

GW - 72

MONITORING REPORTS

DATE:

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

FINAL

**AUGUST 1996 GROUNDWATER SAMPLING
REPORT**

HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

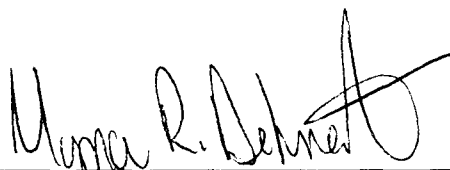
FEBRUARY 2, 1997

**FINAL
AUGUST 1996 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: 2832.11



Myna R. Dehnert
Associate Geologist
Certified Scientist #057

February 2, 1997

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

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

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1.0 INTRODUCTION

Brown and Caldwell conducted the field activities associated with the August 1996 quarterly groundwater sampling event at BJ Services Company, U.S.A. (BJ Services) facility located at 2708 West County Road, in Hobbs, New Mexico. The facility layout is shown on Figure 1.

The facility formerly operated an above-grade on-site fueling system. Subsurface contamination near the fueling system was first detected by the New Mexico Oil Conservation Division (OCD) during an on-site inspection on February 7, 1991. The fueling system was taken out of operation in July 1995. The fueling system comprised one, 22,500 gallon diesel aboveground storage tank (AST) and one, 5,500 gallon gasoline AST. The New Mexico Oil Conservation Division (OCD) requires quarterly groundwater monitoring for hydrocarbon constituents, as the result of the diesel fuel release. A site chronology detailing the history of the fueling system, the groundwater recovery system, and previous sampling events is presented in Table 1.

During the August 1996 sampling event, groundwater samples were collected and analyzed for total benzene, toluene, ethylbenzene, and total xylene (BTEX), Polynuclear Aromatic Hydrocarbons (PAH), eight RCRA metals, and groundwater quality parameters (major anions, cations and alkalinity). This report presents the results of the groundwater sampling event conducted for BJ Services and includes a description of the field activities and a summary of the analytical results. Also included is a groundwater potentiometric surface map and hydrocarbon distribution map.

2.0 GROUNDWATER SAMPLING AND ANALYSES

On August 23, 1996 Brown and Caldwell purged and sampled the groundwater monitoring wells to determine concentrations of dissolved-phase hydrocarbons in the groundwater at the facility. The following sections describe the activities conducted during this sampling event.

2.1 Groundwater Measurements and Sampling

A total of 10 monitoring wells were sampled during the quarterly sampling event. A Site Map depicting the locations of the monitoring wells is presented as Figure 1. As noted in previous sampling reports, monitoring well MW-2 can not be located and is assumed to have been destroyed during facility activities such as grading.

Groundwater level measurements were obtained from all monitoring wells prior to purging and sampling the wells. The 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 on Table 2. The groundwater elevation data indicates that the general groundwater flow direction is towards the southeast with a hydraulic gradient of 0.005 ft/ft. However, a potentiometric low is observed in the vicinity of the former AST area and is possibly related to the operation of the biosparging system. A Potentiometric Surface Map is presented in Figure 2. Phase-separated hydrocarbons were not detected in any of the monitoring wells during this sampling event. The absence of phase-separated hydrocarbons in monitoring wells MW-1 and MW-4 is attributed to the operation of the biosparging remediation system.

Groundwater samples were collected from all monitoring wells on August 23, 1996. The samples were collected after purging the wells with a submersible pump to remove at least three well volumes or until the well became dry. Field parameter measurements for pH, conductivity, and temperature were collected after each well volume was purged. Two consecutive readings within five percent were used to indicate that groundwater had stabilized. The parameters in each

monitoring well typically stabilized after two well volumes had been removed; however, at least three well volumes were removed from each well.

Following recovery, the groundwater samples were collected from each monitoring well using a new, 3-foot long, 1/2-inch I.D., disposable polyethylene bailer. Each sample was transferred to laboratory prepared, clean glass and/or plastic containers sealed with Teflon[®]-lined lids; labeled; and placed on ice in an insulated cooler for shipment via overnight courier to BC Analytical in Glendale, California. Each cooler was accompanied by completed chain-of-custody documentation.

Additional groundwater parameters were measured to assess the potential for natural attenuation purposes during the purging and sampling activities. These parameters were dissolved oxygen, dissolved ferrous iron, and reduction-oxidation potential (redox). All 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 samples are presented on Table 3.

All field measurement equipment was decontaminated prior to and after each use. Decontamination procedures used consisted of washing with fresh water and a non-phosphate detergent and rinsed with deionized (DI) water. Purged water and excess water generated by equipment cleaning operations was placed into 55-gallon drums and transferred to the on-site drum staging area located in the northeast corner of the facility for classification and future disposal by BJ Services.

2.2 Results of Groundwater Analyses

Groundwater samples collected during this sampling event were analyzed for BTEX by EPA Method 8020, total petroleum hydrocarbons (TPH) gasoline range by EPA Method 8015 Modified, Polynuclear Aromatic Hydrocarbons (PAH) by EPA Method 8270, eight RCRA metals by EPA Method 6010/7000 series. Additionally, all samples were analyzed for groundwater quality

parameters including major anions (chloride, nitrate, and sulfate) and major cations (calcium, magnesium, potassium, and sodium) and alkalinity.

Total concentrations of BTEX constituents above the laboratory detection limit are reported in 7 of the 10 groundwater samples obtained during this sampling event. Total benzene concentrations range from below the method detection limit of 0.3 micrograms per liter ($\mu\text{g/L}$) in MW-8, MW-7, and MW-5 to 1,800 $\mu\text{g/L}$ in MW-1. Total BTEX concentrations range from below the method detection limit of 0.6 $\mu\text{g/L}$ in MW-8, MW-7, and MW-5 to 7,770 $\mu\text{g/L}$ in MW-1. TPH concentrations range from below the detection limit of 0.100 milligrams per liter (mg/L) to 17 mg/L in MW-1. A cumulative summary of analytical results for groundwater samples is included as Table 4.

The only PAH compound detected is naphthalene at concentrations ranging from below the method detection limit of 5 $\mu\text{g/L}$ to 440 $\mu\text{g/L}$. The highest concentration is observed in monitor well MW-4. The inorganic constituents detected above the method detection limits include arsenic, barium, and chromium. Total concentrations of arsenic range from 0.003 mg/L to 0.028 mg/L and barium range from 0.038 mg/L to 0.29 mg/L . Chromium is only detected in monitor well MW-6 at a concentration of 0.049 mg/L . Table 5 presents a summary of the detected analytes for PAH, total metals and the groundwater quality parameters.

A benzene concentration map is included as Figure 3. Figure 4 illustrates the distribution of selected target analytes, which include benzene, total BTEX, and TPH. The laboratory analytical reports and chain of custody record are included in Appendix B.

3.0 REMEDIATION SYSTEM

Brown and Caldwell submitted a Remedial Action Plan (RAP) to the New Mexico OCD in May 1994. Based on the results from 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 contaminants in the soil residual (adsorbed phase) and in the soil moisture (dissolved phase), and removes the volatile contaminants. 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 the groundwater and the soil moisture in the capillary fringe and vadose zone. The higher dissolved oxygen content facilitates indigenous microorganisms to accelerate biodegradation of the contaminants. The flushing of the air also strips the volatile and semivolatile contaminants.

The OCD approved the RAP on August 11, 1994. The installation of the biosparging system was conducted between August 2 through 24, 1995. A total of nineteen combined injection/extraction wells, 3 vacuum extraction wells, associated piping, and one extraction blower and one injection blower were installed. The biosparging system layout is presented in Figure 5. The vapors recovered during the extraction process are discharged to the atmosphere in accordance with the State of New Mexico Air Quality Regulations.

On September 14, 1995, a Notice of Intent application was submitted to the State of New Mexico Environmental Department, Air Pollution Control Bureau for the operation of the biosparging system. Prior to the Departments review, additional data pertaining to the system operation parameters and emission rates was required and submitted on January 31, 1996. The Department reviewed the submitted application and on April 2, 1996 determined that an air permit was not required for the operation of the biosparging system.

During the system startup operations, blower operating parameters, such as flow rate, pressure, and vapor temperature were monitored and recorded on the System Operation Data Sheets. An effluent air sample was collected on a monthly basis from the recovered vapors to monitor the bioremediation process and emission rate.

Upon receiving the approval from the State of New Mexico that an air permit is not required, effluent air samples are collected on a quarterly basis. An effluent air sample was collected on August 23, 1996 and analyzed for total petroleum hydrocarbons (TPH) using EPA Method 8015A (modified) and total volatile aromatic hydrocarbons, benzene, toluene, ethylbenzene, and total xylene (BTEX) using EPA Method 5030/8020 (modified). A summary of the analytical results for the air emissions is included as Table 6. The laboratory analytical reports and chain-of-custody documentation are included in Appendix C.

The vapor extraction system has operated at an average flow of 125 cfm at 100°F. The air injection system has operated at an average flow of 28 cfm at 4.5 psi, 160°F. Total BTEX emissions of 0.05 lb/hour and TPH emissions of 0.31 lb/hour are reported for the fourth quarter monitoring event.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the August 1996 quarterly groundwater sampling event.

4.1 Conclusions

- Groundwater flow remains to the east with an average hydraulic gradient of 0.005 ft/ft.
- Free product thickness has continuously decreased in MW-1 and MW-4 since November 1995. Currently, there is no free product in MW-1 and MW-4.
- Total BTEX concentrations have decreased in monitor wells MW-3, MW-5 through MW-8, MW-10, and MW-11. However, total BTEX concentrations have increased in monitor wells MW-1, MW-4 and MW-9. These short term variations in the BTEX concentrations are expected during the operation of the biosparging system. Continued quarterly groundwater monitoring is recommended to understand the variations in BTEX concentrations.
- Benzene concentrations in monitor wells MW-5, MW-7, and MW-8 are below the New Mexico Water Quality Control Commission standard of 0.01 mg/L.

4.2 Recommendations

- Continue the quarterly groundwater sampling program and the operation and maintenance of the biosparging system.

DISTRIBUTION

Final

August 1996 Groundwater Sampling Report

Hobbs, New Mexico

February 2, 1997

1 copy to: State of New Mexico
Energy, Minerals, and Natural Resources Dept.
Oil Conservation Division
Post Office Box 2088, State Land Office Building
Santa Fe, New Mexico 87504

Attention: Mr. Mark Ashley

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

Attention: Mr. Wayne Price

1 copy to: State of New Mexico
Air Pollution Control Bureau
2048 Galsteo Street
Santa Fe, New Mexico 87505

Attention: Mr. Satya Neel

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

Attention: Ms. Jo Ann Cobb

1 copy to: BJ Services Company, U.S.A.
2708 West County Road
Hobbs, New Mexico 88240

Attention: Mr. Clint Chamberlain

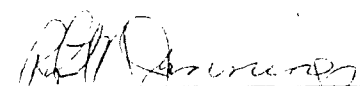
DISTRIBUTION (CONTINUED)

Final
August 1996 Groundwater Sampling Report
Hobbs, New Mexico

February 2, 1997

1 copy to: Brown and Caldwell
Houston, Texas 77002

QUALITY CONTROL REVIEWER



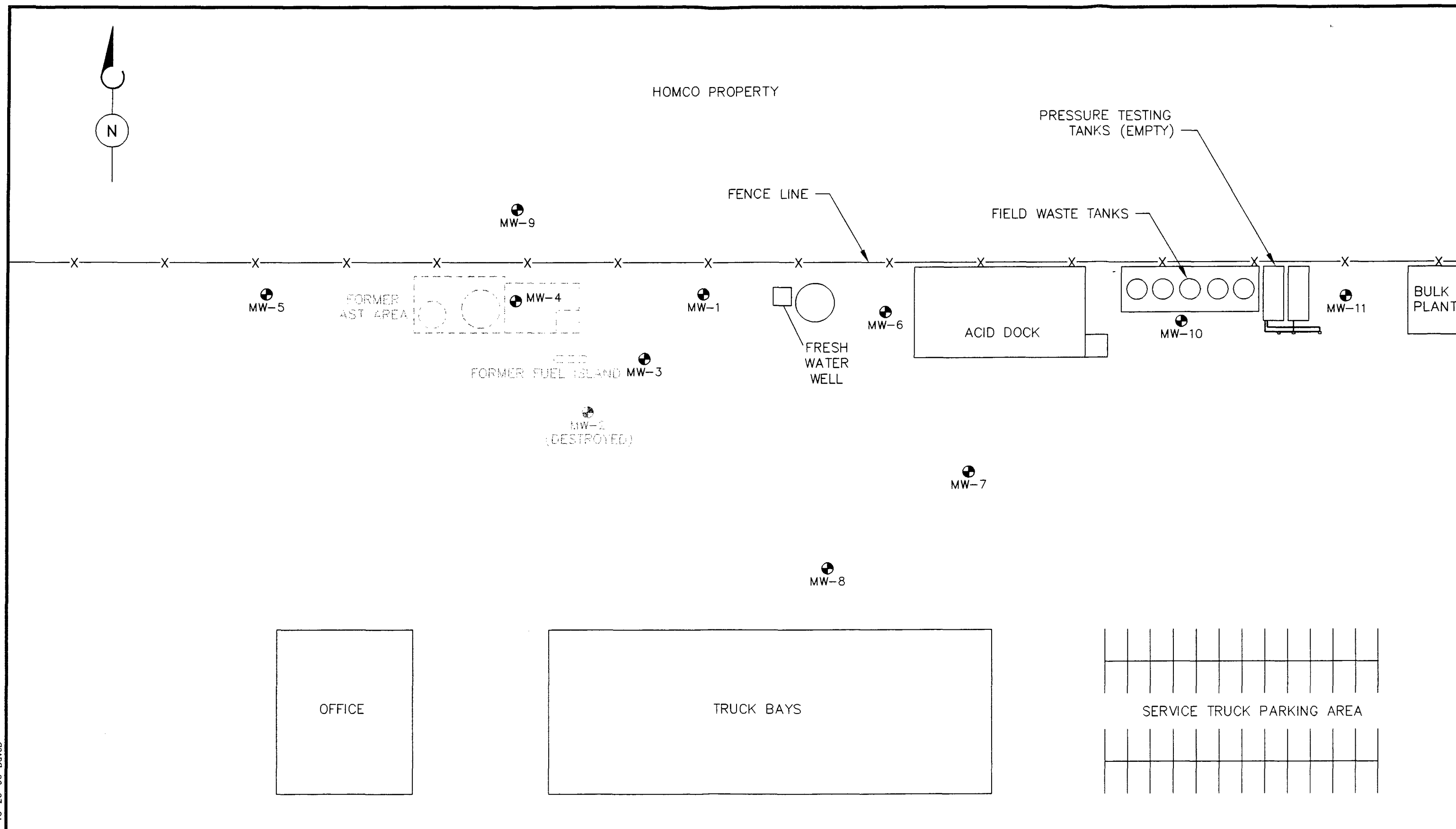
Robert N. Jennings, P.E.
Vice President

MRD:elg:uak

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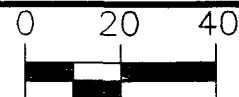
FIGURES

T:\2832\SITEMAP (1=40) 10-26-96 DaveD



**BROWN AND
CALDWELL**
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: WED DATE: 1/97
BROWN AND CALDWELL



SCALE: 1" = 40'
DRAWN BY: DMD DATE: 9/11
CHK'D BY: _____ DATE: _____
APPROVED: _____ DATE: _____

LEGEND



MW-8

MONITORING WELL LOCATION AND IDENTIFICATION

TITLE

SITE MAP

DATE

10/14/96

CLIENT

BJ SERVICES COMPANY, U.S.A.

PROJECT NUMBER

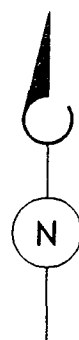
2832-11

SITE

HOBBS, NEW MEXICO

FIGURE NUMBER

1



HOMCO PROPERTY

PRESSURE TESTING
TANKS (EMPTY)

FENCE LINE

FIELD WASTE TANKS

MW-5
82
<0.3

FORMER
AST AREA

MW-9
110

MW-4
110

MW-1
1,800

MW-6
31

ACID DOCK

MW-10
290

MW-11
100

BULK
PLANT

FORMER FUEL ISLAND

MW-3
330

FRESH
WATER
WELL

MW-2
(DESTROYED)

MW-7
31
<0.3

MW-8
47.21
<0.3

OFFICE

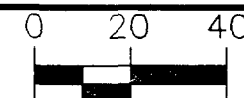
TRUCK BAYS

SERVICE TRUCK PARKING AREA

BASED ON MEASUREMENTS OBTAINED ON 8/23/96.

**BROWN AND
CALDWELL**
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: WED DATE: 7/17
BROWN AND CALDWELL



SCALE: 1" = 40'
DRAWN BY: DMD DATE: 9/11
CHK'D BY: _____ DATE: _____
APPROVED: _____ DATE: _____

MW-8
47.21

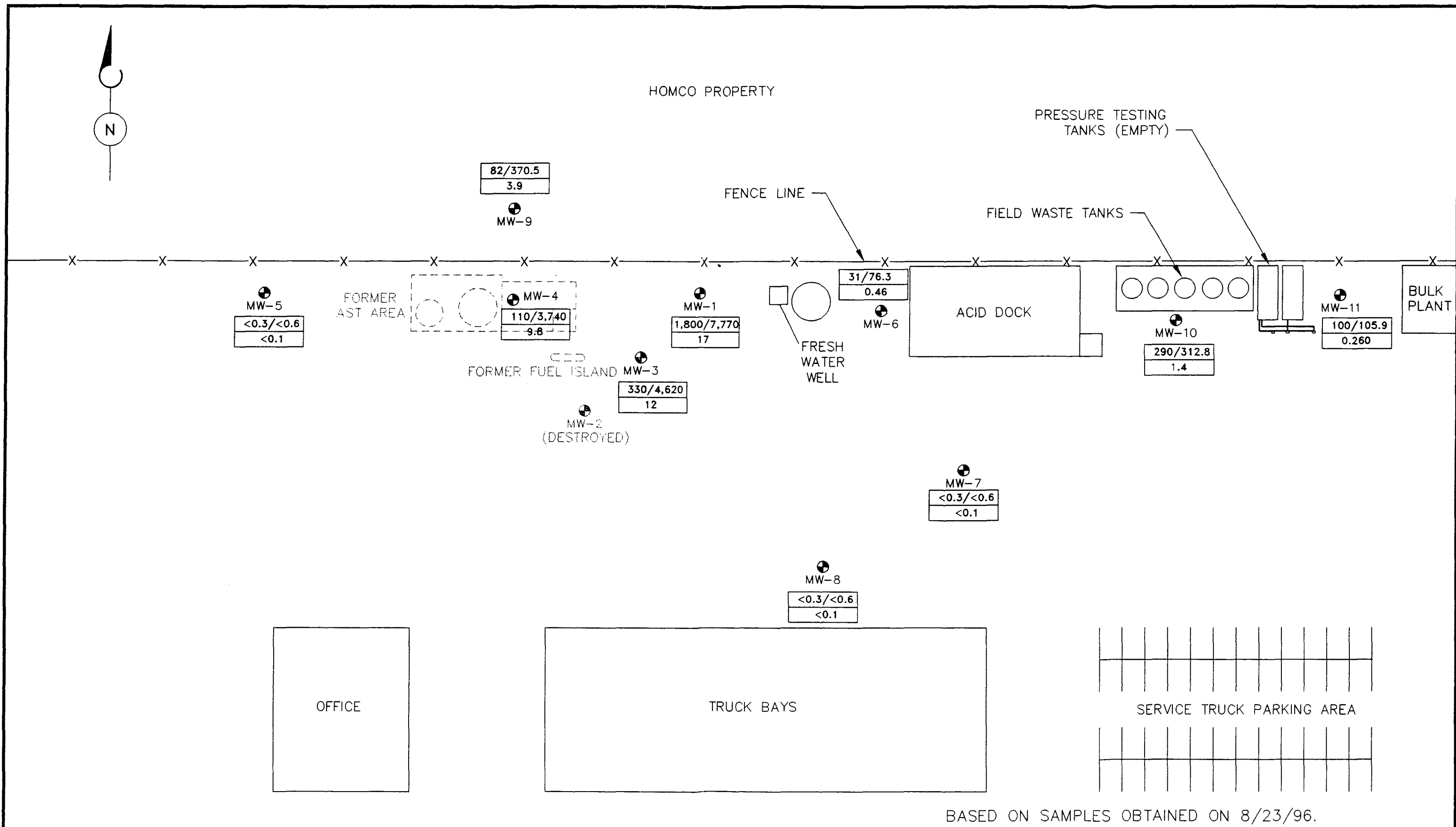
LEGEND

MONITORING WELL LOCATION AND IDENTIFICATION

BENZENE CONCENTRATION (ug/L)

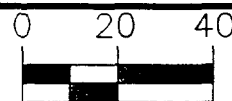
TITLE	BENZENE CONCENTRATION MAP	DATE	10/14/96
CLIENT	BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER	2832-11
SITE	HOBBS, NEW MEXICO	FIGURE NUMBER	3

T:\2832\HYDRO823 (1-40) 10-26-96 DaveD



BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: *[Signature]* DATE: *9/11*
BROWN AND CALDWELL



SCALE: 1" = 40'
DRAWN BY: *DMD* DATE: *9/11*
CHK'D BY: _____ DATE: _____
APPROVED: _____ DATE: _____

MW-8

330/4,620
12

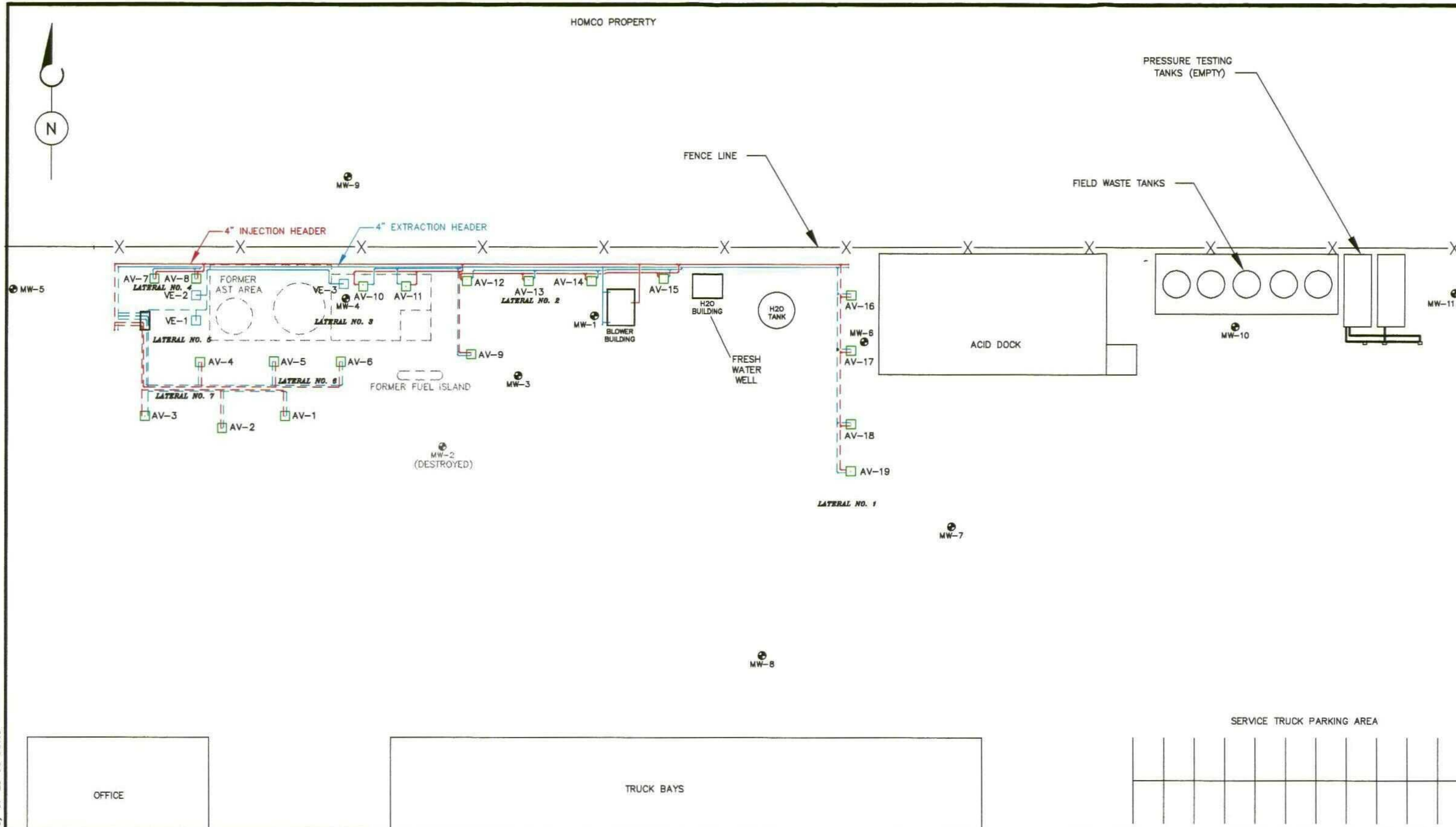
LEGEND

MONITORING WELL LOCATION AND IDENTIFICATION

BENZENE / TOTAL BTEX (ug/L)
TPH (mg/L)

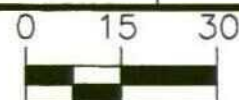
TITLE	HYDROCARBON DISTRIBUTION MAP	DATE	10/14/96
CLIENT	BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER	2832-11
SITE	HOBBS, NEW MEXICO	FIGURE NUMBER	4

T:\2832\AVESCHEM (1=30) 07-25-96 DaveD



**BROWN AND
CALDWELL**
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: MCO DATE: 1/97
BROWN AND CALDWELL



SCALE: 1" = 30'
DRAWN BY: DHD DATE: 12/15
CHK'D BY: _____ DATE: _____
APPROVED: _____ DATE: _____

LEGEND

- MW-8 MONITORING WELL LOCATION AND IDENTIFICATION
- AV-2 EXTRACTION AND INJECTION WELL
- VE-1 VACUUM EXTRACTION WELL
- ABOVE GRADE VACUUM AND INJECTION LINES
- BURIED VACUUM AND INJECTION LINES

TITLE	SCHEMATIC OF BIOSPARGING SYSTEM	DATE	10/14/96
CLIENT	BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER	2832-11
SITE	HOBBS, NEW MEXICO	FIGURE NUMBER	5

Tables

TABLES

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

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

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

DATE	ACTIVITY
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. Submits 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 2 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; all 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 quarterly groundwater sampling event.
July 31, 1995	Brown and Caldwell conducted quarterly groundwater sampling event.
August 2-9, 1995	Installation of biosparging system initiated. Nineteen combined injection/extraction wells and three vacuum extraction wells 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 quarterly groundwater sampling event.
February 23, 1996	Brown and Caldwell conducted quarterly groundwater sampling event.
May 31, 1996	Brown and Caldwell conducted quarterly groundwater sampling event.
August 23, 1996	Brown and Caldwell conducted quarterly groundwater sampling event

Table 2
Summary of Groundwater Measurement Data
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitoring Well	TOC Elevation (ft MSL)	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	Corrected GW Elevation (ft MSL)	Comments
MW-1						
	101.44	8/10/92	53.22	0.00	48.22	
	101.44	2/9/93	53.03	0.00	48.41	
	101.44	8/18/93	53.10	0.00	48.34	
	101.44	1/26/94	53.31	0.00	48.13	
	101.44	5/3/95	54.64	0.20	46.96	
	101.44	7/31/95	54.14	0.00	47.30	
	101.44	11/14/95	53.69	0.00	47.75	
	101.44	2/23/96	54.32	0.00	47.12	
	101.44	5/31/96	54.14	0.00	47.30	
	101.44	8/23/96	56.17	0.00	45.27	
MW-2						
	101.50	8/10/92	52.82	0.00	48.68	
	98.75	2/9/93	49.60	0.00	49.15	
	98.75	8/18/93	49.71	0.00	49.04	
	98.75	1/26/94	49.97	0.00	48.78	
		5/3/95				Monitor well destroyed
MW-3						
	101.44	8/10/92	52.99	0.00	48.45	
	101.44	2/9/93	52.72	0.00	48.72	
	101.44	8/18/93	52.82	0.00	48.62	
	101.44	1/26/94	53.05	0.00	48.39	
	101.44	5/3/95	54.31	0.00	47.13	
	98.76	7/31/95	51.24	0.00	47.52	
	98.76	11/14/95	51.10	0.00	47.66	
	98.76	2/23/96	51.68	0.00	47.08	
	98.76	5/31/96	51.45	0.00	47.31	
	98.76	8/23/96	51.55	0.00	47.21	

Table 2
Summary of Groundwater Measurement Data
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitoring Well	TOC Elevation (ft MSL)	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	Corrected GW Elevation (ft MSL)	Comments
MW-4						
	99.33	8/10/92	50.55	0.00	48.78	
	99.33	2/9/93	50.26	0.00	49.07	
	99.33	8/18/93	50.38	0.00	48.95	
	99.33	1/26/94	50.90	0.30	48.68	
	99.33	5/3/95	51.51	0.45	48.19	
	99.33	7/31/95	51.74	0.26	47.80	
	99.33	11/14/95	51.03	0.00	48.30	
	99.33	2/23/96	51.65	0.01	47.69	
	99.33	5/31/96	51.48	0.00	47.85	
	99.33	8/23/96	53.49	0.00	45.84	
MW-5						
	101.85	8/10/92	52.38	0.00	49.47	
	101.85	2/9/93	52.06	0.00	49.79	
	101.85	8/18/93	52.16	0.00	49.69	
	101.85	1/26/94	52.50	0.00	49.35	
	101.85	5/3/95	53.57	0.00	48.28	
	101.85	7/31/95	53.27	0.00	48.58	
	101.85	11/14/95	52.83	0.00	49.02	
	101.85	2/23/96	53.57	0.00	48.28	
	101.85	5/31/96	53.16	0.00	48.69	
	101.85	8/23/96	53.41	0.00	48.44	
MW-6						
	99.25	2/9/93	50.58	0.00	48.67	
	99.25	8/18/93	50.78	0.00	48.47	
	99.25	1/26/94	51.00	0.00	48.25	
	99.25	5/3/95	52.63	0.00	46.62	
	99.25	7/31/95	51.90	0.00	47.35	
	99.25	11/14/95	51.19	0.00	48.06	
	99.25	2/23/96	52.10	0.00	47.15	
	99.25	5/31/96	51.76	0.00	47.49	
	99.25	8/23/96	51.63	0.00	47.62	

Table 2
Summary of Groundwater Measurement Data
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitoring Well	TOC Elevation (ft MSL)	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	Corrected GW Elevation (ft MSL)	Comments
MW-7						
	98.96	2/9/93	50.53	0.00	48.43	
	98.96	8/18/93	50.74	0.00	48.22	
	98.96	1/26/94	51.01	0.00	47.95	
	98.96	5/3/95	52.25	0.00	46.71	
	98.96	7/31/95	51.92	0.00	47.04	
	98.96	11/14/95	51.48	0.00	47.48	
	98.96	2/23/96	52.15	0.00	46.81	
	98.96	5/31/96	51.78	0.00	47.18	
	98.96	8/23/96	52.02	0.00	46.94	
MW-8						
	99.12	2/9/93	50.48	0.00	48.64	
	99.12	8/18/93	50.67	0.00	48.45	
	99.12	1/26/94	50.96	0.00	48.16	
	99.12	5/3/95	52.15	0.00	46.97	
	99.12	7/31/95	51.77	0.00	47.35	
	99.12	11/14/95	51.37	0.00	47.75	
	99.12	2/23/96	52.17	0.00	46.95	
	99.12	5/31/96	51.55	0.00	47.57	
	99.12	8/23/96	51.92	0.00	47.20	
MW-9						
	99.18	4/22/93	49.73	0.00	49.45	
	99.18	7/15/93	49.65	0.00	49.53	
	99.18	8/18/93	49.85	0.00	49.33	
	99.18	1/26/94	50.02	0.00	49.16	
	99.18	5/3/95	51.35	0.00	47.83	
	99.18	7/31/95	50.97	0.00	48.21	
	99.18	11/14/95	50.43	0.00	48.75	
	99.18	2/23/96	51.12	0.00	48.06	
	99.18	5/31/96	50.89	0.00	48.29	
	99.18	8/23/96	50.98	0.00	48.20	

Table 2
Summary of Groundwater Measurement Data
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitoring Well	TOC Elevation (ft MSL)	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	Corrected GW Elevation (ft MSL)	Comments
MW-10						
	98.90	8/18/93	51.54	0.00	47.36	
	98.90	1/26/94	51.90	0.00	47.00	
	98.90	5/3/95	52.97	0.00	45.93	
	98.90	7/31/95	52.87	0.00	46.03	
	98.90	11/14/95	52.51	0.00	46.39	
	98.90	2/23/96	53.05	0.00	45.85	
	98.90	5/31/96	52.79	0.00	46.11	
	98.90	8/23/96	53.03	0.00	45.87	
MW-11						
	98.82	8/18/93	51.92	0.00	46.90	
	98.82	1/26/94	52.32	0.00	46.50	
	98.82	5/3/95	53.38	0.00	45.44	
	98.82	7/31/95	53.35	0.00	45.47	
	98.82	11/14/95	52.96	0.00	45.86	
	98.82	2/23/96	53.50	0.00	45.32	
	98.82	5/31/96	53.25	0.00	45.57	
	98.82	8/23/96	53.49	0.00	45.33	

MW-2 could not be located and assumed destroyed on May 3, 1995.

Table 3
Field Screening Results - Monitor Well Purging
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitoring Well	Date Measured	Well Volume	pH	Conductivity (µmhos)	Temperature (°C)	Redox (mV)	Dissolved Oxygen (mg/L)	Ferrous Iron (mg/L)
MW-1	8/23/96	1	7.10	1,080.00	19.0	-105	0.50	1.0
		2	7.09	1,170.00	19.0	-112	0.50	
		3	7.09	1,160.00	19.0	-112	0.50	
MW-3	8/23/96	1	7.12	1,180.00	19.3	-84	0.50	0.0
		2	7.09	1,220.00	19.4	-82	0.50	
		3	7.09	1,220.00	19.4	-78	0.50	
MW-4	8/23/96	1	7.15	860.00	19.0	-120	0.50	2.0
		2	7.16	900.00	19.0	-121	0.20	
		3	7.18	880.00	19.0	-116	0.20	
MW-5	8/23/96	1	7.12	1,000.00	19.2	31	2.00	0.0
		2	7.16	980.00	19.1	30	2.00	
		3	7.14	1,020.00	19.1	30	2.00	
MW-6	8/23/96	1	7.96	1,010.00	19.5	10	1.50	0.0
		2	8.02	980.00	19.3	13	1.50	
		3	7.99	1,020.00	19.1	16	1.50	
MW-7	8/23/96	1	6.62	1,710.00	19.6	71	1.00	0.0
		2	6.64	1,700.00	19.6	72	1.00	
		3	6.65	1,690.00	19.7	72	1.00	
MW-8	8/23/96	1	6.68	1,200.00	19.5	83	1.00	0.0
		2	6.71	1,230.00	19.4	79	1.00	
		3	6.72	1,240.00	19.4	74	1.00	

Table 3
Field Screening Results - Monitor Well Purging
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Monitoring Well	Date Measured	Well Volume	pH	Conductivity (µmhos)	Temperature (°C)	Redox (mV)	Dissolved Oxygen (mg/L)	Ferrous Iron (mg/L)
MW-9	8/23/96	1	6.82	1,330.00	19.3	53	1.00	0.0
		2	6.80	1,330.00	19.2	49	1.00	
		3	6.81	1,340.00	19.2	46	1.00	
MW-10	8/23/96	1	6.80	5,640.00	20.3	-105	0.50	7.0
		2	6.79	5,870.00	19.8	-110	0.50	
		3	6.80	5,800.00	19.8	-110	0.50	
MW-11	8/23/96	1	6.93	12,140.00	19.4	47	1.00	0.0
		2	6.82	10,780.00	19.7	45	1.00	

MW-2 could not be located and assumed destroyed on May 3, 1995.

Table 4
Summary of Groundwater Analyses
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

			Benzene	Toluene	Ethylbenzene	Xylenes	TPH
Well ID	Sample Date	Sample Type	micrograms per liter, µg/L				milligrams per liter, mg/L
MW-1	8/10/92	Regular	5550	12090	2160	7370	NA
	2/9/93	Regular	2100	6500	1300	7400	NA
	4/22/93	Regular	NS	NS	NS	NS	NS
	7/15/93	Regular	NS	NS	NS	NS	NS
	8/10/93	Regular	NS	NS	NS	NS	NS
	8/19/93	Regular	3200	7300	1200	3700	NA
	1/27/94	Regular	1930	4580	672	2390	NA
	5/3/95	Regular	NA	NA	NA	NA	NA
	5/4/95	Regular	NS	NS	NS	NS	NS
	8/1/95	Regular	390	1300	230	800	5.7
	11/15/95	Regular	880	1800	300	970	6.8
	2/23/96	Regular	1500	3700	620	2200	21
	5/31/96	Regular	1100	1700	380	990	7.5
	8/23/96	Regular	1800	3300	570	2100	17
MW-2	8/10/92	Regular	14.9	< 4	< 4	< 4	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA
	4/22/93	Regular	NS	NS	NS	NS	NS
	7/15/93	Regular	NS	NS	NS	NS	NS
	8/10/93	Regular	NS	NS	NS	NS	NS
	8/19/93	Regular	100	12	3	13	NA
	1/27/94	Regular	< 1	1.2	2	2.5	NA
	5/3/95	Regular	NA	NA	NA	NA	NA
	5/4/95	Regular	NS	NS	NS	NS	NS
	8/1/95	Regular	NS	NS	NS	NS	NS
	11/15/95	Regular	NS	NS	NS	NS	NS
	2/23/96	Regular	NS	NS	NS	NS	NS
	5/31/96	Regular	NS	NS	NS	NS	NS
	8/23/96	Regular	NS	NS	NS	NS	NS

Table 4
Summary of Groundwater Analyses
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Well ID	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH
			micrograms per liter, µg/L				milligrams per liter, mg/L
MW-3	8/10/92	Regular	304.9	2099	6760	1586	NA
	2/9/93	Regular	130	< 10	< 10	190	NA
	4/22/93	Regular	NS	NS	NS	NS	NS
	7/15/93	Regular	NS	NS	NS	NS	NS
	8/10/93	Regular	NS	NS	NS	NS	NS
	8/19/93	Regular	560	3100	630	1900	NA
	1/27/94	Regular	1070	5380	510	3120	NA
	5/3/95	Regular	NS	NS	NS	NS	NS
	5/4/95	Regular	770	3300	470	1800	NA
	8/1/95	Regular	490	2900	890	1600	14
	11/15/95	Regular	250	1000	180	440	2.9
	2/23/96	Regular	120	810	170	560	4
	5/31/96	Regular	670	3900	1200	2300	15
	8/23/96	Regular	330	2200	590	1500	12
MW-4	8/10/92	Regular	2594	10360	2160	6740	NA
	2/9/93	Regular	5200	15000	2200	10000	NA
	4/22/93	Regular	NS	NS	NS	NS	NS
	7/15/93	Regular	NS	NS	NS	NS	NS
	8/10/93	Regular	NS	NS	NS	NS	NS
	8/19/93	Regular	3000	12000	< 2000	7000	NA
	1/27/94	Regular	NA	NA	NA	NA	NA
	5/3/95	Regular	NA	NA	NA	NA	NA
	5/4/95	Regular	NS	NS	NS	NS	NS
	8/1/95	Regular	5700	17000	3500	13000	120
	11/15/95	Regular	490	1600	310	1100	5.2
	2/23/96	Regular	360	2800	560	2500	18
	5/31/96	Regular	84	830	280	1100	6.2
	8/23/96	Regular	110	1400	430	1800	9.8

Table 4
Summary of Groundwater Analyses
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Well ID	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH
			micrograms per liter, µg/L				milligrams per liter, mg/L
MW-5							
	8/10/92	Regular	< 4	< 4	< 4	< 4	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA
	4/22/93	Regular	NS	NS	NS	NS	NS
	7/15/93	Regular	NS	NS	NS	NS	NS
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA
	8/19/93	Regular	NS	NS	NS	NS	NS
	1/27/94	Regular	8.7	29.9	4	11.3	NA
	5/3/95	Regular	3.7	5.3	0.92	4.6	NA
	5/4/95	Regular	NS	NS	NS	NS	NS
	8/1/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA
	11/15/95	Regular	< 0.3	1.2	< 0.3	1.5	NA
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA
	5/31/96	Regular	31	86	10	20	NA
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	< 0.1
MW-6							
	8/10/92	Regular	NA	NA	NA	NA	NA
	2/9/93	Regular	7000	19000	3100	7200	NA
	4/22/93	Regular	NS	NS	NS	NS	NS
	7/15/93	Regular	NS	NS	NS	NS	NS
	8/10/93	Regular	NS	NS	NS	NS	NS
	8/19/93	Regular	8100	19000	3500	6400	NA
	1/27/94	Regular	7960	20200	3830	6150	NA
	5/3/95	Regular	NS	NS	NS	NS	NS
	5/4/95	Regular	11000	17000	2900	6000	NA
	8/1/95	Regular	8300	12000	2500	5100	60
	11/15/95	Regular	8900	17000	2900	5500	57
	2/23/96	Regular	8100	10000	2300	4000	58
	5/31/96	Regular	83	150	15	51	0.57
	5/31/96	Duplicate	87	160	13	47	0.52
	8/23/96	Regular	31	28	9.4	7.9	0.46

Table 4
Summary of Groundwater Analyses
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Well ID	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH
			micrograms per liter, µg/L				milligrams per liter, mg/L
MW-7							
	8/10/92	Regular	NA	NA	NA	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA
	4/22/93	Regular	NS	NS	NS	NS	NS
	7/15/93	Regular	NS	NS	NS	NS	NS
	8/10/93	Regular	NS	NS	NS	NS	NS
	8/19/93	Regular	< 2	3	< 2	< 2	NA
	1/27/94	Regular	1.1	< 1	< 1	< 1	NA
	5/3/95	Regular	52	3.4	0.67	2.8	NA
	5/4/95	Regular	NS	NS	NS	NS	NS
	8/1/95	Regular	22	2.2	0.85	2.8	< 0.1
	11/15/95	Regular	8.4	0.77	< 0.3	0.93	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	< 0.1
	2/23/96	Duplicate	< 0.3	< 0.3	< 0.3	< 0.6	< 0.1
	5/31/96	Regular	29	83	10	21	0.25
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	< 0.1
MW-8							
	8/10/92	Regular	NA	NA	NA	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA
	4/22/93	Regular	NS	NS	NS	NS	NS
	7/15/93	Regular	NS	NS	NS	NS	NS
	8/10/93	Regular	NS	NS	NS	NS	NS
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA
	5/3/95	Regular	3	4.9	0.75	3.7	NA
	5/4/95	Regular	NS	NS	NS	NS	NS
	8/1/95	Regular	3.1	1.2	0.47	1.6	< 0.001
	8/1/95	Duplicate	3.6	1.5	0.51	1.5	< 0.1
	11/15/95	Regular	< 0.3	0.52	< 0.3	< 0.6	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	< 0.1
	5/31/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	< 0.1
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	< 0.1

Table 4
Summary of Groundwater Analyses
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Well ID	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH
			micrograms per liter, µg/L				milligrams per liter, mg/L
MW-9							
	8/10/92	Regular	NS	NS	NS	NS	NS
	2/9/93	Regular	NS	NS	NS	NS	NS
	4/22/93	Regular	570	380	< 50	870	NA
	7/15/93	Regular	121	7.3	3	458	NA
	8/10/93	Regular	NS	NS	NS	NS	NS
	8/19/93	Regular	390	290	40	250	NA
	1/27/94	Regular	327	357	51.1	293	NA
	5/3/95	Regular	380	110	19	120	NA
	5/4/95	Regular	NS	NS	NS	NS	NS
	8/1/95	Regular	660	410	91	310	6.2
	11/15/95	Regular	240	24	11	140	1.5
	11/15/95	Duplicate	170	18	10	120	1.9
	2/23/96	Regular	170	18	2.3	160	4.3
	5/31/96	Regular	120	16	3	200	NA
	8/23/96	Regular	82	13	6	270	4
	8/23/96	Duplicate	76	14	4.8	250	4.4
MW-10							
	8/10/92	Regular	NS	NS	NS	NS	NS
	2/9/93	Regular	NS	NS	NS	NS	NS
	4/22/93	Regular	NS	NS	NS	NS	NS
	7/15/93	Regular	NS	NS	NS	NS	NS
	8/10/93	Regular	NS	NS	NS	NS	NS
	8/19/93	Regular	190	460	< 200	240	NA
	1/27/94	Regular	13.4	4	5.5	33.6	NA
	5/3/95	Regular	NS	NS	NS	NS	NS
	5/4/95	Regular	980	15	11	84	NA
	8/1/95	Regular	1300	32	32	100	3.6
	11/15/95	Regular	1000	24	15	36	1.7
	2/23/96	Regular	810	23	27	44	2.4
	5/31/96	Regular	700	24	34	28	2
	8/23/96	Regular	290	3.4	6.4	13	1.4

Table 4
Summary of Groundwater Analyses
Hobbs, New Mexico Facility
BJ Services Company, U.S.A.

