrix Spike	50 53 50 54 50 162 e Duplicate	(MSD)	107         70           108         65	118 125				
		Ethylbenz Toluene Xylenes,T Samp Runll	Total <u>Matrix S</u> Die Spiked: D:	990901 HP_J_99	5 5 75 5) / Matrix Spike 00-01 00922C-61530	50 53 50 54 50 162 5 Duplicate Units:	(MSD) ug/L	107         70           108         65	118 125				
	Analyte	Ethylbenz Toluene Xylenes,T Samp Runll	Total <u>Matrix S</u> ole Spiked: D: vsis Date:	9909010 HP_J_99 09/22/1	5) / Matrix Spike 00-01 999 13:30	50 53 50 54 50 162 50 Units: 50 Units: 50 Analyst:	ug/L CJ	107 70 108 65 108 72	118 125 116	RPD	RPD		
	Analyte	Ethylbenz Toluene Xylenes,T Samp Runll	Total <u>Matrix S</u> Die Spiked: D:	990901 HP_J_99	5 5 75 5) / Matrix Spike 00-01 00922C-61530	50 53 50 54 50 162 5 Duplicate Units:	(MSD) ug/L	107         70           108         65	118 125	RPD	RPD Limit	Low Limit	Higi
	Analyte	Ethylbenz Toluene Xylenes,T Samp Runll	Total <u>Matrix S</u> ole Spiked: D: vsis Date: Sample	9909010 HP_J_99 09/22/11	5) / Matrix Spike 00-01 999 13:30	50 53 50 54 50 162 e Duplicate Units: Analyst: MS %	(MSD) ug/L CJ MSD	107 70 108 65 108 72	118 125 116	RPD	RPD Limit	Low Limit	Higi Lim
Benzene	Analyte	Ethylbenz Toluene Xylenes,T Samp Runll	Total <u>Matrix S</u> ole Spiked: D: vsis Date: Sample	9909011 HP_J_99 09/22/1 MS Spike	5) / Matrix Spike 00-01 09922C-61530 999 13:30 MS Result	50 53 50 54 50 162 e Duplicate Units: Analyst: MS %	(MSD) ug/L CJ MSD Spike Added	107 70 108 65 108 72	118 125 116 MSD % Recovery	RPD 38.1*	RPD Limit 21	Low Limit	Lim
Benzene Ethylbenzene	Analyte	Ethylbenz Toluene Xylenes,T Samp Runll	Total <u>Matrix S</u> ble Spiked: D: vsis Date: Sample Result	9909010 HP_J_99 09/22/1 MS Spike Added	5) / Matrix Spike 00-01 09922C-61530 999 13:30 MS Result	50 53 50 54 50 162 E Duplicate Units: Analyst: MS % Recovery	(MSD) ug/L CJ MSD Spike Added 20	107 70 108 65 108 72 MSD Result	118 125 116 MSD % Recovery 63		Limit 21	Limit	Higi Lim 1(
	Analyte	Ethylbenz Toluene Xylenes,T Samp Runll	Total <u>Matrix S</u> ole Spiked: D: /sis Date: Sample Result ND	9909011 HP_J_99 09/22/1 MS Spike Added 20	5) / Matrix Spike 00-01 09922C-61530 999 13:30 MS Result 18 18	50 53 50 54 50 162 e Duplicate Units: Analyst: MS % Recovery 92.2 91.0	(MSD) ug/L CJ MSD Spike Added 20 20	107 70 108 65 108 72 MSD Result	118 125 116 MSD % Recovery 63 61	38.1*	Limit 21 19	Limit	Lim