Well ID	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH
			micrograms per liter, µg/L				milligrams per liter, mg/L
MW-11	8/10/92	Regular	NS	NS	NS	NS	NS
	2/9/93	Regular	NS	NS	NS	NS	NS
	4/22/93	Regular	NS	NS	NS	NS	NS
	7/15/93	Regular	NS	NS	NS	NS	NS
	8/10/93	Regular	NS	NS	NS	NS	NS
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA
	5/3/95	Regular	NS	NS	NS	NS	NS
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA
	8/1/95	Regular	44	29	5.5	13	0.2
	11/15/95	Regular	190	2.8	6.2	11	0.4
	2/23/96	Regular	49	1.2	0.51	4	0.25
	5/31/96	Regular	300	83	12	28	0.8
	8/23/96	Regular	100	1.2	0.3	4.7	0.26

MW-2 destroyed on May 3, 1995

NS = Not Sampled

NA = Not Analysed

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

Analyte	Sample Date	Monitor Wells									
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11
Alkalinity in mg/L											
Bicarbonate	8/1/95	380	430	490	290	670	440	360	570	520	560
	8/23/96	310	310	210	270	120	400	280	390	520	430
Carbonate	8/1/95	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	10
	8/23/96	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Hydroxide	8/1/95	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
	8/23/96	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Anions in mg/L											
Chloride	8/1/95	160	150	310	130	380	310	350	110	2200	3400
	8/23/96	130	140	100	99	210	250	360	140	2000	2900
Nitrate	8/1/95	4.7	5.6	15	28	1.3	9.2	11	38	< 0.1	5.5
	8/23/96	11	7.6	7.6	12	< 0.5	10	8.6	24	< 5	11
Sulfate	8/1/95	150	150	210	230	6.7	180	160	150	130	230
	8/23/96	130	150	150	140	85	80	160	180	120	130

Table 5

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

Analyte	Sample Date	Monitor Wells									
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11
Cations in mg/L											
Calcium	8/1/95	120	120	220	160	320	300	300	180	610	490
	8/23/96	120	130	89	110	62	270	230	190	390	440
Magnesium	8/1/95	34	36	58	27	72	42	49	43	130	130
	8/23/96	120	32	21	18	28	40	48	44	84	120
Potassium	8/1/95	2.4	2.6	3.5	4.2	3	3.4	5	4.1	35	46
	8/23/96	2.4	3	2.2	3.1	2.4	3.7	3.9	2.6	41	53
Sodium	8/1/95	100	93	140	110	130	95	94	98	660	2000
	8/23/96	100	110	88	120	120	96	100	83	960	2600
Metals in mg/L											
Arsenic	8/1/95	0.0076	0.0043	< 0.002	0.0059	0.028	0.0033	0.0034	0.0055	0.015	0.0086
	8/23/96	0.0078	0.0066	0.0059	0.0067	0.018	0.0036	0.0033	0.0044	0.028	0.011
Barium	8/1/95	0.069	0.38	0.34	0.049	1.1	0.069	0.075	0.089	0.37	0.2
	8/23/96	0.064	0.24	0.069	0.038	0.29	0.061	0.066	0.089	0.26	0.2
Cadmium	8/1/95	< 0.001	< 0.001	0.0052	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	8/23/96	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chromium	8/23/96	< 0.01	< 0.01	< 0.01	< 0.01	0.049	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

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

Analyte		Sample Date	Monitor Wells									
			MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11
PAHs in µg/L												
2,4-Dimethylphenol	8/1/95	< 50										
	8/23/96	NA	97	< 500	NA	< 5	42	< 5	< 5	NA	< 5	< 5
2-Methylnaphthalene	8/1/95	280	62	1500	NA	< 5	150	< 5	< 5	36	23	< 5
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	8/1/95	< 50	56	< 500	NA	< 5	< 30	< 5	< 5	< 5	< 5	< 5
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	8/1/95	< 80	< 20	< 800	< 8	< 8	150	< 8	< 8	< 8	< 8	< 8
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	8/1/95	750	< 20	10000	40	< 40	< 40	< 7	< 7	< 7	< 7	< 7
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	8/1/95	< 5	210	1700	< 5	470	< 5	< 5	< 5	15	92	< 5
	8/23/96	230	110	440	< 5	< 30	< 5	< 5	< 5	< 84	< 76	< 5
Phenol	8/1/95	< 50	< 10	< 500	< 5	< 30	< 5	< 5	< 5	< 5	8.2	< 5
	8/23/96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

MW-2 destroyed on May 3, 1995

NA = Not Analysed

PAHs = Polyaromatic Hydrocarbons

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

Sample Number	Sample Date	Benzene	Toluene	Ethylbenzene	Xylenes	TPH	Discharge Rate, scfm	Benzene Emission Rate, lb/hr	Total BTEX Emission Rate, lb/hr	TPH Emission Rate, lb/hr
		parts per million by volume, ppmv								
Extraction-1	9/19/95	790	1100	340	920	9700	132.47	1.24	5.94	16.31
Effluent-1	9/20/95	990	2500	560	1600	16000	135.76	1.58	10.94	27.37
Effluent-2	9/28/95	13	28	6	18	2533	123.56	0.02	0.11	3.89
Effluent-4	11/7/95	15	58	12	36	1500	131.10	0.02	0.24	2.59
Effluent111595-01	11/15/95	39	180	42	130	1870	133.33	0.06	0.77	3.21
Effluent121995-01	12/19/95	10	45	11	33	530	129.64	0.02	0.19	0.89
Effluent012996-01	1/29/96	12	61	17	53	1200	128.45	0.02	0.27	1.95
Effluent032296-01	3/22/96	6	44	12	40	990	124.68	0.01	0.19	1.56
Effluent042496-01	4/25/96	4	37	10	36	900	118.34	0.01	0.15	1.29
Effluent053196-01	5/31/96	3.7	40	10	33	670	124.11	0.01	0.16	1.04
Effluent082396-01	8/23/96	< 5	12	< 5	< 5	200	126.18	0.01	0.05	0.31

Appendices

APPENDICES

W:\BJSERV\2829\029R.DOC

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

A



APPENDIX A
GROUNDWATER SAMPLING FORMS

W:\BJSERV\2832\008R.DOC

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

Groundwater Sampling Field Data Sheet

Project Number:

2832

Task Number:

11

Date: 8/23/96

Casing Diameter 2 inches	Purge Equipment 1.5" pump	Equipment Calibration - Time
Total Depth of Well from TOC 64.42 feet		pH 6.98 = 7.00 at 30.0 °C
Static Water from TOC 56.17 feet	Sample Equipment disposable bucket	pH 7.90 = 4.00 at 30.0 °C
Product Level from TOC 0 feet		Conductivity Conductance Standard: 1,000 µmhos/cm at 25° C
Length of Water Column 8.25 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) YSI Flaw 11	Measured Value: 1,000 µmhos/cm at 25° C
Well Volume 1.31 gal		Dissolved Oxygen DO Meter Calibrated to: 7.26 mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1340	-	-	7.10	19.5	1,080	-080	0.5	clear, odor
1345	1	1.5	7.10	19.0	1,080	-105	0.5	"
1350	2	1.5	7.09	19.0	1,120	-112	0.5	"
1355	3	1.5	7.09	19.0	1,160	-112	0.5	"

Geochemical Parameters	Comments:
Ferrous Iron: 1.0 mg/L	0 recovery from filter
Dissolved Oxygen: 0 mg/L	8/23/96 sample mw-1 @ 1645
Nitrate: mg/L	water level 54.24'
Sulfate: mg/L	

PPE Worn:	Sampler's Signature: 
Disposition of Purge Water:	

Groundwater Sampling Field Data Sheet

Project Number: 2832Task Number: 11Date: 8/23/96

Casing Diameter <u>2</u> inches	Purge Equipment <u>1.5" pump</u>	Equipment Calibration - Time
Total Depth of Well from TOC <u>64.31</u> feet	Sample Equipment <u>disposable barrel</u>	pH <u>6.48</u> = <u>7.00</u> at <u>30.0</u> °C
Static Water from TOC <u>51.55</u> feet		pH <u>3.90</u> = <u>4.00</u> at <u>50.0</u> °C
Product Level from TOC <u>6</u> feet		Conductivity Conductance Standard: <u>1,000</u> µmhos/cm at 25° C
Length of Water Column <u>12.76</u> feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) <u>YSI Flow Cell</u>	Measured Value: <u>1,000</u> µmhos/cm at 25° C
Well Volume <u>2.07</u> gal		Dissolved Oxygen DO Meter Calibrated to: <u>7.26</u> mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1312	-	-	6.83	20.0	1,200	-112	1.0	clear yellow odor
1317	1	2	7.12	19.3	1,150	-084	0.5	"
1322	2	2	7.09	19.4	1,220	-082	0.5	"
1327	3	2	7.09	19.4	1,220	-078	0.5	"

Geochemical Parameters	Comments:
Ferrous Iron: <u>0</u> mg/L	<u>8/23/96 sample mw-3 @ 1625</u> <u>water level 51.60'</u>
Dissolved Oxygen: <u>1</u> mg/L	
Nitrate: _____ mg/L	
Sulfate: _____ mg/L	

PPE Worn:	Sampler's Signature: <u>J. [Signature]</u>
Disposition of Purge Water:	

Groundwater Sampling Field Data Sheet

Project Number: 2832Task Number: 11Date: 8/23/96

Casing Diameter <u>2</u> inches	Purge Equipment <u>1.5" pump</u>	Equipment Calibration - Time
Total Depth of Well from TOC <u>61.43</u> feet		pH <u>6.98</u> = <u>7.00</u> at <u>30.0</u> °C
Static Water from TOC <u>53.49</u> feet	Sample Equipment <u>Disposable beaker</u>	pH <u>3.90</u> = <u>4.00</u> at <u>30.0</u> °C
Product Level from TOC <u>0</u> feet		Conductivity Conductance Standard: <u>1.000</u> µmhos/cm at 25° C
Length of Water Column <u>7.94</u> feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) <u>YSI Flow cell</u>	Measured Value: <u>1.000</u> µmhos/cm at 25° C
Well Volume <u>1.29</u> gal		Dissolved Oxygen DO Meter Calibrated to: <u>7.26</u> mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1408	-	-	7.13	19.2	950 _u	-116	0.2	clear, pinkish
1412	1	1.5	7.15	19.0	860 _u	-120	0.5	"
1416	2	1.5	7.16	19.0	900 _u	-121	0.2	"
1420	3	1.5	7.18	19.0	880 _u	-116	0.2	"

Geochemical Parameters	Comments:
Ferrous Iron: <u>2</u> mg/L	<u>10" PSH received in 2" filter.</u>
Dissolved Oxygen: <u>0</u> mg/L	<u>8/23/96 sample mw-4 @ 1200</u>
Nitrate: <u>0</u> mg/L	<u>water level 51.57'</u>
Sulfate: <u>0</u> mg/L	

PPE Worn:	Sampler's Signature: <u>T. Allen</u>
Disposition of Purge Water:	

BROWN AND CALDWELL

WELL ID: MW-5

Groundwater Sampling Field Data Sheet

Project Number: 2832Task Number: 11Date: 8/23/96

Casing Diameter <u>2</u> inches	Purge Equipment <u>1.5" pump</u>	Equipment Calibration - Time
Total Depth of Well from TOC <u>64.60</u> feet	Sample Equipment <u>Disposable hauler</u>	pH <u>6.98</u> = <u>2.00</u> at <u>30.0</u> °C
Static Water from TOC <u>53.41</u> feet		pH <u>3.90</u> = <u>4.00</u> at <u>30.0</u> °C
Product Level from TOC <u>0</u> feet		Conductivity Conductance Standard: <u>1,000</u> µmhos/cm at 25° C
Length of Water Column <u>11.19</u> feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) <u>YSI Flowcell</u>	Measured Value: <u>1,000</u> µmhos/cm at 25° C
Well Volume <u>1.82</u> gal		Dissolved Oxygen
Screened Interval (from GS) feet		DO Meter Calibrated to: <u>2.26</u> mg/L

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1040	-	-	6.91	20.6	910 µ	041	1.5	clear
1044	1	2	7.12	19.2	1,000 µ	031	2.0	"
1048	2	2	7.16	19.1	980 µ	030	2.0	"
1052	3	2	7.14	19.1	1,020 µ	030	2.0	"

Geochemical Parameters	Comments:
Ferrous Iron: <u>0</u> mg/L	<u>8/23/96 Sample MW-5 @ 1450</u> <u>water level 53.41'</u>
Dissolved Oxygen: <u>3.5</u> mg/L	
Nitrate: _____ mg/L	
Sulfate: _____ mg/L	

PPE Worn:	Sampler's Signature: <u>J. Allen</u>
Disposition of Purge Water:	

BROWN AND CALDWELL

WELL ID:

mw-6

Groundwater Sampling Field Data Sheet

Project Number: 2852

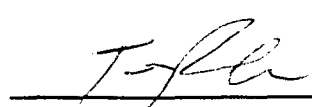
Task Number: 11

Date: 8/23/96

Casing Diameter 2 inches	Purge Equipment 1.5" pump	Equipment Calibration - Time
Total Depth of Well from TOC 60.12 feet	Sample Equipment disposable bailer	pH 6.98 = 7.00 at 30.0 °C
Static Water from TOC 51.63 feet		pH 5.10 = 4.00 at 30.0 °C
Product Level from TOC 0 feet		Conductivity Conductance Standard: 1,000 µmhos/cm at 25° C
Length of Water Column 8.54 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) YSI Flow 61	Measured Value: 1,000 µmhos/cm at 25° C
Well Volume 1.37 gal		Dissolved Oxygen DO Meter Calibrated to: 7.26 mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1105	-	-	7.25	20.7	960.0	012	1.5	clear yellow
1110	1	1.5	7.96	19.5	1,010.0	010	1.5	"
1115	2	1.5	8.02	19.3	980.0	013	1.5	"
1120	3	1.5	7.99	19.1	1,020.0	016	1.5	"

Geochemical Parameters	Comments:
Ferrous Iron: 0 mg/L	8/23/96 sample mw-6 @ 1505 water level 51.98'
Dissolved Oxygen: 5 mg/L	
Nitrate: mg/L	
Sulfate: mg/L	

PPE Worn:	Sampler's Signature: 
Disposition of Purge Water:	

BROWN AND CALDWELL

WELL ID: mw-7

Groundwater Sampling Field Data Sheet

Project Number: 2852Task Number: 11Date: 8/23/96

Casing Diameter <u>2</u> inches	Purge Equipment <u>1.5" pump</u>	Equipment Calibration - Time
Total Depth of Well from TOC <u>61.46</u> feet	Sample Equipment <u>disposable hauler</u>	pH <u>6.98</u> = <u>7.00</u> at <u>30.0</u> °C
Static Water from TOC <u>52.02</u> feet		pH <u>3.90</u> = <u>4.00</u> at <u>30.0</u> °C
Product Level from TOC <u>0</u> feet		Conductivity Conductance Standard: <u>1,000</u> µmhos/cm at 25° C
Length of Water Column <u>9.44</u> feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) <u>YSI Flow Cell</u>	Measured Value: <u>1,000</u> µmhos/cm at 25° C
Well Volume <u>1.53</u> gal		Dissolved Oxygen DO Meter Calibrated to: <u>7.26</u> mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1002	-	-	6.71	20.5	1,670	057	1.0	clear
1006	1	1.5	6.62	19.6	1,710	071	1.0	cloudy
1011	2	1.5	6.64	19.6	1,700	072	1.0	clear
1015	3	1.5	6.65	19.7	1,690	072	1.0	"
STOP 1048								

Geochemical Parameters	Comments:
Ferrous Iron: <u>0</u> mg/L	<u>8/23/96 sample mw-7 @ 1440</u> <u>water level 52.02'</u>
Dissolved Oxygen: <u>2</u> mg/L	
Nitrate: <u> </u> mg/L	
Sulfate: <u> </u> mg/L	

PPE Worn:	Sampler's Signature: <u>T. J. R.</u>
Disposition of Purge Water:	

BROWN AND CALDWELL

WELL ID: MW-8

Groundwater Sampling Field Data Sheet

Project Number: 2852Task Number: 11Date: 8/23/96

Casing Diameter <u>2</u> inches	Purge Equipment <u>1.5" pump</u>	Equipment Calibration - Time
Total Depth of Well from TOC <u>62.37</u> feet	Sample Equipment <u>disposable header</u>	pH <u>6.78</u> = <u>7.00</u> at <u>30.0</u> °C
Static Water from TOC <u>51.92</u> feet		pH <u>6.70</u> = <u>7.00</u> at <u>70.0</u> °C
Product Level from TOC <u>0</u> feet		Conductivity Conductance Standard: <u>1.000</u> µmhos/cm at 25° C
Length of Water Column <u>10.45</u> feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) <u>YSI Model 11</u>	Measured Value: <u>1.000</u> µmhos/cm at 25° C
Well Volume <u>1.70</u> gal		Dissolved Oxygen DO Meter Calibrated to: <u>7.20</u> mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
0915	-	-	6.10	19.8	868 u	135	1.5	clear
0926	1	2	6.68	19.5	1,200	083	1.0	"
0927	2	2	6.71	19.4	1,230	079	1.0	"
0933	3	2	6.72	19.4	1,240	074	1.0	"

Geochemical Parameters	Comments:
Ferrous Iron: <u>0</u> mg/L	<u>8/23/96 sample MW-8 @ 1430</u> <u>water level 51.91'</u>
Dissolved Oxygen: <u>2</u> mg/L	
Nitrate: <u> </u> mg/L	
Sulfate: <u> </u> mg/L	

PPE Worn:	Sampler's Signature: <u>[Signature]</u>
Disposition of Purge Water:	

BROWN AND CALDWELL

WELL ID: MW-9

Groundwater Sampling Field Data Sheet

Project Number: 2832Task Number: 11Date: 8/23/96

Casing Diameter <u>2</u> inches	Purge Equipment <u>1.5" pump</u>	Equipment Calibration - Time
Total Depth of Well from TOC <u>60.27</u> feet	Sample Equipment <u>Disposable bucket</u>	pH <u>6.98</u> = <u>200</u> at <u>20.0</u> °C
Static Water from TOC <u>50.98</u> feet		pH <u>6.70</u> = <u>400</u> at <u>20.0</u> °C
Product Level from TOC <u>0</u> feet		Conductivity Conductance Standard: <u>1,000</u> µmhos/cm at 25° C
Length of Water Column <u>9.29</u> feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) <u>YSI Flow cell</u>	Measured Value: <u>1,000</u> µmhos/cm at 25° C
Well Volume <u>1.51</u> gal		Dissolved Oxygen DO Meter Calibrated to: <u>2.26</u> mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1200	-	-	7.19	20.5	1,280	044	1.0	clear yellow
1204	1	1.5	6.82	19.3	1,330	053	1.0	"
1208	2	1.5	6.80	19.2	1,330	049	1.0	clear
1212	3	1.5	6.81	19.2	1,340	046	1.0	"

Geochemical Parameters	Comments:
Ferrous Iron: <u>0</u> mg/L	<u>8/23/96 sample MW-9 @ 1520</u> <u>water level 50.94'</u>
Dissolved Oxygen: <u>1</u> mg/L	
Nitrate: <u></u> mg/L	
Sulfate: <u></u> mg/L	

PPE Worn:	Sampler's Signature: <u>T-flh</u>
Disposition of Purge Water:	

Groundwater Sampling Field Data Sheet

Project Number: 2852Task Number: 11Date: 8/23/96

Casing Diameter <u>2</u> inches	Purge Equipment <u>1.5" pump</u>	Equipment Calibration - Time
Total Depth of Well from TOC <u>63.60</u> feet	Sample Equipment <u>disposable bucket</u>	pH <u>6.98</u> = <u>7.00</u> at <u>30.0</u> °C
Static Water from TOC <u>53.03</u> feet		pH <u>3.90</u> = <u>4.00</u> at <u>30.0</u> °C
Product Level from TOC <u>0</u> feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) <u>YSI HAN cell</u>	Conductivity Conductance Standard: <u>1,000</u> µmhos/cm at 25° C
Length of Water Column <u>10.57</u> feet		Measured Value: <u>1,000</u> µmhos/cm at 25° C
Well Volume <u>1.72</u> gal		Dissolved Oxygen DO Meter Calibrated to: <u>2.26</u> mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1252	-	-	6.80	20.2	4,180	-071	0.5	clear Yellow
1257	1	2	6.80	20.3	5,640	-105	0.5	"
1301	2	2	6.79	19.8	5,870	-110	0.5	"
1306	3	2	6.80	19.8	5,800	-110	0.5	"

Geochemical Parameters	Comments:
Ferrous Iron: <u>7</u> mg/L	<u>8/23/96 sample MW-10 @ 1610</u> <u>water level 53.04'</u>
Dissolved Oxygen: <u>0</u> mg/L	
Nitrate: <u> </u> mg/L	
Sulfate: <u> </u> mg/L	

PPE Worn:	Sampler's Signature: <u>J-Fl</u>
Disposition of Purge Water:	

Groundwater Sampling Field Data Sheet

Project Number: 2832Task Number: 11Date: 8/23/96

Casing Diameter <u>2</u> inches	Purge Equipment <u>1.5" pump</u>	Equipment Calibration - Time
Total Depth of Well from TOC <u>59.78</u> feet	Sample Equipment <u>disposable transfer</u>	pH <u>6.98</u> = <u>7.00</u> at <u>30.0</u> °C
Static Water from TOC <u>53.49</u> feet		pH <u>5.90</u> = <u>4.00</u> at <u>30.0</u> °C
Product Level from TOC <u>0</u> feet		Conductivity Conductance Standard: <u>1.000</u> µmhos/cm at 25° C
Length of Water Column <u>6.29</u> feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) <u>YSI Flow cell</u>	Measured Value: <u>1.000</u> µmhos/cm at 25° C
Well Volume <u>102</u> gal		Dissolved Oxygen DO Meter Calibrated to: <u>2.26</u> mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1230	-	-	6.81	20.2	10,680	035	1.0	clear
1235	1	1	6.93	19.4	12,140	047	1.0	"
1242	2	1.5	6.82	19.7	10,780	045	1.0	"

Geochemical Parameters	Comments:
Ferrous Iron: <u>0</u> mg/L	<u>Well dry @ 2.5 gal.</u> <u>8/23/96 sample mw-11 @ 1555</u> <u>water level 53.49</u>
Dissolved Oxygen: <u>1.0</u> mg/L	
Nitrate: <u> </u> mg/L	
Sulfate: <u> </u> mg/L	

PPE Worn:	Sampler's Signature: <u>T. J. [Signature]</u>
Disposition of Purge Water:	

B



APPENDIX B

LABORATORY ANALYTICAL REPORTS GROUNDWATER SAMPLES

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

September 11, 1996

Brown and Caldwell Consultants
1415 Louisiana , Suite 2500
Houston, Tx 77002
Attn: Myna Dehnert

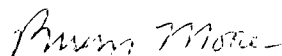
Dear Ms. Dehnert,

Enclosed is the analytical report for chemical testing for samples taken on 08/23/96. It includes the following:

- 1) Analytical Report of results.
- 2) QC summary including LCS/LCSD, MS/MSD, duplicate samples, method blanks, and surrogates.
- 3) Cross reference sheet containing analyte, date analyzed, method, and batch number.
- 4) Case narrative explaining QC deficiencies and/or problems encountered in testing.

If you have any questions, please do not hesitate to call.

Very truly yours,



Brian Moore
Project Manager



B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

Case Narrative

All quality objectives were met including holding times, LCS/LCSD, MS/MSD, Duplicate samples, and Method Blanks as applicable except:

Semivolatile organics method 8270 batche 96192:

Acenaphthalene and Pyrene MS/MSD recovery greater than upper control limit. This MS/MSD was probably spiked twice.

No analytical difficulties were encountered with any project samples except:

Samples G96-08-546-4,6 surrogate Nitrobenzene-d5 method 8270 recovery less than lower control limit.

ANALYTICAL REPORT

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G96-08-546

Received: 24 AUG 96

Mailed: SEP 12 1996

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, TX 77002

Project: 2832.11

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES					DATE SAMPLED
08-546-1	MW-1					23 AUG 96
08-546-2	MW-101					23 AUG 96
08-546-3	MW-3					23 AUG 96
08-546-4	MW-4					23 AUG 96
08-546-5	MW-5					23 AUG 96
PARAMETER	08-546-1	08-546-2	08-546-3	08-546-4	08-546-5	
Chloride (300.0), mg/L	130	140	140	100	99	
Nitrate (300.0), mg/L	9.0	24	7.6	11	12	
Sulfate (300.0), mg/L	140	180	150	140	140	
Alkalinity (310.1)						
Carbonate Alk (as CaCO ₃), mg/L	<10	<10	<10	<10	<10	
Bicarbonate Alk (as CaCO ₃), mg/L	310	390	310	210	270	
Hydroxide Alk (as CaCO ₃), mg/L	<10	<10	<10	<10	<10	
Total Alkalinity (as CaCO ₃), mg/L	310	390	310	210	270	
Arsenic (7060), mg/L	0.0078	0.0044	0.0066	0.0059	0.0067	
Barium (6010), mg/L	0.064	0.089	0.24	0.069	0.038	
Cadmium (6010), mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Calcium (6010), mg/L	120	190	130	89	110	
Chromium (6010), mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Lead (7421), mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	
Magnesium (6010), mg/L	31	44	32	21	18	
Mercury (7470), mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Potassium (6010), mg/L	2.4	2.6	3.0	2.2	3.1	
Selenium (7740), mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	
Silver (6010), mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Sodium (6010), mg/L	100	83	110	88	120	
Digestion (3005), Date	08/28/96	08/28/96	08/28/96	08/28/96	08/28/96	
Furnace Digestion (3020), Date	08/28/96	08/28/96	08/28/96	08/28/96	08/28/96	

B C Analytical

801 Western Avenue
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818/247-5737
Fax: 818/247-9797

LOG NO: G96-08-546

Received: 24 AUG 96

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Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, TX 77002

Project: 2832.11

REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES					DATE SAMPLED
08-546-1	MW-1					23 AUG 96
08-546-2	MW-101					23 AUG 96
08-546-3	MW-3					23 AUG 96
08-546-4	MW-4					23 AUG 96
08-546-5	MW-5					23 AUG 96
PARAMETER	08-546-1	08-546-2	08-546-3	08-546-4	08-546-5	
Polynuclear Aromatics (8270)						
Date Analyzed	09/10/96	09/05/96	09/10/96	09/10/96	09/05/96	
Date Extracted	08/28/96	08/28/96	08/28/96	08/28/96	08/28/96	
Dilution Factor, Times	2	1	2	5	1	
Acenaphthene, ug/L	<10	<5	<10	<30	<5	
Acenaphthylene, ug/L	<10	<5	<10	<30	<5	
Anthracene, ug/L	<10	<5	<10	<30	<5	
Benzo(a)anthracene, ug/L	<10	<5	<10	<30	<5	
Benzo(a)pyrene, ug/L	<10	<5	<10	<30	<5	
Benzo(b)fluoranthene, ug/L	<10	<5	<10	<30	<5	
Benzo(g,h,i)perylene, ug/L	<10	<5	<10	<30	<5	
Benzo(k)fluoranthene, ug/L	<10	<5	<10	<30	<5	
Chrysene, ug/L	<10	<5	<10	<30	<5	
Dibenzo(a,h)anthracene, ug/L	<10	<5	<10	<30	<5	
Fluoranthene, ug/L	<10	<5	<10	<30	<5	
Fluorene, ug/L	<10	<5	<10	<30	<5	
Indeno(1,2,3-c,d)pyrene, ug/L	<10	<5	<10	<30	<5	
Naphthalene, ug/L	230	84	110	440	<5	
Phenanthrene, ug/L	<10	<5	<10	<30	<5	
Pyrene, ug/L	<10	<5	<10	<30	<5	
Surrogates **						
2-Fluorobiphenyl Reported, ug/L	39.7	30.9	32.0	33.4	31.3	
2-Fluorobiphenyl Theo., ug/L	50.0	50.0	50.0	50.0	50.0	

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REPORT OF ANALYTICAL RESULTS

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LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES					DATE SAMPLED
08-546-1	MW-1					23 AUG 96
08-546-2	MW-101					23 AUG 96
08-546-3	MW-3					23 AUG 96
08-546-4	MW-4					23 AUG 96
08-546-5	MW-5					23 AUG 96
PARAMETER	08-546-1	08-546-2	08-546-3	08-546-4	08-546-5	
Nitrobenzene-d5 Reported, ug/L	47.9	38.4	38.6	1.15	31.1	
Nitrobenzene-d5 Theoretical, ug/L	50.0	50.0	50.0	50.0	50.0	
Terphenyl-d14 Reported, ug/L	55.2	49.3	47.1	37.8	48.2	
Terphenyl-d14 Theoretical, ug/L	50.0	50.0	50.0	50.0	50.0	
BTEX (8020)/GRO (8015M)						
Date Analyzed	08/26/96	08/26/96	08/27/96	08/26/96	08/26/96	
Dilution Factor, Times	10	1	10	5	1	
Benzene, ug/L	1800	76	330	110	<0.3	
Toluene, ug/L	3300	14	2200	1400	<0.3	
Ethylbenzene, ug/L	570	4.8	590	430	<0.3	
Total Xylene Isomers, ug/L	2100	250	1500	1800	<0.6	
Carbon Range, .	C6-C12	C6-C12	C6-C12	C6-C12	C6-C12	
TPH (Gasoline Range), ug/L	17000	4400	12000	9800	<100	
Surrogates **						
a,a,a-Trifluorotoluene Rep., ug/L	461	52.0	448	225	44.7	
a,a,a-Trifluorotoluene Th., ug/L	500	50.0	500	250	50.0	

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REPORT OF ANALYTICAL RESULTS

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LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES				DATE SAMPLED
08-546-6	MW-6				23 AUG 96
08-546-7	MW-7				23 AUG 96
08-546-8	MW-8				23 AUG 96
08-546-9	MW-9				23 AUG 96
08-546-10	MW-10				23 AUG 96
PARAMETER	08-546-6	08-546-7	08-546-8	08-546-9	08-546-10
Chloride (300.0), mg/L	210	250	360	140	2000
Nitrate (300.0), mg/L	<0.5	10	8.6	22	<5
Sulfate (300.0), mg/L	85	180	160	180	120
Alkalinity (310.1)					
Carbonate Alk (as CaCO3), mg/L	<10	<10	<10	<10	<10
Bicarbonate Alk (as CaCO3), mg/L	120	400	280	410	520
Hydroxide Alk (as CaCO3), mg/L	<10	<10	<10	<10	<10
Total Alkalinity (as CaCO3), mg/L	120	400	280	410	520
Arsenic (7060), mg/L	0.018	0.0036	0.0033	0.0047	0.028
Barium (6010), mg/L	0.29	0.061	0.066	0.082	0.26
Cadmium (6010), mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Calcium (6010), mg/L	62	270	230	180	390
Chromium (6010), mg/L	0.049	<0.01	<0.01	<0.01	<0.01
Lead (7421), mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Magnesium (6010), mg/L	28	40	48	42	84
Mercury (7470), mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Potassium (6010), mg/L	2.4	3.7	3.9	2.4	41
Selenium (7740), mg/L	<0.004	<0.004	<0.004	<0.004	<0.004
Silver (6010), mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Sodium (6010), mg/L	120	96	100	81	960
Digestion (3005), Date	08/28/96	08/28/96	08/28/96	08/28/96	08/28/96
Furnace Digestion (3020), Date	08/28/96	08/28/96	08/28/96	08/28/96	08/28/96

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REPORT OF ANALYTICAL RESULTS

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LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES					DATE SAMPLED
08-546-6	MW-6					23 AUG 96
08-546-7	MW-7					23 AUG 96
08-546-8	MW-8					23 AUG 96
08-546-9	MW-9					23 AUG 96
08-546-10	MW-10					23 AUG 96
PARAMETER	08-546-6	08-546-7	08-546-8	08-546-9	08-546-10	
Polynuclear Aromatics (8270)						
Date Analyzed	09/10/96	09/05/96	09/05/96	09/05/96	09/05/96	
Date Extracted	08/28/96	08/28/96	08/28/96	08/28/96	08/28/96	
Dilution Factor, Times	5	1	1	1	1	
Acenaphthene, ug/L	<30	<5	<5	<5	<5	
Acenaphthylene, ug/L	<30	<5	<5	<5	<5	
Anthracene, ug/L	<30	<5	<5	<5	<5	
Benzo(a)anthracene, ug/L	<30	<5	<5	<5	<5	
Benzo(a)pyrene, ug/L	<30	<5	<5	<5	<5	
Benzo(b)fluoranthene, ug/L	<30	<5	<5	<5	<5	
Benzo(g,h,i)perylene, ug/L	<30	<5	<5	<5	<5	
Benzo(k)fluoranthene, ug/L	<30	<5	<5	<5	<5	
Chrysene, ug/L	<30	<5	<5	<5	<5	
Dibenzo(a,h)anthracene, ug/L	<30	<5	<5	<5	<5	
Fluoranthene, ug/L	<30	<5	<5	<5	<5	
Fluorene, ug/L	<30	<5	<5	<5	<5	
Indeno(1,2,3-c,d)pyrene, ug/L	<30	<5	<5	<5	<5	
Naphthalene, ug/L	<30	<5	<5	82	76	
Phenanthrene, ug/L	<30	<5	<5	<5	<5	
Pyrene, ug/L	<30	<5	<5	<5	<5	
Surrogates **						
2-Fluorobiphenyl Reported, ug/L	23.6	29.4	29.5	33.9	27.9	
2-Fluorobiphenyl Theo., ug/L	50.0	50.0	50.0	50.0	50.0	

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LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES					DATE SAMPLED
08-546-6	MW-6					23 AUG 96
08-546-7	MW-7					23 AUG 96
08-546-8	MW-8					23 AUG 96
08-546-9	MW-9					23 AUG 96
08-546-10	MW-10					23 AUG 96
PARAMETER	08-546-6	08-546-7	08-546-8	08-546-9	08-546-10	
Nitrobenzene-d5 Reported, ug/L	2.30	32.4	32.4	40.0	36.3	
Nitrobenzene-d5 Theoretical, ug/L	50.0	50.0	50.0	50.0	50.0	
Terphenyl-d14 Reported, ug/L	35.7	52.3	54.6	62.2	51.0	
Terphenyl-d14 Theoretical, ug/L	50.0	50.0	50.0	50.0	50.0	
BTEX (8020)/GRO (8015M)						
Date Analyzed	08/26/96	08/26/96	08/26/96	08/26/96	08/26/96	
Dilution Factor, Times	1	1	1	1	1	
Benzene, ug/L	31	<0.3	<0.3	82	290	
Toluene, ug/L	28	<0.3	<0.3	13	3.4	
Ethylbenzene, ug/L	9.4	<0.3	<0.3	5.5	6.4	
Total Xylene Isomers, ug/L	7.9	<0.6	<0.6	270	13	
Carbon Range, .	C6-C12	C6-C12	C6-C12	C6-C12	C6-C12	
TPH (Gasoline Range), ug/L	460	<100	<100	3900	1400	
Surrogates **						
a,a,a-Trifluorotoluene Rep., ug/L	59.1	45.1	45.5	52.0	45.2	
a,a,a-Trifluorotoluene Th., ug/L	50.0	50.0	50.0	50.0	50.0	

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Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
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REPORT OF ANALYTICAL RESULTS

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LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-546-11	MW-11	23 AUG 96
PARAMETER	08-546-11	
Chloride (300.0), mg/L	2900	
Nitrate (300.0), mg/L	11	
Sulfate (300.0), mg/L	130	
Alkalinity (310.1)		
Carbonate Alk (as CaCO3), mg/L	<10	
Bicarbonate Alk (as CaCO3), mg/L	430	
Hydroxide Alk (as CaCO3), mg/L	<10	
Total Alkalinity (as CaCO3), mg/L	430	
Arsenic (7060), mg/L	0.011	
Barium (6010), mg/L	0.20	
Cadmium (6010), mg/L	<0.01	
Calcium (6010), mg/L	440	
Chromium (6010), mg/L	<0.01	
Lead (7421), mg/L	<0.002	
Magnesium (6010), mg/L	120	
Mercury (7470), mg/L	<0.0002	
Potassium (6010), mg/L	53	
Selenium (7740), mg/L	<0.004	
Silver (6010), mg/L	<0.01	
Sodium (6010), mg/L	2600	
Digestion (3005), Date	08/28/96	
Furnace Digestion (3020), Date	08/28/96	

BCA

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REPORT OF ANALYTICAL RESULTS

Page 8

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-546-11	MW-11	23 AUG 96
PARAMETER	08-546-11	
Polynuclear Aromatics (8270)		
Date Analyzed	09/10/96	
Date Extracted	08/30/96	
Dilution Factor, Times	1	
Acenaphthene, ug/L	<5	
Acenaphthylene, ug/L	<5	
Anthracene, ug/L	<5	
Benzo(a)anthracene, ug/L	<5	
Benzo(a)pyrene, ug/L	<5	
Benzo(b)fluoranthene, ug/L	<5	
Benzo(g,h,i)perylene, ug/L	<5	
Benzo(k)fluoranthene, ug/L	<5	
Chrysene, ug/L	<5	
Dibenzo(a,h)anthracene, ug/L	<5	
Fluoranthene, ug/L	<5	
Fluorene, ug/L	<5	
Indeno(1,2,3-c,d)pyrene, ug/L	<5	
Naphthalene, ug/L	<5	
Phenanthrene, ug/L	<5	
Pyrene, ug/L	<5	
Surrogates **		
2-Fluorobiphenyl Reported, ug/L	44.9	
2-Fluorobiphenyl Theo., ug/L	50.0	
Nitrobenzene-d5 Reported, ug/L	47.0	
Nitrobenzene-d5 Theoretical, ug/L	50.0	
Terphenyl-d14 Reported, ug/L	51.8	
Terphenyl-d14 Theoretical, ug/L	50.0	

BCA

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LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-546-11	MW-11	23 AUG 96
PARAMETER	08-546-11	
BTEX (8020)/GRO (8015M)		
Date Analyzed	08/26/96	
Dilution Factor, Times	1	
Benzene, ug/L	100	
Toluene, ug/L	1.2	
Ethylbenzene, ug/L	<0.3	
Total Xylene Isomers, ug/L	4.7	
Carbon Range, .	C6-C12	
TPH (Gasoline Range), ug/L	260	
Surrogates **		
a,a,a-Trifluorotoluene Rep., ug/L	44.9	
a,a,a-Trifluorotoluene Th., ug/L	50.0	

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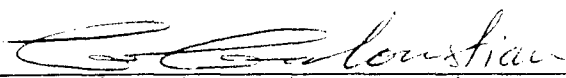
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REPORT OF ANALYTICAL RESULTS

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LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED	
08-546-12	EB-1	23 AUG 96	
08-546-13	Trip Blank	23 AUG 96	
PARAMETER	08-546-12	08-546-13	
BTEX (8020)/GRO (8015M)			
Date Analyzed	08/26/96	08/27/96	
Dilution Factor, Times	1	1	
Benzene, ug/L	<0.3	<0.3	
Toluene, ug/L	<0.3	<0.3	
Ethylbenzene, ug/L	<0.3	<0.3	
Total Xylene Isomers, ug/L	<0.6	<0.6	
Carbon Range, .	C6-C12	C6-C12	
TPH (Gasoline Range), ug/L	<100	<100	
Surrogates **			
a,a,a-Trifluorotoluene Rep., ug/L	44.5	45.5	
a,a,a-Trifluorotoluene Th., ug/L	50.0	50.0	


Greta Galoustian, Laboratory Director

The analytical results within this report relate only to the specific compounds and samples investigated and may not necessarily reflect other apparently similar material from the same or a similar location.

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BCA

AMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE.....	METHOD.....	EQUIP.	BATCH..	ID.NO
			ANALYZED				
9608546*1	MW-1	ANIONS,CL	08.25.96	300.0	533-23	960825	8488
		ANIONS,NO3	08.25.96	300.0	533-23	960825	8488
		ANIONS,SO4	08.25.96	300.0	533-23	960825	8488
		ALK	08.27.96	310.1	533-29	9656	8804
		AS,GFA	08.28.96	7060	534-07	961963	7396
		BA	08.28.96	6010	535-03	961965	7396
		CD	08.28.96	6010	535-03	961965	7396
		CA	08.29.96	6010	535-02	961965	7396
		CR	08.28.96	6010	535-03	961965	7396
		PB,GFA	08.29.96	7421	534-07	961963	7396
		MG	08.28.96	6010	535-03	961965	7396
		HG	08.30.96	7470	534-06	961974	8488
		K	08.28.96	6010	535-03	961965	7396
		SE,GFA	08.28.96	7740	534-07	961963	7396
		AG	08.28.96	6010	535-03	961965	7396
		NA	08.29.96	6010	535-02	961965	7396
		DIG,AQ,HCL	08.28.96	3005		961965	7620
		DIG,AQ,GFA	08.28.96	3020		961963	7620
		BNA.8270.PNA	09.10.96	8270	537-14	96190	7616
		GAS.TPH.BTEX	08.26.96	8015M	536-23	965111	6843
9608546*2	MW-101	ANIONS,CL	08.25.96	300.0	533-23	960825	8488
		ANIONS,NO3	08.25.96	300.0	533-23	960825	8488
		ANIONS,SO4	08.25.96	300.0	533-23	960825	8488
		ALK	08.27.96	310.1	533-29	9656	8804
		AS,GFA	08.28.96	7060	534-07	961963	7396
		BA	08.28.96	6010	535-03	961965	7396
		CD	08.28.96	6010	535-03	961965	7396
		CA	08.29.96	6010	535-02	961965	7396
		CR	08.28.96	6010	535-03	961965	7396
		PB,GFA	08.29.96	7421	534-07	961963	7396
		MG	08.28.96	6010	535-03	961965	7396
		HG	08.30.96	7470	534-06	961974	8488
		K	08.28.96	6010	535-03	961965	7396
		SE,GFA	08.28.96	7740	534-07	961963	7396
		AG	08.28.96	6010	535-03	961965	7396
		NA	08.29.96	6010	535-02	961965	7396
		DIG,AQ,HCL	08.28.96	3005		961965	7620
		DIG,AQ,GFA	08.28.96	3020		961963	7620
		BNA.8270.PNA	09.05.96	8270	537-11	96190	6750
		GAS.TPH.BTEX	08.26.96	8015M	536-23	965111	6843
9608546*3	MW-3	ANIONS,CL	08.25.96	300.0	533-23	960825	8488
		ANIONS,NO3	08.25.96	300.0	533-23	960825	8488
		ANIONS,SO4	08.25.96	300.0	533-23	960825	8488
		ALK	08.27.96	310.1	533-29	9656	8804

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

=====

AMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE.....	METHOD.....	EQUIP.	BATCH..	ID.NO
			ANALYZED				

	AS,GFA		08.28.96	7060	534-07	961963	7396
	BA		08.28.96	6010	535-03	961965	7396
	CD		08.28.96	6010	535-03	961965	7396
	CA		08.29.96	6010	535-02	961965	7396
	CR		08.28.96	6010	535-03	961965	7396
	PB,GFA		08.29.96	7421	534-07	961963	7396
	MG		08.28.96	6010	535-03	961965	7396
	HG		08.30.96	7470	534-06	961974	8488
	K		08.28.96	6010	535-03	961965	7396
	SE,GFA		08.28.96	7740	534-07	961963	7396
	AG		08.28.96	6010	535-03	961965	7396
	NA		08.29.96	6010	535-02	961965	7396
	DIG,AQ.HCL		08.28.96	3005		961965	7620
	DIG,AQ,GFA		08.28.96	3020		961963	7620
	BNA.8270.PNA		09.10.96	8270	537-14	96190	7616
	GAS.TPH.BTEX		08.27.96	8015M	536-23	965112	8171
9608546*4	ANIONS,CL		08.25.96	300.0	533-23	960825	8488
	ANIONS,NO3		08.25.96	300.0	533-23	960825	8488
	ANIONS,SO4		08.25.96	300.0	533-23	960825	8488
	ALK		08.27.96	310.1	533-29	9656	8804
	AS,GFA		08.28.96	7060	534-07	961963	7396
	BA		08.28.96	6010	535-03	961965	7396
	CD		08.28.96	6010	535-03	961965	7396
	CA		08.28.96	6010	535-03	961965	7396
	CR		08.28.96	6010	535-03	961965	7396
	PB,GFA		08.29.96	7421	534-07	961963	7396
	MG		08.28.96	6010	535-03	961965	7396
	HG		08.30.96	7470	534-06	961974	8488
	K		08.28.96	6010	535-03	961965	7396
	SE,GFA		08.28.96	7740	534-07	961963	7396
	AG		08.28.96	6010	535-03	961965	7396
	NA		08.28.96	6010	535-03	961965	7396
	DIG,AQ.HCL		08.28.96	3005		961965	7620
	DIG,AQ,GFA		08.28.96	3020		961963	7620
	BNA.8270.PNA		09.10.96	8270	537-14	96190	7616
	GAS.TPH.BTEX		08.26.96	8015M	536-23	965111	6843
9608546*5	ANIONS,CL		08.25.96	300.0	533-23	960825	8488
	ANIONS,NO3		08.25.96	300.0	533-23	960825	8488
	ANIONS,SO4		08.25.96	300.0	533-23	960825	8488
	ALK		08.27.96	310.1	533-29	9656	8804
	AS,GFA		08.28.96	7060	534-07	961963	7396
	BA		08.28.96	6010	535-03	961965	7396
	CD		08.28.96	6010	535-03	961965	7396
	CA		08.29.96	6010	535-02	961965	7396

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

AMPLES... SAMPLE DESCRIPTION.. DETERM..... DATE..... METHOD..... EQUIP. BATCH.. ID.NO
 ANALYZED

	CR	08.28.96	6010	535-03	961965	7396
	PB,GFA	08.29.96	7421	534-07	961963	7396
	MG	08.28.96	6010	535-03	961965	7396
	HG	08.30.96	7470	534-06	961974	8488
	K	08.28.96	6010	535-03	961965	7396
	SE,GFA	08.28.96	7740	534-07	961963	7396
	AG	08.28.96	6010	535-03	961965	7396
	NA	08.29.96	6010	535-02	961965	7396
	DIG,AQ.HCL	08.28.96	3005		961965	7620
	DIG,AQ,GFA	08.28.96	3020		961963	7620
	BNA.8270.PNA	09.05.96	8270	537-11	96190	6750
9608546*6 MW-6	GAS.TPH.BTEX	08.26.96	8015M	536-23	965111	6843
	ANIONS,CL	08.25.96	300.0	533-23	960825	8488
	ANIONS,NO3	08.25.96	300.0	533-23	960825	8488
	ANIONS,S04	08.25.96	300.0	533-23	960825	8488
	ALK	08.27.96	310.1	533-29	9656	8804
	AS,GFA	08.28.96	7060	534-07	961963	7396
	BA	08.28.96	6010	535-03	961965	7396
	CD	08.28.96	6010	535-03	961965	7396
	CA	08.29.96	6010	535-02	961965	7396
	CR	08.28.96	6010	535-03	961965	7396
	PB,GFA	08.29.96	7421	534-07	961963	7396
	MG	08.28.96	6010	535-03	961965	7396
	HG	08.30.96	7470	534-06	961974	8488
	K	08.28.96	6010	535-03	961965	7396
	SE,GFA	08.28.96	7740	534-07	961963	7396
	AG	08.28.96	6010	535-03	961965	7396
	NA	08.29.96	6010	535-02	961965	7396
	DIG,AQ.HCL	08.28.96	3005		961965	7620
	DIG,AQ,GFA	08.28.96	3020		961963	7620
	BNA.8270.PNA	09.10.96	8270	537-14	96190	7616
9608546*7 MW-7	GAS.TPH.BTEX	08.26.96	8015M	536-23	965111	6843
	ANIONS,CL	08.25.96	300.0	533-23	960825	8488
	ANIONS,NO3	08.25.96	300.0	533-23	960825	8488
	ANIONS,S04	08.25.96	300.0	533-23	960825	8488
	ALK	08.27.96	310.1	533-29	9656	8804
	AS,GFA	08.28.96	7060	534-07	961963	7396
	BA	08.28.96	6010	535-03	961965	7396
	CD	08.28.96	6010	535-03	961965	7396
	CA	08.29.96	6010	535-02	961965	7396
	CR	08.28.96	6010	535-03	961965	7396
	PB,GFA	08.29.96	7421	534-07	961963	7396
	MG	08.28.96	6010	535-03	961965	7396
	HG	08.30.96	7470	534-06	961974	8488

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

AMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE.....	METHOD.....	EQUIP.	BATCH..	ID.NO
			ANALYZED				
		K	08.28.96	6010	535-03	961965	7396
		SE,GFA	08.28.96	7740	534-07	961963	7396
		AG	08.28.96	6010	535-03	961965	7396
		NA	08.29.96	6010	535-02	961965	7396
		DIG,AQ.HCL	08.28.96	3005		961965	7620
		DIG,AQ,GFA	08.28.96	3020		961963	7620
		BNA.8270.PNA	09.05.96	8270	537-11	96190	6750
608546*8	MW-8	GAS.TPH.BTEX	08.26.96	8015M	536-23	965111	6843
		ANIONS,CL	08.25.96	300.0	533-23	960825	8488
		ANIONS,NO3	08.25.96	300.0	533-23	960825	8488
		ANIONS,S04	08.25.96	300.0	533-23	960825	8488
		ALK	08.27.96	310.1	533-29	9656	8804
		AS,GFA	08.28.96	7060	534-07	961963	7396
		BA	08.28.96	6010	535-03	961965	7396
		CD	08.28.96	6010	535-03	961965	7396
		CA	08.29.96	6010	535-02	961965	7396
		CR	08.28.96	6010	535-03	961965	7396
		PB,GFA	08.29.96	7421	534-07	961963	7396
		MG	08.28.96	6010	535-03	961965	7396
		HG	08.30.96	7470	534-06	961974	8488
		K	08.28.96	6010	535-03	961965	7396
		SE,GFA	08.28.96	7740	534-07	961963	7396
		AG	08.28.96	6010	535-03	961965	7396
		NA	08.29.96	6010	535-02	961965	7396
		DIG,AQ.HCL	08.28.96	3005		961965	7620
		DIG,AQ,GFA	08.28.96	3020		961963	7620
		BNA.8270.PNA	09.05.96	8270	537-11	96190	6750
608546*9	MW-9	GAS.TPH.BTEX	08.26.96	8015M	536-23	965111	6843
		ANIONS,CL	08.25.96	300.0	533-23	960825	8488
		ANIONS,NO3	08.25.96	300.0	533-23	960825	8488
		ANIONS,S04	08.25.96	300.0	533-23	960825	8488
		ALK	08.27.96	310.1	533-29	9656	8804
		AS,GFA	08.28.96	7060	534-07	961963	7396
		BA	08.28.96	6010	535-03	961965	7396
		CD	08.28.96	6010	535-03	961965	7396
		CA	08.29.96	6010	535-02	961965	7396
		CR	08.28.96	6010	535-03	961965	7396
		PB,GFA	08.29.96	7421	534-07	961963	7396
		MG	08.28.96	6010	535-03	961965	7396
		HG	08.30.96	7470	534-06	961974	8488
		K	08.28.96	6010	535-03	961965	7396
		SE,GFA	08.28.96	7740	534-07	961963	7396
		AG	08.28.96	6010	535-03	961965	7396
		NA	08.29.96	6010	535-02	961965	7396

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

SAMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE.....	METHOD.....	EQUIP.	BATCH..	ID.NO
			ANALYZED				
	DIG,AQ.HCL		08.28.96	3005		961965	7620
	DIG,AQ,GFA		08.28.96	3020		961963	7620
	BNA.8270.PNA		09.05.96	8270	537-11	96190	6750
508546*10 MW-10	GAS.TPH.BTEX		08.26.96	8015M	536-23	965111	6843
	ANIONS,CL		08.25.96	300.0	533-23	960825	8488
	ANIONS,NO3		08.25.96	300.0	533-23	960825	8488
	ANIONS,SO4		08.25.96	300.0	533-23	960825	8488
	ALK		08.27.96	310.1	533-29	9656	8804
	AS,GFA		08.28.96	7060	534-07	961963	7396
	BA		08.28.96	6010	535-03	961965	7396
	CD		08.28.96	6010	535-03	961965	7396
	CA		08.29.96	6010	535-02	961965	7396
	CR		08.28.96	6010	535-03	961965	7396
	PB,GFA		08.29.96	7421	534-07	961963	7396
	MG		08.28.96	6010	535-03	961965	7396
	HG		08.30.96	7470	534-06	961974	8488
	K		08.28.96	6010	535-03	961965	7396
	SE,GFA		08.28.96	7740	534-07	961963	7396
	AG		08.28.96	6010	535-03	961965	7396
	NA		08.29.96	6010	535-02	961965	7396
	DIG,AQ.HCL		08.28.96	3005		961965	7620
	DIG,AQ,GFA		08.28.96	3020		961963	7620
	BNA.8270.PNA		09.05.96	8270	537-11	96190	6750
508546*11 MW-11	GAS.TPH.BTEX		08.26.96	8015M	536-23	965111	6843
	ANIONS,CL		08.25.96	300.0	533-23	960825	8488
	ANIONS,NO3		08.25.96	300.0	533-23	960825	8488
	ANIONS,SO4		08.25.96	300.0	533-23	960825	8488
	ALK		08.27.96	310.1	533-29	9656	8804
	AS,GFA		08.28.96	7060	534-07	961963	7396
	BA		08.28.96	6010	535-03	961965	7396
	CD		08.28.96	6010	535-03	961965	7396
	CA		08.29.96	6010	535-02	961965	7396
	CR		08.28.96	6010	535-03	961965	7396
	PB,GFA		08.29.96	7421	534-07	961963	7396
	MG		08.28.96	6010	535-03	961965	7396
	HG		08.30.96	7470	534-06	961974	8488
	K		08.28.96	6010	535-03	961965	7396
	SE,GFA		08.28.96	7740	534-07	961963	7396
	AG		08.28.96	6010	535-03	961965	7396
	NA		08.29.96	6010	535-02	961965	7396
	DIG,AQ.HCL		08.28.96	3005		961965	7620
	DIG,AQ,GFA		08.28.96	3020		961963	7620
	BNA.8270.PNA		09.10.96	8270	537-14	96192	7616
	GAS.TPH.BTEX		08.26.96	8015M	536-23	965111	6843

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

ORDER PLACED FOR CLIENT: Brown and Caldwell Consultants 9608546 :
BC ANALYTICAL : GLEN LAB : 14:40:34 12 SEP 1996 - P. 6 :
=====

SAMPLES... SAMPLE DESCRIPTION.. DETERM..... DATE..... METHOD..... EQUIP. BATCH.. ID.NO
ANALYZED

9608546*12	EB-1	GAS.TPH.BTEX	08.26.96	8015M	536-23	965111	6843
9608546*13	Trip Blank	GAS.TPH.BTEX	08.27.96	8015M	536-23	965112	8171

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

MATRIX QC

Batch: ALK*9656 Method: 310.1 - Alkalinity, Titrimetric										
Carbonate Alk (as CaCO3)	10	-	-	-	-	-	-	-	-	-
Bicarbonate Alk (as CaCO3)	10	-	98	-	97	-	92	108	1	-
Hydroxide Alk (as CaCO3)	10	-	-	-	-	-	-	-	-	-
Total Alkalinity (as CaCO3)	10	-	98	-	97	-	92	108	1	-

Batch: 960825 Method: 300.0 - Inorganic anions in water, Ion chromatograph																
Chloride	mg/L	0	0.5	-	97	-	-	90	110	-	94	-	72	117	0	15
Nitrate	mg/L	0	0.5	-	96	-	-	90	110	-	102	-	74	115	2	15
Sulfate	mg/L	0	1	-	97	-	-	90	110	-	88	-	69	116	0	15

Batch: AS, GFA*961963 Method: 7060 - Arsenic, AA, Furnace									
Arsenic		mg/L		0.002		97		96	
124	74	124	74	1	1	-	-	-	-
113	-	113	-	111	-	48	140	2	20

Batch: PB,GFA*961963 Method: 7421 - Lead, AA, Furnace									
Lead	mg/L	0.0019	0.002	-	95	-	95	-	77
					124	0	-	-	102
					101	-	40	156	1
					20	-			

[illegible]

Batch: 961965 Method: 6010 - ICAP Metals																				
Silver	0	0.01	-	95	-	96	-	80	117	1	-	123	-	114	-	64	124	8	20	-
Barium	0.0010	0.005	-	97	-	94	-	80	116	3	-	95	-	93	-	73	116	2	20	-
Calcium	0.29	0.5	-	97	-	96	-	81	115	1	-	-	-	NC	-	73	118	-	20	NC
Cadmium	0	0.01	-	99	-	98	-	84	117	2	-	97	-	95	-	71	122	2	20	-
Chromium	0.002	0.01	-	100	-	97	-	81	118	2	-	98	-	94	-	42	153	4	20	-
Potassium	0.12	0.5	-	95	-	92	-	80	111	3	-	96	-	94	-	47	156	2	20	-
Magnesium	0.03	0.1	-	97	-	95	-	82	113	2	-	95	-	93	-	74	119	2	20	-
Sodium	0.21	0.5	-	95	-	93	-	87	112	3	-	99	-	97	-	74	120	1	20	-

Batch:	HG-961974	Method:	7470 - Mercury (Liquid), Cold Vapor AA, Manual
Mercury		mg/L	0 0.0002 - 98 - 105 - 71 123 7 - - 105 - 28 164 5 20

Batch: GAS*965111 Method: 8015M - Modified 8015																
Benzene	0	0.3	-	86	-	-	-	-	78	-	86	-	70	153	7	25
Toluene	0	0.3	-	91	-	-	-	-	89	-	93	-	69	119	4	25
Ethylbenzene	0	0.3	-	89	-	-	-	-	88	-	89	-	68	116	1	25
Total Xylene Isomers	0	0.6	-	92	-	-	-	-	93	-	95	-	61	118	2	25

AQUEOUS SAMPLES

METHOD BLANK				LAB CONTROL				MATRIX QC			
UNITS	RESULT	ROL	FLG	LCS	%REC	FLG	LCS	MSD	%REC	FLG	LCS
Batch: GAS*965111 Method: 8015M - Modified 8015, con't											
TPH (Gasoline Range)	ug/L	0	100	-	98	-	-	85	120	-	-
[a,a,a-Trifluorotoluene]	Percent	94	-	-	101	-	-	85	118	-	-
Batch: GAS*965112 Method: 8015M - Modified 8015											
Benzene	ug/L	0	0.3	-	89	-	-	76	155	-	-
Toluene	ug/L	0	0.3	-	91	-	-	72	121	-	-
Ethylbenzene	ug/L	0	0.3	-	90	-	-	72	115	-	-
Total Xylene Isomers	ug/L	0	0.6	-	95	-	-	68	115	-	-
TPH (Gasoline Range)	ug/L	0	100	-	98	-	-	85	120	-	-
[a,a,a-Trifluorotoluene]	Percent	93	-	-	97	-	-	85	118	-	-

Batch: BMA*96190 Method: 8270 - GC/MS for Semivolatile Organics, Capillary column

Acenaphthene	ug/L	0	5	-	89	-	87	-	51	126	3	-	-	-	78	-	92	-	52	131	16	26	-
Acenaphthylene	ug/L	0	5	-	99	-	95	-	56	131	4	-	-	-	85	-	100	-	33	138	16	50	-
Anthracene	ug/L	0	5	-	87	-	86	-	54	117	2	-	-	-	81	-	94	-	47	133	15	25	-
Benzo(a)anthracene	ug/L	0	5	-	97	-	94	-	55	132	4	-	-	-	88	-	102	-	54	142	15	26	-
Benzo(a)pyrene	ug/L	0	5	-	97	-	93	-	51	141	4	-	-	-	90	-	103	-	35	145	13	40	-
Benzo(b)fluoranthene	ug/L	0	5	-	89	-	81	-	43	135	9	-	-	-	83	-	99	-	33	133	17	29	-
Benzo(g,h,i)perylene	ug/L	0	5	-	101	-	98	-	36	157	3	-	-	-	80	-	93	-	25	163	15	39	-
Benzo(k)fluoranthene	ug/L	0	5	-	89	-	90	-	57	137	1	-	-	-	95	-	103	-	36	162	9	36	-
Chrysene	ug/L	0	5	-	96	-	92	-	55	134	4	-	-	-	90	-	102	-	53	154	12	25	-
Dibenzo(a,h)anthracene	ug/L	0	5	-	99	-	97	-	41	144	2	-	-	-	76	-	91	-	23	169	18	41	-
Fluoranthene	ug/L	0	5	-	89	-	88	-	52	128	2	-	-	-	79	-	91	-	46	150	15	27	-
Fluorene	ug/L	0	5	-	97	-	93	-	55	126	4	-	-	-	87	-	101	-	59	121	15	20	-
Indeno(1,2,3-c,d)pyrene	ug/L	0	5	-	104	-	100	-	30	172	4	-	-	-	79	-	91	-	21	167	14	49	-
Naphthalene	ug/L	0	5	-	80	-	80	-	40	110	0	-	-	-	69	-	83	-	40	120	18	25	-
Phenanthrene	ug/L	0	5	-	96	-	93	-	54	128	3	-	-	-	90	-	103	-	54	120	14	29	-
Pyrene	ug/L	0	5	-	91	-	87	-	53	128	4	-	-	-	90	-	103	-	45	162	13	34	-
[2-Fluorobiphenyl]	Percent	68	-	-	87	-	81	-	43	116	-	-	-	-	78	-	89	-	43	116	-	-	-
[M]trobenezene-d5]	Percent	76	-	-	87	-	85	-	37	114	-	-	-	-	81	-	92	-	35	114	-	-	-
[Terphenyl-d14]	Percent	76	-	-	100	-	93	-	33	141	-	-	-	-	97	-	107	-	33	141	-	-	-

AQUEOUS SAMPLES

AQUEOUS SAMPLES	METHOD BLANK				LAB CONTROL				MATRIX QC															
UNITS	RESULT	RDL	FLG	LCS	%REC	FLG	LCL	UCL	RPD	UCL	RPD	FLG	MS	%REC	FLG	MSD	%REC	FLG	LCL	UCL	RPD	UCL	RPD	FLG
Batch: BNA*96192 Method: 8270 - GC/MS for Semivolatile Organics, Capillary column																								
Acenaphthene	ug/L	0	5	-	103	-	-	51	126	-	-	-	194	Q	185	Q	52	131	5	26	-	-	-	-
Acenaphthylene	ug/L	0	5	-	114	-	-	56	131	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	ug/L	0	5	-	99	-	-	54	117	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	ug/L	0	5	-	110	-	-	55	132	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	ug/L	0	5	-	110	-	-	51	141	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	ug/L	0	5	-	101	-	-	43	135	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	ug/L	0	5	-	111	-	-	36	157	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	ug/L	0	5	-	115	-	-	57	137	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	ug/L	0	5	-	108	-	-	55	134	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)anthracene	ug/L	0	5	-	104	-	-	41	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	ug/L	0	5	-	97	-	-	52	128	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	ug/L	0	5	-	112	-	-	55	126	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-c,d)pyrene	ug/L	0	5	-	107	-	-	30	172	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	ug/L	0	5	-	93	-	-	40	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0	5	-	108	-	-	54	128	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0	5	-	116	-	-	53	128	-	-	-	204	Q	200	Q	45	162	2	34	-	-	-	-
[2-Fluorobiphenyl]	Percent	79	-	-	97	-	-	43	116	-	-	-	86	-	79	-	43	116	-	-	-	-	-	-
[Nitrobenzene-d5]	Percent	87	-	-	101	-	-	37	114	-	-	-	100	-	98	-	35	114	-	-	-	-	-	-
[Terphenyl-d14]	Percent	96	-	-	121	-	-	33	141	-	-	-	101	-	103	-	33	141	-	-	-	-	-	-

SURROGATE RECOVERIES :

BC ANALYTICAL : GLEN LAB : 14:41:12 12 SEP 1996 - P. 1 :

METHOD	ANALYTE	BATCH	ANALYZED	REPORTED	TRUE	%REC	FLAG	LCL	UCL
9608546*1									
8270	Nitrobenzene-d5	96190	09/10/96	47.9	50.0	96		35	114
	2-Fluorobiphenyl	96190	09/10/96	39.7	50.0	79		43	116
	Terphenyl-d14	96190	09/10/96	55.2	50.0	110		33	141
8015M	a,a,a-Trifluorotoluene	Re965111	08/26/96	461	500	92		85	118
9608546*2									
8270	Nitrobenzene-d5	96190	09/05/96	38.4	50.0	77		35	114
	2-Fluorobiphenyl	96190	09/05/96	30.9	50.0	62		43	116
	Terphenyl-d14	96190	09/05/96	49.3	50.0	99		33	141
8015M	a,a,a-Trifluorotoluene	Re965111	08/26/96	52.0	50.0	104		85	118
9608546*3									
8270	Nitrobenzene-d5	96190	09/10/96	38.6	50.0	77		35	114
	2-Fluorobiphenyl	96190	09/10/96	32.0	50.0	64		43	116
	Terphenyl-d14	96190	09/10/96	47.1	50.0	94		33	141
8015M	a,a,a-Trifluorotoluene	Re965112	08/27/96	448	500	90		85	118
9608546*4									
8270	Nitrobenzene-d5	96190	09/10/96	1.15	50.0	2 Q		35	114
	2-Fluorobiphenyl	96190	09/10/96	33.4	50.0	67		43	116
	Terphenyl-d14	96190	09/10/96	37.8	50.0	76		33	141
8015M	a,a,a-Trifluorotoluene	Re965111	08/26/96	225	250	90		85	118
9608546*5									
8270	Nitrobenzene-d5	96190	09/05/96	31.1	50.0	62		35	114
	2-Fluorobiphenyl	96190	09/05/96	31.3	50.0	63		43	116
	Terphenyl-d14	96190	09/05/96	48.2	50.0	96		33	141
8015M	a,a,a-Trifluorotoluene	Re965111	08/26/96	44.7	50.0	89		85	118
9608546*6									
8270	Nitrobenzene-d5	96190	09/10/96	2.30	50.0	5 Q		35	114
	2-Fluorobiphenyl	96190	09/10/96	23.6	50.0	47		43	116
	Terphenyl-d14	96190	09/10/96	35.7	50.0	71		33	141
8015M	a,a,a-Trifluorotoluene	Re965111	08/26/96	59.1	50.0	118		85	118
9608546*7									
8270	Nitrobenzene-d5	96190	09/05/96	32.4	50.0	65		35	114
	2-Fluorobiphenyl	96190	09/05/96	29.4	50.0	59		43	116
	Terphenyl-d14	96190	09/05/96	52.3	50.0	105		33	141
8015M	a,a,a-Trifluorotoluene	Re965111	08/26/96	45.1	50.0	90		85	118
9608546*8									
8270	Nitrobenzene-d5	96190	09/05/96	32.4	50.0	65		35	114
	2-Fluorobiphenyl	96190	09/05/96	29.5	50.0	59		43	116
	Terphenyl-d14	96190	09/05/96	54.6	50.0	109		33	141
8015M	a,a,a-Trifluorotoluene	Re965111	08/26/96	45.5	50.0	91		85	118

SURROGATE RECOVERIES :

: BC ANALYTICAL : GLEN LAB : 14:41:26 12 SEP 1996 - P. 2 :

METHOD	ANALYTE	BATCH	ANALYZED	REPORTED	TRUE	%REC	FLAG	LCL	UCL
608546*9									
8270	Nitrobenzene-d5	96190	09/05/96	40.0	50.0	80		35	114
	2-Fluorobiphenyl	96190	09/05/96	33.9	50.0	68		43	116
	Terphenyl-d14	96190	09/05/96	62.2	50.0	124		33	141
8015M	a,a,a-Trifluorotoluene	Re965111	08/26/96	52.0	50.0	104		85	118
608546*10									
8270	Nitrobenzene-d5	96190	09/05/96	36.3	50.0	73		35	114
	2-Fluorobiphenyl	96190	09/05/96	27.9	50.0	56		43	116
	Terphenyl-d14	96190	09/05/96	51.0	50.0	102		33	141
8015M	a,a,a-Trifluorotoluene	Re965111	08/26/96	45.2	50.0	90		85	118
608546*11									
8270	Nitrobenzene-d5	96192	09/10/96	47.0	50.0	94		35	114
	2-Fluorobiphenyl	96192	09/10/96	44.9	50.0	90		43	116
	Terphenyl-d14	96192	09/10/96	51.8	50.0	104		33	141
8015M	a,a,a-Trifluorotoluene	Re965111	08/26/96	44.9	50.0	90		85	118
608546*12									
8015M	a,a,a-Trifluorotoluene	Re965111	08/26/96	44.5	50.0	89		85	118
608546*13									
8015M	a,a,a-Trifluorotoluene	Re965112	08/27/96	45.5	50.0	91		85	118

CHAIN OF CUSTODY RECORD

BCA Log Number

Client name Brown and Caldwell		Project or PO# 2832.11	
Address 1415 LOUISIANA SUITE 2500		Phone # 713.754.0999	
City, State, Zip HOUSTON TX 77002		Report attention Myra Denhart	

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sample description		Number of containers	Analyses required					Remarks
				Sampled by			BTEX (Gallo)	PAHs (B-70)	Chlorides (Ca, Hg, Pb)	Heavy Metals (Lead, Cad)	Hazardous sample special handling required	
	8/23/96	1430	8W		MW-8	6		X	X	X		
		1440			MW-7	6		X	X	X		
		1450			MW-5	6		X	X	X		
		1505			MW-6	6		X	X	X		
		1520			MW-9	6		X	X	X		
		1526			MW-101	6		X	X	X		
		1555			MW-11	6		X	X	X		
		1610			MW-10	6		X	X	X		
		1625			MW-3	6		X	X	X		
		1645			MW-1	6		X	X	X		
		1700			MW-4	6		X	X	X		
		1710			FB-1	2		X	X	X		Trip Blank included

Relinquished by T. Parker	Signature T. Parker	Print Name T. Parker	Company Brown and Caldwell	Date 8/23/96	Time 1730
Received by Kevin Phan	Signature Kevin Phan	Print Name Kevin Phan	Company BCA	Date 8/24/96	Time 1235
Relinquished by					
Received by					
Relinquished by					
Received by Laboratory					

BC ANALYTICAL

- ☐ 1085 Shary Circle, Concord, CA 94518 (510) 825-3894
- ☐ 801 Western Avenue, Glendale, CA 91201 (818) 247-5737
- ☐ 1200 Gene Autry Way, Anaheim, CA 92805 (714) 978-0113

Note: Samples are discarded 30 days after results are reported unless other arrangements are made.
Hazardous samples will be returned to client or disposed of at client's expense.

Disposal arrangements: _____

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge
GW—Groundwater SO—Soil PE—Petroleum
WW—Wastewater

C



APPENDIX C

LABORATORY ANALYTICAL REPORTS

AIR SAMPLES

W:\BJSERV\2832\008R.DOC

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



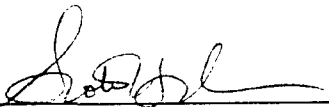
HOUSTON LABORATORY

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

Southern Petroleum Laboratories, Inc.

Certificate of Analysis Number: 96-08-C25

Approved for Release by:



Siok Hong Chen, Project Manager

9/7/96
Date:

Greg Grandits
Laboratory Director

Idelis Williams
Quality Assurance Officer



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

CASE NARRATIVE

WORK ORDER NO.:9608C25

Southern Petroleum Laboratories (SPL) is pleased to present the results of laboratory analyses to Brown & Caldwell. An air sample was received at our laboratory on August 26, 1996. The following is a brief narrative of the Laboratory analyses.

The sample was analyzed for BTEX & TPH. There were no deviations from the methods.

The relative percent difference between the blank matrix spike and matrix spike duplicate was outside the control limits. The results were reported since Laboratory Control Sample exhibit excellent spike recovery. All of the other quality control data was within limits.

Please refer to this project by SPL 9608C25 to expedite any further discussions. I will be happy to address any questions or concern you may have.

A handwritten signature in cursive script, appearing to read "Siok Hong Chen", is written over a horizontal line.

Siok Hong Chen
Project Manager



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

Certificate of Analysis No. H9-9608C25-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Myna Dehnert

DATE: 09/06/96

PROJECT: BJ Hobbs
SITE: New Mexico
SAMPLED BY: Brown & Caldwell
SAMPLE ID: Effluent-8/23/96-1

PROJECT NO: 2832.11
MATRIX: AIR
DATE SAMPLED: 08/23/96 08:00:00
DATE RECEIVED: 08/26/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	5.0 P	ppm
TOLUENE	12	5.0 P	ppm
ETHYLBENZENE	ND	5.0 P	ppm
TOTAL XYLENE	ND	5.0 P	ppm
TOTAL VOLATILE AROMATIC HYDROCARBONS	12		ppm
METHOD 5030/8020 (Modified)***			
Analyzed by: DAO			
Date: 08/30/96			
Total Petroleum Hydrocarbons	200	25	ppm
Method Modified 8015A Air***			
Analyzed by: DAO			
Date: 08/30/96 09:32:00			

ND - Not detected.

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance
with EPA guidelines for quality assurance.

QUALITY CONTROL
DOCUMENTATION



** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8015 (Modified)

PAGE

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

Matrix: Air
Units: ppm

Batch Id: HP_P960829020000

B L A N K S P I K E S

S P I K E C O M P O U N D S	Sample Results <2>	Spike Added <3>	Matrix Spike		Matrix Spike		MS/MSD Relative % Difference	QC Limits(**) (Advisory)	
			Duplicate		Duplicate			RPD Max.	Recovery Range
			Result <1>	Recovery <4>	Result <1>	Recovery <5>			
TPHAIR	ND	200	83	41.5	88	44.0	5.85	30	20 - 150

Analyst: DAO

Sequence Date: 08/30/96

Method Blank File ID:

Sample File ID:

Blank Spike File ID: PPH6523.TX0

Matrix Spike File ID:

Matrix Spike Duplicate File ID:

* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = $\left(\frac{<1> - <2>}{<3>} \right) \times 100$

Relative Percent Difference = $\frac{|<4> - <5>|}{[(<4> + <5>) \times 0.5]} \times 100$

(**) = Source: Temporary limits

SAMPLES IN BATCH(SPL ID):

9608B29-01A 9608B29-07A 9608B29-04A 9608C50-01A
9608E38-01A 9608E65-01A 9608F00-01A 9608D56-01A
9608D76-02A 9608C50-02A 9608D59-01A 9608C25-01A
9608B29-06A 9608D57-01A



** SPL BATCH QUALITY CONTROL REPORT **
METHOD 5030/8020 (Modified)

PAGE

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

Matrix: Air
Units: ppm

Batch Id: HP_P960829070300

B L A N K S P I K E S

S P I K E C O M P O U N D S	Sample Results <2>	Spike Added <3>	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative % Difference	QC Limits(**) (Advisory)	
			Result	Recovery	Result	Recovery		RPD	Recovery Range
			<1>	<4>	<1>	<5>		Max.	
BENZENE	ND	20	11	55.0	13	65.0	16.7	30	20 - 150
TOLUENE	ND	20	12	60.0	14	70.0	15.4	30	20 - 150
ETHYLBENZENE	ND	20	12	60.0	15	75.0	22.2	30	20 - 150
O XYLENE	ND	20	11	55.0	15	75.0	30.8 *	30	20 - 150
M & P XYLENE	ND	40	10	25.0	13	32.5	26.1	30	20 - 150

Analyst: DAO

Sequence Date: 08/30/96

Method Blank File ID:

Sample File ID:

Blank Spike File ID: P_H6523.TX0

Matrix Spike File ID:

Matrix Spike Duplicate File ID:

* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = $[(<1> - <2>) / <3>] \times 100$

Relative Percent Difference = $| (<4> - <5>) | / [(<4> + <5>) \times 0.5] \times 100$

(**) = Source: Temporary Limits

SAMPLES IN BATCH(SPL ID):

9608E38-01A 9608E65-01A 9608F00-01A 9608D57-01A
9608D56-01A 9608D76-02A 9608C50-02A 9608D59-01A
9608C25-01A 9608E15-03A

CHAIN OF CUSTODY
AND
SAMPLE RECEIPT CHECKLIST

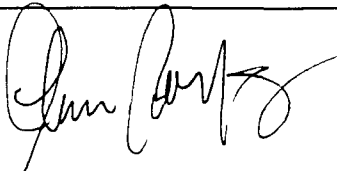
SPL Houston Environmental Laboratory

Sample Login Checklist

Date: 8-24-96	Time: 0930
---------------	------------

SPL Sample ID: 96-08-C25

		Yes	No
1	Chain-of-Custody (COC) form is present.	✓	
2	COC is properly completed.	✓	
3	If no, Non-Conformance Worksheet has been completed.		
4	Custody seals are present on the shipping container.	✓	
5	If yes, custody seals are intact.	✓	
6	All samples are tagged or labeled.	✓	
7	If no, Non-Conformance Worksheet has been completed.		
8	Sample containers arrived intact	✓	
9	Temperature of samples upon arrival:	C	
10	Method of sample delivery to SPL:	SPL Delivery	
		Client Delivery	
		FedEx Delivery (airbill #)	8286673102
		Other:	
11	Method of sample disposal:	SPL Disposal	✓
		HOLD	
		Return to Client	

Name: 	Date: 8-24-96
---	---------------

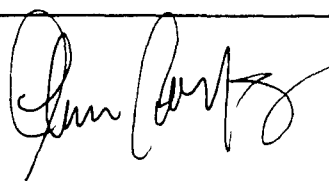
SPL Houston Environmental Laboratory

Sample Login Checklist

Date: 8-26-94	Time: 0930
---------------	------------

SPL Sample ID: 94-08-C25

		Yes	No
1	Chain-of-Custody (COC) form is present.	✓	
2	COC is properly completed.	✓	
3	If no, Non-Conformance Worksheet has been completed.		
4	Custody seals are present on the shipping container.	✓	
5	If yes, custody seals are intact.	✓	
6	All samples are tagged or labeled.	✓	
7	If no, Non-Conformance Worksheet has been completed.		
8	Sample containers arrived intact	✓	
9	Temperature of samples upon arrival:		C
10	Method of sample delivery to SPL:	SPL Delivery	
		Client Delivery	
		FedEx Delivery (airbill #)	8286673102
		Other:	
11	Method of sample disposal:	SPL Disposal	✓
		HOLD	
		Return to Client	

Name: 	Date: 8-26-94
---	---------------



Analysis Request & Chain of Custody Record

SPL Workorder No:

H-10298

page of

Client Name:	Brown and Caldwell
Address/Phone:	1415 Louisiana 713 759-0999
Client Contact:	Myna Denhart
Project Name:	BS Hobbs
Project Number:	2832.11
Project Location:	New Mexico

[illegible]

EFFLUENT-8/23/96-1	8/23/96	0800	X AIR P	-	-	1	X	X

Client/Consultant Remarks:

Laboratory remarks:

Intact?	☒ Y	☐ N
Temp:		

Requested TAT		Special Reporting Requirements				Fax Results		Raw Data		Special Detection Limits (specify):		PM review (initial):	
24hr	72hr	Standard QC	Level 3 QC	Level 4 QC	date	time	Received by:	Received by:	Received by:	Received by:	Received by:	Received by:	
☐	☐	Standard QC ☐				Level 3 QC ☐		Level 4 QC ☐		Special Detection Limits (specify):		PM review (initial):	
☐	☒	Relinquished by Samples				date		time		Received by:		Received by:	
☐	☐	Relinquished by:				date		time		Received by:		Received by:	
☐	☐	Relinquished by:				date		time		Received by:		Received by:	

☒	8880 Interchange Drive, Houston, TX 77054 (713) 660-0901	☐	500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775
☐	459 Hughes Drive, Traverse City, MI 49684 (616) 947-5777	☐	1511 E. Orangethorpe Avenue, Fullerton, CA 92631 (714) 447-6868

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

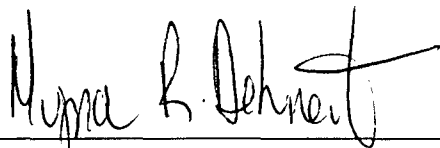
FINAL
MAY 1996 GROUNDWATER SAMPLING
REPORT
HOBBS, NEW MEXICO FACILITY
BJ SERVICES COMPANY, U.S.A.
OCTOBER 25, 1996

**FINAL
MAY 1996 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: 2832.11



Myna R. Dehnert
Associate Geologist
Certified Scientist #057

October 25, 1996

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

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

Contents



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1.0	INTRODUCTION	1
2.0	GROUNDWATER SAMPLING AND ANALYSES.....	2
2.1	GROUNDWATER MEASUREMENTS AND SAMPLING	2
2.2	RESULTS OF GROUNDWATER ANALYSES	3
3.0	REMEDIATION SYSTEM.....	5
4.0	CONCLUSIONS AND RECOMMENDATIONS	7
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4.2	RECOMMENDATIONS	7

DISTRIBUTION AND QA/QC REVIEWER'S SIGNATURE

FIGURES

- 1 Site Map
- 2 Potentiometric Surface Map
- 3 Benzene Concentration Map
- 4 Hydrocarbon Distribution Map
- 5 Schematic Of Biosparging System

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- 1 Site Chronology
- 2 Cumulative Groundwater Elevation Data
- 3 Field Screening Results for Groundwater Samples
- 4 Cumulative Results Of Analysis For Groundwater Samples
- 5 Summary Of Analytical Results For Air Emissions

APPENDICES

- A Groundwater Sampling Forms
- B Laboratory Analytical Reports Groundwater Samples
- C Remediation System Operation Data Sheets
- D Laboratory Analytical Reports Air Samples

1.0 INTRODUCTION

Brown and Caldwell conducted the field activities associated with the May 1996 quarterly groundwater sampling event at BJ Services Company, U.S.A. (BJ Services) facility located at 2708 West County Road, in Hobbs, New Mexico. The facility layout is shown on Figure 1.

The facility formerly operated an above-grade on-site fueling system. Subsurface contamination near the fueling system was first detected by the New Mexico Oil Conservation Division (OCD) during an on-site inspection on February 7, 1991. The fueling system was taken out of operation in July 1995. The fueling system comprised one, 22,500 gallon diesel aboveground storage tank (AST) and one, 5,500 gallon AST. The New Mexico Oil Conservation Division (OCD) requires quarterly groundwater monitoring for hydrocarbon constituents, as the result of the diesel fuel release. A site chronology detailing the history of the fueling system, the groundwater recovery system, and previous sampling events is presented in Table 1.

During the May 1996 sampling event, groundwater samples were collected and analyzed for total benzene, ethylbenzene, toluene, and total xylene (BETX). This report presents the results of the groundwater sampling event conducted for BJ Services and includes a description of the field activities and a summary of the analytical results. Also included is a groundwater potentiometric surface map and hydrocarbon distribution map.

2.0 GROUNDWATER SAMPLING AND ANALYSES

On May 31, 1996 Brown and Caldwell purged and sampled the groundwater monitoring wells to determine concentrations of dissolved-phase hydrocarbons in the groundwater at the facility. The following sections describe the activities conducted during this sampling event.

2.1 Groundwater Measurements and Sampling

A total of 10 monitoring wells were sampled during the quarterly sampling event. A Site Map depicting the locations of the monitoring wells is presented as Figure 1. As noted in previous sampling reports, monitoring well MW-2 can not be located and is assumed to have been destroyed during facility activities such as grading.

Groundwater level measurements were obtained from all monitoring wells prior to purging and sampling the wells. The 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 on Table 2. The groundwater elevation data indicates that the general groundwater flow direction is towards the southeast with a hydraulic gradient of 0.005 ft/ft. A Potentiometric Surface Map is presented in Figure 2. Phase-separated hydrocarbons were detected in monitoring wells MW-1 and MW-4 with thickness ranging from a sheen to 0.01 feet during the previous quarterly monitoring event in March, 1996. Currently, no phase-separated hydrocarbons were detected. The absence of phase-separated hydrocarbons in monitoring wells MW-1 and MW-4 is attributed to the operation of the biosparging remediation system.

Groundwater samples were collected from all monitoring wells on May 31, 1996. The samples were collected after purging the wells with a submersible pump to remove at least three well volumes or until the well became dry. Field parameter measurements for pH, conductivity, and temperature were collected after each well volume was purged. Two consecutive readings within five percent were used to indicate that groundwater had stabilized. The parameters in each

monitoring well typically stabilized after two well volumes had been removed; however, at least three well volumes were removed from each well.

Following recovery, the groundwater samples were collected from each monitoring well using a new, 3-foot long, 1/2-inch I.D., disposable polyethylene bailer. Each sample was transferred to laboratory prepared, clean glass and/or plastic containers sealed with Teflon[®]-lined lids; labeled; and placed on ice in an insulated cooler for shipment via overnight courier to BC Analytical in Glendale, California. Each cooler was accompanied by completed chain-of-custody documentation.

Additional groundwater parameters were measured to assess the potential for natural attenuation purposes during the purging and sampling activities. These parameters were dissolved oxygen and dissolved ferrous iron. All 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 samples are presented on Table 3.

All field measurement equipment was decontaminated prior to and after each use. Decontamination procedures used consisted of washing with fresh water and a non-phosphate detergent and rinsing with deionized (DI) water. Purged water and excess water generated by equipment cleaning operations was placed into 55-gallon drums and transferred to the on-site drum staging area located in the northeast corner of the facility for classification and future disposal by BJ Services.

2.2 Results of Groundwater Analyses

Groundwater samples collected during this sampling event were analyzed for benzene, ethylbenzene, toluene, and total xylenes (BETX) by EPA Method 8020 and total petroleum hydrocarbons (TPH) by EPA Method 8015 Modified. Total concentrations of BETX constituents above the laboratory detection limit were reported in 9 of the 10 groundwater samples obtained during this sampling event. Total benzene concentrations ranged from below the method detection

limit of 0.3 micrograms per liter ($\mu\text{g/L}$) in MW-8 to 1,100 $\mu\text{g/L}$ in MW-1. Total BETX concentrations ranged from below the method detection limit of 0.6 $\mu\text{g/L}$ in MW-8 to 8,070 $\mu\text{g/L}$ in MW-3. TPH concentrations ranged from below the detection limit of 0.100 milligrams per liter (mg/L) to 15 mg/L in MW-6. A cumulative summary of analytical results for groundwater samples is included as Table 4. A benzene concentration map is included as Figure 3. Figure 4 illustrates the distribution of selected target analytes, which include benzene, total BETX, and TPH. The laboratory analytical reports and chain of custody record are included in Appendix B.

3.0 REMEDIATION SYSTEM

Brown and Caldwell submitted a Remedial Action Plan (RAP) to the New Mexico OCD in May 1994. Based on the results from 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 contaminants in the soil residual (adsorbed phase) and in the soil moisture (dissolved phase), and removes the volatile contaminants. 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 the groundwater and the soil moisture in the capillary fringe and vadose zone. The higher dissolved oxygen content facilitates indigenous microorganisms to accelerate biodegradation of the contaminants. The flushing of the air also strips the volatile and semivolatile contaminants.

The OCD approved the RAP on August 11, 1994. The installation of the biosparging system was conducted between August 2 through 24, 1995. A total of nineteen combined injection/extraction wells, 3 vacuum extraction wells, associated piping, and one extraction blower and one injection blower were installed. The biosparging system layout is presented in Figure 5. The vapors recovered during the extraction process are discharged to the atmosphere in accordance with the State of New Mexico Air Quality Regulations.

During system operations, blower operating parameters, such as flow rate, pressure, and vapor temperature are monitored and recorded on the System Operation Data Sheets included in Appendix C. An effluent air sample is collected on a monthly basis from the recovered vapors to monitor the bioremediation process and emission rate. A summary of the analytical results for the air emissions is included as Table 5. The laboratory analytical reports and chain-of-custody documentation are included in Appendix D.

Since the biosparging system has been in operation, the vapor extraction system has operated at an average flow of 125 cfm at 100°F. The air injection system has operated at an average flow of 28 cfm at 4.5 psig, 160°F. Monthly air samples have been collected and analyzed for total petroleum hydrocarbons (TPH) using EPA Method 8015 (modified) and total volatile aromatic hydrocarbons, benzene, ethylbenzene, toluene, and total xylene (BETX) using EPA Method 4030/8020 (modified). The total BETX emissions for the third quarter ranged from 0.17 lb/hour to 0.18 lb/hour and TPH emissions ranged from 1.20 lb/hour to 1.49 lb/hour.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the quarterly groundwater sampling event.

4.1 Conclusions

- Groundwater flow remains to the east with an average hydraulic gradient of 0.005 ft/ft.
- Free product thickness has continuously decreased in MW-1 and MW-4 since November 1995. Currently, there is no free product in MW-1 and MW-4.
- Total BETX concentrations have decreased in monitor wells MW-1, MW-4, MW-6, MW-9, and MW-10. However, total BTEX concentrations have increased in monitor wells MW-3, MW-5, MW-7 and MW-11. These short term variations in the BTEX concentrations are expected during the operation of the biosparging system. It is difficult to derive long term conclusions from such variations. Continued quarterly groundwater monitoring is recommended to understand the variations in BTEX concentrations.
- Benzene concentrations in monitor well MW-8 is below the New Mexico Water Quality Control Commission standard of 0.01 mg/L.

4.2 Recommendations

- Continue the quarterly groundwater sampling program and the operation and maintenance of the biosparging system.