Qualifiers: N

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

J - Estimated value between MDL and PQL

\* - Recovery Outside Advisable QC Limits

D - Surrogate Recovery Unreportable due to Dilution

<u>I</u>	

## **Quality Control Report**

## Brown & Caldwell BJ-HOBBS

Method:	Gasoline Ra SW8015B	ange Organi	CS					Work Lab B	Order: atch ID:	9909 R283			
	<u> </u>	Method	Blank		<u></u>	San	nples in A	nalytical Bate	:h:				
RunID:	HP_S_990924	4A-60855	Units:	mg/L		Lab	Sample I	D	Client Sa	mole ([	3		
Analysis Date	09/24/1999 1	17.23	Analyst:	WR			90124-014		MW-9		-		
			/ maryou				90124-02/		MW-7				
							90124-03/		MW-8				
							90124-04/		MW-11A				
		nalyte	6		Rep Limit								
	Gasoline Range Orga			ND	0.10								
	Surr: 1,4-Difluorobe Surr: 4-Bromofluoro			<u>88.7</u> 94.3	<u>62-144</u> 44-153								
	oun. 4-Diomonaore	ODCHECHO		0_4.0[									
				lab	oratory Contr	ol Sample /I	<u>()</u>						
				<u>Lau</u>	ioratory contr	UI Sample IL	031						
		RunID;	н	IP_S_990	924A-60854	Units: n	ng/L						
		Analysis D	O	9/24/199	0 16 54	Analyst: V	NR						
		Analysis L	Jale. U	9/24/199	9 10.34	Analyst. V							
		Analysis L	Jate. U	9/24/199	9 10.04	Analyst. v							
			Jale. U	9/24/199	9 10.34								
	Γ		<u></u>		9 10.54 Spike		Percen	t Lower	Upper				
	ſ		Analyte			Result	<b>.</b>	1 1	Upper Limit				
		-	Analyte		Spike	Result	Percent Recover	1 1					
		Gasoline Rar	Analyte		Spike	e Result d	Percent Recover	ry Limit	Limit				
		-	Analyte		Spike	e Result d	Percent Recover	ry Limit	Limit				
		-	Analyte nge Organic	S	Spike Adde	e Result d 1 0.9	Percent Recover	ry Limit	Limit				
		-	Analyte nge Organic	S	Spike	e Result d 1 0.9	Percent Recover	ry Limit	Limit				
		Gasoline Rar	Analyte nge Organic <u>Matrix S</u>	s Spike (M	Spike Adde S) / Matrix Spi	e Result d 1 0.9	Percent Recover	ry Limit	Limit				
		Gasoline Rar Sample	Analyte nge Organic <u>Matrix S</u>	s Spike (M 9909611	Spike Adde S) / Matrix Spi 6-06A	e Result d 1 0.9 ke Duplicate	Percent Recover	ry Limit	Limit				
		Gasoline Rar Sample RunID:	Analyte nge Organic <u>Matrix S</u> Spiked:	s Spike (M 9909611 HP_S_91	Spika Adde S) / Matrix Spi 6-06A 90924A-60856	e Result d 1 0.9 ke Duplicate Units:	Percent Recover	ry Limit	Limit				
		Gasoline Rar Sample	Analyte nge Organic <u>Matrix S</u> Spiked:	s Spike (M 9909611 HP_S_91	Spike Adde S) / Matrix Spi 6-06A	e Result d 1 0.9 ke Duplicate	Percent Recover	ry Limit	Limit				
		Gasoline Rar Sample RunID:	Analyte nge Organic <u>Matrix S</u> Spiked:	s Spike (M 9909611 HP_S_91	Spika Adde S) / Matrix Spi 6-06A 90924A-60856	e Result d 1 0.9 ke Duplicate Units:	Percent Recover	ry Limit	Limit				
		Gasoline Rar Sample RunID: Analysis	Analyte nge Organic <u>Matrix S</u> Spiked: s Date:	s Spike (M 9909610 HP_S_90 09/24/11	Spika Adde S) / Matrix Spi 6-06A 90924A-60856 999 18:49	e Result d 1 0.9 <u>ke Duplicate</u> Units: Analyst:	Percent Recover (MSD) mg/L WR	ry Limit 90 64	Limit 131				
	Analyte	Gasoline Rar Sample RunID: Analysis	Analyte nge Organic <u>Matrix S</u> Spiked:	s Spike (M 9909611 HP_S_99 09/24/11 MS	Spika Adde S) / Matrix Spi 6-06A 90924A-60856	e Result d 1 0.9 <u>ke Duplicate</u> Units: Analyst:	Percent Recover (MSD) mg/L WR	ry Limit	Limit 131 MSD %	RPD	RPD	Low	
		Gasoline Rar Sample RunID: Analysis	Analyte nge Organic <u>Matrix S</u> Spiked: s Date:	s Spike (M 9909611 HP_S_99 09/24/11 MS Spike	Spika Adde S) / Matrix Spi 6-06A 90924A-60856 999 18:49	e Result d 1 0.9 <u>ke Duplicate</u> Units: Analyst:	Percent Recover (MSD) mg/L WR MSD Spike	ry Limit 90 64	Limit 131	RPD	RPD Limit	Low Limit	Hig
Gasoline Rar	Analyte	Gasoline Rar Sample RunID: Analysis	Analyte nge Organic <u>Matrix S</u> Spiked: s Date:	s Spike (M 9909611 HP_S_99 09/24/11 MS	Spika Adde S) / Matrix Spi 6-06A 90924A-60856 999 18:49	e Result d 1 0.9 ke Duplicate Units: Analyst: MS % Recovery	Percent Recover (MSD) (MSD) mg/L WR MSD Spike Added	ry Limit 90 64	Limit 131 MSD %				

Qualifiers:

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115

ND/U - Not Detected at the Reporting Limit

B - Analyte detected in the associated Method Blank

\* - Recovery Outside Advisable QC Limits

D - Surrogate Recovery Unreportable due to Dilution

				Brown & C BJ- HOB								
Analysis: Method:	Nitrogen, Nitrate (A E300	s N}						Order: atch ID:	9909 R261	0124 17		
<b></b>	Mel	hod Blank			San	nples in	Analytical Batc	h:				
RunID: Analysis Date:	WET_990914J-56558 09/14/1999 18:50	Units: Analyst:	mg/L ES			90124-04		<u>Client Sa</u> MW-11A	mple II	2		
<b>N</b>	Analyte itrogen,Nitrate (As N)		Result ND	Rep Limit 0.10								
			Lat	oratory Contro	Sample (L	CSI						
	Runit	); V				ng/L						
			- 9/14/199			ES						
		Analyte	<u> </u>	Spike	Result	Perce Recov		Upper Limit				
	Nitrogen	,Nitrate (As N)			0 9.3		93 90	110				
	<u> </u>					- <b>4</b> - ,	ttt					
						(110.5)	<u></u>					
				S} / Matrix Spik	e Duplicate	(MSD)						
	Sar Rui	nple Spiked: nID:	990901 WET_99	00-01 10914J-56561	Units:	mg/L						
		lysis Date:		999 18:50	Analyst:	ES						
	Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	H
			10	9.4	91.8	10	9.4	92	.0654	20	86	