DISTRIBUTION

Final
May 1996 Groundwater Sampling Report
Hobbs, New Mexico

October 25, 1996

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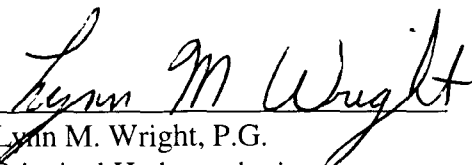
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May 1996 Groundwater Sampling Report
Hobbs, New Mexico

October 25, 1996

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QUALITY CONTROL REVIEWER



Lynn M. Wright, P.G.
Principal Hydrogeologist

MRD:elg

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Tables

TABLES

TABLE 1
SITE CHRONOLOGY
BJ SERVICES COMPANY, U.S.A.
HOBBS, NEW MEXICO

DATE	ACTIVITY
February 7, 1991	The State of New Mexico Oil Conservation Division (OCD) conducted an on-site inspection, including sampling of the on-site fresh water well.
August 6, 1991	OCD requests submittal of an investigation work plan.
September 5, 1991	Roberts/Schornick and Associates, Inc. (RSA) submits Technical Work Plan for soil and groundwater investigation to the OCD.
November 15, 1991	The OCD approves Technical Work Plan submitted by RSA.
December 16, 1991	RSA samples the fresh water well. Analytical results are submitted to the OCD.
February 21, 1992	Western samples the fresh water well. Analytical results are submitted to the OCD.
July 29 - August 10, 1992	Brown and Caldwell conducts a soil and groundwater investigation according to the approved Technical Work Plan. Investigation included drilling and sampling 9 soil borings, sampling 6 hand-augered soil borings, the installation and sampling of 5 monitoring wells, and the sampling of the fresh water well.
October 12, 1992	Brown and Caldwell submits Soil and Groundwater Investigation Report to the OCD.
December 2, 1992	The OCD requests the installation and sampling of 4 additional monitoring wells, including a monitoring well on an adjacent property.
April 13, 1993	Brown and Caldwell conducts a vapor extraction pilot test on existing groundwater monitoring wells.
April 15, 1993	Brown and Caldwell installs off-site monitoring well.
April 22, 1993	Brown and Caldwell samples off-site monitoring well.
May 27, 1993	Brown and Caldwell submits a letter report documenting the installation and sampling of the off-site monitoring well to the OCD.
June 2, 1993	Brown and Caldwell conducts a short-term aquifer test using the fresh water well at the facility.
June 8, 1993	USTank Management, Inc. Conducts a non-volumetric tank system tightness test on the diesel and unleaded gasoline aboveground storage tanks at the facility.
June 21, 1993	ENSR Consulting and Engineering (ENSR) requests to sample the off-site monitoring well. ENSR is the environmental consultant of the adjacent property owner on which the off-site well is located.
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. Submits 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 2 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; all 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 quarterly groundwater sampling event.

TABLE 1 (CONTINUED)
SITE CHRONOLOGY
BJ SERVICES COMPANY, U.S.A.
HOBBS, NEW MEXICO

DATE	ACTIVITY
July 31, 1995	Brown and Caldwell conducted quarterly groundwater sampling event.
August 2-9, 1995	Installation of biosparging system initiated. Nineteen combined injection/extraction wells and three vacuum extraction wells 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 quarterly groundwater sampling event.
February 23, 1996	Brown and Caldwell conducted quarterly groundwater sampling event.
May 31, 1996	Brown and Caldwell conducted quarterly groundwater sampling event.

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

Well ID	Date Measured	Top of Casing Elevation (ft) (relative)	Depth to Water from TOC (ft) ⁽¹⁾	Depth to Hydrocarbon from TOC (ft)	Hydrocarbon Thickness (ft)	Potentiometric Surface Elevation (ft)
MW-1	August 10, 1992	101.44	53.22	None	0.00	48.22
	February 9, 1993	101.44	53.03	None	0.00	48.41
	August 18, 1993	101.44	53.10	None	0.00	48.34
	January 26, 1994	101.44	53.31	None	0.00	48.13
	May 3, 1995	101.44	54.64	54.44	0.20	46.80
	July 31, 1995	101.44	54.14	None	0.00	47.30
	November 14, 1995	101.44	53.69	None	0.00	47.75
	February 23, 1996	101.44	54.32	None	0.00	47.12
	May 31, 1996	101.44	54.14	None	0.00	47.30
MW-2	August 10, 1992	101.5	52.82	None	0.00	48.68
	February 9, 1993	98.75	49.60	None	0.00	49.15
	August 18, 1993	98.75	49.71	None	0.00	49.04
	January 26, 1994	98.75	49.97	None	0.00	48.78
	May 3, 1995	98.75		Well destroyed ⁽²⁾		
MW-3	August 10, 1992	101.44	52.99	None	0.00	48.45
	February 9, 1993	101.44	52.72	None	0.00	48.72
	August 18, 1993	101.44	52.82	None	0.00	48.62
	January 26, 1994	101.44	53.05	None	0.00	48.39
	May 3, 1995	101.44	54.31	None	0.00	47.13
	July 31, 1995	98.76	51.24	None	0.00	47.52
	November 14, 1995	98.76	51.10	None	0.00	47.66
	February 23, 1996	98.76	51.68	None	0.00	47.08
	May 31, 1996	98.76	51.45	None	0.00	47.31
MW-4	August 10, 1992	99.33	50.55	None	0.00	48.78
	February 9, 1993	99.33	50.26	None	0.00	49.07
	August 18, 1993	99.33	50.38	None	0.00	48.95
	January 26, 1994	99.33	50.90	50.60	0.30	48.43
	May 3, 1995	99.33	51.51	51.06	0.45	47.82
	July 31, 1995	99.33	51.74	51.48	0.26	47.59
	November 14, 1995	99.33	51.03	None	0.00	48.30
	February 23, 1996	99.33	51.65	SHEEN	0.01	47.68
MW-5	August 10, 1992	101.85	52.38	None	0.00	49.47
	February 9, 1993	101.85	52.06	None	0.00	49.79
	August 18, 1993	101.85	52.16	None	0.00	49.69
	January 26, 1994	101.85	52.50	None	0.00	49.35
	May 3, 1995	101.85	53.57	None	0.00	48.28
	July 31, 1995	101.85	53.27	None	0.00	48.58
	November 14, 1995	101.85	52.83	None	0.00	49.02
	February 23, 1996	101.85	53.57	None	0.00	48.28
MW-6	August 10, 1992	101.85	53.16	None	0.00	48.69
	February 9, 1993	99.25	50.58	None	0.00	48.67
	August 18, 1993	99.25	50.78	None	0.00	48.47
	January 26, 1994	99.25	51.00	None	0.00	48.25
	May 3, 1995	99.25	52.63	None	0.00	46.62
	July 31, 1995	99.25	51.90	None	0.00	47.35
	November 14, 1995	99.25	51.19	None	0.00	48.06
	February 23, 1996	99.25	52.10	None	0.00	47.15
	May 31, 1996	99.25	51.76	None	0.00	47.49

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

Well ID	Date Measured	Top of Casing Elevation (ft) (relative)	Depth to Water from TOC (ft) ⁽¹⁾	Depth to Hydrocarbon from TOC (ft)	Hydrocarbon Thickness (ft)	Potentiometric Surface Elevation (ft)
MW-7	February 9, 1993	98.96	50.53	None	0.00	48.43
	August 18, 1993	98.96	50.74	None	0.00	48.22
	January 26, 1994	98.96	51.01	None	0.00	47.95
	May 3, 1995	98.96	52.25	None	0.00	46.71
	July 31, 1995	98.96	51.92	None	0.00	47.04
	November 14, 1995	98.96	51.48	None	0.00	47.48
	February 23, 1996	98.96	52.15	None	0.00	46.81
	May 31, 1996	98.96	51.78	None	0.00	47.18
MW-8	February 9, 1993	99.12	50.48	None	0.00	48.64
	August 18, 1993	99.12	50.67	None	0.00	48.45
	January 26, 1994	99.12	50.96	None	0.00	48.16
	May 3, 1995	99.12	52.15	None	0.00	46.97
	July 31, 1995	99.12	51.77	None	0.00	47.35
	November 14, 1995	99.12	51.37	None	0.00	47.75
	February 23, 1996	99.12	52.17	None	0.00	46.95
	May 31, 1996	99.12	51.55	None	0.00	47.57
MW-9	April 22, 1993	99.18	49.73	None	0.00	49.45
	July 15, 1993	99.18	49.65	None	0.00	49.53
	August 18, 1993	99.18	49.85	None	0.00	49.33
	January 26, 1994	99.18	50.02	None	0.00	49.16
	May 3, 1995	99.18	51.35	None	0.00	47.83
	July 31, 1995	99.18	50.97	None	0.00	48.21
	November 14, 1995	99.18	50.43	None	0.00	48.75
	February 23, 1996	99.18	51.12	None	0.00	48.06
MW-10	May 31, 1996	99.18	50.89	None	0.00	48.29
	August 18, 1993	98.9	51.54	None	0.00	47.36
	January 26, 1994	98.9	51.90	None	0.00	47.00
	May 3, 1995	98.9	52.97	None	0.00	45.93
	July 31, 1995	98.9	52.87	None	0.00	46.03
	November 14, 1995	98.9	52.51	None	0.00	46.39
	February 23, 1996	98.9	53.05	None	0.00	45.85
	May 31, 1996	98.9	52.79	None	0.00	46.11
MW-11	August 18, 1993	98.82	51.92	None	0.00	46.90
	January 26, 1994	98.92	52.32	None	0.00	46.60
	May 3, 1995	98.92	53.38	None	0.00	45.54
	July 31, 1995	98.92	53.35	None	0.00	45.57
	November 14, 1995	98.92	52.96	None	0.00	45.96
	February 23, 1996	98.92	53.50	None	0.00	45.42
	31-May-96	98.92	53.25	None	0.00	45.67

Notes: (1) All measurements are recorded to the nearest 0.01 foot units.
 (2) MW-2 could not be located and is assumed destroyed.

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

Well I.D.	Sample Date	Well Casing Vol. (gallons)	Well Volume No.	pH (Std. Units)	Conductivity (Microhms/cm)	Temperature (Celsius)	Redox (mV)	Dissolved Oxygen (mg/L)	Ferrous Iron (mg/L)
MW-1	31-May-96	1.75	1	6.09	1,260	20.2	-211	1.8	
		3.5	2	6.90	1,240	20.3	-209	1.8	
		5.3	3	6.90	1,230	20.3	-204	1.8	0.0
MW-3	31-May-96	2.5	1	6.91	1,250	20.0	-146	1.6	
		5.0	2	6.90	1,250	20.0	-153	3.0	
		7.5	3	6.88	1,260	20.1	-158	3.2	0.0
MW-4	31-May-96	1.8	1	6.95	1,050	20.2	-109	4.1	
		3.5	2	6.95	1,050	20.0	-100	4.2	
		5.3	3	6.95	1,100	19.9	-117	4.1	0.06
MW-5	31-May-96	2	1	6.95	1,111	19.7	-134	4.3	
		4	2	7.00	1,056	19.6	-127	3.9	
		6	3	7.01	1,036	19.6	-121	3.7	0.0
MW-6	31-May-96	1.5	1	6.66	1,587	20.4	-223	3.1	
		3.0	2	6.66	1,641	19.8	-235	1.4	
		4.5	3	6.64	1,641	19.5	-239	1.1	1.2
MW-7	31-May-96	2	1	6.44	1,730	20.5	-084	1.9	
		4	2	6.46	1,729	20.4	-087	1.9	
		6	3	6.48	1,718	20.3	-091	1.6	0.0

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

Well I.D.	Sample Date	Well Casing Vol. (gallons)	Well Volume No.	pH (Std. Units)	Conductivity (Microhms/cm)	Temperature (Celcius)	Redox (mV)	Dissolved Oxygen (mg/L)	Ferrous Iron (mg/L)
MW-8	31-May-96	2	1	6.57	1,791	19.6	105	3.8	
		4	2	6.60	1,784	19.5	096	3.2	
		6	3	6.60	1,788	19.6	090	3.2	0.0
MW-9	31-May-96	1.5	1	6.72	1,144	19.8	-052	1.9	
		3.0	2	6.76	1,136	19.7	-051	1.6	
		4.5	3	6.79	1,142	19.8	-050	1.4	0.0
MW-10	31-May-96	2	1	6.42	8,730	20.6	-141	1.9	
		4	2	6.51	7,890	20.7	-163	1.1	
		6	3	6.54	7,620	20.8	-169	1.0	>10
MW-11	31-May-96	1.3	1	6.72	10,670	20.8	-042	2.3	
		2.5	2	6.74	10,450	21.5	-051	2.5	
		3.75	3	6.74	10,400	21.4	-054	2.5	0.0

mV = millivolts

mg/L = milligrams per Liter

NA= not analyzed

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

Well ID	Sampling Date	Benzene ⁽¹⁾ (ug/L)	Toluene ⁽¹⁾ (ug/L)	Ethylbenzene ⁽¹⁾ (ug/L)	Xylenes ⁽¹⁾ (ug/L)	Total BTEX (ug/L)	TPH ⁽²⁾ (mg/L)
MW-1	10-Aug-92	5,550	12,090	2,160	7,370	27,170	NA ⁽³⁾
	9-Feb-93	2,100	6,500	1,300	7,400	17,300	NA
	19-Aug-93	3,200	7,300	1,200	3,700	15,400	NA
	27-Jan-94	1,930	4,580	672	2,390	9,572	NA
	3-May-95	Not Sampled - Phase-Separated Hydrocarbons Present					
	1-Aug-95	390	1,300	230	800	2,720	5.7
	15-Nov-95	880	1,800	300	970	3,950	6.8
	23-Feb-96	1,500	3,700	620	2,200	8,020	21
	31-May-96	1,100	1,700	380	990	4,170	7.5
MW-2	10-Aug-92	14.9	<4.0	<4.0	<4.0	14.9	NA
	9-Feb-93	<2.0	<2.0	<2.0	<6.0	ND ⁽⁵⁾	NA
	19-Aug-93	100	12	3	13	128.0	NA
	27-Jan-94	<1.0	1.2	2	2.5	5.7	NA
	3-May-95	Well Destroyed					
MW-3	10-Aug-92	304.9	2,099	6,760	1,586	10,749.9	NA
	9-Feb-93	130	<10.0	<10.0	190	320	NA
	19-Aug-93	560	3,100	630	1,900	6,190	NA
	27-Jan-94	1,070	5,380	510	3,120	10,080	NA
	4-May-95	770	3,300	470	1,800	6,340	NA
	1-Aug-95	490	2,900	890	1,600	5,880	14
	15-Nov-95	250	1,000	180	440	1,870	2.9
	23-Feb-96	120	810	170	560	1,660	4
	31-May-96	670	3,900	1200	2,300	8,070	15
MW-4	10-Aug-92	2,594	10,360	2,160	6,740	21,854	NA
	9-Feb-93	5,200	15,000	2,200	10,000	32,400	NA
	19-Aug-93	3,000	12,000	<2,000	7,000	22,000	NA
	27-Jan-94	Not Sampled - Phase-Separated Hydrocarbons Present					
	3-May-95	Not Sampled - Phase-Separated Hydrocarbons Present					
	1-Aug-95	5,700	17,000	3,500	13,000	39,200	120
	15-Nov-95	490	1,600	310	1,100	3,500	5.2
	23-Feb-96	360	2,800	560	2,500	6,220	18
	31-May-96	84	830	280	1,100	2,294	6.2
MW-5	10-Aug-92	<4.0	<4.0	<4.0	<4.0	ND	NA
	9-Feb-93	<2.0	<2.0	<2.0	<6.0	ND	NA
	10-Aug-93	<2.0	<2.0	<2.0	<2.0	ND	NA
	27-Jan-94	8.7	29.9	4	11.3	53.9	NA
	3-May-95	3.7	5.3	0.92	4.6	14.5	NA
	1-Aug-95	<0.3	<0.3	<0.3	<0.6	ND	<0.100
	15-Nov-95	<0.3	1.2	<0.3	1.5	2.7	<0.100
	23-Feb-96	<0.3	<0.3	<0.3	<0.6	<0.6	<0.100
	31-May-96	31	86	10	20	147	0.25

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

Well ID	Sampling Date	Benzene ⁽¹⁾ (ug/L)	Toluene ⁽¹⁾ (ug/L)	Ethylbenzene ⁽¹⁾ (ug/L)	Xylenes ⁽¹⁾ (ug/L)	Total BTEX (ug/L)	TPH ⁽²⁾ (mg/L)
MW-6	10-Aug-92	NS ⁽⁴⁾	NS	NS	NS	NS	NS
	9-Feb-93	7,000	19,000	3,100	7,200	36,300	NA
	19-Aug-93	8,100	19,000	3,500	6,400	37,000	NA
	27-Jan-94	7,960	20,200	3,830	6,150	38,140	NA
	4-May-95	11,000	17,000	2,900	6,000	36,900	NA
	1-Aug-95	8,300	12,000	2,500	5,100	27,900	60
	15-Nov-95	8,900	17,000	2,900	5,500	34,300	57
	23-Feb-96	8,100	10,000	2,300	4,000	24,400	58
	31-May-96	83	150	15	51	299	0.57
3832-D ⁽⁶⁾	31-May-96	87	160	13	47	307	0.52
MW-7	10-Aug-92	NS	NS	NS	NS	NS	NS
	9-Feb-93	<2.0	<2.0	<2.0	<6.0	NS	NA
	19-Aug-93	<2.0	3	<2.0	<2.0	3.00	NA
	27-Jan-94	1.1	<1.0	<1.0	<1.0	1.10	NA
	3-May-95	52	3.4	0.67	2.8	58.87	NA
	1-Aug-95	22	2.2	0.85	2.8	27.85	<0.100
	15-Nov-95	8.4	0.77	<0.3	0.93	10.10	<0.100
	23-Feb-96	<0.3	<0.3	<0.3	<0.6	ND	<0.100
	23-Feb-96	<0.3	<0.3	<0.3	<0.6	<0.6	<0.100
	31-May-96	29	83	10	21	143	0.25
MW-8	10-Aug-92	NS	NS	NS	NS	NS	NS
	9-Feb-93	<2.0	<2.0	<2.0	<6.0	ND	NA
	19-Aug-93	<2.0	<2.0	<2.0	<2.0	ND	NA
	27-Jan-94	<1.0	<1.0	<1.0	<1.0	ND	NA
	3-May-95	3	4.9	0.75	3.7	12.35	NA
	1-Aug-95	3.1	1.2	0.47	1.6	6.37	<0.001
	1-Aug-95	3.6	1.5	0.51	1.5	7.11	<0.100
	15-Nov-95	<0.3	0.52	<0.3	<0.6	0.52	<0.100
	23-Feb-96	<0.3	<0.3	<0.3	<0.6	<0.6	<0.100
	31-May-96	<0.3	<0.3	<0.3	<0.6	<0.6	<0.100
080195 ⁽⁶⁾	10-Aug-92	NS	NS	NS	NS	NS	NS
	9-Feb-93	<2.0	<2.0	<2.0	<6.0	ND	NA
	19-Aug-93	<2.0	<2.0	<2.0	<2.0	ND	NA
	27-Jan-94	<1.0	<1.0	<1.0	<1.0	ND	NA
	3-May-95	3	4.9	0.75	3.7	12.35	NA
	1-Aug-95	3.1	1.2	0.47	1.6	6.37	<0.001
	1-Aug-95	3.6	1.5	0.51	1.5	7.11	<0.100
	15-Nov-95	<0.3	0.52	<0.3	<0.6	0.52	<0.100
	23-Feb-96	<0.3	<0.3	<0.3	<0.6	<0.6	<0.100
	31-May-96	<0.3	<0.3	<0.3	<0.6	<0.6	<0.100
MW-9	22-Apr-93	570	380	<50.0	870	1,820	NA
	15-Jul-93	121	7.3	3	458	589	NA
	19-Aug-93	390	290	40	250	970	NA
	27-Jan-94	327	357	51.1	293	1,028	NA
	3-May-95	380	110	19	120	629	NA
	1-Aug-95	660	410	91	310	1,471	6.2
	15-Nov-95	240	24	11	140	415	1.5
	15-Nov-95	170	18	10	120	318	1.9
	23-Feb-96	170	18	2.3	160	350	4.3
	31-May-96	120	16	<3	200	336	4
11159501 ⁽⁶⁾	15-Nov-95	170	18	10	120	318	1.9
	23-Feb-96	170	18	2.3	160	350	4.3
	31-May-96	120	16	<3	200	336	4

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

Well ID	Sampling Date	Benzene ⁽¹⁾ (ug/L)	Toluene ⁽¹⁾ (ug/L)	Ethylbenzene ⁽¹⁾ (ug/L)	Xylenes ⁽¹⁾ (ug/L)	Total BTEX (ug/L)	TPH ⁽²⁾ (mg/L)
MW-10	19-Aug-93	190	460	<200	240	890	NA
	27-Jan-94	13.4	4	5.5	33.6	56.5	NA
	4-May-95	980	15	11	84	1,090	NA
	1-Aug-95	1,300	32	32	100	1,464	3.6
	15-Nov-95	1,000	24	15	36	1,075	1.7
	23-Feb-96	810	23	27	44	904	2.4
	31-May-96	700	24	34	28	786	2
MW-11	19-Aug-93	<2.0	<2.0	<2.0	<2.0	ND	NA
	27-Jan-94	<1.0	<1.0	<1.0	<1.0	ND	NA
	4-May-95	<0.3	<0.3	<0.3	<0.6	ND	NA
	1-Aug-95	44	29	5.5	13	91.5	0.2
	15-Nov-95	190	2.8	6.2	11	210.0	0.4
	23-Feb-96	49	1.2	0.51	4	54.7	0.25
	31-May-96	300	83	12	28	423.0	0.8
Field Blank							
11159502	15-Nov-95	<0.3	0.42	<0.3	<0.6	0.42	<0.100
Field Blank	23-Feb-96	<0.3	<0.3	<0.3	<0.6	ND	<0.100
Trip Blank	23-Feb-96	<0.3	<0.3	<0.3	<0.6	ND	<0.100

- NOTES:
- 1) BTEX analyzed using EPA Method 8015 modified.
 - 2) Total Petroleum Hydrocarbons (TPH) analyzed using EPA Method 8015 modified.
 - 3) NA = Not analyzed.
 - 4) NS = Not sampled.
 - 5) ND = Concentration not detected above method detection limit.
 - 6) Field duplicate collected from monitor well.
 - 7) Biosparging System (extraction blower only) was placed into operation on September 22, 1995.
 - 8) Biosparging system (extraction and injection blowers) was placed into operation on November 14, 1995.

Table 5
Summary of Analytical Results for Air Emissions
BJ Services Company, USA
Hobbs, New Mexico

Sample Number	Date Sampled	Benzene (ppmv)	Ethyl- benzene (ppmv)	Toluene (ppmv)	Total Xylene (ppmv)	Total BETX (ppmv)	TPH (ppmv)	Discharge Rate (scfm)	Emission Rate Benzene (lb/hr)	Emission Rate Total BETX (lb/hr)	Emission Rate TPH (lb/hr)
Extraction ⁽¹⁾ -1	9/19/95	790	340	1,100	920	3,150	9,700	131.03	1.26	6.05	16.62
Effluent ⁽²⁾ -1	9/20/95	990	560	2,500	1,600	5,650	16,000	131.03	1.58	10.95	27.41
Extraction-2	9/28/95	13	6	28	18	65	2,533	123.55	0.02	0.12	4.09
Effluent-4	11/07/95	15	12	58	36	121	1,500	131.10	0.02	0.24	2.57
Effluent-11159501	11/15/95	39	42	180	130	391	1,870	133.33	0.06	0.79	3.26
Effluent 121995-01	12/19/95	10	11	45	33	99	530	129.64	0.02	0.23	1.04
Effluent 012996-01	1/29/96	12	17	61	53	143	1,200	128.45	0.02	0.33	2.33
Effluent 032296-01	3/22/96	6	12	44	40	102	990	124.68	0.01	0.23	1.87
Effluent 042496-01	4/24/96	4	10	37	36	87	900	118.34	0.01	0.17	1.49
Effluent 053196-01	5/31/96	4	10	40	33	87	670	124.11	0.01	0.18	1.20

Notes:

(1) Extraction = Vacuum extraction blower in operation only.

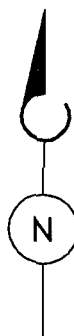
(2) Effluent = Vacuum extraction and injection blowers in operation.

ppmv = parts per million by volume.

scfm = cubic feet per minute.

Figures

FIGURES



HOMCO PROPERTY

PRESSURE TESTING
TANKS (EMPTY)

FENCE LINE

FIELD WASTE TANKS

MW-5

FORMER
AST AREA

MW-9

MW-4

MW-1

MW-6

FRESH
WATER
WELL

ACID DOCK

MW-10

MW-11

BULK
PLANT

FORMER FUEL TANK

MW-3

MW-2
(DESTROYED)

MW-7

MW-8

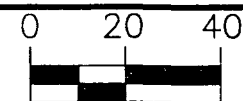
OFFICE

TRUCK BAYS

SERVICE TRUCK PARKING AREA

**BROWN AND
CALDWELL**
HOUSTON, TEXAS

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



SCALE: 1" = 40'
DRAWN BY: DMD DATE 9/11
CHK'D BY: MCP DATE 10/20
APPROVED: _____ DATE: _____

LEGEND

MW-8

MONITORING WELL LOCATION AND IDENTIFICATION

TITLE

SITE MAP

DATE

7/18/96

CLIENT

BJ SERVICES COMPANY, U.S.A.

PROJECT NUMBER

2832-10

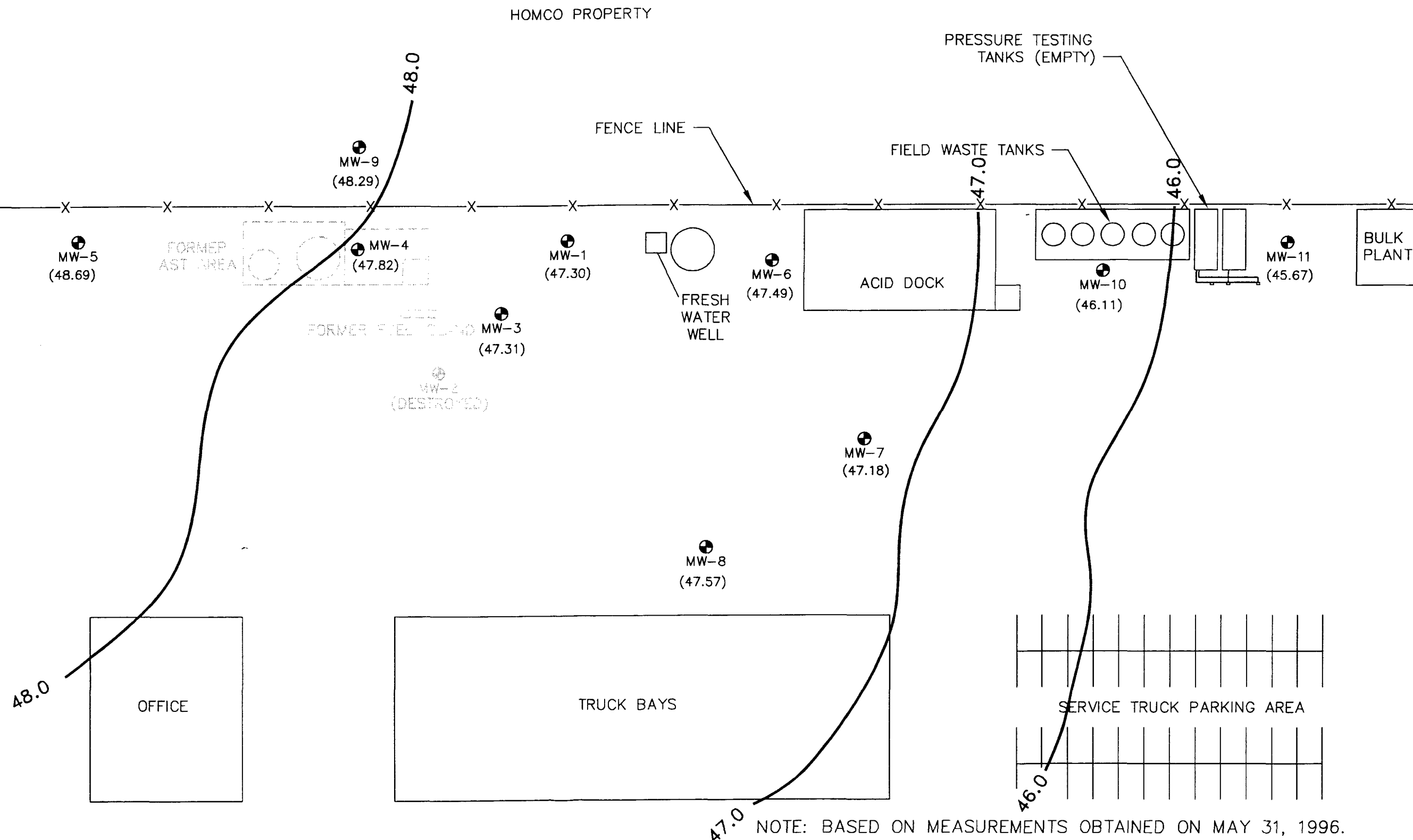
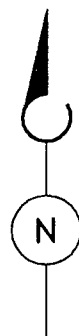
SITE

HOBBS, NEW MEXICO

FIGURE NUMBER

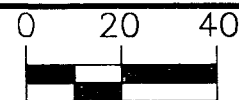
1

T: 2832/POTN0531 (1=40) 07-25-96 DaveD



**BROWN AND
CALDWELL**
HOUSTON, TEXAS

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



SCALE: 1" = 40'
DRAWN BY: DMD DATE 9/11
CHK'D BY: MMD DATE 7/96
APPROVED: _____ DATE _____

LEGEND

● MW-8
(47.12)

MONITORING WELL LOCATION AND IDENTIFICATION

POTENTIOMETRIC SURFACE ELEVATION, FEET

— 47.0 —

POTENTIOMETRIC SURFACE CONTOUR, FEET

TITLE

POTENTIOMETRIC SURFACE MAP

CLIENT

BJ SERVICES COMPANY, U.S.A.

SITE

HOBBS, NEW MEXICO

DATE

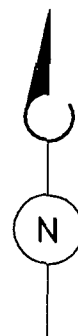
7/2/96

PROJECT NUMBER

2832-11

FIGURE NUMBER

2



HOMCO PROPERTY

PRESSURE TESTING
TANKS (EMPTY)

FIELD WASTE TANKS

BULK
PLANT

ACID DOCK

FRESH
WATER
WELL

FENCE LINE

100

100

100

MW-5
(31)/3.7

FORMER
AST AREA

(120)/1.4
MW-9

MW-4
(84)/4.1

MW-1
(1100)/1.8

MW-3
(670)/3.2

MW-2
(DESTROYED)

(83)/1.1
MW-6

MW-10
(700)/1.0

MW-11
(300)/2.5

MW-7
(29)/1.6

MW-8
(<0.3)/3.2

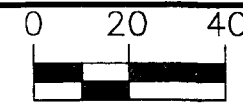
OFFICE

TRUCK BAYS

SERVICE TRUCK PARKING AREA

**BROWN AND
CALDWELL**
HOUSTON, TEXAS

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



SCALE: 1" = 40'
DRAWN BY: DMD DATE 7/2
CHK'D BY: MD DATE 7/96
APPROVED: _____ DATE: _____

LEGEND

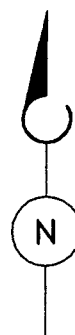
MW-8
(120)/1.3

MONITORING WELL LOCATION AND IDENTIFICATION
BENZENE CONCENTRATION ($\mu\text{g/L}$)/DISSOLVED OXYGEN (mg/L)

BASED ON SAMPLES COLLECTED ON MAY 31, 1996.

TITLE
BENZENE CONCENTRATION MAP
CLIENT
BJ SERVICES COMPANY, U.S.A.
SITE
HOBBS, NEW MEXICO

DATE
7/2/96
PROJECT NUMBER
2832-11
FIGURE NUMBER
3



HOMCO PROPERTY

PRESSURE TESTING
TANKS (EMPTY)

FORMER AST AREA

FENCE LINE

FIELD WASTE TANKS

BULK
PLANT

MW-5
31 / 147
0.25

MW-4
84 / 2,294
6.2

120 / 336
4
MW-9

MW-1
1,100 / 4,170
7.5

MW-3
670 / 8,070
15

FRESH
WATER
WELL

MW-6
83 / 299
0.57

MW-7
29 / 143
0.25

MW-10
700 / 786
2

MW-11
300 / 423
0.8

FORMER FUEL ISLAND

MW-2
(DESTROYED)

MW-8
<0.3 / <0.6
<0.100

OFFICE

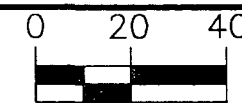
TRUCK BAYS

SERVICE TRUCK PARKING AREA

NOTE: BASED ON SAMPLES COLLECTED ON MAY 31, 1996.

BROWN AND
CALDWELL
HOUSTON, TEXAS

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



SCALE: 1" = 40'
DRAWN BY: *DND* DATE: *7/2*
CHK'D BY: *me* DATE: *7/16*
APPROVED: _____ DATE: _____

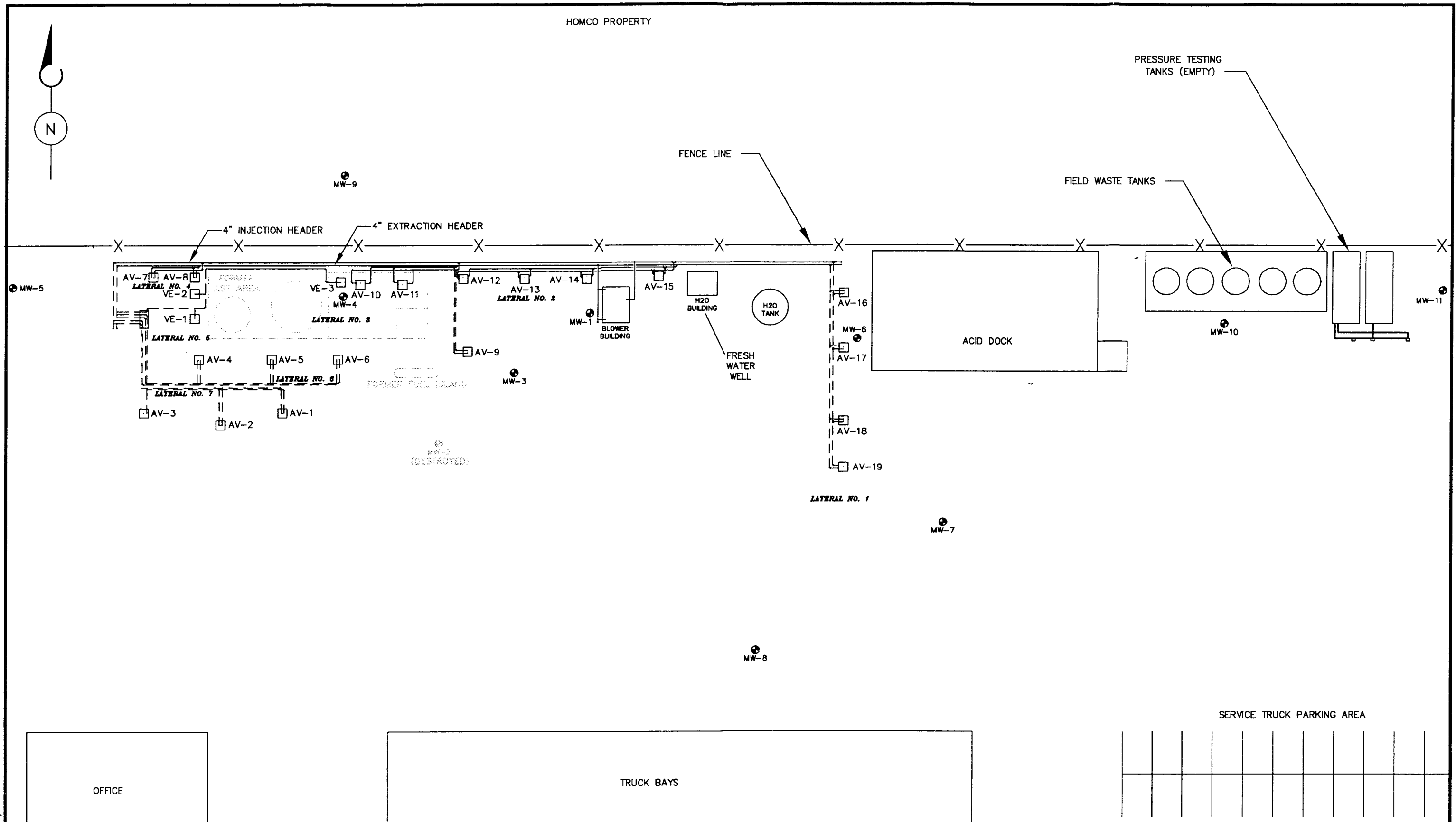
LEGEND

MW-8
360 / 6,220
18

MONITORING WELL LOCATION AND IDENTIFICATION
BENZENE / TOTAL BTEX (ug/L)
TPH (mg/L)

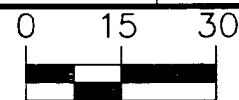
TITLE	HYDROCARBON DISTRIBUTION MAP	DATE	7/2/96
CLIENT	BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER	2832-11
SITE	HOBBS, NEW MEXICO	FIGURE NUMBER	4

T:\2832\AVESCHEM (1-30) 07-25-96 DoveD



BROWN AND CALDWELL
HOUSTON, TEXAS

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



SCALE: 1" = 30'
DRAWN BY: DMD DATE: 12/15
CHK'D BY: WCD DATE: 1/16
APPROVED: _____ DATE: _____

LEGEND

- MW-8 MONITORING WELL LOCATION AND IDENTIFICATION
 AV-2 EXTRACTION AND INJECTION WELL
 VE-1 VACUUM EXTRACTION WELL
 ABOVE GRADE VACUUM AND INJECTION LINES
 BURIED VACUUM AND INJECTION LINES

TITLE

SCHEMATIC OF BIOSPARING SYSTEM

CLIENT

BJ SERVICES COMPANY, U.S.A.

SITE

HOBBS, NEW MEXICO

DATE

12/19/95

PROJECT NUMBER

2832-10

FIGURE NUMBER

5

A



APPENDIX A

GROUNDWATER SAMPLING FORMS

Groundwater Sampling Field Data Sheet

Project Number: 2832

Task Number: 11

Date: 5-31-96

Casing Diameter 2 inches	Purge Equipment Submersible pump	Equipment Calibration - Time
Total Depth of Well from TOC 64.42 feet		pH 7.0 = 7.04 at 19.7 °C
Static Water from TOC 54.14 feet	Sample Equipment disposable bailer	pH 10.0 = 9.56 at 19.7 °C
Product Level from TOC 0 feet		Conductivity Conductance Standard: 1000 µmhos/cm at 25 °C
Length of Water Column 10.28 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) pH, temp., conductivity, redox, DO	Measured Value: µmhos/cm at 25 °C
Well Volume 1.64 gal		Dissolved Oxygen DO Meter Calibrated to: 7.69 mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1400	1	1.75	6.89	20.2	1.26 @ 20 scale	-211	1.8	clear
1404	2	1.75	6.90	20.3	1.24 @ 20 scale	-209	1.8	clear
1408	3	1.75	6.96	20.3	1.23 @ 20 scale	-204	1.8	clear

Geochemical Parameters	Comments:
Ferrous Iron: 0 mg/L	
Dissolved Oxygen: 0 mg/L	
Nitrate: mg/L	
Sulfate: mg/L	

PPE Worn: Level D	Sampler's Signature: <u>R. R. R.</u>
Disposition of Purge Water: drummed	

Groundwater Sampling Field Data Sheet

Project Number: 2832

Task Number: 11

Date: 5-31-86

Casing Diameter 2" inches	Purge Equipment submersible pump	Equipment Calibration - Time pH 7.0 = 7.04 at 19.7 °C
Total Depth of Well from TOC 64.31 feet	Sample Equipment disposable bailer	pH 10.0 = 9.56 at 19.7 °C
Static Water from TOC 51.45 feet		Conductivity Conductance Standard: 1000 µmhos/cm at 25° C Measured Value: _____ µmhos/cm at 25° C
Product Level from TOC 0 feet		
Length of Water Column 12.86 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) pH, Temp, Conductivity, redox, DO	Dissolved Oxygen DO Meter Calibrated to: 7.69 mg/L
Well Volume 2.06 gal		
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1331	1	2.5	6.91	20.0	1.25 @ 20 scale	-146	1.6	clear
1337	2	2.5	6.90	20.0	1.25 @ 20 scale	-153	3.0	clear
1344	3	2.5	6.88	20.1	1.26 @ 20 scale	-158	3.2	clear

Geochemical Parameters	Comments:
Ferrous Iron: 0 mg/L	
Dissolved Oxygen: 1.8 mg/L	
Nitrate: _____ mg/L	
Sulfate: _____ mg/L	

PPE Worn: Level D	Sampler's Signature: <u>TL Repord</u>
Disposition of Purge Water: drummed	

Groundwater Sampling Field Data Sheet

Project Number: 2832Task Number: 11Date: 5-31-96

Casing Diameter <u>2"</u> inches	Purge Equipment <u>submersible pump</u>	Equipment Calibration - Time
Total Depth of Well from TOC <u>101.43</u> feet	Sample Equipment <u>disposable bailer</u>	pH <u>7.0</u> = <u>7.04</u> at <u>19.7</u> °C
Static Water from TOC <u>51.48</u> feet		pH <u>10.0</u> = <u>9.56</u> at <u>19.7</u> °C
Product Level from TOC <u>0</u> feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) <u>pH, DO, redox, temp., conductivity</u>	Conductivity Conductance Standard: <u>1000</u> µmhos/cm at 25° C
Length of Water Column <u>9.95</u> feet		Measured Value: _____ µmhos/cm at 25° C
Well Volume <u>1.59</u> gal		Dissolved Oxygen DO Meter Calibrated to: <u>7.69</u> mg/L
Screened Interval (from GS) _____ feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1322	1	1.75	6.95	20.2 °C	1.05 @ 20 Scale	-109	4.1	clear
1326	2	1.75	6.95	20.0 °C	1.05 @ 20 Scale	-100	4.2	clear
1331	3	2	6.95	19.9	1.10 @ 20 Scale	-117	4.1	clear

Geochemical Parameters	Comments:
Ferrous Iron: <u>0.6</u> mg/L	
Dissolved Oxygen: <u>0</u> mg/L	
Nitrate: _____ mg/L	
Sulfate: _____ mg/L	

PPE Worn: <u>Level D</u>	Sampler's Signature: <u>R. Rexford</u>
Disposition of Purge Water: <u>drummed</u>	

BROWN AND CALDWELL

WELL ID:

MW-5

Groundwater Sampling Field Data Sheet

Project Number: 2832

Task Number: 11

Date: 5-31-96

Casing Diameter 2" inches	Purge Equipment Submersible pump	Equipment Calibration - Time
Total Depth of Well from TOC 14.60 feet	Sample Equipment disposable bailer	pH 70 = 7.04 at 19.7 °C
Static Water from TOC 53.16 feet		pH 100 = 7.96 at 19.7 °C
Product Level from TOC 0 feet		Conductivity Conductance Standard: 1000 µmhos/cm at 25° C
Length of Water Column 1.44 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) pH, temp, conductivity DO, redox	Measured Value: _____ µmhos/cm at 25° C
Well Volume 1.83 gal		Dissolved Oxygen DO Meter Calibrated to: 7.69 mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1040	1	2	6.95	19.7°C	1.11 @ 2 scale	-134	4.3	Slightly cloudy-gray
1044	2	2	7.00	19.6°C	1.056 @ 2 scale	-127	3.9	clear
1048	3	2	7.01	19.6°C	1.036 @ 2 scale	-121	3.7	clear

Geochemical Parameters	Comments:
Ferrous Iron: 0 mg/L	
Dissolved Oxygen: 0.8 mg/L	
Nitrate: mg/L	
Sulfate: mg/L	

PPE Worn: Level D	Sampler's Signature: <u>R. K. Brown</u>
Disposition of Purge Water: drummed	

BROWN AND CALDWELL

WELL ID: MW-6

Groundwater Sampling Field Data Sheet

Project Number: 2832Task Number: 11Date: 5-31-96

Casing Diameter <u>2</u> inches	Purge Equipment <u>Submersible pump</u>	Equipment Calibration - Time pH <u>7.0</u> = <u>7.04</u> at <u>19.7</u> °C
Total Depth of Well from TOC <u>100.17</u> feet	Sample Equipment <u>disposable bailer</u>	pH <u>10.0</u> = <u>9.56</u> at <u>19.7</u> °C
Static Water from TOC <u>51.76</u> feet		Conductivity <u>1000</u> μ mhos/cm at 25° C
Product Level from TOC <u>0</u> feet		Standard: <u>1000</u> μ mhos/cm at 25° C
Length of Water Column <u>8.41</u> feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) <u>pH, DO, redox, conductivity, temperature</u>	Measured Value: _____ μ mhos/cm at 25° C
Well Volume <u>1.35</u> gal		Dissolved Oxygen DO Meter Calibrated to: <u>7.69</u> mg/L
Screened Interval (from GS) _____ feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
0953	1	1.5	6.66	20.4°C	1587 μ S/cm @ 2 scale	-223	3.1	black to dark gray
0957	2	1.5	6.66	19.8°C	1641 μ S/cm @ 2 scale	-235	1.4	medium gray
1001	3	1.5	6.64	19.5°C	1641 μ S/cm @ 2 scale	-239	1.1	as above

Geochemical Parameters	Comments:
Ferrous Iron: <u>1.2</u> mg/L	
Dissolved Oxygen: <u>0</u> mg/L	
Nitrate: _____ mg/L	
Sulfate: _____ mg/L	

PPE Worn: <u>Level D</u>	Sampler's Signature: <u>[Signature]</u>
Disposition of Purge Water: <u>drummed</u>	

Groundwater Sampling Field Data Sheet

Project Number: 2832

Task Number: 11

Date: 5-31-26

Casing Diameter 2.12 inches	Purge Equipment submersible pump	Equipment Calibration - Time pH 7.0 = 7.04 at 19.7 °C
Total Depth of Well from TOC 61.46 feet	Sample Equipment disposable bailer	pH 10.0 = 9.56 at 19.7 °C
Static Water from TOC 51.78 feet		Conductivity Conductance Standard: 1000 µmhos/cm at 25° C
Product Level from TOC 0 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) pH, temp, conductivity DO, redox	Measured Value: _____ µmhos/cm at 25° C
Length of Water Column 9.68 feet		Dissolved Oxygen DO Meter Calibrated to: 769 mg/L
Well Volume 1.55 gal		
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1123	1	2	6.44	20.5°C	1.730 @ 2 scale	-084	1.9	light brown (sandy)
1129	2	2	6.46	20.4°C	1.729 @ 2 scale	-087	1.9	very light brown (slightly turbid)
1134	3	2	6.48	20.3°C	1.718 @ 2 scale	-091	1.6	nearly clear (very low turbidity)

Geochemical Parameters	Comments:
Ferrous Iron: 0 mg/L	purge interrupted after 1 volume removed - had to re-set pump and resume
Dissolved Oxygen: 0 mg/L	
Nitrate: _____ mg/L	
Sulfate: _____ mg/L	

PPE Worn: Level D	Sampler's Signature: <u>K. K. K.</u>
Disposition of Purge Water: drummed	

Groundwater Sampling Field Data Sheet

Project Number: 2832

Task Number: 11

Date: 5-31-96

Casing Diameter 2" inches	Purge Equipment Submersible pump	Equipment Calibration - Time
Total Depth of Well from TOC 62.37 feet	Sample Equipment disposable bailer	pH 7.0 = 7.04 at 19.7 °C
Static Water from TOC 51.55 feet		pH 10.0 = 9.56 at 19.7 °C
Product Level from TOC 0 feet		Conductivity Conductance Standard: 1000 µmhos/cm at 25° C
Length of Water Column 10.82 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) DO, redox, pH, temperature, conductivity	Measured Value: _____ µmhos/cm at 25° C
Well Volume 1.73 gal		Dissolved Oxygen DO Meter Calibrated to: 7.69 mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
0920	1.231 gal	2 gal	6.57	19.6°C	1.791 @ 2 scale	105	3.8 mg/L	cloudy grey
0928	2 gal	(2 gal)			1.784 @ 2 scale	096	3.2 mg/L	cloudy clear
0933	1.75 gal	4 gal	6.60	19.5°C	1.788 @ 2 scale	090	3.2	as above
	3 gal	(2 gal)	6.60	19.6°C				

Geochemical Parameters	Comments:
Ferrous Iron: 0 mg/L	
Dissolved Oxygen: 3.5 mg/L	
Nitrate: mg/L	
Sulfate: mg/L	

PPE Worn: Level D	Sampler's Signature: <u>JK Remond</u>
Disposition of Purge Water: drummed	

BROWN AND CALDWELL

WELL ID: MW-9

Groundwater Sampling Field Data Sheet

Project Number: 2832

Task Number: 11

Date: 5-31-96

Casing Diameter 2 inches	Purge Equipment Submersible pump	Equipment Calibration - Time	
Total Depth of Well from TOC 60.27 feet		pH 7.0 = 7.04 at 12.7 °C	
Static Water from TOC 50.89 feet	Sample Equipment disposable bailer	pH 10.0 = 9.56 at 19.7 °C	
Product Level from TOC 0 feet		Conductivity Conductance Standard: 1026 µmhos/cm at 25° C	
Length of Water Column 9.38 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) pH, temperature, conductivity, DO, redox	Measured Value: µmhos/cm at 25° C	
Well Volume 1.50 gal		Dissolved Oxygen DO Meter Calibrated to: 7.69 mg/L	
Screened Interval (from GS) feet			

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1228	1	1.5	6.72	19.8°C	1.144 @ 2 scale	-052	1.9	clear
1232	2	1.5	6.76	19.7°C	1.136 @ 2 scale	-051	1.6	clear
1235	3	1.5	6.79	19.8°C	1.142 @ 2 scale	-050	1.4	clear

Geochemical Parameters	Comments:
Ferrous Iron: 0 mg/L	
Dissolved Oxygen: 0 mg/L	
Nitrate: mg/L	
Sulfate: mg/L	

PPE Worn: Level D	Sampler's Signature: <u>T. Brown</u>
Disposition of Purge Water: drummed	

Groundwater Sampling Field Data Sheet

Project Number: 2832Task Number: 11Date: 5-31-90

Casing Diameter <u>2</u> inches	Purge Equipment <u>submersible pump</u>	Equipment Calibration - Time pH <u>7.0</u> = <u>7.04</u> at <u>19.7</u> °C
Total Depth of Well from TOC <u>63.60</u> feet		pH <u>10.0</u> = <u>9.56</u> at <u>19.7</u> °C
Static Water from TOC <u>52.74</u> feet	Sample Equipment <u>disposable bailer</u>	Conductivity Conductance Standard: <u>1000</u> µmhos/cm at 25° C
Product Level from TOC <u>0</u> feet		Measured Value: _____ µmhos/cm at 25° C
Length of Water Column <u>10.81</u> feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) <u>pH, temperature, conductivity, DO, redox</u>	Dissolved Oxygen DO Meter Calibrated to: <u>7.69</u> mg/L
Well Volume <u>1.73</u> gal		
Screened Interval (from GS) _____ feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1302	1	2	6.42	20.6	8.73 @ 20 scale	-141	1.9	cloudy (gray)
1307	2	(2) 4	6.51	20.7	7.59 @ 20 scale	-163	1.1	clear
1312	3	(2) 6	6.54	20.8	7.62 @ 20 scale	-169	1.0	clear

Geochemical Parameters	Comments:
Ferrous Iron: <u>>10</u> mg/L	<u>slightly greater than 10 mg/L Ferrous Iron</u>
Dissolved Oxygen: <u>0</u> mg/L	
Nitrate: _____ mg/L	
Sulfate: _____ mg/L	

PPE Worn: <u>Level D</u>	Sampler's Signature: <u>[Signature]</u>
Disposition of Purge Water: <u>drummed</u>	

Groundwater Sampling Field Data Sheet

Project Number: 2832Task Number: 11Date: 5-31-26

Casing Diameter <u>2</u> inches	Purge Equipment <u>submersible pump</u>	Equipment Calibration - Time pH <u>7.0</u> = <u>7.64</u> at <u>19.7</u> °C
Total Depth of Well from TOC <u>59.78</u> feet	Sample Equipment <u>disposable bailer</u>	pH <u>10.02</u> = <u>9.56</u> at <u>19.7</u> °C
Static Water from TOC <u>53.25</u> feet		Conductivity Conductance Standard: <u>1000</u> µmhos/cm at 25° C
Product Level from TOC <u>0</u> feet		Measured Value: _____ µmhos/cm at 25° C
Length of Water Column <u>6.53</u> feet	Analytical Equipment (pH, DO, Redox, filtration, etc.) <u>pH, temp., conductivity, DO, redox</u>	Dissolved Oxygen DO Meter Calibrated to: <u>7.69</u> mg/L
Well Volume <u>1.04</u> gal		
Screened Interval (from GS) _____ feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1157	1	1.25	6.72	20.8	10.67 @ 20 scale	-042	2.3	clear
1206	2	1.25	6.74	21.5	10.45 @ 20 scale	-051	2.5	clear
1204	3	1.25	6.74	21.4°	10.40 @ 20 scale	-054	2.5	clear

Geochemical Parameters	Comments:
Ferrous Iron: <u>0</u> mg/L	
Dissolved Oxygen: <u>4.5</u> mg/L	
Nitrate: _____ mg/L	
Sulfate: _____ mg/L	

PPE Worn: <u>Level D</u>	Sampler's Signature: <u>[Signature]</u>
Disposition of Purge Water: <u>drummed</u>	

B



APPENDIX B

LABORATORY ANALYTICAL REPORTS GROUNDWATER SAMPLES

June 10, 1996

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, TX 77002



B C Analytical

Subject: Explanation of amended report G96-06-013 (project # 2832.11)

Dear Myna,

I appreciate the opportunity to provide you with results of my investigation of order G96-06-013 and the changes that were made to the report as a result. I conducted a thorough review of the order: chain of custody, sample containers, hardcopy report and raw data. In reviewing the data, I paid particular attention to results reported for 2832-D, MW-6 and MW-3. As indicated by you, 2832-D and MW-6 are blind duplicates. Their results were different by a factor of 2. The results of these samples are also of concern due to vastly different reported values on this round of samples as opposed to the previous round.

Sample 2832-D was found to have been reported with an incorrect dilution factor. The hardcopy result listed a dilution factor of 1:10. The actual dilution factor was 1:5. The sample was run initially on 6/3/96 and a dilution factor of 1:5 was called for based on the results obtained. Documentation in the log book and the chromatograph shows that the sample was loaded and run at 1:5. The error was made by the chemist in working up the data. Inadvertently, the chemist used a 1:10 dilution and carried this factor all the way through their reporting process. The error has been addressed with the responsible chemist and steps are being taken to insure that this type of error does not recur.

The chain of custody and sample containers were checked and compared to determine if any errors were made in labeling when sampling or at the time of login at the laboratory. The chain of custody and the sample containers matched perfectly. The odors for MW-6 and 2832-D were very similar. The odor for MW-3 had a very strong gas smell which would have supported the dilution factor of 1:20 that it received. MW-3 was initially run with a 1:10 dilution. This run had analytes over the calibration limit for the instrument used and this is why the 1:20 dilution was run the next day. The results from the 1:10 and 1:20 dilutions match closely.

In summary, order G96-06-013 has been amended for the dilution factor reported for sample 2832-D. The dilution should have been 1:5. This was a error committed at the time of data work-up. The problem has been addressed with the responsible chemist and the report changed. All other areas of the report were found to be correct. If you should have any other questions regarding this report I would be happy to provide assistance.

Sincerely,

A handwritten signature in cursive script, appearing to read "Fred Haley".

Fred Haley
Division Manager

cc: Brian Moore
Linda Geddes, QA Director

ANALYTICAL REPORT

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G96-06-013

Received: 03 JUN 96
Mailed : 05 JUN 96

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, TX 77002

Project: 2832.11

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES					DATE SAMPLED
06-013-1	MW-8					31 MAY 96
06-013-2	MW-6					31 MAY 96
06-013-3	2832-D					31 MAY 96
06-013-4	MW-5					31 MAY 96
06-013-6	MW-7					31 MAY 96
PARAMETER	06-013-1	06-013-2	06-013-3	06-013-4	06-013-6	
BTEX/GRO (8020) (8015M)						
Date Analyzed	06/03/96	06/03/96	06/04/96	06/03/96	06/03/96	
Dilution Factor, Times	1	1	5	1	1	
Benzene, ug/L	<0.3	83	87	31	29	
Toluene, ug/L	<0.3	150	160	86	83	
Ethylbenzene, ug/L	<0.3	15	13	10	10	
Total Xylene Isomers, ug/L	<0.6	51	47	20	21	
Carbon Range, .	C6-C12	C6-C12	C6-C12	C6-C12	C6-C12	
TPH (Gasoline Range), ug/L	<100	570	520	250	250	
Surrogates **						
a,a,a-Trifluorotoluene Rep., ug/L	50.8	51.8	270	50.1	52.3	
a,a,a-Trifluorotoluene Th., ug/L	50.0	50.0	250	50.0	50.0	



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1415 Louisiana, Suite 2500
Houston, TX 77002

Project: 2832.11

REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES					DATE SAMPLED
06-013-7	MW-11					31 MAY 96
06-013-8	MW-9					31 MAY 96
06-013-9	MW-10					31 MAY 96
06-013-10	MW-3					31 MAY 96
06-013-11	MW-1					31 MAY 96
PARAMETER	06-013-7	06-013-8	06-013-9	06-013-10	06-013-11	
BTEX/GRO (8020) (8015M)						
Date Analyzed	06/03/96	06/03/96	06/03/96	06/04/96	06/04/96	
Dilution Factor, Times	1	10	10	20	10	
Benzene, ug/L	300	120	700	670	1100	
Toluene, ug/L	83	16	24	3900	1700	
Ethylbenzene, ug/L	12	<3	34	1200	380	
Total Xylene Isomers, ug/L	28	200	28	2300	990	
Carbon Range, .	C6-C12	C6-C12	C6-C12	C6-C12	C6-C12	
TPH (Gasoline Range), ug/L	800	4000	2000	15000	7500	
Surrogates **						
a,a,a-Trifluorotoluene Rep., ug/L	48.9	539	524	1070	494	
a,a,a-Trifluorotoluene Th., ug/L	50.0	500	500	1000	500	

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G96-06-013

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Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, TX 77002

Project: 2832.11

REPORT OF ANALYTICAL RESULTS

Page 3

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
06-013-12	MW-4	31 MAY 96
PARAMETER	06-013-12	
BTEX/GRO (8020) (8015M)		
Date Analyzed	06/03/96	
Dilution Factor, Times	5	
Benzene, ug/L	84	
Toluene, ug/L	830	
Ethylbenzene, ug/L	280	
Total Xylene Isomers, ug/L	1100	
Carbon Range, .	C6-C12	
TPH (Gasoline Range), ug/L	6200	
Surrogates **		
a,a,a-Trifluorotoluene Rep., ug/L	274	
a,a,a-Trifluorotoluene Th., ug/L	250	

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G96-06-013

Received: 03 JUN 96
Mailed : 05 JUN 96

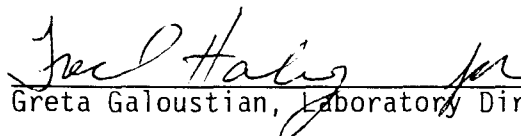
Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, TX 77002

Project: 2832.11

REPORT OF ANALYTICAL RESULTS

Page 4

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED	
06-013-5	FB-1	31 MAY 96	
06-013-13	Trip Blank #60502	31 MAY 96	
PARAMETER	06-013-5	06-013-13	
BTEX/GRO (8020) (8015M)			
Date Analyzed	06/04/96	06/03/96	
Dilution Factor, Times	1	1	
Benzene, ug/L	<0.3	<0.3	
Toluene, ug/L	0.72	<0.3	
Ethylbenzene, ug/L	<0.3	<0.3	
Total Xylene Isomers, ug/L	0.82	<0.6	
Carbon Range, .	C6-C12	C6-C12	
TPH (Gasoline Range), ug/L	<100	<100	
Surrogates **			
a,a,a-Trifluorotoluene Rep., ug/L	48.9	51.4	
a,a,a-Trifluorotoluene Th., ug/L	50.0	50.0	


Greta Galoustian, Laboratory Director

The analytical results within this report relate only to the specific compounds and samples investigated and may not necessarily reflect other apparently similar material from the same or a similar location.

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BCA

ORDER PLACED FOR CLIENT: Brown and Caldwell Consultants 9606013 :
BC ANALYTICAL : GLEN LAB : 12:57:57 05 JUN 1996 - P. 1 :
=====

SAMPLES... SAMPLE DESCRIPTION.. DETERM..... DATE..... METHOD..... EQUIP. BATCH.. ID.NO
ANALYZED

9606013*1	MW-8	GAS.TPH.BTEX	06.03.96	8015M	536-23	96572	8171
9606013*2	MW-6	GAS.TPH.BTEX	06.03.96	8015M	536-23	96572	8171
9606013*3	2832-D	GAS.TPH.BTEX	06.04.96	8015M	536-21	96261	8171
9606013*4	MW-5	GAS.TPH.BTEX	06.03.96	8015M	536-23	96572	8171
9606013*6	MW-7	GAS.TPH.BTEX	06.03.96	8015M	536-23	96572	8171
9606013*7	MW-11	GAS.TPH.BTEX	06.03.96	8015M	536-23	96572	8171
9606013*8	MW-9	GAS.TPH.BTEX	06.03.96	8015M	536-23	96572	8171
9606013*9	MW-10	GAS.TPH.BTEX	06.03.96	8015M	536-23	96572	8171
9606013*10	MW-3	GAS.TPH.BTEX	06.04.96	8015M	536-21	96261	8171
9606013*11	MW-1	GAS.TPH.BTEX	06.04.96	8015M	536-21	96261	8171
9606013*12	MW-4	GAS.TPH.BTEX	06.03.96	8015M	536-23	96572	8171
9606013*5	FB-1	GAS.TPH.BTEX	06.04.96	8015M	536-21	96261	8171
9606013*13	Trip Blank #60502	GAS.TPH.BTEX	06.03.96	8015M	536-23	96572	8171

Notes: Equipment = BC Analytical identification number for a
particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of
analyst.

AQUEOUS SAMPLES

----- METHOD BLANK -----

LAB CONTROL

MATRIX OC

1
1
3
6
8
1
1

Batch: GAS*96261 Method: 8015M - Modified 8015

Benzene	ug/L	0	0.3	-	122	-	-	-	-
Toluene	ug/L	0	0.3	-	112	-	-	-	-
Ethylbenzene	ug/L	0	0.3	-	98	-	-	-	-
Total Xylene Isomers	ug/L	0	0.6	-	95	-	-	-	-
TPH (Gasoline Range)	ug/L	0	100	-	96	-	-	-	-
[a,a,-Trifluorotoluene]	Percent	102	-	-	117	-	-	-	-

Batch: GAS*96572 Method: 8015M - Modified 8015

Benzene	ug/L	0	0.3	-	109	-	-	76	141	-	-	101	-	102	-	71	125	1	29	-
Toluene	ug/L	0	0.3	-	101	-	-	73	122	-	-	100	-	101	-	63	126	1	33	-
Ethylbenzene	ug/L	0	0.3	-	100	-	-	72	133	-	-	100	-	100	-	65	126	1	34	-
Total Xylene Isomers	ug/L	0	0.6	-	101	-	-	64	117	-	-	102	-	103	-	69	128	1	35	-
TPH (Gasoline Range)	ug/L	0	100	-	99	-	-	64	152	-	-	93	-	93	-	53	166	0	21	-
[a,a,a-Trifluorotoluene]	Percent	100	-	-	111	-	-	75	117	-	-	109	-	110	-	78	126	-	-	-

SURROGATE RECOVERIES :
: BC ANALYTICAL : GLEN LAB : 12:58:14 05 JUN 1996 - P. 1 :
=====

METHOD	ANALYTE	BATCH	ANALYZED	REPORTED	TRUE	%REC	FLAG	LCL	UCL
606013*1									
8015M	a,a,a-Trifluorotoluene	Re96572	06/03/96	50.8	50.0	102		78	126
606013*2									
8015M	a,a,a-Trifluorotoluene	Re96572	06/03/96	51.8	50.0	104		78	126
606013*3									
8015M	a,a,a-Trifluorotoluene	Re96261	06/04/96	539	500	108		78	126
606013*4									
8015M	a,a,a-Trifluorotoluene	Re96572	06/03/96	50.1	50.0	100		78	126
606013*5									
8015M	a,a,a-Trifluorotoluene	Re96261	06/04/96	48.9	50.0	98		78	126
606013*6									
8015M	a,a,a-Trifluorotoluene	Re96572	06/03/96	52.3	50.0	105		78	126
606013*7									
8015M	a,a,a-Trifluorotoluene	Re96572	06/03/96	48.9	50.0	98		78	126
606013*8									
8015M	a,a,a-Trifluorotoluene	Re96572	06/03/96	539	500	108		78	126
606013*9									
8015M	a,a,a-Trifluorotoluene	Re96572	06/03/96	524	500	105		78	126
606013*10									
8015M	a,a,a-Trifluorotoluene	Re96261	06/04/96	1070	1000	107		78	126
606013*11									
8015M	a,a,a-Trifluorotoluene	Re96261	06/04/96	494	500	99		78	126
606013*12									
8015M	a,a,a-Trifluorotoluene	Re96572	06/03/96	274	250	110		78	126
606013*13									
8015M	a,a,a-Trifluorotoluene	Re96572	06/03/96	51.4	50.0	103		78	126

CHAIN OF CUSTODY RECORD

BCA Log Number

69626013

Client name BROWN AND STEWART (BJ-Hobbs)				Project or PO# 2832.11		
Address 1415 Louisiana # 2500				Phone # 713-646-1133		
City, State, Zip Newport, TX 77002		Report attention Myra Dehnert				
Lab Sample number	Date sampled	Time sampled	Type See key below	Sampled by	Sample description	Number of containers
	5-31-96	1455	AQ	Richard Rexroad	MW-8	2
		1508	AQ		MW-6	2
		1510	AQ		2832-D	2
		1520	AQ		MW-5	2
		1522	AQ		FB-1	2
		1535	AQ		MW-7	2
		1550	AQ		MW-11	2
		1600	AQ		MW-9	2
		1607	AQ		MW-10	2
		1613	AQ		MW-3	2
		1618	AQ		MW-1	2
		1625	AQ		MW-4	2
		1630	AQ		TRIP BLANK #60502	2
Relinquished by <i>Richard Rexroad</i>			Signature		Print Name Richard Rexroad	Company Brown & Caldwell
Received by <i>Sharon Malone</i>			Signature		Print Name Sharon Malone	Company BCA
Relinquished by			Signature		Print Name	Company
Received by			Signature		Print Name	Company
Relinquished by			Signature		Print Name	Company
Received by Laboratory			Signature		Print Name	Company
Analyses required						Remarks Fed Ex Airbill # 9693597126
Hazardous sample Special handling required						

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge
GW—Groundwater SO—Soil PE—Petroleum
WW—Wastewater

Note: Samples are discarded 30 days after results are reported unless other arrangements are made.
Hazardous samples will be returned to client or disposed of at client's expense.

Disposal arrangements

B C ANALYTICAL

1085 Shary Circle Concord CA 94518 (510) 825-3894

1601 Western Avenue Glendale CA 91201 (818) 247-5737

1200 Gane Aultry Way Anaheim CA 92805 (714) 978-0113

1

C



APPENDIX C

REMEDIATION SYSTEM OPERATION DATA SHEETS

W:\BJSERV\2832\007R.DOC

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

BJ Services

Hobbs, New Mexico

ph (505) 392-5556

fax (505) 392-7307

Date : 4-25-96Recorded by : Kenny Hawnbuckle

Time : _____

Weather conditions : _____

Temperature : _____

Humidity : _____

Barometric Press : _____

Time : 8:30 am

Blower Measurements

Injection System

Flow Rate	40	scfm
Pressure	5.1	psi
Temperature	182°	F

Extraction System

Flow Rate	160	scfm
Vacuum	20	in. H ₂ O
Temperature	114°	F

Time : _____

Differential Pressure Readings (ΔP)

Injection System

Lat. #	ΔP (in. H ₂ O)	Ps (PSI)
1		
2		
3		
4		
5	N/A	N/A
6		
7		

Extraction System

Lat. #	ΔP (in. H ₂ O)	Ps (in. H ₂ O)
1		
2		
3		
4		
5		
6		
7		

Time : 6:00 pm

Blower Measurements

Injection System

Flow Rate	40	scfm
Pressure	5	psi
Temperature	194°	F

Extraction System

Flow Rate	160	scfm
Vacuum	20	in. H ₂ O
Temperature	126°	F

Fax daily to : Myna Dehnert @ (713) 759-0952
voice (713) 759-0999

BJ Services

Hobbs, New Mexico

ph (505) 392-5556

fax (505) 392-7307

Date : 5/31/96Recorded by : T. ParkerTime : 1400Weather conditions : Partly Sunny

Temperature : _____

Humidity : _____

Barometric Press : _____

Water drained from extraction unit:

AM Main _____

Standby _____

PM Main _____

Standby _____

Time : 1400**Blower Measurements****Injection System**

Flow Rate	<u>40</u>	<u>1600</u> scfm
Pressure	<u>5.1</u>	psi
Temperature	<u>190</u>	F

Extraction System

Flow Rate	<u>160</u>	scfm
Vacuum	<u>24</u>	in. H ₂ O
Temperature	<u>160</u>	F

Time : _____

Differential Pressure Readings (ΔP)**Injection System**

Lat. #	ΔP (in. H ₂ O)	Ps (PSI)
1		
2		
3		
4		
5	N/A	N/A
6		
7		

Extraction System

Lat. #	ΔP (in. H ₂ O)	Ps (in. H ₂ O)
1		
2		
3		
4		
5		
6		
7		

Time : _____

Blower Measurements**Injection System**

Flow Rate	scfm
Pressure	psi
Temperature	F

Extraction System

Flow Rate	scfm
Vacuum	in. H ₂ O
Temperature	F

Fax daily to : Myna Dehnert @ (713) 759-0952
voice (713) 759-0999

APPENDIX D

LABORATORY ANALYTICAL REPORTS

AIR SAMPLES



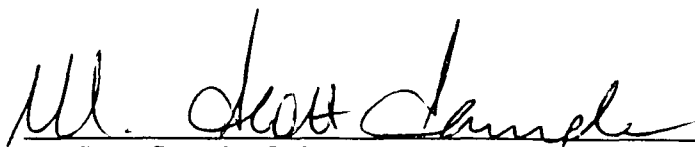
HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

SPL, INC.

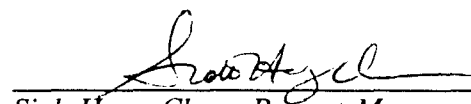
REPORT APPROVAL SHEET

WORK ORDER NUMBER: 96 - 04 - C90

Approved for release by:


M. Scott Sample, Laboratory Director

Date: 4/30/96


Siok Hong Chen, Project Manager

Date: 4/30/96



Southern Petroleum Laboratories

****SUMMARY REPORT****

®

04/29/96

HOUSTON LABORATORY

8880 INTERCHANGE DRIVE

HOUSTON, TEXAS 77054

PHONE (713) 660-0901

Company: Brown and Caldwell

Site: Hobbs, NM

Project No: 2832.31

Project: Hobbs Remediation

ANALYTICAL DATA

NOTE: ND - Not Detected

CLIENT ID DATE SAMPLED	BENZENE PQL	TOLUENE PQL	ETHYLBENZ. PQL	XYLENE PQL	TPH-IR	TPH-GC	LEAD	MTBE
4007-01 Effluent 042496-01 04/24/96 15:00:00	4 1ppm	37 1ppm	10 1ppm	36 1ppm		900 25ppm		

EX - METHOD 5030/8020 (Modified)***
GC - Method Modified 8015A Air***

SPL, Inc., - Project Manager



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

Certificate of Analysis No. H9-9604C90-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Myna Dehnert

DATE: 04/29/96

PROJECT: Hobbs Remediation
SITE: Hobbs, NM
SAMPLED BY: B J Services
SAMPLE ID: Effluent 042496-01

PROJECT NO: 2832.31
MATRIX: AIR
DATE SAMPLED: 04/24/96 15:00:00
DATE RECEIVED: 04/25/96

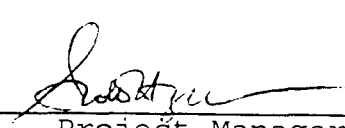
ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	4	1 P	ppm
TOLUENE	37	1 P	ppm
ETHYLBENZENE	10	1 P	ppm
TOTAL XYLENE	36	1 P	ppm
TOTAL VOLATILE AROMATIC HYDROCARBONS	87		ppm
METHOD 5030/8020 (Modified)***			
Analyzed by: DAO			
Date: 04/26/96			
Total Petroleum Hydrocarbons	900	25	ppm
Method Modified 8015A Air***			
Analyzed by: DAO			
Date: 04/26/96 02:35:00			

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.


SPL, Inc., - Project Manager

QUALITY CONTROL
DOCUMENTATION



* SPL BATCH QUALITY CONTROL REPORT **
METHOD 5030/8020 (Modified)

PAGE

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

Matrix: Air
Units: ppm

Batch Id: HP_P960425104010

B L A N K S P I K E S

S P I K E C O M P O U N D S	Sample Results	Spike Added	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative % Difference	QC Limits(**) (Advisory)	
			Result	Recovery	Result	Recovery		RPD	Recovery Range
			<1>	<4>	<1>	<5>		Max.	
BENZENE	ND	20	14	70.0	14	70.0	0	30	20 - 150
TOLUENE	ND	20	13	65.0	14	70.0	7.41	30	20 - 150
ETHYLBENZENE	ND	20	13	65.0	14	70.0	7.41	30	20 - 150
M XYLENE	ND	20	13	65.0	14	70.0	7.41	30	20 - 150
M & P XYLENE	ND	20	15	75.0	16	80.0	6.45	30	20 - 150

Analyst: DAO
Sequence Date: 04/25/96
Method Blank File ID:
Sample File ID:
Blank Spike File ID: PP_709.TX0
Matrix Spike File ID:
Matrix Spike Duplicate File ID:

* = Values Outside QC Range
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
 $\% \text{ Recovery} = [(<1> - <2>) / <3>] \times 100$
 $\text{Relative Percent Difference} = [(<4> - <5>) / [(<4> + <5>) \times 0.5]] \times 100$
(**) = Source: Temporary Limits

SAMPLES IN BATCH(SPL ID):

9604D25-01A 9604D25-02A 9604C90-01A

QC Officer



** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8015 (Modified)

PAGE

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

Matrix: Air
Units: ppm

Batch Id: HP_P960425104000

B L A N K S P I K E S

S P I K E C O M P O U N D S	Sample Results <2>	Spike Added <3>	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative % Difference	QC Limits(**) (Advisory)	
			Result	Recovery	Result	Recovery		RPD Max.	Recovery Range
			<1>	<4>	<1>	<5>			
TPHAIR	ND	200	200	99.5	230	114	13.6	30	20 - 150

Analyst: DAO

Sequence Date: 04/25/96

Method Blank File ID:

Sample File ID:

Blank Spike File ID: P__709.TX0

Matrix Spike File ID:

Matrix Spike Duplicate File ID:

* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

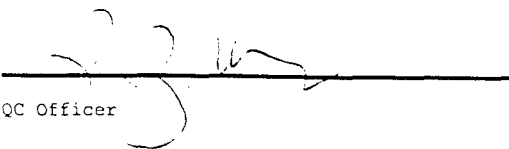
% Recovery = [(<1> - <2>) / <3>] x 100

Relative Percent Difference = | (<4> - <5>) | / [(<4> + <5>) x 0.5] x 100

(**) = Source: Temporary limits

SAMPLES IN BATCH(SPL ID):

9604D25-01A 9604D25-02A 9604C90-01A


QC Officer

CHAIN OF CUSTODY
AND
SAMPLE RECEIPT CHECKLIST



Environmental Laboratory
8880 Interchange Drive
Houston, Texas 77054
713/660-0901

Analysis Request and Chain of Custody Record

[illegible]

© Brown & Caldwell

SPL Houston Environmental Laboratory

Sample Login Checklist

Date: 4-25-96	Time: 11:00
------------------	----------------

SPL Sample ID: 9604C90

		Yes	No
1	Chain-of-Custody (COC) form is present.	☒	☐
2	COC is properly completed.	☒	☐
3	If no, Non-Conformance Worksheet has been completed.	☐	☐
4	Custody seals are present on the shipping container.	☒	☐
5	If yes, custody seals are intact.	☒	☐
6	All samples are tagged or labeled.	☒	☐
7	If no, Non-Conformance Worksheet has been completed.	☐	☐
8	Sample containers arrived intact	☒	☐
9	Temperature of samples upon arrival:	Ambient, C	
10	Method of sample delivery to SPL:	SPL Delivery	☐
		Client Delivery	☐
		FedEx Delivery (airbill #)	788271 9530
		Other:	☐
11	Method of sample disposal:	SPL Disposal	☒
		HOLD	☐
		Return to Client	☐

Name: Elita Brown	Date: 4/25/96
----------------------	------------------

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

FINAL

**FEBRUARY 1996 GROUNDWATER
SAMPLING REPORT
HOBBS, NEW MEXICO FACILITY**

BJ SERVICES COMPANY, U.S.A.

JUNE 17, 1996

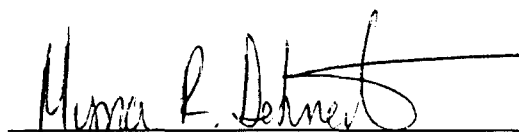


**FINAL
FEBRUARY 1996 GROUNDWATER SAMPLING REPORT
HOBBS, NEW MEXICO FACILITY
BJ SERVICES COMPANY, U.S.A.**

Prepared for

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

BC Project Number: 2832.11



Myna R. Dehnert
Associate Geologist
Certified Scientist #057

June 17, 1996

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

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

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1.0	INTRODUCTION	1
2.0	GROUNDWATER SAMPLING AND ANALYSES.....	2
2.1	GROUNDWATER MEASUREMENTS AND SAMPLING	2
2.2	RESULTS OF GROUNDWATER ANALYSES	3
3.0	REMEDIATION SYSTEM.....	5
4.0	CONCLUSIONS AND RECOMMENDATIONS	7
4.1	CONCLUSIONS	7
4.2	RECOMMENDATIONS	7

DISTRIBUTION AND QA/QC REVIEWER'S SIGNATURE

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- 1 Site Map
- 2 Potentiometric Surface Map
- 3 Benzene Concentration Map
- 4 Hydrocarbon Distribution Map
- 5 Schematic Of Biosparging System

TABLES

- 1 Site Chronology
- 2 Cumulative Groundwater Elevation Data
- 3 Field Screening Results for Groundwater Samples
- 4 Cumulative Results Of Analysis For Groundwater Samples
- 5 Summary Of Analytical Results For Air Emissions

APPENDICES

- A Groundwater Sampling Forms
- B Laboratory Analytical Reports Groundwater Samples
- C Remediation System Operation Data Sheets
- D Laboratory Analytical Reports Air Samples



1.0 INTRODUCTION

Brown and Caldwell conducted the field activities associated with the February 1996 quarterly groundwater sampling event at BJ Services Company, U.S.A. (BJ Service) facility located at 2708 West County Road, in Hobbs, New Mexico. The facility layout is shown on Figure 1.

The facility formerly operated an above-grade on-site fueling system. Subsurface contamination near the fueling system was first detected by the New Mexico Oil Conservation Division (OCD) during an on-site inspection on February 7, 1991. The fueling system was taken out of operation in July 1995. The fueling system comprised one, 22,500 gallon diesel aboveground storage tank (AST) and one, 5,500 gallon AST. The New Mexico Oil Conservation Division (OCD) requires quarterly groundwater monitoring for hydrocarbon constituents, as the result of the diesel fuel release. A site chronology detailing the history of the fueling system, the groundwater recovery system, and previous sampling events is presented in Table 1.

During the February 1996 sampling event, groundwater samples were collected and analyzed for total benzene, ethylbenzene, toluene, and total xylene (BETX). This report presents the results of the groundwater sampling event conducted for BJ Services and includes a description of the field activities and a summary of the analytical results. Also included is a groundwater potentiometric surface map and hydrocarbon distribution map.



2.0 GROUNDWATER SAMPLING AND ANALYSES

On February 23 and 24, 1996 Brown and Caldwell purged and sampled the groundwater monitoring wells to determine concentrations of dissolved-phase hydrocarbons in the groundwater at the facility. The following sections describe the activities conducted during this sampling event.

2.1 Groundwater Measurements and Sampling

A total of 10 monitoring wells were sampled during the quarterly sampling event. A Site Map depicting the locations of the monitoring wells is presented as Figure 1. As noted in previous sampling reports, monitoring well MW-2 can not be located and is assumed to have been destroyed during facility activities such as grading.

Groundwater level measurements were obtained from all monitoring wells prior to purging and sampling the wells. The 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 on Table 2. The groundwater elevation data indicates that the general groundwater flow direction is towards the southeast with a hydraulic gradient of 0.008 ft/ft. A Potentiometric Surface Map is presented in Figure 2. Phase-separated hydrocarbons were detected in monitoring wells MW-1 and MW-4 with thickness ranging from a sheen to 0.01 feet. The presence of phase-separated hydrocarbons in monitoring wells MW-1 and MW-4 is attributed to the decline in water levels since the previous quarter.

Groundwater samples were collected from all monitoring wells on February 23 and 24, 1996. The samples were collected after purging the wells with a submersible pump to remove at least three well volumes or until the well became dry. Field parameter measurements for pH, conductivity, and temperature were collected after each well volume was purged. Two consecutive readings within five percent were used to indicate that groundwater had stabilized. The parameters in each monitoring well typically stabilized after two well volumes had been removed; however, at least three well volumes were removed from each well.

Following recovery, the groundwater samples were collected from each monitoring well using a new, 3-foot long, 1/2-inch I.D., disposable polyethylene bailer. Each sample was transferred to laboratory prepared, clean glass and/or plastic containers sealed with Teflon[®]-lined lids; labeled; and placed on ice in an insulated cooler for shipment via overnight courier to BC Analytical in Glendale, California. Each cooler was accompanied by completed chain-of-custody documentation.

Additional groundwater parameters were measured to assess the potential for natural attenuation purposes during the purging and sampling activities. These parameters were dissolved oxygen and dissolved ferrous iron. All 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 samples are presented on Table 3.

All field measurement equipment was decontaminated prior to and after each use. Decontamination procedures used consisted of washing with fresh water and a non-phosphate detergent and rinsed with deionized (DI) water. Purged water and excess water generated by equipment cleaning operations was placed into 55-gallon drums and transferred to the on-site drum staging area located in the northeast corner of the facility for classification and future disposal by BJ Services.

2.2 Results of Groundwater Analyses

Groundwater samples collected during this sampling event were analyzed for benzene, ethylbenzene, toluene, and total xylenes (BETX) by EPA Method 8020 and total petroleum hydrocarbons (TPH) by EPA Method 8015 Modified. Total concentrations of BETX constituents above the laboratory detection limit were reported in 7 of the 10 groundwater samples obtained during this sampling event. Total benzene concentrations ranged from below the method detection limit of 0.3 micrograms per liter ($\mu\text{g/L}$) in MW-5, MW-7, and MW-8 to 8,100 $\mu\text{g/L}$ in MW-6. Total BETX concentrations ranged from below the method detection limit of 0.6 $\mu\text{g/L}$ in MW-5 to

24,400 µg/L in MW-6. TPH concentrations ranged from below the detection limit of 0.100 milligrams per liter (mg/L) to 58 mg/L in MW-6. A cumulative summary of analytical results for groundwater samples is included as Table 4. A benzene concentration map is included as Figure 3. Figure 4 illustrates the distribution of selected target analytes, which include benzene, total BETX, and TPH. The laboratory analytical reports and chain of custody record are included in Appendix B.



3.0 REMEDIATION SYSTEM

Brown and Caldwell submitted a Remedial Action Plan (RAP) to the New Mexico OCD in May 1994. Based on the results from 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 contaminants in the soil residual (adsorbed phase) and in the soil moisture (dissolved phase), and removes the volatile contaminants. 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 the groundwater and the soil moisture in the capillary fringe and vadose zone. The higher dissolved oxygen content facilitates indigenous microorganisms to accelerate biodegradation of the contaminants. The flushing of the air also strips the volatile and semivolatile contaminants.

The OCD approved the RAP on August 11, 1994. The installation of the biosparging system was conducted between August 2 through 24, 1995. A total of nineteen combined injection/extraction wells, 3 vacuum extraction wells, associated piping, and two extraction blowers and one injection blower were installed. The biosparging system layout is presented in Figure 5. The vapors recovered during the extraction process are discharged to the atmosphere in accordance with the State of New Mexico Air Quality Regulations.

During system operations, blower operating parameters, such as flow rate, pressure, and vapor temperature are monitored and recorded on the System Operation Data Sheets included in Appendix C. An effluent air sample is collected on a monthly basis from the recovered vapors to monitor the bioremediation process and emission rate. A summary of the analytical results for the air emissions is included as Table 5. The laboratory analytical reports and chain-of-custody documentation are included in Appendix D.

Since the biosparging system has been in operation, the vapor extraction system has operated at an average flow of 125 cfm at 100°F. The air injection system has operated at an average flow of 28 cfm at 4.5 psig, 160°F. Monthly air samples have been collected and analyzed for total petroleum hydrocarbons (TPH) using EPA Method 8015 (modified) and total volatile aromatic hydrocarbons, benzene, ethylbenzene, toluene, and total xylene (BETX) using EPA Method 4030/8020 (modified). The total BETX emissions for the second quarter ranged from 0.23 lb/hour to 0.33 lb/hour and TPH emissions ranged from 1.04 lb/hr to 2.33 lb/hr.



4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the quarterly groundwater sampling event.

4.1 Conclusions

- Groundwater flow remains to the east with an average hydraulic gradient of 0.008 ft/ft.
- Free product thickness has decreased in MW-1 and MW-4 since November 1995.
- Total BETX concentrations have decreased in monitor wells MW-3, MW-7, MW-8, MW-10, and MW-11.
- Benzene concentrations in monitor wells MW-7 and MW-8 are below the New Mexico Water Quality Control Commission standard of 0.01 mg/L.

4.2 Recommendations

- Continue the quarterly groundwater sampling program and the operation and maintenance of the biosparging system.