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9/29/99 11:01:41 AM

	PL	B	Q	uality	Contro	ol Repor	t		41 0888 HOUS	ON LABORA ITERCHANGE DE STON, TEXAS 776 (713) 660-0901	IVE	
				Brow	n & Ca	ldwell						
-				B	1- Hobe	38						
Analysis: Method:	Sulfate E300								kOrder: Batch ID:	99090124 R2767		
<u></u>	M	ethod Blank				San	nples in A	Analytical Ba	tch:			
RunID: Analysis Date:	WET_990921M-5937 09/17/1999 14:00	76 Units: Analyst:	mg/L ES				<u>Sample</u> 90124-04		<u>Client Sa</u> MW-11A	imple ID		
Sulfa	Analyte		Result R	Rep Limit 0.20	1							
						Sample (L						
	Ana		WET_99092 09/17/1999 e				ng/L S Percer Recove		Upper Limit			
	Sulfate	3			10	10		101 9	0 110			
		Matrix	Spike (MS	S) / Matr	x Spike	Duplicate	(MSD)					
	R	<u>Matrix</u> ample Spiked: unID: nalysis Date:	Spike (MS 9909010 WET_990 09/17/19	0-02 0921M-59	379	Duplicate Units: Analyst:	(MSD) mg/L ES					

Qualifiers:

11

ND/U - Not Detected at the Reporting Limit

\* - Recovery Outside Advisable QC Limits

B - Analyte detected in the associated Method Blank .

Chain of Custody And Sample Receipt Checklist

96090(24)	ulvsis		SL ALIO O	৩১		6) 5	10	3 -Ha	<u>y 4</u>	$\times$	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	X	X X X X				Intad? $\bigcup_{c} \bigcup_{c} \bigcup_{c} \bigcup_{c}$	Special Detection Limits (specify): PiA review (initial):		ζ U 2. Received by:	4. Received by:	0.0 6. Recting by Laborationy.	500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775
SPL, Inc.	trivition custory means	~		=0Þ	10= 1H= 209 [ 20	0 5=0 7=9	et é s s f f f f f f f f f f f f f f f f f	H32 HCI 805 8198 b198	3= 1= 3= 5= 5= 5= 37	2		<i>ы</i>	<u>ل</u>				Laboratory remarks:	A Raw Data	0	date (17: 5.13.56, (17:	detc time	000/ 65-41-2	C 500 Ambass
SPL SPL	-	were	235422 - 217 0 c2 t# 1	(Y)		=S			TE TIME comp grab	m sh:h/ 1/5.21-5	e1:31 45 21.5	m eh: 11 53. 61.3	M SILL 55 ELS				qe1	Special Reporting Requirements Fax Results	Standard QC	1. Relinquished by Sampler.	3. Relinquished by:	5. Relinquished by:	2330 Interchange Drive, Houston, TX 77054 (713) 660-0901
CSSI /		Dientition of Cowstanting	11	Ric	B5- H	- 17S	1	1.	SAMPLE ID	1121-9 6-141-9			51				<b>Girnt/Consultant Remarks</b>	Reated TAT S		241:r 🗋 72hr 🛄 1	48hr 🔲 Standard 🕅	Other 0	D 2320 Interchange Drive, F



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

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## Sample Receipt Checklist

Workorder:	99090124		Received by:		Turnell, Randy
Date and Time Received:	9/14/99 10:00:00 AM		Carrier name:		FedEx
Temperature:	5 C	<del></del>			
Shipping container/cooler in g	good condition?	Yes 🔽	No 🗔	Not Present	
Custody seals intact on shipp	oping container/cooler?	Yes 🔽	No 🗌	Not Present	
Custody seals intact on samp	ole bottles?	Yes 🗋	No 🗌	Not Present	
Chain of custody present?		Yes 🗹	No 🗔		
Chain of custody signed whe	n relinquished and received?	Yes 🔽	No 🗌		
Chain of custody agrees with	sample labels?	Yes 🔽	No 🗌		
Samples in proper container/	/bottle?	Yes 🔽	No 🗌		
Sample containers intact?		Yes 🔽	No 🗌		
Sufficient sample volume for	indicated test?	Yes 🗹	No 🗔		
All samples received within h	olding time?	Yes 🔽	No 🗌		
Container/Temp Blank tempe	erature in compliance?	Yes 🔽	No 🗌		
Water - VOA vials have zero	headspace?	Yes 🗹	No 🗔	Not Present	
Water - pH acceptable upon	receipt?	Yes 🗹	No 🗌		