DISTRIBUTION

Final
February 1996 Groundwater Sampling Report
Hobbs, New Mexico

June 17, 1996

Copy No. 1

Copy 1: State of New Mexico
 Energy, Minerals, and Natural Resources Dept.
 Oil Conservation Division
 P.O. Box 2088, State Land Office Building
 Santa Fe, New Mexico 87504

Attention: Mr. Mark Ashley

Copy 2: State of New Mexico
 Oil Conservation Division
 Hobbs District Office
 P.O. Box 1980
 Hobbs, New Mexico 88240

Attention: Mr. Wayne Price

Copy 3: State of New Mexico
 Air Pollution Control Bureau
 2048 Galsteo Street
 Santa Fe, New Mexico 87505

Attention: Mr. Satya Neel

Copy 4: BJ Services Company, U.S.A.
 8701 New Trails Drive
 The Woodland, Texas 77381

Attention: Ms. Jo Ann Cobb

Copy 5: BJ Services Company, U.S.A.
 2708 West County Road
 Hobbs, New Mexico 88240

Attention: Mr. Brad Brooks

DISTRIBUTION (Continued)

Final

February 1996 Groundwater Sampling Report

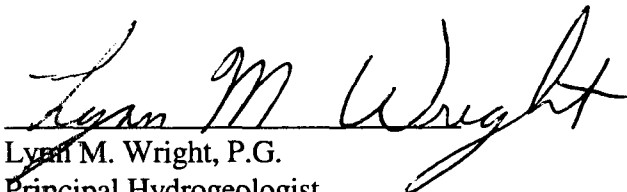
Hobbs, New Mexico

June 17, 1996

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 Houston, Texas 77002

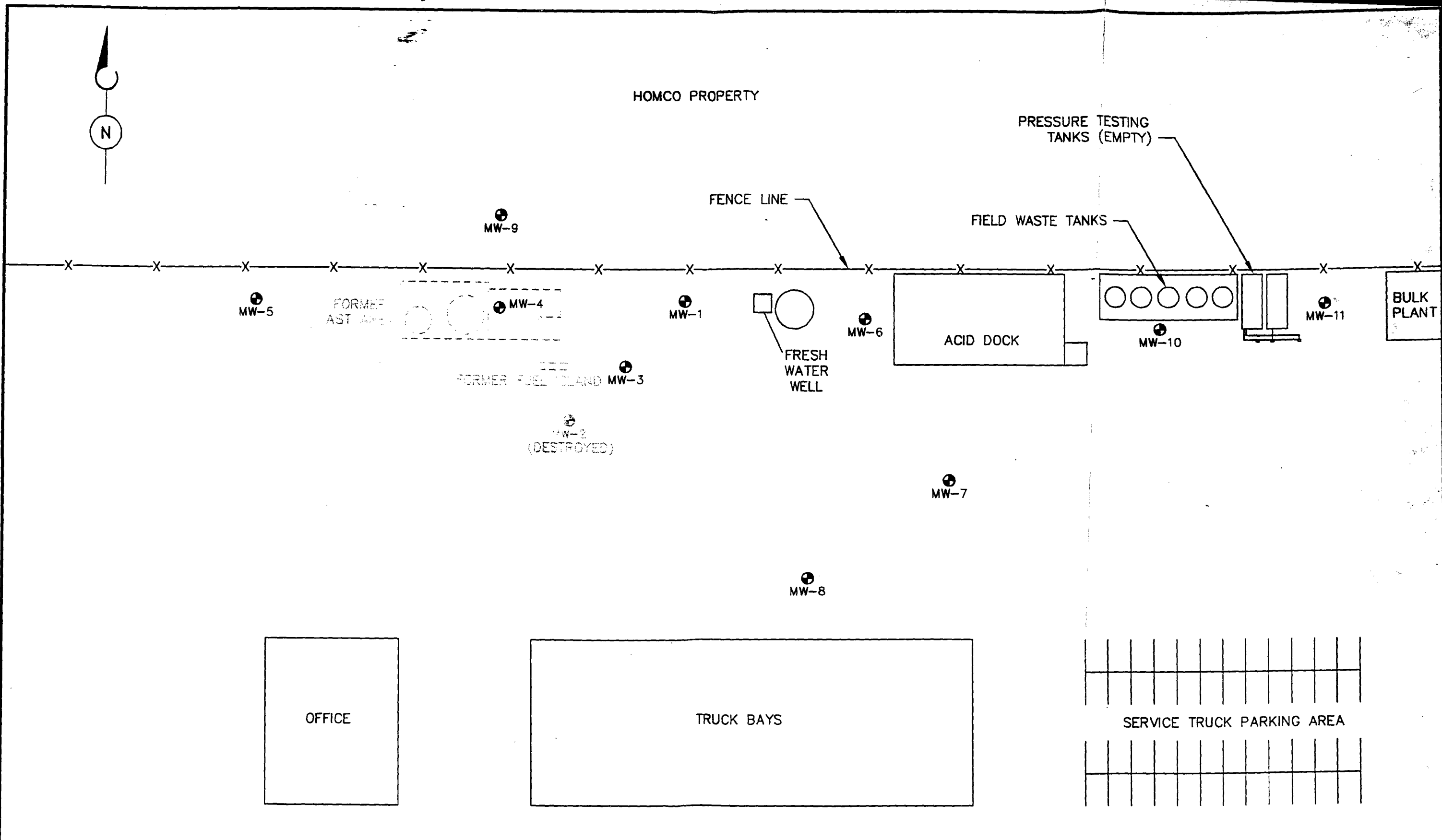
QUALITY CONTROL REVIEWER


Lynn M. Wright, P.G.
Principal Hydrogeologist

MRD:elg

W:\BJSERV\2832\004R.DOC

FIGURES



BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: PRO DATE: 6/96

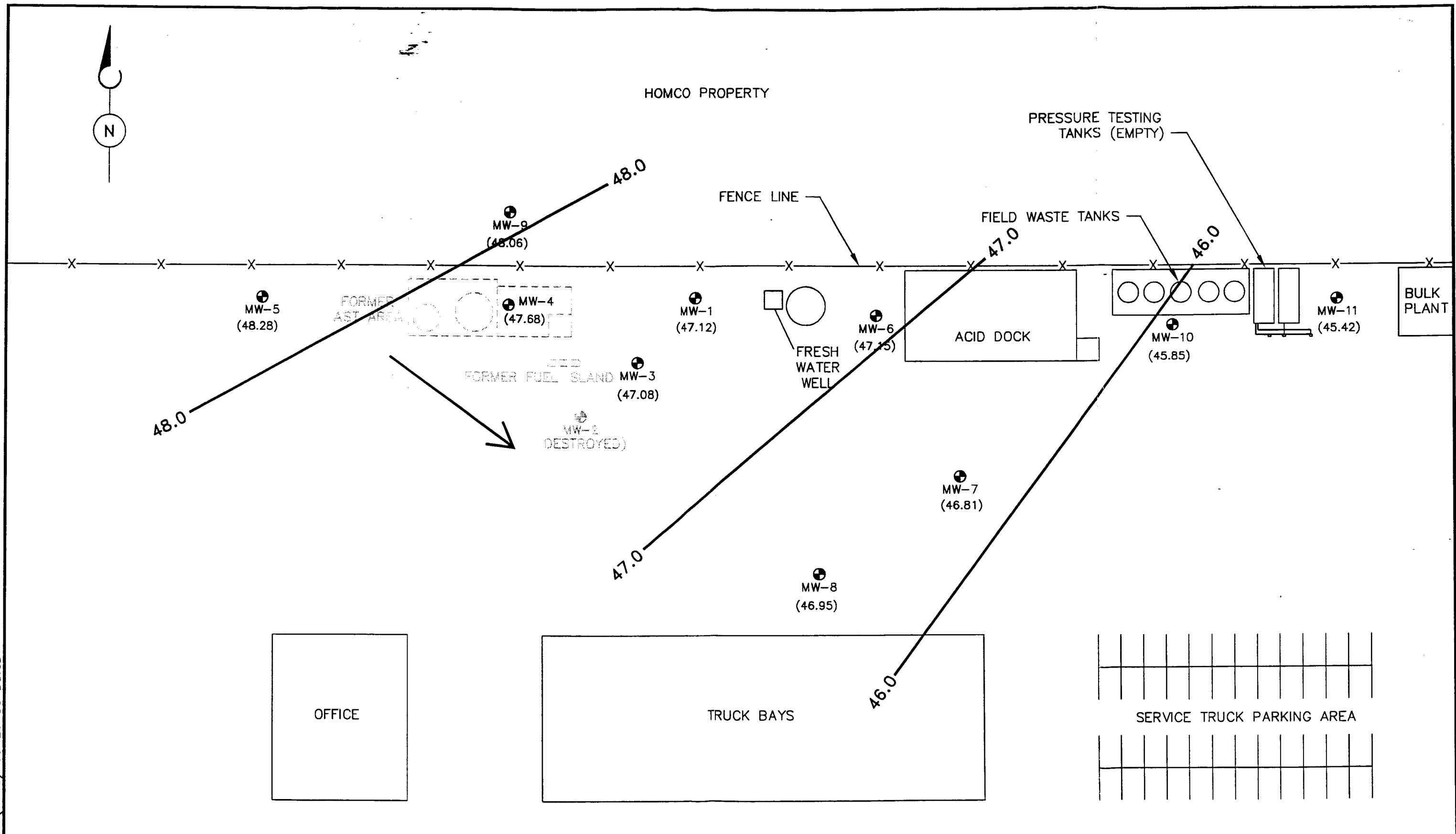
0 20 40
SCALE: 1" = 40'
DRAWN BY: DHD DATE: 9/11
CHECKED BY: WLD DATE: 6/96

MW-8

LEGEND
MONITORING WELL LOCATION AND IDENTIFICATION

TITLE	SITE MAP	DATE	12/19/95
CLIENT	BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER	2832-10
SITE	HOBBS, NEW MEXICO	FIGURE NUMBER	1

T:\2832\POIN0223 (1=40) 03-26-96 DaveD



BROWN AND CALDWELL

HOUSTON, TEXAS

SUBMITTED: [Signature] DATE: 6/96

PROJECT MANAGER

APPROVED: _____ DATE: _____

BROWN AND CALDWELL

0 20 40

SCALE: 1" = 40'

DRAWN BY: DMD DATE: 2/11

CHK'D BY: [Signature] DATE: 6/96

APPROVED: _____ DATE: _____

LEGEND

● MW-8

(47.12)

— 47.0 —

MONITORING WELL LOCATION AND IDENTIFICATION

POTENTIOMETRIC SURFACE ELEVATION, FEET

POTENTIOMETRIC SURFACE CONTOUR, FEET

TITLE

POTENTIOMETRIC SURFACE MAP

CLIENT

BJ SERVICES COMPANY, U.S.A.

SITE

HOBBS, NEW MEXICO

DATE

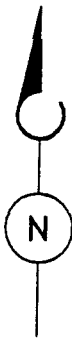
3/26/96

PROJECT NUMBER

2832-11

FIGURE NUMBER

2

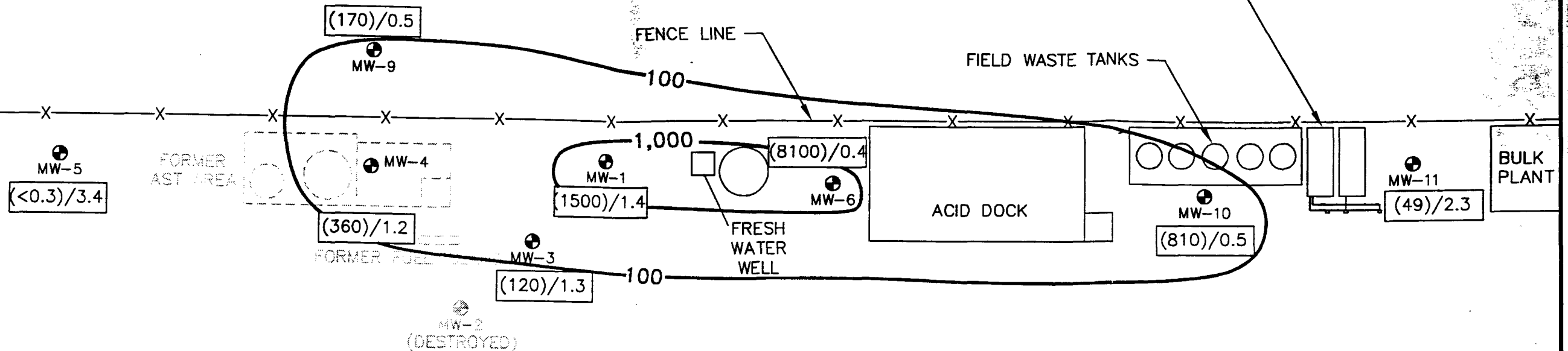


HOMCO PROPERTY

PRESSURE TESTING
TANKS (EMPTY)

FIELD WASTE TANKS

BULK
PLANT



OFFICE

TRUCK BAYS

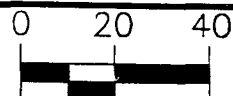
SERVICE TRUCK PARKING AREA

BROWN AND
CALDWELL

HOUSTON, TEXAS

SUBMITTED: DATE: 6/96
PROJECT MANAGER

APPROVED: DATE: _____
BROWN AND CALDWELL



SCALE: 1" = 40'
DRAWN BY: DHD DATE 5/26
CHK'D BY: WED DATE 6/96
APPROVED: DATE: _____



MW-8
(120)/1.3

LEGEND

MONITORING WELL LOCATION AND IDENTIFICATION

BENZENE CONCENTRATION (ug/L)/DISSOLVED OXYGEN (mg/L)

BASED ON SAMPLES COLLECTED ON 2/23/96.

TITLE

BENZENE CONCENTRATION MAP

CLIENT

BJ SERVICES COMPANY, U.S.A.

SITE

HOBBS, NEW MEXICO

DATE

3/26/96

PROJECT NUMBER

2832-11

FIGURE NUMBER

3



HOMCO PROPERTY

PRESSURE TESTING
TANKS (EMPTY)

FORMER AST AREA

FENCE LINE

FIELD WASTE TANKS

BULK
PLANT

MW-5
0.3 / 0.6
0.100

MW-4
360 / 6,220
18

170 / 350
4.3
MW-9

MW-1
1,500 / 8,020
21

FRESH
WATER
WELL

MW-6
8,100 / 24,400
58

ACID DOCK

MW-10
810 / 904
2.4

MW-11
49 / 54.7
0.25

FORMER FUEL ISLAND

MW-2
(DESTROYED)

MW-3
120 / 1,660
4

MW-7
0.3 / 0.6
0.100

MW-8
0.3 / 0.6
0.100

OFFICE

TRUCK BAYS

SERVICE TRUCK PARKING AREA

BROWN AND
CALDWELL

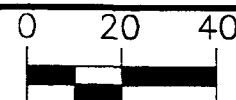
HOUSTON, TEXAS

SUBMITTED: *M. Dennis* DATE: *6/96*

PROJECT MANAGER

APPROVED: _____ DATE: _____

BROWN AND CALDWELL



SCALE: 1" = 40'

DRAWN BY: *DMD* DATE: *9/11*

CHK'D BY: *MD* DATE: *6/96*

APPROVED: _____ DATE: _____

LEGEND

MW-8

360 / 6,220
18

MONITORING WELL LOCATION AND IDENTIFICATION

BENZENE / TOTAL BTEX (ug/L)
TPH (mg/L)

TITLE

HYDROCARBON DISTRIBUTION MAP

CLIENT

BJ SERVICES COMPANY, U.S.A.

SITE

HOBBS, NEW MEXICO

DATE

3/26/96

PROJECT NUMBER

2832-11

FIGURE NUMBER

4

HOMCO PROPERTY

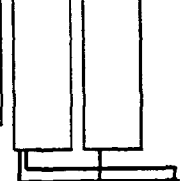
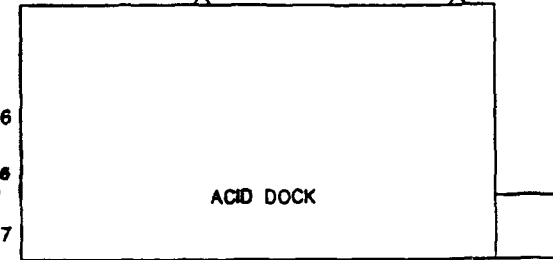
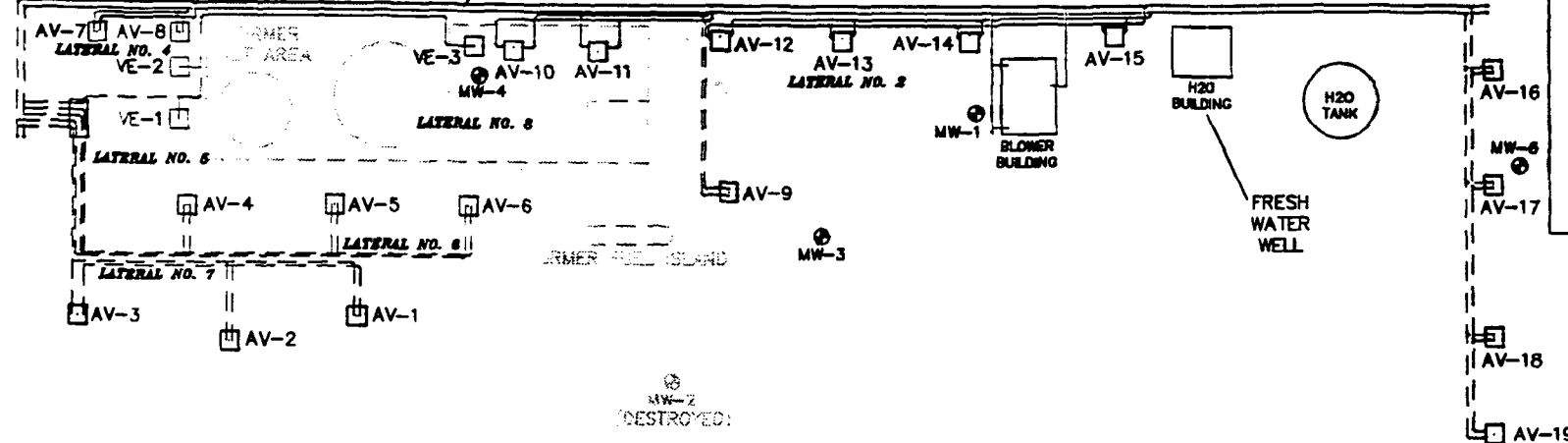


FENCE LINE

PRESSURE TESTING
TANKS (EMPTY)

FIELD WASTE TANKS

4" INJECTION HEADER 4" EXTRACTION HEADER



OFFICE

TRUCK BAYS

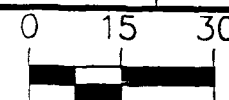
SERVICE TRUCK PARKING AREA

BROWN AND CALDWELL

HOUSTON, TEXAS

SUBMITTED: *M. D. Caldwell* DATE: *6/96*
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL



SCALE: 1" = 30'

DRAWN BY: *DHD* DATE: *12/15*

CHK'D BY: *MCD* DATE: *6/96*
APPROVED: _____ DATE: _____

LEGEND

- MONITORING WELL LOCATION AND IDENTIFICATION
- AV-2 EXTRACTION AND INJECTION WELL
- VE-1 VACUUM EXTRACTION WELL
- ABOVE GRADE VACUUM AND INJECTION LINES
- BURIED VACUUM AND INJECTION LINES

TITLE

SCHEMATIC OF BIOSPARING SYSTEM

CLIENT

BJ SERVICES COMPANY, U.S.A.

SITE

HOBBS, NEW MEXICO

DATE

12/19/95

PROJECT NUMBER

2832-10

FIGURE NUMBER

5

Tables

TABLES

TABLE 1
SITE CHRONOLOGY
BJ SERVICES COMPANY, U.S.A.
HOBBS, NEW MEXICO

DATE	ACTIVITY
February 7, 1991	The State of New Mexico Oil Conservation Division (OCD) conducted an on-site inspection, including sampling of the on-site fresh water well.
August 6, 1991	OCD requests submittal of an investigation work plan.
September 5, 1991	Roberts/Schornick and Associates, Inc. (RSA) submits Technical Work Plan for soil and groundwater investigation to the OCD.
November 15, 1991	The OCD approves Technical Work Plan submitted by RSA.
December 16, 1991	RSA samples the fresh water well. Analytical results are submitted to the OCD.
February 21, 1992	Western samples the fresh water well. Analytical results are submitted to the OCD.
July 29 - August 10, 1992	Brown and Caldwell conducts a soil and groundwater investigation according to the approved Technical Work Plan. Investigation included drilling and sampling 9 soil borings, sampling 6 hand-augered soil borings, the installation and sampling of 5 monitoring wells, and the sampling of the fresh water well.
October 12, 1992	Brown and Caldwell submits Soil and Groundwater Investigation Report to the OCD.
December 2, 1992	The OCD requests the installation and sampling of 4 additional monitoring wells, including a monitoring well on an adjacent property.
April 13, 1993	Brown and Caldwell conducts a vapor extraction pilot test on existing groundwater monitoring wells.
April 15, 1993	Brown and Caldwell installs off-site monitoring well.
April 22, 1993	Brown and Caldwell samples off-site monitoring well.
May 27, 1993	Brown and Caldwell submits a letter report documenting the installation and sampling of the off-site monitoring well to the OCD.
June 2, 1993	Brown and Caldwell conducts a short-term aquifer test using the fresh water well at the facility.
June 8, 1993	USTank Management, Inc. Conducts a non-volumetric tank system tightness test on the diesel and unleaded gasoline aboveground storage tanks at the facility.
June 21, 1993	ENSR Consulting and Engineering (ENSR) requests to sample the off-site monitoring well. ENSR is the environmental consultant of the adjacent property owner on which the off-site well is located.
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. Submits 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 2 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; all 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 quarterly groundwater sampling event.

TABLE 1 (CONTINUED)
SITE CHRONOLOGY
BJ SERVICES COMPANY, U.S.A.
HOBBS, NEW MEXICO

DATE	ACTIVITY
July 31, 1995	Brown and Caldwell conducted quarterly groundwater sampling event.
August 2-9, 1995	Installation of biosparging system initiated. Nineteen combined injection/extraction wells and three vacuum extraction wells 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 quarterly groundwater sampling event.
February 23, 1996	Brown and Caldwell conducted quarterly groundwater sampling event.

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

Well ID	Date Measured	Top of Casing Elevation (ft) (relative)	Depth to Water from TOC (ft) ⁽¹⁾	Depth to Hydrocarbon from TOC (ft)	Hydrocarbon Thickness (ft)	Potentiometric Surface Elevation (ft)
MW-1	August 10, 1992	101.44	53.22	None	0.00	48.22
	February 9, 1993	101.44	53.03	None	0.00	48.41
	August 18, 1993	101.44	53.10	None	0.00	48.34
	January 26, 1994	101.44	53.31	None	0.00	48.13
	May 3, 1995	101.44	54.64	54.44	0.20	46.80
	July 31, 1995	101.44	54.14	None	0.00	47.30
	November 14, 1995	101.44	53.69	None	0.00	47.75
	February 23, 1996	101.44	54.32	SHEEN	0.01	47.12
MW-2	August 10, 1992	101.5	52.82	None	0.00	48.68
	February 9, 1993	98.75	49.60	None	0.00	49.15
	August 18, 1993	98.75	49.71	None	0.00	49.04
	January 26, 1994	98.75	49.97	None	0.00	48.78
	May 3, 1995	98.75		Well destroyed ⁽²⁾		
MW-3	August 10, 1992	101.44	52.99	None	0.00	48.45
	February 9, 1993	101.44	52.72	None	0.00	48.72
	August 18, 1993	101.44	52.82	None	0.00	48.62
	January 26, 1994	101.44	53.05	None	0.00	48.39
	May 3, 1995	101.44	54.31	None	0.00	47.13
	July 31, 1995	98.76	51.24	None	0.00	47.52
	November 14, 1995	98.76	51.10	None	0.00	47.66
	February 23, 1996	98.76	51.68	None	0.00	47.08
MW-4	August 10, 1992	99.33	50.55	None	0.00	48.78
	February 9, 1993	99.33	50.26	None	0.00	49.07
	August 18, 1993	99.33	50.38	None	0.00	48.95
	January 26, 1994	99.33	50.90	50.60	0.30	48.43
	May 3, 1995	99.33	51.51	51.06	0.45	47.82
	July 31, 1995	99.33	51.74	51.48	0.26	47.59
	November 14, 1995	99.33	51.03	None	0.00	48.30
	February 23, 1996	99.33	51.65	SHEEN	0.01	47.68
MW-5	August 10, 1992	101.85	52.38	None	0.00	49.47
	February 9, 1993	101.85	52.06	None	0.00	49.79
	August 18, 1993	101.85	52.16	None	0.00	49.69
	January 26, 1994	101.85	52.50	None	0.00	49.35
	May 3, 1995	101.85	53.57	None	0.00	48.28
	July 31, 1995	101.85	53.27	None	0.00	48.58
	November 14, 1995	101.85	52.83	None	0.00	49.02
	February 23, 1996	101.85	53.57	None	0.00	48.28
MW-6	February 9, 1993	99.25	50.58	None	0.00	48.67
	August 18, 1993	99.25	50.78	None	0.00	48.47
	January 26, 1994	99.25	51.00	None	0.00	48.25
	May 3, 1995	99.25	52.63	None	0.00	46.62
	July 31, 1995	99.25	51.90	None	0.00	47.35
	November 14, 1995	99.25	51.19	None	0.00	48.06
	February 23, 1996	99.25	52.10	None	0.00	47.15

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

Well ID	Date Measured	Top of Casing Elevation (ft) (relative)	Depth to Water from TOC (ft) ⁽¹⁾	Depth to Hydrocarbon from TOC (ft)	Hydrocarbon Thickness (ft)	Potentiometric Surface Elevation (ft)
MW-7	February 9, 1993	98.96	50.53	None	0.00	48.43
	August 18, 1993	98.96	50.74	None	0.00	48.22
	January 26, 1994	98.96	51.01	None	0.00	47.95
	May 3, 1995	98.96	52.25	None	0.00	46.71
	July 31, 1995	98.96	51.92	None	0.00	47.04
	November 14, 1995	98.96	51.48	None	0.00	47.48
	February 23, 1996	98.96	52.15	None	0.00	46.81
MW-8	February 9, 1993	99.12	50.48	None	0.00	48.64
	August 18, 1993	99.12	50.67	None	0.00	48.45
	January 26, 1994	99.12	50.96	None	0.00	48.16
	May 3, 1995	99.12	52.15	None	0.00	46.97
	July 31, 1995	99.12	51.77	None	0.00	47.35
	November 14, 1995	99.12	51.37	None	0.00	47.75
	February 23, 1996	99.12	52.17	None	0.00	46.95
MW-9	April 22, 1993	99.18	49.73	None	0.00	49.45
	July 15, 1993	99.18	49.65	None	0.00	49.53
	August 18, 1993	99.18	49.85	None	0.00	49.33
	January 26, 1994	99.18	50.02	None	0.00	49.16
	May 3, 1995	99.18	51.35	None	0.00	47.83
	July 31, 1995	99.18	50.97	None	0.00	48.21
	November 14, 1995	99.18	50.43	None	0.00	48.75
	February 23, 1996	99.18	51.12	None	0.00	48.06
MW-10	August 18, 1993	98.9	51.54	None	0.00	47.36
	January 26, 1994	98.9	51.90	None	0.00	47.00
	May 3, 1995	98.9	52.97	None	0.00	45.93
	July 31, 1995	98.9	52.87	None	0.00	46.03
	November 14, 1995	98.9	52.51	None	0.00	46.39
	February 23, 1996	98.9	53.05	None	0.00	45.85
MW-11	August 18, 1993	98.82	51.92	None	0.00	46.90
	January 26, 1994	98.92	52.32	None	0.00	46.60
	May 3, 1995	98.92	53.38	None	0.00	45.54
	July 31, 1995	98.92	53.35	None	0.00	45.57
	November 14, 1995	98.92	52.96	None	0.00	45.96
	February 23, 1996	98.92	53.50	None	0.00	45.42

Notes: (1) All measurements are recorded to the nearest 0.01 foot units.
 (2) MW-2 could not be located and is assumed destroyed.

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

Well I.D.	Sample Date	Well Casing Vol. (gallons)	Well Volume No.	pH (Std. Units)	Conductivity (Microhms/cm)	Temperature (Celcius)	Redox (mV)	Dissolved Oxygen (mg/L)	Ferrous Iron (mg/L)
MW-1	23-Feb-96	1.6	1	6.73	1,120	18.8	-169	1.0	
		3.2	2	6.75	1,120	18.8	-162	1.2	
		5.0	3	6.81	1,160	19.0	-154	1.4	0.1
MW-3	23-Feb-96	2	1	6.89	1,140	18.9	-116	1.8	
		4	2	6.80	1,120	19.0	-106	1.3	
		6.4	3	6.80	1,120	19.0	-099	2.0	0.1
MW-4	23-Feb-96	1.5	1	6.74	1,310	18.6	-169	0.6	
		3.0	2	6.75	1,290	18.6	-162	1.2	
		4.5	3	6.75	1,280	18.6	-146	2.0	0.85
MW-5	23-Feb-96	1.8	1	6.81	1,080	18.4	091	4.6	
		3.5	2	6.82	1,030	18.5	090	3.6	
		5.3	3	6.82	1,030	18.6	089	3.4	0.1
MW-6	23-Feb-96	1.3	1	6.46	1,690	18.7	-177	0.5	
		2.6	2	6.46	1,680	18.7	-179	0.4	
		4.0	3	6.48	1,670	18.7	-178	0.4	1.1
MW-7	23-Feb-96	1.5	1	6.32	1,650	18.6	069	1.7	
		3.0	2	6.33	1,640	18.9	063	0.6	
		4.5	3	6.35	1,630	18.9	065	0.7	0.1

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

Well I.D.	Sample Date	Well Casing Vol. (gallons)	Well Volume No.	pH (Std. Units)	Conductivity (Microhms/cm)	Temperature (Celcius)	Redox (mV)	Dissolved Oxygen (mg/L)	Ferrous Iron (mg/L)
MW-8	23-Feb-96	2.6	1	6.52	1,600	18.6	107	3.1	
		5.2	2	6.48	1,670	18.7	109	2.9	
		7.8	3	6.49	1,670	18.8	109	2.9	0.1
MW-9	23-Feb-96	1.5	1	6.45	1,320	19.0	063	0.5	
		3.0	2	6.45	1,300	19.0	050	0.5	
		4.5	3	6.45	1,300	19.0	043	0.5	0.1
MW-10	23-Feb-96	1.7	1	6.35	7,330	19.8	-068	1.4	
		3.4	2	6.40	6,920	19.6	-086	0.6	
		5.0	3	6.44	6,620	19.4	-094	0.5	1.2
MW-11	23-Feb-96	1.0	1	6.59	8,960	19.0	098	3.8	
		2.0	2	6.63	8,140	18.9	091	2.3	0.1

mV = millivolts
 mg/L = milligrams per Liter
 NA= not analyzed

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

Well ID	Sampling Date	Benzene ⁽¹⁾ (ug/L)	Toluene ⁽¹⁾ (ug/L)	Ethylbenzene ⁽¹⁾ (ug/L)	Xylenes ⁽¹⁾ (ug/L)	Total BTEX (ug/L)	TPH ⁽²⁾ (mg/L)
MW-1	10-Aug-92	5,550	12,090	2,160	7,370	27,170	NA ⁽³⁾
	9-Feb-93	2,100	6,500	1,300	7,400	17,300	NA
	19-Aug-93	3,200	7,300	1,200	3,700	15,400	NA
	27-Jan-94	1,930	4,580	672	2,390	9,572	NA
	3-May-95	Not Sampled - Phase-Separated Hydrocarbons Present					
	1-Aug-95	390	1,300	230	800	2,720	5.7
	15-Nov-95	880	1,800	300	970	3,950	6.8
	23-Feb-96	1,500	3,700	620	2,200	8,020	21
MW-2	10-Aug-92	14.9	<4.0	<4.0	<4.0	14.9	NA
	9-Feb-93	<2.0	<2.0	<2.0	<6.0	ND ⁽⁵⁾	NA
	19-Aug-93	100	12	3	13	128.0	NA
	27-Jan-94	<1.0	1.2	2	2.5	5.7	NA
	3-May-95	Well Destroyed					
MW-3	10-Aug-92	304.9	2,099	6,760	1,586	10,749.9	NA
	9-Feb-93	130	<10.0	<10.0	190	320	NA
	19-Aug-93	560	3,100	630	1,900	6,190	NA
	27-Jan-94	1,070	5,380	510	3,120	10,080	NA
	4-May-95	770	3,300	470	1,800	6,340	NA
	1-Aug-95	490	2,900	890	1,600	5,880	14
	15-Nov-95	250	1,000	180	440	1,870	2.9
	23-Feb-96	120	810	170	560	1,660	4
MW-4	10-Aug-92	2,594	10,360	2,160	6,740	21,854	NA
	9-Feb-93	5,200	15,000	2,200	10,000	32,400	NA
	19-Aug-93	3,000	12,000	<2,000	7,000	22,000	NA
	27-Jan-94	Not Sampled - Phase-Separated Hydrocarbons Present					
	3-May-95	Not Sampled - Phase-Separated Hydrocarbons Present					
	1-Aug-95	5,700	17,000	3,500	13,000	39,200	120
	15-Nov-95	490	1,600	310	1,100	3,500	5.2
MW-5	23-Feb-96	360	2,800	560	2,500	6,220	18
	10-Aug-92	<4.0	<4.0	<4.0	<4.0	ND	NA
	9-Feb-93	<2.0	<2.0	<2.0	<6.0	ND	NA
	10-Aug-93	<2.0	<2.0	<2.0	<2.0	ND	NA
	27-Jan-94	8.7	29.9	4	11.3	53.9	NA
	3-May-95	3.7	5.3	0.92	4.6	14.5	NA
	1-Aug-95	<0.3	<0.3	<0.3	<0.6	ND	<0.100
	15-Nov-95	<0.3	1.2	<0.3	1.5	2.7	<0.100
MW-5	23-Feb-96	<0.3	<0.3	<0.3	<0.6	<0.6	<0.100

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

Well ID	Sampling Date	Benzene ⁽¹⁾ (ug/L)	Toluene ⁽¹⁾ (ug/L)	Ethylbenzene ⁽¹⁾ (ug/L)	Xylenes ⁽¹⁾ (ug/L)	Total BTEX (ug/L)	TPH ⁽²⁾ (mg/L)
MW-6	10-Aug-92	NS ⁽⁴⁾	NS	NS	NS	NS	NS
	9-Feb-93	7,000	19,000	3,100	7,200	36,300	NA
	19-Aug-93	8,100	19,000	3,500	6,400	37,000	NA
	27-Jan-94	7,960	20,200	3,830	6,150	38,140	NA
	4-May-95	11,000	17,000	2,900	6,000	36,900	NA
	1-Aug-95	8,300	12,000	2,500	5,100	27,900	60
	15-Nov-95	8,900	17,000	2,900	5,500	34,300	57
	23-Feb-96	8,100	10,000	2,300	4,000	24,400	58
MW-7	10-Aug-92	NS	NS	NS	NS	NS	NS
	9-Feb-93	<2.0	<2.0	<2.0	<6.0	NS	NA
	19-Aug-93	<2.0	3	<2.0	<2.0	3.00	NA
	27-Jan-94	1.1	<1.0	<1.0	<1.0	1.10	NA
	3-May-95	52	3.4	0.67	2.8	58.87	NA
	1-Aug-95	22	2.2	0.85	2.8	27.85	<0.100
	15-Nov-95	8.4	0.77	<0.3	0.93	10.10	<0.100
	23-Feb-96	<0.3	<0.3	<0.3	<0.6	ND	<0.100
022396-1 ⁽⁶⁾	23-Feb-96	<0.3	<0.3	<0.3	<0.6	<0.6	<0.100
MW-8	10-Aug-92	NS	NS	NS	NS	NS	NS
	9-Feb-93	<2.0	<2.0	<2.0	<6.0	ND	NA
	19-Aug-93	<2.0	<2.0	<2.0	<2.0	ND	NA
	27-Jan-94	<1.0	<1.0	<1.0	<1.0	ND	NA
	3-May-95	3	4.9	0.75	3.7	12.35	NA
	1-Aug-95	3.1	1.2	0.47	1.6	6.37	<0.001
	1-Aug-95	3.6	1.5	0.51	1.5	7.11	<0.100
	15-Nov-95	<0.3	0.52	<0.3	<0.6	0.52	<0.100
080195 ⁽⁶⁾	23-Feb-96	<0.3	<0.3	<0.3	<0.6	<0.6	<0.100
MW-9	22-Apr-93	570	380	<50.0	870	1,820	NA
	15-Jul-93	121	7.3	3	458	589	NA
	19-Aug-93	390	290	40	250	970	NA
	27-Jan-94	327	357	51.1	293	1,028	NA
	3-May-95	380	110	19	120	629	NA
	1-Aug-95	660	410	91	310	1,471	6.2
	15-Nov-95	240	24	11	140	415	1.5
	15-Nov-95	170	18	10	120	318	1.9
11159501 ⁽⁶⁾	23-Feb-96	170	18	2.3	160	350	4.3

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

Well ID	Sampling Date	Benzene ⁽¹⁾ (ug/L)	Toluene ⁽¹⁾ (ug/L)	Ethylbenzene ⁽¹⁾ (ug/L)	Xylenes ⁽¹⁾ (ug/L)	Total BTEX (ug/L)	TPH ⁽²⁾ (mg/L)
MW-10	19-Aug-93	190	460	<200	240	890	NA
	27-Jan-94	13.4	4	5.5	33.6	56.5	NA
	4-May-95	980	15	11	84	1,090	NA
	1-Aug-95	1,300	32	32	100	1,464	3.6
	15-Nov-95	1,000	24	15	36	1,075	1.7
	23-Feb-96	810	23	27	44	904	2.4
MW-11	19-Aug-93	<2.0	<2.0	<2.0	<2.0	ND	NA
	27-Jan-94	<1.0	<1.0	<1.0	<1.0	ND	NA
	4-May-95	<0.3	<0.3	<0.3	<0.6	ND	NA
	1-Aug-95	44	29	5.5	13	91.5	0.2
	15-Nov-95	190	2.8	6.2	11	210.0	0.4
	23-Feb-96	49	1.2	0.51	4	54.7	0.25
Field Blank							
11159502	15-Nov-95	<0.3	0.42	<0.3	<0.6	0.42	<0.100
Field Blank	23-Feb-96	<0.3	<0.3	<0.3	<0.6	ND	<0.100
Trip Blank	23-Feb-96	<0.3	<0.3	<0.3	<0.6	ND	<0.100

- NOTES:
- 1) BTEX analyzed using EPA Method 8015 modified.
 - 2) Total Petroleum Hydrocarbons (TPH) analyzed using EPA Method 8015 modified.
 - 3) NA = Not analyzed.
 - 4) NS = Not sampled.
 - 5) ND = Concentration not detected above method detection limit.
 - 6) Field duplicate collected from monitor well.
 - 7) Biosparging System (extraction blower only) was placed into operation on September 22, 1995.
 - 8) Biosparging system (extraction and injection blowers) was placed into operation on November 14, 1995.

Table 5
Summary of Analytical Results for Air Emissions
 BJ Services Company, USA
 Hobbs, New Mexico

Sample Number	Date Sampled	Benzene (ppmv)	Ethyl-benzene (ppmv)	Toluene (ppmv)	Total Xylene (ppmv)	Total BETX (ppmv)	TPH (ppmv)	Discharge Rate (scfm)	Emission Rate Benzene (lb/hr)	Emission Rate Total BETX (lb/hr)	Emission Rate TPH (lb/hr)
Extraction ⁽¹⁾ -1	9/19/95	790	340	1,100	920	3,150	9,700	131.03	1.26	6.05	16.62
Effluent ⁽²⁾ -1	9/20/95	990	560	2,500	1,600	5,650	16,000	131.03	1.58	10.95	27.41
Extraction-2	9/28/95	13	6	28	18	65	2,533	123.55	0.02	0.12	4.09
Effluent-4	11/07/95	15	12	58	36	121	1,500	131.10	0.02	0.24	2.57
Effluent-11159501	11/15/95	39	42	180	130	391	1,870	133.33	0.06	0.79	3.26
Effluent 121995-01	12/19/95	10	11	45	33	99	530	129.64	0.02	0.23	1.04
Effluent 012996-01	1/29/96	12	17	61	53	143	1,200	128.45	0.02	0.33	2.33
Effluent 032296-01	3/22/96	6	12	44	40	102	990	124.68	0.01	0.23	1.87

Notes:

(1) Extraction = Vacuum extraction blower in operation only.

(2) Effluent = Vacuum extraction and injection blowers in operation.

ppmv = parts per million by volume.

scfm = cubic feet per minute.

Appendices

A



APPENDIX A
GROUNDWATER SAMPLING FORMS

GROUNDWATER SAMPLING FIELD DATA SHEET

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Well ID. No. <u>MW-1</u>	☒ Purge Equipment ☒ Other <u>1.40" Sub Pump</u>	Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. <u>1</u>	Sampler's Initials <u>MKD</u>	Time <u>1615</u>	Date <u>2/23/96</u>
Casing Diameter <u>2"</u> in.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer: O.D. ☐ 1.65" ☐ 1.85" ☐ 3.75" LENGTH ☐ 2 ft. ☐ 3 ft. ☐ 4 ft.	Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☒ Other <u>YSI-3500</u> SERIAL NO. <u>1</u>	Meter Calibration pH <u>7.0</u> = <u>6.48</u> at <u>19.2</u> °C Time <u>0740</u> pH <u>10.0</u> = <u>9.48</u> at <u>19.3</u> °C Time <u>0740</u> Conductance Standard: _____ μmhos/cm at 25°C Time _____ Measured Value: _____ μmhos/cm at 25°C Time _____ Dissolved Oxygen Calibrated to _____ mg/l at _____ °C Time _____		
Casing Stickup _____ ft.	☒ Sample Equipment ☒ Other <u>1.40" Sub Pump</u>	Dissolved Oxygen Meter: ☒ YSI Model 50B SERIAL NO. _____ Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. <u>1</u>	Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u> #Clicks _____ Color _____		
Total Well Depth (from TOC) <u>104.42</u> ft.		Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispo. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. _____	Sample Depth: (ft.) <u>Excl</u>		
Static Water Level (from TOC) <u>54.32</u> ft.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer: O.D. ☐ 1.65" ☐ 1.85" ☐ 3.75" LENGTH ☐ 2 ft. ☐ 3 ft. ☐ 4 ft.	Purge Contaminized? ☐ Yes ☐ No Destination: <u>From on-site</u>			
Water Thickness <u>10.10</u> ft.					
Casing Volume <u>1.6</u> gal.					
Screened Interval (from GS) _____ ft.					

Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	M. E.C. μmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
1618	1	—	54.32	18.3	1,080	6.84	2.2	.4	168	Clear
1628	1	1.4	—	18.8	1,126	6.73	1.0	.4	169	Clear
1628	2	3.2	—	18.8	1,120	6.75	1.2	.4	162	Clear
1632	3	5.0	—	19.0	1,166	6.81	1.4	.4	154	Clear
TOTAL PUMPED		5.0 gallons								
4		Fe ¹² = 0.0 mg/L								
2/23/96	0845	collect full sample suite								

Analyses Requested (see COC) QC Samples: <u>GCMS</u> Additional Analyses: _____ Additional Comments: _____	Full Suite Rinse Blank Field Blank Trip Blank	Initial Readings: ☐ HNu ☐ OVA ☐ Microtip TOC _____ BZ _____ Bkgnd _____	Sample Readings: TOC _____ BZ _____ Bkgnd _____ Protective Level: B <u>0</u> C <u>0</u>
SERIAL NO. _____ HSO Signature: <u>[Signature]</u> Condition of Well, Remarks: _____		Sampler's Signature: <u>[Signature]</u>	

GROUNDWATER SAMPLING FIELD DATA SHEET

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Well ID. No. <u>MW-3</u>	☒ Purge Equipment ☒ Other <u>ELFI Sub Pump</u>	Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. _____	Sampler's Initials <u>MEB</u>	Time <u>1400</u>	Date <u>2/23/96</u>
Casing Diameter <u>2"</u> in.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailor	Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☒ Other <u>YSI-3500</u> SERIAL NO. _____	Meter Calibration pH <u>7.0</u> = <u>6.98</u> at <u>14.2</u> °C Time <u>0740</u> pH <u>10.0</u> = <u>9.98</u> at <u>14.3</u> °C Time <u>0740</u>		
Casing Stickup <u>Flush Mount</u> ft.	O.D. LENGTH 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft.	Dissolved Oxygen Meter: ☒ YSI Model 50B SERIAL NO. _____	Conductance Standard: _____ µmhos/cm at 25°C Time _____ Measured Value: _____ µmhos/cm at 25°C Time _____		
Total Well Depth (from TOC) <u>64.31</u> ft.	Sample Equipment ☒ Other <u>Disp. Pdy.</u>	Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☒ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. _____	Dissolved Oxygen Calibrated to _____ mg/l at _____ °C Time _____		
Static Water Level (from TOC) <u>51.68</u> ft.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailor	Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter	Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u>		
Water Thickness <u>12.63</u> ft.	O.D. LENGTH 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft.	Water Level Meter: ☐ Solinst SERIAL NO. _____	#Clicks _____ Color _____		
Casing Volume <u>2.02</u> gal.	SERIAL NO. _____		Sample Depth: (ft.) <u>Edex</u>		
Screened Interval (from GS) _____ ft.					
Purge Contaminized? ☒ Yes ☐ No Destination: <u>Drum on Site</u>					

Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. µmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
1408	INT	—	51.68	18.4	1,100	7.01	3.6	—	-108	CLEAR
1410	1	2	—	18.9	1,140	6.89	1.8	0.4	-116	CLEAR
1415	2	4	—	19.0	1,120	6.80	1.3	0.4	-106	CLEAR
1420	3	6.4	—	19.0	1,120	6.80	2.0	0.4	-08	CLEAR

Analyses Requested (see COC)

OC Samples: GC/MS

Additional Analyses:

Additional Comments:

Full Suite

Partial Suite (explain)

Rinse Blank

Field Blank

Trip Blank

- ☐
- HNu
-
- ☐
- OVA
-
- ☐
- Microtip

Initial Readings:

 TOC _____
 BZ _____
 Bkgnd _____

Sample Readings:

 TOC _____
 BZ _____
 Bkgnd _____
Protective Level:
B C D

SERIAL NO. _____

HSO Signature: _____

Condition of Well, Remarks:

* Sampler's Signature: _____

GROUNDWATER SAMPLING FIELD DATA SHEET

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Well ID. No. <u>MW-4</u>	☒ Purge Equipment ☐ Other <u>Electric Sub Pump</u>	☐ Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3400</u> SERIAL NO. _____ Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☒ Other <u>YSI-3500</u> SERIAL NO. _____ Dissolved Oxygen Meter: ☒ YSI Model 50B SERIAL NO. _____ Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. _____ Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. _____	Sampler's Initials <u>UKD</u> Time <u>1645</u> Date <u>2/23/96</u>
Casing Diameter <u>2"</u> in.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailor: O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft.	Meter Calibration pH <u>7.0</u> = <u>6.98</u> at <u>19.2</u> °C Time <u>0740</u> pH <u>10.0</u> = <u>9.98</u> at <u>19.3</u> °C Time <u>0740</u> Conductance Standard: _____ µmhos/cm at 25°C Time _____ Measured Value: _____ µmhos/cm at 25°C Time _____ Dissolved Oxygen Calibrated to _____ mg/l at _____ °C Time _____	
Casing Stickup <u>Flush mount</u> ft.	☒ Sample Equipment ☐ Other <u>Dispersal</u> ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailor: O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft.	Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u> #Clicks _____ Color _____	
Total Well Depth (from TOC) <u>61.43</u> ft.		Sample Depth: (ft.) <u>Adex</u>	
Static Water Level (from TOC) <u>51.65</u> ft.			
Water Thickness <u>9.78</u> ft.			
Casing Volume <u>1.56</u> gal.			
Screened Interval (from GS) _____ ft.			
Purge Contaminized? ☒ Yes ☐ No Destination: <u>Drum On-site</u>			

Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. µmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
1649	INT	—	—	18.1	1.08	6.80	4.4	.4	748	GREY/CLEAR
1652	1	1.5	—	18.6	1.31	6.74	0.6	.4	769	CLEAR
1655	2	3.0	—	18.6	1.29	6.75	1.2	.4	762	CLEAR
1658	3	4.5	—	18.6	1.28	6.75	2.0	.5	746	CLEAR
TOTAL		PURGE 4.5 GALLONS								
		Fe ¹² = .85								
<u>2/23/96</u> <u>OBSS</u> <u>collected full sample site</u>										

Analyses Requested (see COC) GC Samples: <u>GC/MS</u> Additional Analyses: _____ Additional Comments: _____	☒ Full Suite ☐ Rinse Blank ☐ Field Blank ☐ Trip Blank	Initial Readings: ☐ HNu ☐ OVA ☐ Microtip TOC _____ BZ _____ Bkgnd _____ Sample Readings: TOC _____ BZ _____ Bkgnd _____ Protective Level: ☐ B ☐ C ☐ D SERIAL NO. _____ HSO Signature: <u>[Signature]</u> Condition of Well, Remarks: _____ * Sampler's Signature: <u>[Signature]</u>
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GROUNDWATER SAMPLING FIELD DATA SHEET

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Well ID. No. <u>MW-5</u>	☒ Purge Equipment Other <u>Free Subm. Pump</u>	Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. <u> </u>	Sampler's Initials <u>NRD</u>	Time <u>0920</u>	Date <u>2/23/96</u>
Casing Diameter <u>2"</u> in.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer: O.D. ☐ 1.65" ☐ 1.85" ☐ 3.75" LENGTH ☐ 2 ft. ☐ 3 ft. ☐ 4 ft.	Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☒ Other <u>YSI-3500</u> SERIAL NO. <u>YSI-3500</u>	Meter Calibration pH <u>7.0 = 6.98</u> at <u>19.2</u> °C <u>0.90</u> Time pH <u>10.0 = 9.98</u> at <u>19.3</u> °C <u>0.90</u> Time Conductance Standard: <u> </u> µmhos/cm at 25°C Measured Value: <u> </u> µmhos/cm at 25°C		
Casing Stickup <u> </u> ft.	Sample Equipment ☒ Other <u>Disp. Poly</u> ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer: O.D. ☐ 1.65" ☐ 1.85" ☐ 3.75" LENGTH ☐ 2 ft. ☐ 3 ft. ☐ 4 ft.	Dissolved Oxygen Meter: ☐ YSI Model 50B SERIAL NO. <u> </u>	Dissolved Oxygen Calibrated to <u>8.87</u> mg/l at <u>14.9</u> °C <u>0.735</u> Time		
Total Well Depth (from TOC) <u>64.60</u> ft.		Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. <u> </u>	Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point <u> </u> pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u> #Clicks <u> </u> <u> </u> <u> </u> <u> </u> Color <u> </u> <u> </u> <u> </u> <u> </u>		
Static Water Level (from TOC) <u>53.57</u> ft.	SCREENED INTERVAL (from GS) <u> </u> ft.	Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. <u> </u>	Sample Depth: (ft.) <u>Redox</u>		
Water Thickness <u>11.03</u> ft.		Purge Containerized? ☒ Yes ☐ No Destination: <u>Drum on-site</u>			
Casing Volume <u>1.76</u> gal.					

Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. µmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
0920	INT	—	53.57	17.4	1.08	6.82	4.5	0.91	0.46	CLEAR
0924	1	1.76	—	18.4	1.08	6.81	4.6	0.91	0.46	CLEAR
0930	2	3.5	—	18.5	1.03	6.82	3.6	0.90	0.46	CLEAR
0935	3	5.3	—	18.6	1.03	6.82	3.4	0.89	0.46	CLEAR
<u>Fe⁺² = 0.0 mg/L</u> <u>4/28/96 collect full sample suite @ 0900.</u>										

Analyses Requested (see COC) GC Samples: <u>GC/MS</u> Additional Analyses: <u> </u>	☒ Full Suite ☐ Field Blank ☐ Trip Blank	Partial Suite (explain) ☐ Field Blank ☐ Trip Blank	Initial Readings: ☐ HNu ☐ OVA ☐ Microtip TOC <u> </u> BZ <u> </u> Bkgnd <u> </u>	Sample Readings: TOC <u> </u> BZ <u> </u> Bkgnd <u> </u> Protective Level: ☐ B ☐ C ☒ D
Additional Comments: <u> </u>			SERIAL NO. <u> </u> HSO Signature: <u> </u> Condition of Well, Remarks: <u> </u>	
Sampler's Signature: <u> </u>				

GROUNDWATER SAMPLING FIELD DATA SHEET

Task GW Sampling

Log Book # _____

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Well ID. No. <u>MW-4</u>	☒ Purge Equipment ☐ Other <u>Flow Sub Pump</u>	Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. _____	Sampler's Initials <u>M.R.D.</u>	Time <u>1530</u>	Date <u>2/23/96</u>
Casing Diameter <u>2"</u> in.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer: O.D. _____ LENGTH _____ ☐ 1.65" ☐ 2 ft. ☐ 1.85" ☐ 3 ft. ☐ 3.75" ☐ 4 ft.	Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☒ Other <u>YSI-3500</u> SERIAL NO. _____	Meter Calibration pH <u>7.0</u> = <u>6.98</u> at <u>14.2</u> °C Time <u>0740</u> pH <u>10.0</u> = <u>9.98</u> at <u>14.3</u> °C Time <u>0740</u> Conductance Standard: _____ µmhos/cm at 25°C Time _____ Measured Value: _____ µmhos/cm at 25°C Time _____		
Casing Stickup <u>PLUSH MOUNT</u> ft.	☐ Sample Equipment ☒ Other <u>Flow Sub Pump</u>	Dissolved Oxygen Meter: ☐ YSI Model 50B SERIAL NO. _____	Dissolved Oxygen Calibrated to _____ mg/l at _____ °C Time _____		
Total Well Depth (from TOC) <u>60.17</u> ft.			Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6M) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u> #Clicks _____ Color _____		
Static Water Level (from TOC) <u>52.10</u> ft.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer: O.D. _____ LENGTH _____ ☐ 1.65" ☐ 2 ft. ☐ 1.85" ☐ 3 ft. ☐ 3.75" ☐ 4 ft.	Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-2500</u> SERIAL NO. _____	Sample Depth: (ft.) <u>127</u>		
Water Thickness <u>807</u> ft.	☐ Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. _____	Visual Description			
Casing Volume <u>1.29</u> gal.		Purge Contaminized? ☒ Yes ☐ No Destination: _____			
Screened Interval (from GS) ft.	Time Number of Casing Volumes Gallons Removed Water Level Temp °C E.C. µmhos/cm pH Dissolved O ₂ mg/liter Pump Rate GPM Approx. Pump Depth ft. Visual Description				

Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. $\mu\text{mhos/cm}$	pH	Dissolved O_2 mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
1535	INT	—	52.10	18.2	1,540	6.52	2.8	—	127	BLACK ODR
1540	1	1.3	—	18.7	1,690	6.46	0.5	0.5	177	LT GREY ODR
1543	2	2.6	—	18.7	1,680	6.46	0.4	0.5	179	LT GREY CLEAR (ODR)
1546	3	4.0	—	18.7	1,670	6.48	0.4	0.5	178	LT GREY
	Fe ⁺² = 1.1 mg/L									
4/24/96	0840	collected full sample suite								

Analyses Requested (see COC) OC Samples: GC/MS Additional Analyses: _____	☒ Full Suite ☐ Rinse Blank ☐ Field Blank ☐ Trip Blank	Initial Readings: HNu _____ OVA _____ Microtip _____ TOC _____ BZ _____ Bkgnd _____ Sample Readings: TOC _____ BZ _____ Bkgnd _____ Protective Level: B _____ C _____ D _____
Additional Comments: _____		SERIAL NO. _____ HSO Signature: _____ Condition of Well, Remarks: _____
Sampler's Signature: _____		_____

GROUNDWATER SAMPLING FIELD DATA SHEET

Task FW SAMPLING

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Job # 7522.11

Page _____ of _____

Well ID. No. <u>MW-7</u> Casing Diameter <u>2"</u> in. Casing Pickup <u>Flush Mount</u> ft. Total Well Depth (from TOC) <u>61.46</u> ft. Static Water Level (from TOC) <u>52.15</u> ft. Water Thickness <u>9.31</u> ft. Casing Volume <u>1.48</u> gal. Screened Interval (from GS) _____ ft.		Purge Equipment ☒ Other <u>Flex Sub Pump</u> ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer: O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft. SERIAL NO. _____		Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. _____ Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☒ Other <u>YSI-3500</u> SERIAL NO. _____ Dissolved Oxygen Meter: ☒ YSI Model 50B SERIAL NO. _____ Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. _____ Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. _____		Sampler's Initials <u>MED</u> Time <u>1000</u> Date <u>2/23/96</u> Meter Calibration pH <u>7.0</u> = <u>6.96</u> at <u>14.2</u> °C Time <u>0740</u> pH <u>10.0</u> = <u>9.98</u> at <u>9.3</u> °C Time <u>0740</u> Conductance Standard: _____ μmhos/cm at 25°C Time _____ Measured Value: _____ μmhos/cm at 25°C Time _____ Dissolved Oxygen Calibrated to _____ mg/l at _____ °C Time _____ Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u> #Clicks _____ Color _____ Sample Depth: (ft.) <u>Reel</u>																																																																																																								
Purge Contaminized? ☒ Yes ☐ No Destination: <u>From on-site</u>		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Time</th> <th>Number of Casing Volumes</th> <th>Gallons Removed</th> <th>Water Level</th> <th>Temp °C</th> <th>E.C. μmhos/cm</th> <th>pH</th> <th>Dissolved O₂ mg/liter</th> <th>Pump Rate GPM</th> <th>Approx. Pump Depth ft.</th> <th>Visual Description</th> </tr> </thead> <tbody> <tr> <td>1007</td> <td>INT</td> <td>0</td> <td>52.15</td> <td>16.6</td> <td>1.51</td> <td>6.53</td> <td>4.2</td> <td>0.5</td> <td>089</td> <td>CLEAR</td> </tr> <tr> <td>1012</td> <td>1</td> <td>1.5</td> <td>—</td> <td>16.6</td> <td>1.65</td> <td>6.32</td> <td>1.7</td> <td>0.5</td> <td>061</td> <td>CLEAR</td> </tr> <tr> <td>1014</td> <td>2</td> <td>3.0</td> <td>—</td> <td>18.9</td> <td>1.64</td> <td>6.33</td> <td>0.6</td> <td>0.5</td> <td>063</td> <td>CLEAR</td> </tr> <tr> <td>1018</td> <td>3</td> <td>4.5</td> <td>—</td> <td>18.9</td> <td>1.63</td> <td>6.35</td> <td>0.7</td> <td>0.5</td> <td>065</td> <td>CLEAR</td> </tr> <tr> <td colspan="11"> Fe²⁺ = 0.0 mg/L collect full sample suite collect duplicate 022396 </td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>										Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. μmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description	1007	INT	0	52.15	16.6	1.51	6.53	4.2	0.5	089	CLEAR	1012	1	1.5	—	16.6	1.65	6.32	1.7	0.5	061	CLEAR	1014	2	3.0	—	18.9	1.64	6.33	0.6	0.5	063	CLEAR	1018	3	4.5	—	18.9	1.63	6.35	0.7	0.5	065	CLEAR	Fe ²⁺ = 0.0 mg/L collect full sample suite collect duplicate 022396																																											
Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. μmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description																																																																																																				
1007	INT	0	52.15	16.6	1.51	6.53	4.2	0.5	089	CLEAR																																																																																																				
1012	1	1.5	—	16.6	1.65	6.32	1.7	0.5	061	CLEAR																																																																																																				
1014	2	3.0	—	18.9	1.64	6.33	0.6	0.5	063	CLEAR																																																																																																				
1018	3	4.5	—	18.9	1.63	6.35	0.7	0.5	065	CLEAR																																																																																																				
Fe ²⁺ = 0.0 mg/L collect full sample suite collect duplicate 022396																																																																																																														
Analyses Requested (see COC) <u>(Full Suite)</u> Partial Suite (explain) _____ QC Samples: GC/MS Rinse Blank Field Blank Trip Blank Additional Analyses: <u>Duplicate 022396-1</u> Additional Comments: _____						Initial Readings: <u>HNu</u> <u>TOC</u> <u>BZ</u> <u>Bkgnd</u> ☐ HNu ☐ OVA ☐ Microtip Sample Readings: <u>TOC</u> <u>BZ</u> <u>Bkgnd</u> Protective Level: <u>B</u> <u>C</u> <u>D</u> SERIAL NO. _____ HSO Signature: <u>[Signature]</u> Condition of Well, Remarks: _____ Sampler's Signature: <u>[Signature]</u>																																																																																																								

GROUNDWATER SAMPLING FIELD DATA SHEET

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 Job # 2932.11 Page _____ of _____

Well ID. No. <u>11W-8</u> Casing Diameter <u>2"</u> in. Casing Stickup <u>Flush Mount</u> ft. Total Well Depth (from TOC) <u>62.37</u> ft. Static Water Level (from TOC) <u>52.17</u> ft. Water Thickness <u>16.2</u> ft. Casing Volume <u>2.59</u> gal. Screened Interval (from GS) _____ ft. Purge Containerized? ☒ Yes ☐ No Destination: <u>Drum on site</u>		Purge Equipment ☒ Other <u>Elect Pump</u> ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☒ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Sailer: O.D. ☐ 1.65" ☐ 1.85" ☐ 3.75" LENGTH ☐ 2 ft. ☐ 3 ft. ☐ 4 ft. SERIAL NO. _____		Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. _____ Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☒ Other <u>YSI-3500</u> SERIAL NO. _____ Dissolved Oxygen Meter: ☒ YSI Model 50B SERIAL NO. _____ Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. _____ Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. _____		Sampler's Initials <u>MRD</u> Time <u>0810</u> Date <u>2/23/98</u> Meter Calibration pH <u>7.0</u> = <u>6.98</u> at <u>14.2</u> °C Time <u>0740</u> pH <u>10.0</u> = <u>9.98</u> at <u>14.3</u> °C Time <u>0740</u> Conductance Standard: _____ µmhos/cm at 25°C Time _____ Measured Value: _____ µmhos/cm at 25°C Dissolved Oxygen Calibrated to <u>8.87</u> mg/l at <u>14.9</u> °C Time <u>0735</u> Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u> #Clicks _____ Color _____ Sample Depth: (ft.) <u>6.0x</u>				
Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. µmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
0830	INT	—	52.17	16.4	1.61	7.25	4.2	0.5	112	CLEAR
0840	1	2.6	—	18.6	1.60	6.52	3.1	0.5	107	CLEAR
0847	2	5.2	—	18.7	1.67	6.48	2.9	0.5	109	CLEAR
0852	3	7.8	—	18.8	1.67	6.49	2.9	0.5	109	CLEAR
<u>4/23/96</u> <u>0835</u> <u>collect full sample suite</u> <u>Fe²⁺ = 0.0 mg/L</u>										
Analyses Requested (see COC) GC Samples: <u>GC/MS</u> <u>Full Suite</u> <u>Rinse Blank</u> Additional Analyses: _____ Additional Comments: _____						Partial Suite (explain) Field Blank Trip Blank Initial Readings: ☐ HNu ☐ TOC ☐ OVA ☐ BZ ☐ Microtip ☐ Bkgnd Sample Readings: TOC _____ BZ _____ Bkgnd _____ Protective Layer: <u>B</u> <u>C</u> <u>D</u> SERIAL NO. <u>None</u> HSO Signature: <u>None</u> Condition of Well, Remarks: _____ Sampler's Signature: <u>MRD</u>				

GROUNDWATER SAMPLING FIELD DATA SHEET

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 Job # 2832.10 Page _____ of _____

Well ID. No. <u>MLV-9</u>	☒ Purge Equipment ☐ Other <u>Flex Sub Pump</u>	Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. _____	Sampler's Initials <u>MED</u>	Time <u>1125</u>	Date <u>2/23/96</u>
Casing Diameter <u>2"</u> in.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer:	Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☒ Other <u>YSI-3500</u> SERIAL NO. _____	Meter Calibration pH <u>7.0</u> = <u>6.98</u> at <u>19.2</u> °C Time <u>0740</u> pH <u>10.0</u> = <u>9.98</u> at <u>19.3</u> °C Time <u>0740</u> Conductance Standard: _____ µmhos/cm at 25°C Time _____ Measured Value: _____ µmhos/cm at 25°C Time _____		
Casing Stickup <u>FLUSHMOUNT</u> ft.	O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft.	Dissolved Oxygen Meter: ☒ YSI Model 50B SERIAL NO. _____	Dissolved Oxygen Calibrated to _____ mg/l at _____ °C		
Total Well Depth (from TOC) <u>60.27</u> ft.	Sample Equipment ☒ Other <u>Disp Poly</u>	Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u>YSI-3500</u> SERIAL NO. _____	Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u>		
Static Water Level (from TOC) <u>51.12</u> ft.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer:	Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. _____	Sample Depth: (ft.) <u>RdX</u>		
Water Thickness <u>9.15</u> ft.	O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft.		#Clicks _____		
Casing Volume <u>1.46</u> gal.			Color _____		
Screened Interval (from GS) _____ ft.			Sample Depth: (ft.) <u>RdX</u>		
Purge Contaminized? ☒ Yes ☐ No Destination: <u>Drum - on site</u>					

Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. µmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
1128	INT	—	51.12	18.6	1,040	6.52	1.9	0.33	065	CLEAR
1136	1	1.5	—	19.0	1,320	6.45	0.5	0.33	063	CLEAR
1139	2	3.0	—	14.0	1,300	6.45	0.5	0.33	050	CLEAR
1142	3	4.5	—	19.0	1,300	6.45	0.55	0.33	043	CLEAR
		<u>Fe²⁺ 0.0 mg/L</u>								
<u>2/23/96</u>	<u>0910</u>	<u>collected well sample suite.</u>								

Analyses Requested (see COC) OC Samples: <u>GC/MS</u> <u>Field Blank</u> Additional Analyses: <u>Field Blank</u> Additional Comments: _____	Initial Readings: ☐ HNu ☐ OVA ☐ Microtip Sample Readings: TOC _____ BZ _____ Bkgnd _____ Protective Level: <u>B</u> <u>C</u> <u>D</u> SERIAL NO. _____ HSO Signature: <u>Meyre Whit</u> Condition of Well, Remarks: _____ * Sampler's Signature: <u>Meyre Whit</u>
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GROUNDWATER SAMPLING FIELD DATA SHEET

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Well ID. No. <u>MW-10</u>	☒ Purge Equipment ☐ Other ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailor: O.D. ☐ 1.65" ☐ 1.85" ☐ 3.75" LENGTH ☐ 2 ft. ☐ 3 ft. ☐ 4 ft. ☐ _____ ft. SERIAL NO. <u> </u>	Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u> </u> SERIAL NO. <u> </u> Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☒ Other <u> </u> SERIAL NO. <u> </u> Dissolved Oxygen Meter: ☒ YSI Model 50B SERIAL NO. <u> </u> Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☒ Other <u> </u> SERIAL NO. <u> </u> Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. <u> </u>	Sampler's Initials <u>MPD</u> Time <u> </u> Date <u>2/23/96</u> Meter Calibration pH <u>7.0</u> = <u>6.98</u> at <u>19.2</u> °C Time <u>0740</u> pH <u>10.0</u> = <u>9.98</u> at <u>19.3</u> °C Time <u>0740</u> Conductance Standard: _____ µmhos/cm at 25°C Time _____ Measured Value: _____ µmhos/cm at 25°C Time _____ Dissolved Oxygen Calibrated to _____ mg/l at _____ °C Time _____ Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u> #Clicks _____ Color _____ Sample Depth: (ft.) <u>Reddy</u>
Casing Diameter <u>2"</u> in. Casing Stickup <u>FLUSH MANT</u> ft. Total Well Depth (from TOC) <u>63.60</u> ft. Static Water Level (from TOC) <u>53.05</u> ft. Water Thickness <u>10.55</u> ft. Casing Volume <u>1.68</u> gal. Screened Interval (from GS) _____ ft.	Sample Equipment ☒ Other ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailor: O.D. ☐ 1.65" ☐ 1.85" ☐ 3.75" LENGTH ☐ 2 ft. ☐ 3 ft. ☐ 4 ft. ☐ _____ ft. SERIAL NO. <u> </u>		
Purge Contaminized? ☒ Yes ☐ No Destination: <u>Drum on site</u>			

Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. µmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
1325	INT	—	53.05	19.3	7,560	6.26	2.5	—	-047	LT GREY SAND
1335	1	1.7	—	19.8	7,330	6.35	1.4	0.2	-068	LT GREY (CLAY) - SAND
1340	2	3.4	—	19.6	6,920	6.40	0.6	0.2	-060	SAME
1346	3	5.0	—	19.4	6,620	6.44	0.5	0.2	-074	LT GREY CLEAR
Fe ²⁺ = 1.2 mg/L										
4/23/96	0020	collected full sample suite								

Analyses Requested (see COC) QC Samples: GC/MS Rinse Blank Field Blank Trip Blank Additional Analyses: Additional Comments:	☒ Full Suite ☐ Partial Suite (explain) Initial Readings: HNu _____ TOC _____ BZ _____ Bkgrd _____ Sample Readings: TOC _____ BZ _____ Bkgrd _____ Protective Level: B C D SERIAL NO. _____ HSO Signature: <u> </u> Condition of Well, Remarks: <u> </u> Sampler's Signature: <u> </u>
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B



APPENDIX B

LABORATORY ANALYTICAL REPORTS GROUNDWATER SAMPLES

B C Analytical

.....

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

March 4, 1996

Brown and Caldwell Consultants
1415 Louisiana , Suite 2500
Houston, Tx 77002
Attn: Myna Dehnert

Dear Ms. Dehnert,

Enclosed is the analytical report for chemical testing for samples taken on 02/23/96. It includes the following:

- 1) Analytical Report of results.
- 2) QC summary including LCS/LCSD, MS/MSD, duplicate samples, method blanks, and surrogates.
- 3) Cross reference sheet containing analyte, date analyzed, method, and batch number.
- 4) Case narrative explaining QC deficiencies and/or problems encountered in testing.

If you have any questions, please do not hesitate to call.

Very truly yours,

Brian Moore

Brian Moore
Program Specialist

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

Case Narrative

All quality objectives were met including holding times, LCS/LCSD, MS/MSD, Duplicate samples, and Method Blanks as applicable.

No analytical difficulties were encountered with any project samples.

ANALYTICAL REPORT

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G96-02-609

Received: 28 FEB 96

Mailed: MAR 4 1996

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

Project: 2832.11

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES					DATE SAMPLED
02-609-1	MW-1					23 FEB 96
02-609-2	MW-3					23 FEB 96
02-609-3	MW-4					23 FEB 96
02-609-4	MW-5					23 FEB 96
02-609-5	MW-6					23 FEB 96
PARAMETER	02-609-1	02-609-2	02-609-3	02-609-4	02-609-5	
BTEX/GRO (8015M)						
Date Analyzed	03/01/96	03/01/96	03/01/96	02/29/96	03/01/96	
Dilution Factor, Times	20	5	10	1	50	
Benzene, ug/L	1500	120	360	<0.3	8100	
Toluene, ug/L	3700	810	2800	<0.3	10000	
Ethylbenzene, ug/L	620	170	560	<0.3	2300	
Total Xylene Isomers, ug/L	2200	560	2500	<0.6	4000	
Carbon Range, .	C6-C12	C6-C12	C6-C12	C6-C12	C6-C12	
TPH (Gasoline Range), ug/L	21000	4000	18000	<100	58000	
Surrogates **						
a,a,a-Trifluorotoluene Rep., ug/L	1043	253	495	48.5	2725	
a,a,a-Trifluorotoluene Th., ug/L	1000	250	500	50.0	2500	

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G96-02-609

Received: 28 FEB 96

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

Project: 2832.11

REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES				DATE SAMPLED
02-609-6	MW-7				23 FEB 96
02-609-7	MW-8				23 FEB 96
02-609-8	MW-9				23 FEB 96
02-609-9	MW-10				23 FEB 96
02-609-10	MW-11				23 FEB 96
PARAMETER	02-609-6	02-609-7	02-609-8	02-609-9	02-609-10
BTEX/GRO (8015M)					
Date Analyzed	02/29/96	03/01/96	03/01/96	03/01/96	03/01/96
Dilution Factor, Times	1	1	1	5	1
Benzene, ug/L	<0.3	<0.3	170	810	49
Toluene, ug/L	<0.3	<0.3	18	23	1.2
Ethylbenzene, ug/L	<0.3	<0.3	2.3	27	0.51
Total Xylene Isomers, ug/L	<0.6	<0.6	160	44	4.0
Carbon Range, .	C6-C12	C6-C12	C63-C12	C6-C12	C6-C12
TPH (Gasoline Range), ug/L	<100	<100	4300	2400	250
Surrogates **					
a,a,a-Trifluorotoluene Rep., ug/L	50.5	50.4	56.1	241	47.2
a,a,a-Trifluorotoluene Th., ug/L	50.0	50.0	50.0	250	50.0

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G96-02-609

Received: 28 FEB 96

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

Project: 2832.11

REPORT OF ANALYTICAL RESULTS

Page 3

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
02-609-11	022396-1	23 FEB 96
PARAMETER	02-609-11	
BTEX/GRO (8015M)		
Date Analyzed	03/01/96	
Dilution Factor, Times	1	
Benzene, ug/L	<0.3	
Toluene, ug/L	<0.3	
Ethylbenzene, ug/L	<0.3	
Total Xylene Isomers, ug/L	<0.6	
Carbon Range, .	C6-C12	
TPH (Gasoline Range), ug/L	<100	
Surrogates **		
a,a,a-Trifluorotoluene Rep., ug/L	50.1	
a,a,a-Trifluorotoluene Th., ug/L	50.0	

B C Analytical

801 Western Avenue
Glendale, CA 91201
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1415 Louisiana, Suite 2500
Houston, Texas 77002

Project: 2832.11

REPORT OF ANALYTICAL RESULTS

Page 4

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED	
02-609-12	Field Blank	23 FEB 96	
02-609-13	Trip Blank	23 FEB 96	
PARAMETER	02-609-12	02-609-13	
BTEX/GRO (8015M)			
Date Analyzed	03/01/96	03/01/96	
Dilution Factor, Times	1	1	
Benzene, ug/L	<0.3	<0.3	
Toluene, ug/L	<0.3	<0.3	
Ethylbenzene, ug/L	<0.3	<0.3	
Total Xylene Isomers, ug/L	<0.6	<0.6	
Carbon Range, .	C6-C12	C6-C12	
TPH (Gasoline Range), ug/L	<100	<100	
Surrogates **			
a,a,a-Trifluorotoluene Rep., ug/L	51.0	53.1	
a,a,a-Trifluorotoluene Th., ug/L	50.0	50.0	

B C Analytical

.....

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G96-02-609

Received: 28 FEB 96

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

Project: 2832.11

REPORT OF ANALYTICAL RESULTS

Page 5

Ainda Meddes Fox DS

Dick Swenson, Laboratory Director

The analytical results within this report relate only to the specific compounds and samples investigated and may not necessarily reflect other apparently similar material from the same or a similar location.

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: ORDER PLACED FOR CLIENT: Brown and Caldwell Consultants 9602609 :
: BC ANALYTICAL : GLEN LAB : 09:59:22 04 MAR 1996 - P. 1 :
=====

SAMPLES... SAMPLE DESCRIPTION.. DETERM..... DATE..... METHOD..... EQUIP. BATCH.. ID.NO
ANALYZED

9602609*1	MW-1	GAS.TPH.BTEX	03.01.96	8015M	536-35	96425	6843
9602609*2	MW-3	GAS.TPH.BTEX	03.01.96	8015M	536-35	96425	6843
9602609*3	MW-4	GAS.TPH.BTEX	03.01.96	8015M	536-35	96425	6843
9602609*4	MW-5	GAS.TPH.BTEX	02.29.96	8015M	536-35	96424	8171
9602609*5	MW-6	GAS.TPH.BTEX	03.01.96	8015M	536-35	96425	6843
9602609*6	MW-7	GAS.TPH.BTEX	02.29.96	8015M	536-35	96424	8171
9602609*7	MW-8	GAS.TPH.BTEX	03.01.96	8015M	536-35	96424	8171
9602609*8	MW-9	GAS.TPH.BTEX	03.01.96	8015M	536-35	96424	8171
9602609*9	MW-10	GAS.TPH.BTEX	03.01.96	8015M	536-35	96424	8171
9602609*10	MW-11	GAS.TPH.BTEX	03.01.96	8015M	536-35	96424	8171
9602609*11	022396-1	GAS.TPH.BTEX	03.01.96	8015M	536-35	96424	8171
9602609*12	Field Blank	GAS.TPH.BTEX	03.01.96	8015M	536-35	96424	8171
9602609*13	Trip Blank	GAS.TPH.BTEX	03.01.96	8015M	536-35	96424	8171

AQUEOUS SAMPLES

-----METHOD BLANK-----

-----LAB CONTROL-----

-----MATRIX QC-----

UNITS	RESULT	RDL	FLG	%REC	FLG	%REC	FLG	LCL	UCL	RPD	UCL	FLG	%REC	FLG	%REC	FLG	LCL	UCL	RPD	UCL	FLG
-------	--------	-----	-----	------	-----	------	-----	-----	-----	-----	-----	-----	------	-----	------	-----	-----	-----	-----	-----	-----

Batch: GAS*96424 Method: 8015M - Modified 8015

Benzene	ug/L	0	0.3	-	107	-	-	76	141	-	-	-	107	-	112	-	71	125	5	29	-
Toluene	ug/L	0	0.3	-	78	-	-	73	122	-	-	-	78	-	80	-	63	126	4	33	-
Ethylbenzene	ug/L	0	0.3	-	75	-	-	72	133	-	-	-	76	-	78	-	65	126	2	34	-
Total Xylene Isomers	ug/L	0	0.6	-	72	-	-	64	117	-	-	-	73	-	74	-	69	128	2	35	-
TPH (Gasoline Range)	ug/L	0	100	-	106	-	-	64	152	-	-	-	92	-	97	-	53	166	6	21	-
[a,a,a-Trifluorotoluene]	Percent	102	-	-	110	-	-	75	117	-	-	-	106	-	100	-	75	117	-	-	-

Batch: GAS*96425 Method: 8015M - Modified 8015

Benzene	ug/L	0	0.3	-	111	-	-	76	141	-	-	-	113	-	113	-	71	125	1	29	-
Toluene	ug/L	0	0.3	-	80	-	-	73	122	-	-	-	80	-	81	-	63	126	1	33	-
Ethylbenzene	ug/L	0	0.3	-	78	-	-	72	133	-	-	-	79	-	78	-	65	126	1	34	-
Total Xylene Isomers	ug/L	0	0.6	-	75	-	-	64	117	-	-	-	75	-	75	-	69	128	0	35	-
TPH (Gasoline Range)	ug/L	0	100	-	99	-	-	64	152	-	-	-	101	-	98	-	53	166	3	21	-
[a,a,a-Trifluorotoluene]	Percent	102	-	-	115	-	-	75	117	-	-	-	112	-	108	-	75	117	-	-	-

SURROGATE RECOVERIES :
BC ANALYTICAL : GLEN LAB : 10:01:15 04 MAR 1996 - P. 1 :
=====

METHOD	ANALYTE	BATCH	ANALYZED	REPORTED	TRUE	%REC	FLAG	LCL	UCL
9602609*1									
8015M	a,a,a-Trifluorotoluene	Re96425	03/01/96	1043	1000	104		75	117
9602609*2									
8015M	a,a,a-Trifluorotoluene	Re96425	03/01/96	253	250	101		75	117
9602609*3									
8015M	a,a,a-Trifluorotoluene	Re96425	03/01/96	495	500	99		75	117
9602609*4									
8015M	a,a,a-Trifluorotoluene	Re96424	02/29/96	48.5	50.0	97		75	117
9602609*5									
8015M	a,a,a-Trifluorotoluene	Re96425	03/01/96	2725	2500	109		75	117
9602609*6									
8015M	a,a,a-Trifluorotoluene	Re96424	02/29/96	50.5	50.0	101		75	117
9602609*7									
8015M	a,a,a-Trifluorotoluene	Re96424	03/01/96	50.4	50.0	101		75	117
9602609*8									
8015M	a,a,a-Trifluorotoluene	Re96424	03/01/96	56.1	50.0	112		75	117
9602609*9									
8015M	a,a,a-Trifluorotoluene	Re96424	03/01/96	241	250	96		75	117
9602609*10									
8015M	a,a,a-Trifluorotoluene	Re96424	03/01/96	47.2	50.0	94		75	117
9602609*11									
8015M	a,a,a-Trifluorotoluene	Re96424	03/01/96	50.1	50.0	100		75	117
9602609*12									
8015M	a,a,a-Trifluorotoluene	Re96424	03/01/96	51.0	50.0	102		75	117
9602609*13									
8015M	a,a,a-Trifluorotoluene	Re96424	03/01/96	53.1	50.0	106		75	117

CHAIN OF CUSTODY RECORD

BCA Log Number

596002609

Client name B.S. SERVICES		Project or PO# 2832.11	
Address 1415 LOUISIANA ST SE 2500		Phone # (713) 646-1133	
City, State, Zip HOUSTON, TX 77002		Report attention MYNIA DENNETT	

Lab Sample number	Date sampled	Time sampled	Type* See key below	Sampled by	Sample description	Number of containers	Analyses required		Remarks
							BULK (8020)	Hazardous sample required	
2/23/96	0815		GW		MW-1	2			
					MW-3	2			
					MW-4	2			
					MW-5	2			
					MW-6	2			
					MW-7	2			
					MW-8	2			
					MW-9	2			
					MW-10	2			
2/23/96	0910				MW-11	2			
2/23/96	0930		GW		022396-1	2			
2/23/96	0940		AQ		FIELD BURN	2			

Relinquished by	Signature	Print Name	Company	Date	Time
Relinquished by	<i>[Signature]</i>	MYNIA DENNETT	BROWN & McLOWELL	2/24/96	11:15
Received by	<i>[Signature]</i>	Kenneth Hounsbuckle	BS Services	2-28-96	11:15
Relinquished by	<i>[Signature]</i>	Red-Ex	Kedua/Kypres	2-26-96	—
Received by	<i>[Signature]</i>	Kieutrus Phom	BCA	2/28/96	11:55
Relinquished by					
Received by Laboratory					

B C ANALYTICAL

- ☐ 1085 Shary Circle, Concord, CA 94518 (510) 825-3894
- ☐ 801 Western Avenue, Glendale, CA 91201 (818) 247-5737
- ☐ 1200 Gene Autry Way, Anaheim, CA 92805 (714) 978-0113

Note: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client's expense.

Disposal arrangements: _____

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge
GW—Groundwater SO—Soil PE—Petroleum
WW—Wastewater

59602607

BCA Log Number

[illegible]

BC ANALYTICAL

- ☐ 1085 Shary Circle, Concord, CA 94518 (510) 825-3894
☐ 801 Western Avenue, Glendale, CA 91201 (818) 247-5737
☐ 1200 Gene Autry Way, Anaheim, CA 92805 (714) 978-0113

Note: Samples are discarded 30 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client's expense.

Disposal arrangements:

*KEY: AQ—Aqueous NA—Nonaqueous SL—Sludge
GW—Groundwater SO—Soil PE—Petroleum
WW—Wastewater

C



APPENDIX C

REMEDIATION SYSTEM OPERATION DATA SHEETS

W:\BJSERV\2832\004R.DOC

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

BJ Services

Hobbs, New Mexico

ph (505) 392-5556

fax (505) 392-7307

Date : 12-19-95Recorded by : Kenny Hounbuckle

Time : _____

Weather conditions : _____

Temperature : _____

Humidity : _____

Barometric Press : _____

Water drained from extraction unit:

AM Main 1 gal
Standby _____PM Main 1 1/2 gal
Standby _____Time : 8:30 am**Blower Measurements****Injection System**

Flow Rate	scfm
Pressure	psi
Temperature	F

Extraction System

Flow Rate	<u>170</u> scfm
Vacuum	<u>25</u> in. H ₂ O
Temperature	<u>74°</u> F

Time : _____

Differential Pressure Readings (ΔP)**Injection System**

Lat. #	ΔP (in. H ₂ O)	Ps (PSI)
1		
2		
3		
4		
5	N/A	N/A
6		
7		

*No Readings***Extraction System**

Lat. #	ΔP (in. H ₂ O)	Ps (in. H ₂ O)
1		
2		
3		
4		
5		
6		
7		

Time : 8:00 pm**Blower Measurements****Injection System**

Flow Rate	<u>40</u> scfm
Pressure	<u>5.1</u> psi
Temperature	<u>150°</u> F

*no readings***Extraction System**

Flow Rate	<u>170</u> scfm
Vacuum	<u>23</u> in. H ₂ O
Temperature	<u>80°</u> F

- Fax daily to : Myna Dehnert @ (713) 759-0952
voice (713) 759-0999

BJ Services

Hobbs, New Mexico

ph (505) 392-5556

fax (505) 392-7307

Date : JAN 20 1996

Recorded by : Kenny

Time : _____

Weather conditions : _____

Temperature : _____

Humidity : _____

Barometric Press : _____

Water drained from extraction unit:

AM Main: 2.5 gal

Standby: _____

PM Main: 0

Standby: _____

Time : 0800

Blower Measurements

Injection System - RESTART

Flow Rate	<u>N/A</u>	scfm
Pressure	<u>N/A</u>	psi
Temperature		F

Extraction System

Flow Rate	<u>170</u>	scfm
Vacuum	<u>25</u>	in. H ₂ O
Temperature	<u>76°</u>	F

Time : _____

Differential Pressure Readings (ΔP)

Injection System

Lat. #	ΔP (in. H ₂ O)	Ps (PSI)
1		
2		
3		
4		
5	<u>N/A</u>	<u>N/A</u>
6		
7		

Extraction System

Lat. #	ΔP (in. H ₂ O)	Ps (in. H ₂ O)
1		
2		
3		
4		
5		
6		
7		

Time : 1350

Blower Measurements

Injection System

Flow Rate	<u>40</u>	scfm
Pressure	<u>5.0</u>	psi
Temperature	<u>160°</u>	F

Extraction System

Flow Rate	<u>170</u>	scfm
Vacuum	<u>23</u>	in. H ₂ O
Temperature	<u>90</u>	F

Fax daily to : Myna Dehnert @ (713) 759-0952

voice (713) 759-0999

BJ Services

Hobbs, New Mexico

ph (505) 392-5556

fax (505) 392-7307

Date : 3/22/96Recorded by : KennyTime : 0800Weather conditions : ClearTemperature : 42°Humidity : 45%Barometric Press : NA

Water drained from extraction unit:

AM Main 0Standby 0PM Main 0Standby 0Time : 0900**Blower Measurements****Injection System**

Flow Rate	<u>40</u>	scfm
Pressure	<u>5.0</u>	psi
Temperature	<u>162°</u>	F

Extraction System

Flow Rate	<u>165</u>	scfm
Vacuum	<u>20</u>	in. H ₂ O
Temperature	<u>90°</u>	F

Time : _____

Differential Pressure Readings (ΔP)**Injection System**

Lat. #	ΔP (in. H ₂ O)	Ps (PSI)
1		
2		
3		
4		
5	N/A	N/A
6		
7		

Extraction System

Lat. #	ΔP (in. H ₂ O)	Ps (in. H ₂ O)
1		
2		
3		
4		
5		
6		
7		

Time : 1800**Blower Measurements****Injection System**

Flow Rate	<u>40</u>	scfm
Pressure	<u>5</u>	psi
Temperature	<u>176°</u>	F

Extraction System

Flow Rate	<u>165</u>	scfm
Vacuum	<u>20</u>	in. H ₂ O
Temperature	<u>110°</u>	F

Fax daily to : Myna Dehnert @ (713) 759-0952
voice (713) 759-0999

D



APPENDIX D

LABORATORY ANALYTICAL REPORTS

AIR SAMPLES



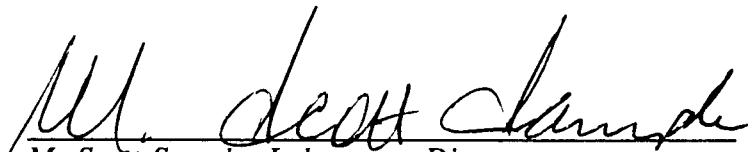
HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

SPL, INC.

REPORT APPROVAL SHEET

WORK ORDER NUMBER: 96 - 03 - B73

Approved for release by:


M. Scott Sample, Laboratory Director

Date: 3/27/96


Siok Hong Chen, Project Manager

Date: 3/27/96



Southern Petroleum Laboratories

****SUMMARY REPORT****

03/27/96

HOUSTON LABORATORY

8880 INTERCHANGE DRIVE

HOUSTON, TEXAS 77054

PHONE (713) 660-0901

Company: Brown and Caldwell
Site: 2708 W. County Rd, Hobbs, NM
Project No: 2832.31
Project: BJ Services/Hobbs Remediation

ANALYTICAL DATA

NOTE: ND - Not Detected

SPL ID MATRIX	CLIENT ID DATE SAMPLED	BENZENE PQL	TOLUENE PQL	ETHYLBENZ. PQL	XYLENE PQL	TPH-IR	TPH-GC	LEAD	MTBE
9603B73-01 AIR	Effluent 032296-01 03/22/96 13:30:00	6 1ppm	44 1ppm	12 1ppm	40 1ppm		990 5ppm		

BTEX - METHOD 5030/8020 (Modified)***
TPH-GC - METHOD 8015 (Modified)


SPL, Inc., - Project Manager



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

Certificate of Analysis No. H9-9603B73-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Myna Dehnert

DATE: 03/27/96

PROJECT: BJ Services/Hobbs Remediation
SITE: 2708 W. County Rd, Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: Effluent 032296-01

PROJECT NO: 2832.31
MATRIX: AIR
DATE SAMPLED: 03/22/96 13:30:00
DATE RECEIVED: 03/25/96

ANALYTICAL DATA				
PARAMETER	RESULTS	DETECTION LIMIT	UNITS	
BENZENE	6	1 P	ppm	
TOLUENE	44	1 P	ppm	
ETHYLBENZENE	12	1 P	ppm	
TOTAL XYLENE	40	1 P	ppm	
TOTAL VOLATILE AROMATIC HYDROCARBONS	102		ppm	
METHOD 5030/8020 (Modified)***				
Analyzed by: DAO				
Date: 03/25/96				
Total Petroleum Hydrocarbons	990	5	ppm	
METHOD 8015 (Modified)				
Analyzed by: DAO				
Date: 03/25/96 07:36:00				

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

QUALITY CONTROL
DOCUMENTATION



** SPL BATCH QUALITY CONTROL REPORT **

METHOD 5030/8020 (Modified)

PAGE

HOUSTON LABORATORY

8880 INTERCHANGE DRIVE

HOUSTON, TEXAS 77054

PHONE (713) 660-0901

Matrix: Air

Batch Id: HP_P960324072410

Units: ppm

B L A N K S P I K E S

S P I K E C O M P O U N D S	Sample Results <2>	Spike Added <3>	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative % Difference	QC Limits(**) (Advisory)	
			Result	Recovery	Result	Recovery		RPD	Recovery Range
			<1>	<4>	<1>	<5>		Max.	
BENZENE	ND	20	19	95.0	18	90.0	5.41	30	20 - 150
TOLUENE	ND	20	17	85.0	17	85.0	0	30	20 - 150
ETHYLBENZENE	ND	20	16	80.0	16	80.0	0	30	20 - 150
O XYLENE	ND	20	15	75.0	15	75.0	0	30	20 - 150
M & P XYLENE	ND	20	17	85.0	16	80.0	6.06	30	20 - 150

Analyst: AA

Sequence Date: 03/24/96

Method Blank File ID:

Sample File ID:

Blank Spike File ID: PP_499.TX0

Matrix Spike File ID:

Matrix Spike Duplicate File ID:

* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

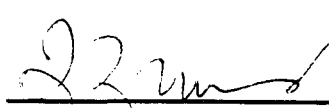
ND = Not Detected/Below Detection Limit

% Recovery = $[(<1> - <2>) / <3>] \times 100$ Relative Percent Difference = $|(<4> - <5> | / [(<4> + <5>) \times 0.5] \times 100$

(**) = Source: Temporary Limits

SAMPLES IN BATCH(SPL ID):

9603B40-01A 9603B41-01A 9603B44-01A 9603B45-01A
9603B42-01A 9603B43-01A 9603B73-01A 9603B91-01A
9603B14-01A 9603B16-01A 9603B17-01A 9603B39-01A


QC Officer



** SPL BATCH QUALITY CONTROL REPORT **

Mod. 8015 - Diesel

PAGE 1
HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Matrix: Soil
Units: mg/Kg

Batch Id: HP_T960320011600

LABORATORY CONTROL SAMPLE

S P I K E C O M P O U N D S	Method Blank Result <2>	Spike Added <3>	Blank Spike		QC Limits(**) (Mandatory) % Recovery Range
			Result <1>	Recovery %	
Diesel Petr. Hydrocarbons	ND	250	292.67	117	82 - 128

MATRIX SPIKES

S P I K E C O M P O U N D S	Sample Results <2>	Spike Added <3>	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative % Difference	QC Limits(***) (Advisory)	
			Result <1>	Recovery <4>	Result <1>	Recovery <5>		RPD Max.	Recovery Range
DIESEL PETR. HYDROCARBONS	778.69	250	872.53	37.5	1205.30	171 *	128 *	11	32 - 162

Analyst: RR

Sequence Date: 03/19/96

SPL ID of sample spiked: 9603749-03C

Sample File ID: T__994.TX0

Method Blank File ID:

Blank Spike File ID: TT_711.TX0

Matrix Spike File ID: T__995.TX0

Matrix Spike Duplicate File ID: T__996.TX0

* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = $((<1> - <2>) / <3>) \times 100$

LCS % Recovery = $(<1> / <3>) \times 100$

Relative Percent Difference = $|(<4> - <5>) / ((<4> + <5>) \times 0.5)| \times 100$

(**) = Source: SPL-Houston Historical Data (3rd Q '95)

(***) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID):

9603749-11C 9603749-10C 9603695-04C 9603695-02C
9603749-07C 9603695-07C 9603695-03C 9603695-01C
9603749-02C 9603749-09C 9603749-12C 9603749-03C
9603695-06C 9603749-01C 9603749-04C 9603749-05C
9603749-06C 9603749-08C

QC Officer

CHAIN OF CUSTODY
AND
SAMPLE RECEIPT CHECKLIST

SPL Houston Environmental Laboratory

Sample Login Checklist

Date: 3/25/96	Time: 0930
---------------	------------

SPL Sample ID: 9603B73

		Yes	No
1	Chain-of-Custody (COC) form is present.	✓	
2	COC is properly completed.	✓	
3	If no, Non-Conformance Worksheet has been completed.		
4	Custody seals are present on the shipping container.	✓	
5	If yes, custody seals are intact.	✓	
6	All samples are tagged or labeled.	✓	
7	If no, Non-Conformance Worksheet has been completed.		
8	Sample containers arrived intact	✓	
9	Temperature of samples upon arrival:	ambient C	
10	Method of sample delivery to SPL:	SPL Delivery	
		Client Delivery	
		FedEx Delivery (airbill #)	7882719320
		Other:	
11	Method of sample disposal:	SPL Disposal	✓
		HOLD	
		Return to Client	

Name: <i>Orville Salas</i>	Date: 3/25/96
----------------------------	---------------



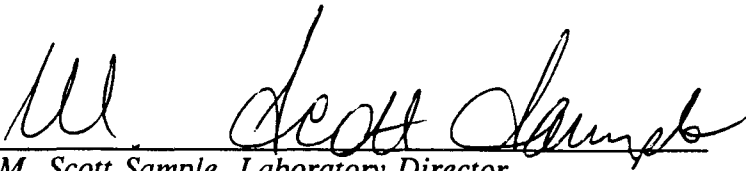
HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

SPL, INC.

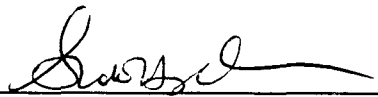
REPORT APPROVAL SHEET

WORK ORDER NUMBER: 96 - 01 - C42

Approved for release by:


M. Scott Sample, Laboratory Director

Date: 2/6/96


Siok Hong Chen, Project Manager

Date: 2/6/96



Southern Petroleum Laboratories

*****SUMMARY REPORT*****

02/06/96

HOUSTON LABORATORY

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

Company: Brown and Caldwell
Site: 2708 W. County Rd, Hobbs, NM
Project No: 2832.31
Project: BJ Services/Hobbs Remediation

ANALYTICAL DATA

NOTE: ND - Not Detected

SPL ID MATRIX	CLIENT ID DATE SAMPLED	BENZENE PQL	TOLUENE PQL	ETHYLBENZ. PQL	XYLENE PQL	TPH-IR	TPH-GC	LEAD	MTBE
9601C42-01 AIR	Effluent 012996-01 01/29/96 14:00:00	12 1ppm	61 1ppm	17 1ppm	53 1ppm		1200 5ppm		

BTEX - METHOD 5030/8020 (Modified)***
TPH-GC - METHOD 8015 (Modified)


SPL, Inc., - Project Manager



Certificate of Analysis No. H9-9601C42-01

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

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Myna Dehnert

DATE: 02/06/96

PROJECT: BJ Services/Hobbs Remediation
SITE: 2708 W.County Rd, Hobbs, NM
SAMPLED BY: BJ Services
SAMPLE ID: Effluent 012996-01

PROJECT NO: 2832.31
MATRIX: AIR
DATE SAMPLED: 01/29/96 14:00:00
DATE RECEIVED: 01/31/96

ANALYTICAL DATA				
PARAMETER	RESULTS	DETECTION LIMIT	UNITS	
BENZENE	12	1 P	ppm	
TOLUENE	61	1 P	ppm	
ETHYLBENZENE	17	1 P	ppm	
TOTAL XYLENE	53	1 P	ppm	
TOTAL VOLATILE AROMATIC HYDROCARBONS	143		ppm	
METHOD 5030/8020 (Modified)***				
Analyzed by: KA				
Date: 02/01/96				
Total Petroleum Hydrocarbons	1200	5	ppm	
METHOD 8015 (Modified)				
Analyzed by: KA				
Date: 02/01/96 15:54:00				

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

QUALITY CONTROL
DOCUMENTATION



** SPL BATCH QUALITY CONTROL REPORT **

PAGE

METHOD 5030/8020 (Modified)

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HOUSTON LABORATORY

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

Matrix: Air

Batch Id: HP_P960201112300

Units: ppm

B L A N K S P I K E S

S P I K E C O M P O U N D S	Sample Results <2>	Spike Added <3>	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative % Difference	QC Limits(**) (Advisory)	
			Result	Recovery	Result	Recovery		RPD	Recovery Range
			<1>	<4>	<1>	<5>		Max.	
BENZENE	ND	20	16	80.0	16	80.0	0	30	20 - 150
TOLUENE	ND	20	15	75.0	16	80.0	6.45	30	20 - 150
ETHYLBENZENE	ND	20	15	75.0	15	75.0	0	30	20 - 150
O XYLENE	ND	20	15	75.0	15	75.0	0	30	20 - 150
M & P XYLENE	ND	20	16	80.0	17	85.0	6.06	30	20 - 150

Analyst: fab

Sequence Date: 02/02/96

Method Blank File ID:

Sample File ID:

Blank Spike File ID: PP_031.TX0

Matrix Spike File ID:

Matrix Spike Duplicate File ID:

* = Values Outside QC Range

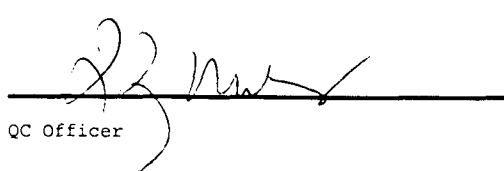
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = $[(<1> - <2>) / <3>] \times 100$ Relative Percent Difference = $| (<4> - <5>) / [(<4> + <5>) \times 0.5] \times 100$

(**) = Source: Temporary Limits

SAMPLES IN BATCH(SPL ID):

9601C99-01A 9602031-01A 9602031-02A 9602033-01A
9602088-02A 9602088-01A 9601C42-01A
QC Officer



** SPL BATCH QUALITY CONTROL REPORT **

PAGE

METHOD 8015 (Modified)

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HOUSTON LABORATORY

8880 INTERCHANGE DRIVE

HOUSTON, TEXAS 77054

PHONE (713) 660-0901

Matrix: Air

Batch Id: HP_P960201123000

Units: ppm

BLANK SPIKES

S P I K E C O M P O U N D S	Sample Results <2>	Spike Added <3>	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative % Difference	QC Limits(**) (Advisory)	
			Result	Recovery	Result	Recovery		RPD	Recovery Range
			<1>	<4>	<1>	<5>		Max.	
TPHAIR	ND	200	226	113	227	114	0.881	30	20 - 150

Analyst: fab

Sequence Date: 02/02/96

Method Blank File ID:

Sample File ID:

Blank Spike File ID: P__031.TX0

Matrix Spike File ID:

Matrix Spike Duplicate File ID:

* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = $\left(\frac{<1> - <2>}{<3>} \right) \times 100$

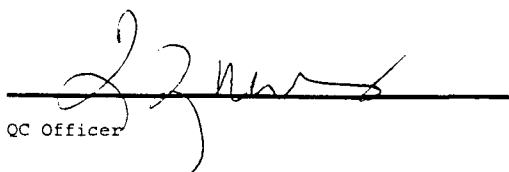
Relative Percent Difference = $\left| \frac{<4> - <5>}{\left(\frac{<4> + <5>}{2} \right)} \right| \times 100$

(**) = Source: Temporary limits

SAMPLES IN BATCH(SPL ID):

9602031-02A 9602033-01A 9602088-02A 9602088-01A

9601C42-01A 9601C99-01A 9602031-01A


QC Officer

CHAIN OF CUSTODY
AND
SAMPLE RECEIPT CHECKLIST



Environmental Laboratory
8880 Interchange Drive
Houston, Texas 77054
713/660-0901

Analysis Request and Chain of Custody Record

Project No.		Client/Project Name			Project Location			
2832.31		BJ Services / Hobbs Remediation			2708 W. County Rd., Hobbs, N.M.			
Field Sample No./ Identification	Date and Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid, Sludge, Etc.)	Preservative	ANALYSIS REQUESTED	LABORATORY REMARKS
EFFluent D12A9601	1-29-96 2:00pm			Tedlar bag	Air	-	TPH, BTEX	
Samplers (Signature) <i>Kenny Howard</i>	Date: 1-29-96 Time: 2:00 PM	Relinquished by: (Signature) <i>Kenny Howard</i>	Date: 1-29-96 Time: 2:00 PM	Received by: (Signature) <i>P. West</i>	Date: 1/31/96 Time: 1000	Intact <i>[Signature]</i>		
Affiliation BJ Services		Relinquished by: (Signature)		Received by: (Signature)	Date:	Intact		
		Relinquished by: (Signature)		Received by: (Signature)	Date:	Intact		
SAMPLER REMARKS:					Received for laboratory: (Signature)	Date:	Laboratory No.	
					Data Results to:	Time:	<i>9601C42</i>	
					Seal #			

@ Brown & Caldwell

SPL Houston Environmental Laboratory

Sample Login Checklist

Date: 1-31-96	Time: 1000
------------------	---------------

SPL Sample ID: 9601042

		Yes	No
1	Chain-of-Custody (COC) form is present.	✓	
2	COC is properly completed.	✓	
3	If no, Non-Conformance Worksheet has been completed.		
4	Custody seals are present on the shipping container.	✓	
5	If yes, custody seals are intact.	✓	
6	All samples are tagged or labeled.	✓	
7	If no, Non-Conformance Worksheet has been completed.		
8	Sample containers arrived intact	✓	
9	Temperature of samples upon arrival:	3°C	
10	Method of sample delivery to SPL:	SPL Delivery	
		Client Delivery	
		FedEx Delivery (airbill #) 7882719040	
		Other:	
11	Method of sample disposal:	SPL Disposal	✓
		HOLD	
		Return to Client	

Name: Wayne B. B...	Date: 1-31-96
------------------------	------------------



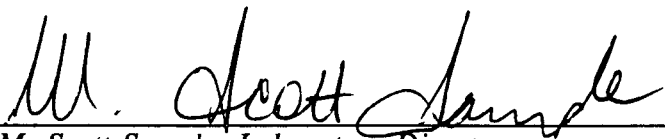
HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

SPL, INC.

REPORT APPROVAL SHEET

WORK ORDER NUMBER: 95 - 12 - A01

Approved for release by:


M. Scott Sample, Laboratory Director

Date: 12/28/95


Siok Hong Chen, Project Manager

Date: 12/27/95



Southern Petroleum Laboratories

*****SUMMARY REPORT*****

12/27/95

HOUSTON LABORATORY

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

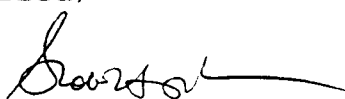
Company: Brown and Caldwell
Site: Hobbs, New Mexico
Project No: 2832.31
Project: BJ Services

ANALYTICAL DATA

NOTE: ND - Not Detected

SPL ID MATRIX	CLIENT ID DATE SAMPLED	BENZENE PQL	TOLUENE PQL	ETHYLBENZ. PQL	XYLENE PQL	TPH-IR	TPH-GC	LEAD	MTBE
9512A01-01 AIR	Effluent 121995-01 12/19/95 15:15:00	10 1ppm	45 1ppm	11 1ppm	33 1ppm		530 6ppm		

BTEX - METHOD 5030/8020 (Modified)***
TPH-GC - METHOD 8015 (Modified)



SPL, Inc., - Project Manager



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

Certificate of Analysis No. H9-9512A01-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Myna Dehnert

DATE: 12/27/95

PROJECT: BJ Services
SITE: Hobbs, New Mexico
SAMPLED BY: Brown & Caldwell
SAMPLE ID: Effluent 121995-01

PROJECT NO: 2832.31
MATRIX: AIR
DATE SAMPLED: 12/19/95 15:15:00
DATE RECEIVED: 12/20/95

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	10	1 P	ppm
TOLUENE	45	1 P	ppm
ETHYLBENZENE	11	1 P	ppm
TOTAL XYLENE	33	1 P	ppm
TOTAL VOLATILE AROMATIC HYDROCARBONS	99		ppm
METHOD 5030/8020 (Modified)***			
Analyzed by: RR			
Date: 12/22/95			
Total Petroleum Hydrocarbons	530	6	ppm
METHOD 8015 (Modified)			
Analyzed by: RR			
Date: 12/22/95 02:52:00			

(P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 18th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

QUALITY CONTROL
DOCUMENTATION



* SPL BATCH QUALITY CONTROL REPORT **
METHOD 5030/8020 (Modified)
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HOUSTON LABORATORY
8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Matrix: Air
Units: ppm

Batch Id: HP_P951222123700

B L A N K S P I K E S

S P I K E C O M P O U N D S	Sample Results <2>	Spike Added <3>	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative % Difference	QC Limits(**) (Advisory)	
			Result	Recovery	Result	Recovery		RPD	Recovery Range
			<1>	<4>	<1>	<5>		Max.	
BENZENE	ND	20	20	100	19	95.0	5.13	30	20 - 150
TOLUENE	ND	20	19	95.0	18	90.0	5.41	30	20 - 150
ETHYLBENZENE	ND	20	19	95.0	17	85.0	11.1	30	20 - 150
O XYLENE	ND	20	18	90.0	18	90.0	0	30	20 - 150
M & P XYLENE	ND	20	17	85.0	18	90.0	5.71	30	20 - 150

Analyst: RR

Sequence Date: 12/23/95

Method Blank File ID:

Sample File ID:

Blank Spike File ID: PP_663.TX0

Matrix Spike File ID:

Matrix Spike Duplicate File ID:

* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

% Recovery = $[(<1> - <2>) / <3>] \times 100$

Relative Percent Difference = $| (<4> - <5>) | / [(<4> + <5>) \times 0.5] \times 100$

(**) = Source: Temporary Limits

SAMPLES IN BATCH(SPL ID):

9512B34-01A 9512B34-02A 9512A78-01A 9512A01-01A


QC Officer



** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8015 (Modified)
®

PAGE

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

Matrix: Air
Units: ppm

Batch Id: HP_P951222120200

BLANK SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike		Matrix Spike Duplicate		MS/MSD Relative % Difference	QC Limits(**) (Advisory)	
			Result	Recovery	Result	Recovery		RPD Max.	Recovery Range
			<1>	<4>	<1>	<5>			
TPHAIR	ND	200	176	88.0	166	83.0	5.85	30	20 - 150

Analyst: RR

Sequence Date: 12/23/95

Method Blank File ID:

Sample File ID:

Blank Spike File ID: P__663.TX0

Matrix Spike File ID:

Matrix Spike Duplicate File ID:

* = Values Outside QC Range

NC = Not Calculated (Sample exceeds spike by factor of 4 or more)

ND = Not Detected/Below Detection Limit

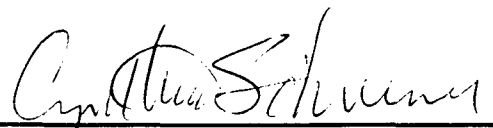
% Recovery = $[(<1> - <2>) / <3>] \times 100$

Relative Percent Difference = $| (<4> - <5>) | / [(<4> + <5>) \times 0.5] \times 100$

(**) = Source: Temporary limits

SAMPLES IN BATCH(SPL ID):

9512B34-01A 9512B34-02A 9512A78-01A 9512A01-01A


QC Officer

CHAIN OF CUSTODY
AND
SAMPLE RECEIPT CHECKLIST

SPL Houston Environmental Laboratory

Sample Login Checklist

Date: 12/20/95	Time: 10:00
----------------	-------------

SPL Sample ID: 9512A01

		Yes	No
1	Chain-of-Custody (COC) form is present.	✓	
2	COC is properly completed.	✓	
3	If no, Non-Conformance Worksheet has been completed.		
4	Custody seals are present on the shipping container.	✓	
5	If yes, custody seals are intact.	✓	
6	All samples are tagged or labeled.	✓	
7	If no, Non-Conformance Worksheet has been completed.		
8	Sample containers arrived intact	✓	
9	Temperature of samples upon arrival:	ambient C	
10	Method of sample delivery to SPL:	SPL Delivery	
		Client Delivery	
		FedEx Delivery (airbill #)	7882718760
		Other:	
11	Method of sample disposal:	SPL Disposal	✓
		HOLD	
		Return to Client	

Name: <i>Antonio Salas</i>	Date: 12/20/95
----------------------------	----------------

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

Groundwater Sampling Event
August, 1995
Hobbs, New Mexico Facility

BJ Services Company, U.S.A.

September 28, 1995

GROUNDWATER SAMPLING EVENT

HOBBS, NEW MEXICO FACILITY

AUGUST, 1995

BJ SERVICES COMPANY, U.S.A.

SEPTEMBER 28, 1995

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

BROWN AND CALDWELL

September 28, 1995

Mr. Mark Ashley
State of New Mexico
Energy, Minerals, and Natural Resources Dept.
Oil Conservation Division
Post Office Box 2088
State Land Office Building
Santa Fe, New Mexico 87504

19-2832-10

Subject: BJ Services Company, U.S.A.
2708 West County Road
Hobbs, New Mexico Facility
August 1995 Monitoring Well Sampling Event

Dear Mr. Ashley:

This report presents the results of the groundwater sampling event conducted for BJ Services Company, U.S.A. (BJ Services) at their Hobbs, New Mexico facility located at 2708 West County Road. BJ Services acquired The Western Company of North America (Western) oil well servicing district office in Hobbs, New Mexico effective April 13, 1995. On July 31 and August 1, 1995 Brown and Caldwell conducted a groundwater sampling event to determine concentrations of dissolved-phase hydrocarbons in the groundwater at the facility. The following is a description of the activities conducted during this sampling event.

Groundwater level measurements were obtained from all monitoring wells prior to sampling the wells. The 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 on Table 1. The groundwater elevation data indicates that the general groundwater flow direction continues towards the east with a hydraulic gradient of 0.005 ft/ft. A potentiometric surface map is presented in Figure 1. Phase-separated hydrocarbons were detected in monitoring wells MW-1 and MW-4 with thickness ranging from a sheen to 0.26 feet, respectively. Monitoring well MW-2 could not be located and is assumed to have been destroyed during facility activities such as grading.

Groundwater samples were collected from all monitoring wells on August 1, 1995. The samples were collected after purging the wells with a submersible pump to remove at least three well volumes or until the well became dry. Field parameter measurements for pH, conductivity, temperature, dissolved oxygen (DO), oxidation/reduction potential (Redox) and iron were collected after each well volume was purged. Two consecutive readings within five percent (for each of the

G:\2832.10\aug95

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

Environmental Engineering And Consulting • Analytical Services

1415 LOUISIANA, SUITE 2500, HOUSTON, TX 77002
(713) 759-0999 FAX (713) 759-0952

three parameters: pH, temperature, and specific conductivity) were used to indicate that groundwater had stabilized. The parameters in each monitoring well typically stabilized after two well volumes had been removed; however, at least three well volumes were removed from each well. All field parameter readings were recorded in the field log book and are listed on the Groundwater Sampling Forms included in Appendix A. Following recovery, the groundwater samples were collected using a new, 3-foot long, 1/2-inch I.D., disposable polyethylene bailer. Each sample was transferred to laboratory prepared, clean glass and/or plastic containers sealed with Teflon[®]-lined lids; labeled; and placed on ice in an insulated cooler for shipment via overnight courier to BC Analytical in Glendale, California. Strict chain-of-custody documentation was followed throughout the entire process.

All purging equipment was decontaminated prior to and after each use. Decontamination procedures used consisted of steam cleaning and/or washing with fresh water and a non-phosphate detergent and rinsed with deionized (DI) water. Purged water and excess water generated by equipment cleaning operations was placed into 55-gallon drums and transferred to an on-site drum staging area for classification and future disposal.

Groundwater samples collected during this sampling event were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8020, Polynuclear Aromatic Hydrocarbons (PAH) by EPA Method 8270, and eight RCRA metals by EPA Method 6010/700. Additionally, all samples were analyzed for background groundwater quality parameters including major anions (chloride, nitrate, sulfate), major cations (calcium, magnesium, potassium, sodium) and alkalinity.

Total concentrations of BTEX constituents above the laboratory detection limit were reported in the groundwater samples obtained from each monitoring well except MW-5. Total benzene concentrations ranged from 3.1 micrograms per liter ($\mu\text{g/L}$) in MW-8 to 8,300 $\mu\text{g/L}$ in MW-6. Total BTEX concentrations ranged from 6.37 $\mu\text{g/L}$ in MW-8 to 27,900 $\mu\text{g/L}$ in MW-6. TPH concentrations ranged from below the detection limit of 0.100 mg/L in MW-5 to 120 mg/L in MW-4. A cumulative summary of BTEX analytical results for groundwater samples is included as Table 2. Figure 2 illustrates the distribution of selected target analytes, which include benzene, total BTEX, and TPH. The laboratory analytical reports and chain of custody record are included as Appendix B.

The PAH compounds detected included 2-Methylnaphthalene, 2-Methylphenol (o-Cresol), 4-Methylphenol (p-Cresol), Naphthalene, Bis(2-ethylhexyl)phthalate, 2,4-Dimethylphenol and phenol. 2,4-Dimethylphenol was detected in monitoring wells MW-3 and MW-6 at concentrations of 97 $\mu\text{g/L}$ and 42 $\mu\text{g/L}$, respectively. Monitoring well MW-1, MW-3, MW-4, MW-6, MW-9, and MW-10 reported concentrations of 2-Methylnaphthalene ranging from 23 $\mu\text{g/L}$ to 1,500 $\mu\text{g/L}$ and naphthalene ranging from 15 $\mu\text{g/L}$ to 1,700 $\mu\text{g/L}$. 2-Methylphenol (o-Cresol) was detected only in monitoring well MW-3 at a concentration of 56 $\mu\text{g/L}$. 4-Methylphenol (p-Cresol) was detected only

in monitoring well MW-6 at a concentration of 150 µg/L. Phenol was detected only in monitoring well MW-10 at a concentration of 8.2 µg/L. Monitoring wells MW-1, MW-4, and MW-5 reported concentrations of Bis (2-ethylhexyl) phthalate ranging from 40 µg/L to 10,000 µg/L.

The concentrations of Bis (2-ethylhexyl) phthalate (40 µg/L) and phenol (8.2 µg/L) detected in monitoring well MW-5 and MW-10, respectively are possible laboratory contaminants. Phthalates and phenol compounds are common laboratory contaminants and were detected in the laboratory blanks. According to the National Functional Guidelines for Organic Data Review (June, 1991) compounds detected in a sample at concentrations less than 10 times the amount detected in the laboratory blanks are considered not detected. The reported concentrations for Bis (2-ethylhexyl) phthalate and phenol in samples MW-5 and MW-10, respectively are considered attributed to laboratory contamination.

The inorganic constituents detected in the groundwater samples were arsenic, barium, and cadmium. Barium was the only constituent detected in all ten monitoring wells at concentrations ranging from 0.049 mg/L to 1.1 mg/L. Arsenic concentrations ranged from 0.0033 mg/L to 0.028 mg/L and were detected in monitoring wells MW-1, MW-3, and MW-5 through MW-11. Cadmium was detected only in monitoring well MW-4 at a concentration of 0.0052 mg/L.

If you have any questions regarding the information contained in this letter report, please contact either of the undersigned at (713) 759-0999.

Very truly yours,

BROWN AND CALDWELL



Myrna R. Dehnert
Associate Geologist



Robert N. Jennings, P.E.
Manager, Gulf Coast Region

cc: Ms. Jo Ann Cobb, BJ Services Company, U.S.A.

Tables

TABLES

CUMULATIVE GROUNDWATER ELEVATION DATA

Table 1.
Cumulative Groundwater Elevation Data
 BJ Services/Western Hobbs Facility
 Hobbs, New Mexico

Well ID	Date Measured	Top of Casing Elevation (ft) (relative)	Depth to Water from TOC (ft) (1)	Depth to Hydrocarbon from TOC (ft)	Hydrocarbon Thickness (ft)	Potentiometric Surface Elevation (ft)
MW-1	August 10, 1992	101.44	53.22	None	0.00	48.22
	February 9, 1993	101.44	53.03	None	0.00	48.41
	August 18, 1993	101.44	53.1	None	0.00	48.34
	January 26, 1994	101.44	53.31	None	0.00	48.13
	May 3, 1995	101.44	54.64	54.44	0.20	46.80
	July 31, 1995	101.44	54.14	None	0.00	47.30
MW-2	August 10, 1992	101.5	52.82	None	0.00	48.68
	February 9, 1993	98.75	49.6	None	0.00	49.15
	August 18, 1993	98.75	49.71	None	0.00	49.04
	January 26, 1994	98.75	49.97	None	0.00	48.78
	May 3, 1995	98.75		Well destroyed		
MW-3	August 10, 1992	101.44	52.99	None	0.00	48.45
	February 9, 1993	101.44	52.72	None	0.00	48.72
	August 18, 1993	101.44	52.82	None	0.00	48.62
	January 26, 1994	101.44	53.05	None	0.00	48.39
	May 3, 1995	101.44	54.31	None	0.00	47.13
	July 31, 1995	98.76	51.24	None	0.00	47.52
MW-4	August 10, 1992	99.33	50.55	None	0.00	48.78
	February 9, 1993	99.33	50.26	None	0.00	49.07
	August 18, 1993	99.33	50.38	None	0.00	48.95
	January 26, 1994	99.33	50.9	None	0.00	48.43
	May 3, 1995	99.33	54.51	51.06	3.45	44.82
	July 31, 1995	99.33	51.74	51.48	0.26	47.59
MW-5	August 10, 1992	101.85	52.38	None	0.00	49.47
	February 9, 1993	101.85	52.06	None	0.00	49.79
	August 18, 1993	101.85	52.16	None	0.00	49.69
	January 26, 1994	101.85	52.5	None	0.00	49.35
	May 3, 1995	101.85	53.57	None	0.00	48.28
	July 31, 1995	101.85	53.27	None	0.00	48.58
MW-6	February 9, 1993	99.25	50.58	None	0.00	48.67
	August 18, 1993	99.25	50.78	None	0.00	48.47
	January 26, 1994	99.25	51	None	0.00	48.25
	May 3, 1995	99.25	52.63	None	0.00	46.62
	July 31, 1995	99.25	51.9	None	0.00	47.35
MW-7	February 9, 1993	98.96	50.53	None	0.00	48.43
	August 18, 1993	98.96	50.74	None	0.00	48.22
	January 26, 1994	98.96	51.01	None	0.00	47.95
	May 3, 1995	98.96	52.25	None	0.00	46.71
	July 31, 1995	98.96	51.92	None	0.00	47.04
MW-8	February 9, 1993	99.12	50.48	None	0.00	48.64
	August 18, 1993	99.12	50.67	None	0.00	48.45
	January 26, 1994	99.12	50.96	None	0.00	48.16
	May 3, 1995	99.12	52.15	None	0.00	46.97
	July 31, 1995	99.12	51.77	None	0.00	47.35
MW-9	April 22, 1993	99.18	49.73	None	0.00	49.45
	July 15, 1993	99.18	49.65	None	0.00	49.53
	August 18, 1993	99.18	49.85	None	0.00	49.33
	January 26, 1994	99.18	50.02	None	0.00	49.16
	May 3, 1995	99.18	51.35	None	0.00	47.83
	July 31, 1995	99.18	50.97	None	0.00	48.21

Table 1.
Cumulative Groundwater Elevation Data
 BJ Services/Western Hobbs Facility
 Hobbs, New Mexico

Well ID	Date Measured	Top of Casing Elevation (ft) (relative)	Depth to Water from TOC (ft) (1)	Depth to Hydrocarbon from TOC (ft)	Hydrocarbon Thickness (ft)	Potentiometric Surface Elevation (ft)
MW-10	August 18, 1993	98.9	51.54	None	0.00	47.36
	January 26, 1994	98.9	51.9	None	0.00	47.00
	May 3, 1995	98.9	52.97	None	0.00	45.93
	July 31, 1995	98.9	52.87	None	0.00	46.03
MW-11	August 18, 1993	98.82	51.92	None	0.00	46.90
	January 26, 1994	98.92	52.32	None	0.00	46.60
	May 3, 1995	98.92	53.38	None	0.00	45.54
	July 31, 1995	98.92	53.35	None	0.00	45.57

Notes: (1) All measurements are recorded to the nearest 0.01 foot units.
 (2) MW-2 could not be located and is assumed destroyed.

CUMULATIVE RESULTS OF BTEX ANALYSIS FOR GROUNDWATER SAMPLES

Table 2.
Cumulative Results of BTEX Analysis for Groundwater Samples
 BJ Services/Western Hobbs Facility
 Hobbs, New Mexico

Well ID	Sampling Date	Benzene(1) (ug/L)	Toluene(1) (ug/L)	Ethylbenzene(1) (ug/L)	Xylenes(1) (ug/L)	TPH(2) (mg/L)
MW-1	8/10/92	5,550	12,090	2,160	7,370	NA (4)
	2/9/93	2,100	6,500	1,300	7,400	NA
	8/19/93	3,200	7,300	1,200	3,700	NA
	1/27/94	1,930	4,580	672	2,390	NA
	5/3/95	NS (3)	NS	NS	NS	NS
	8/1/95	390	1,300	230	800	5.7
MW-2	8/10/92	14.9	<4.0	<4.0	<4.0	NA
	2/9/93	<2.0	<2.0	<2.0	<6.0	NA
	8/19/93	100	12	3	13	NA
	1/27/94	<1.0	1.2	2	2.5	NA
	5/3/95	NS	NS	NS	NS	NS
	8/1/95	NS	NS	NS	NS	NS
MW-3	8/10/92	304.9	2,099	6,760	1,586	NA
	2/9/93	130	<10.0	<10.0	190	NA
	8/19/93	560	3,100	630	1,900	NA
	1/27/94	1,070	5,380	510	3,120	NA
	5/4/95	770	3,300	470	1,800	NA
	8/1/95	490	2,900	890	1,600	14
MW-4	8/10/92	2,594	10,360	2,160	6,740	NA
	2/9/93	5,200	15,000	2,200	10,000	NA
	8/19/93	3,000	12,000	<2,000	7,000	NA
	1/27/94	NS	NS	NS	NS	NS
	5/3/95	NS	NS	NS	NS	NS
	8/1/95	5,700	17,000	3,500	13,000	120
MW-5	8/10/92	<4.0	<4.0	<4.0	<4.0	NA
	2/9/93	<2.0	<2.0	<2.0	<6.0	NA
	8/10/93	<2.0	<2.0	<2.0	<2.0	NA
	1/27/94	8.7	29.9	4	11.3	NA
	5/3/95	3.7	5.3	0.92	4.6	NA
	8/1/95	<0.3	<0.3	<0.3	<0.6	<0.100
MW-6	8/10/92	NS	NS	NS	NS	NS
	2/9/93	7,000	19,000	3,100	7,200	NA
	8/19/93	8,100	19,000	3,500	6,400	NA
	1/27/94	7,960	20,200	3,830	6,150	NA
	5/4/95	11,000	17,000	2,900	6,000	NA
	8/1/95	8,300	12,000	2,500	5,100	60
MW-7	8/10/92	NS	NS	NS	NS	NS
	2/9/93	<2.0	<2.0	<2.0	<6.0	NA
	8/19/93	<2.0	3	<2.0	<2.0	NA
	1/27/94	1.1	<1.0	<1.0	<1.0	NA
	5/3/95	52	3.4	0.67	2.8	NA
	8/1/95	22	2.2	0.85	2.8	<0.100

Table 2.
Cumulative Results of BTEX Analysis for Groundwater Samples
 BJ Services/Western Hobbs Facility
 Hobbs, New Mexico

Well ID	Sampling Date	Benzene(1) (ug/L)	Toluene(1) (ug/L)	Ethylbenzene(1) (ug/L)	Xylenes(1) (ug/L)	TPH(2) (mg/L)
MW-8	8/10/92	NS	NS	NS	NS	NS
	2/9/93	<2.0	<2.0	<2.0	<6.0	NA
	8/19/93	<2.0	<2.0	<2.0	<2.0	NA
	1/27/94	<1.0	<1.0	<1.0	<1.0	NA
	5/3/95	3	4.9	0.75	3.7	NA
	8/1/95	3.1	1.2	0.47	1.6	<0.001
080195(3)	8/1/95	3.6	1.5	0.51	1.5	<0.100
MW-9	4/22/93	570	380	<50.0	870	NA
	7/15/93	121	7.3	3	458	NA
	8/19/93	390	290	40	250	NA
	1/27/94	327	357	51.1	293	NA
	5/3/95	380	110	19	120	NA
	8/1/95	660	410	91	310	6.2
MW-10	8/19/93	190	460	<200	240	NA
	1/27/94	13.4	4	5.5	33.6	NA
	5/4/95	980	15	11	84	NA
	8/1/95	1,300	32	32	100	3.6
MW-11	8/19/93	<2.0	<2.0	<2.0	<2.0	NA
	1/27/94	<1.0	<1.0	<1.0	<1.0	NA
	5/4/95	<0.3	<0.3	<0.3	<0.6	NA
	8/1/95	44	29	5.5	13	0.2
Fresh Water Well	8/10/92	<4.0	<4.0	<4.0	<4.0	NA
	2/9/93	77	10	<2.0	73	NA
	8/19/93	NS	NS	NS	NS	NS
	1/27/94	<1.0	<1.0	<1.0	<1.0	NA
	5/4/95	<0.3	<0.3	<0.3	<0.6	NA
	8/1/95	NS	NS	NS	NS	NS

- NOTES:
- 1) BTEX analyzed using EPA Method 8015 modified.
 - 2) Total Petroleum Hydrocarbons (TPH) analyzed using EPA Method 8015 modified.
 - 3) NS = Not sampled.
 - 4) NA = Not analyzed.
 - 5) Field duplicate collected from monitor well MW-8.

SUMMARY OF DETECTED ANALYTES FOR GROUNDWATER QUALITY

Table 3.
Summary of Detected Analytes for Groundwater Quality
 BJ Services/Western - Hobbs Facility
 Hobbs, New Mexico

Analyte	Sample Date	Well ID									
		MW-1	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11
PAH (ug/L)											
2,4-Dimethylphenol	1-Aug-95	<50	97	<500	<5	42	<5	<5	<5	<5	<5
2-Methylnaphthalene	1-Aug-95	280	62	1,500	<5	150	<5	<5	36	23	<5
2-Methylphenol (o-Cresol)	1-Aug-95	<50	56	<500	<5	<30	<5	<5	<5	<5	<5
4-Methylphenol (p-Cresol)	1-Aug-95	<80	<20	<800	<8	150	<8	<8	<8	<8	<8
Naphthalene	1-Aug-95	500	210	1,700	<5	470	<5	<5	15	92	<5
Phenol	1-Aug-95	<50	<10	<500	<5	<30	<5	<5	<5	8.2	<5
Bis (2-ethylhexyl) phthalate	1-Aug-95	750	<20	10,000	40	<40	<7	<7	<7	<7	<7
Total Metals (mg/L)											
Arsenic	1-Aug-95	0.0076	0.0043	<0.002	0.0059	0.028	0.0033	0.0034	0.0055	0.015	0.0086
Barium	1-Aug-95	0.069	0.38	0.34	0.049	1.1	0.069	0.075	0.089	0.37	0.2
Cadmium	1-Aug-95	<0.001	<0.001	0.0052	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Alkalinity (mg/L)											
Carbonate	1-Aug-95	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bicarbonate	1-Aug-95	380	430	490	290	670	440	360	570	520	560
Hydroxide	1-Aug-95	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cations (mg/L)											
Calcium	1-Aug-95	120	120	220	160	320	300	300	180	610	490
Magnesium	1-Aug-95	34	36	58	27	72	42	49	43	130	130
Potassium	1-Aug-95	2.4	2.6	3.5	4.2	3	3.4	5	4.1	35	46
Sodium	1-Aug-95	100	93	140	110	130	95	94	98	660	2000
Anions (mg/L)											
Chloride	1-Aug-95	160	150	310	130	380	310	350	110	2200	3400
Nitrate	1-Aug-95	4.7	5.6	15	28	1.3	9.2	11	38	<0.1	5.5
Sulfate	1-Aug-95	150	150	210	230	6.7	180	160	150	130	230

NOTES: (1) Polynuclear Aromatic Hydrocarbons (PAH) were analyzed using EPA Method 8270.

(1) Total Metals were analyzed using EPA Method 6010/7000 (eight RCRA metals).

(2) Alkalinity was analyzed using EPA Method 310.1.

(3) Cations analyzed using EPA Method 6010.

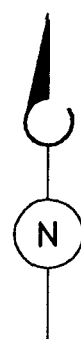
(4) Anions analyzed using EPA Method 300.0.

(5) mg/L = milligrams per liter.

Figures

FIGURES

POTENTIOMETRIC SURFACE MAP



HOMCO PROPERTY

PRESSURE TESTING
TANKS (EMPTY)

FENCE LINE

FIELD WASTE TANKS

BULK
PLANT

ACID DOCK

FRESH
WATER
WELL

FUEL ISLAND

48.5

48.0

47.5

47.0

46.5

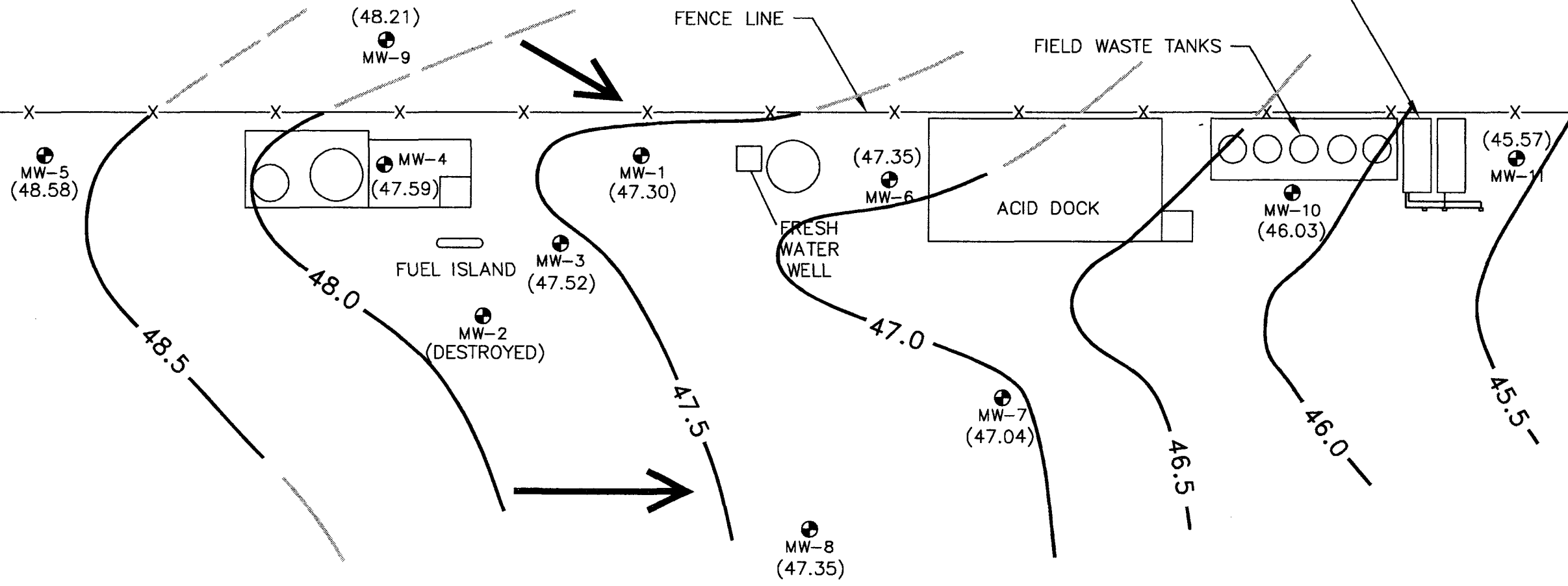
46.0

45.5

OFFICE

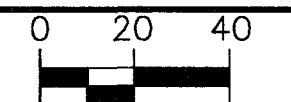
TRUCK BAYS

SERVICE TRUCK PARKING AREA



**BROWN AND
CALDWELL**
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: *MRD* DATE: *9/28/95*
BROWN AND CALDWELL



SCALE: 1" = 40'
DRAWN BY: *DMD* DATE: *9/6*
CHK'D BY: _____ DATE: _____
APPROVED: _____ DATE: _____

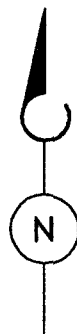
LEGEND

- MW-8 (47.35) MONITORING WELL LOCATION AND IDENTIFICATION, WATER LEVEL
- POTENTIOMETRIC SURFACE ELEVATION (FT)
- GROUNDWATER FLOW DIRECTION

TITLE	POTENTIOMETRIC SURFACE MAP BASED ON MEASUREMENTS OBTAINED 7/31/95		DATE	9/11/95
CLIENT	BJ SERVICES COMPANY, U.S.A.		PROJECT NUMBER	2832-10
SITE	HOBBS, NEW MEXICO		FIGURE NUMBER	1

T:\2832\POTENTIO 9/28/95 DHD

HYDROCARBON DISTRIBUTION MAP



HOMCO PROPERTY

PRESSURE TESTING
TANKS (EMPTY)

FENCE LINE

FIELD WASTE TANKS

BULK
PLANT

MW-5
ND / ND
ND

5,700 / 39,200
120

660 / 1,471
6.2
MW-9

FUEL ISLAND

MW-2
(DESTROYED)

MW-3
490 / 5,880
14

MW-1
390 / 2,720
5.7

FRESH
WATER
WELL

MW-6
8,300 / 27,900
60

MW-7
22 / 27.85
ND

MW-8
3.1 / 6.37
ND

ACID DOCK

MW-10
1,300 / 1,464
3.6

MW-11
44 / 91.5
0.2

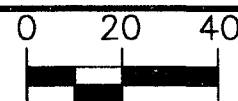
OFFICE

TRUCK BAYS

SERVICE TRUCK PARKING AREA

**BROWN AND
CALDWELL**
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: *WCD* DATE: *9/27/95*
BROWN AND CALDWELL



SCALE: 1" = 40'

DRAWN BY: *DHD* DATE: *9/11*

CHK'D BY: _____ DATE: _____

APPROVED: _____ DATE: _____

MW-8

490 / 5,880
14

LEGEND

MONITORING WELL LOCATION AND IDENTIFICATION

BENZENE / TOTAL BTEX (ug/L)
TPH (mg/L)

TITLE

HYDROCARBON DISTRIBUTION MAP

CLIENT

BJ SERVICES COMPANY, U.S.A.

SITE

HOBBS, NEW MEXICO

DATE

9/11/95

PROJECT NUMBER

2832-10

FIGURE NUMBER

2

Appendices

APPENDICES

A



APPENDIX A
GROUNDWATER SAMPLING FORMS

GROUNDWATER SAMPLING FIELD DATA SHEET

Task 10 Log Book # 7832
 Job # 7832 Page 1 of 1

Well ID. No. <u>NW-1</u>	Purge Equipment ☒ Other <u>Hand</u>	Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____	Sampler's Initials <u>MRD/XF</u>	Time	Date <u>8/1/95</u>
Casing Diameter <u>2</u> in.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailor: O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft. SERIAL NO. _____	Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☐ Other _____ SERIAL NO. _____	Meter Calibration pH <u>4.0</u> = <u>4.05</u> at <u>34.8</u> °C Time <u>0735</u> pH <u>7.0</u> = <u>7.02</u> at <u>34.1</u> °C Time <u>0735</u>		
Casing Stickup _____ ft.		Disolved Oxygen Meter: ☐ YSI Model 50B SERIAL NO. _____	Conductance Standard: <u>7500</u> µmhos/cm at 25°C Time _____		
Total Well Depth (from TOC) <u>54.14</u> ft.	Sample Equipment ☒ Other <u>Disp. Poly.</u>	Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____	Measured Value: _____ µmhos/cm at 25°C Time _____		
Static Water Level (from TOC) <u>64.42</u> ft.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailor: O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft. SERIAL NO. _____	Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter	Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH _____ 8.3 _____ 5.1 _____ 4.8 _____ 4.5		
Water Thickness <u>10.28</u> ft.		Water Level Meter: ☐ Solinst SERIAL NO. _____	#Clicks _____		
Casing Volume <u>1.67</u> gal.			Color _____		
Screened Interval (from GS) _____ ft.			Sample Depth: (ft.) _____		
Purge Containerized? ☐ Yes ☐ No Destination: <u>On site Drum</u>					

Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. µmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
	<u>1 vol</u>	<u>1.6</u>	<u>—</u>	<u>14.4</u>	<u>1240</u>	<u>7.00</u>	<u>1.4</u>			<u>DICKNEY HED</u>
	<u>2 vol</u>	<u>3.2</u>	<u>—</u>	<u>14.4</u>	<u>1220</u>	<u>7.05</u>	<u>1.5</u>			<u>Heavy Green</u>
	<u>3 vol</u>	<u>5.2</u>	<u>—</u>	<u>14.5</u>	<u>1220</u>	<u>7.05</u>	<u>1.8</u>			<u>3.00 mg/L O₂</u>
										<u>HEAVY GREEN</u>
										<u>fe = 0.4</u>
<u>1130</u>	<u>collect full sample suite</u>									

Analyses Requested (see COC) GC/MS <u>Full Suite</u> <u>Rinse Blank</u> Additional Analyses: _____ Additional Comments: _____	Partial Suite (explain) Field Blank _____ Trip Blank _____	Initial Readings: ☐ HNu _____ ☐ OVA _____ ☐ Microtip _____ TOC _____ BZ _____ Bkgnd _____ Sample Readings: TOC _____ BZ _____ Bkgnd _____ Protective Level: _____ SERIAL NO. _____ HSO Signature: <u>Nancy Schmidt</u> Condition of Well, Remarks: _____ Sampler's Signature: <u>Nancy Schmidt</u>
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Task 2832 10 Log Book # _____
Job # 2832 Page 1 of 1

Well ID. No. 1111-3		Purge Equipment ☒ Other Redi 10		Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____		Sampler's Initials MRD/AF		Time 0740		Date 9/1/95			
Casing Diameter 2 in.		☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer: O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft. SERIAL NO. _____		Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☐ Other _____ SERIAL NO. _____		Meter Calibration pH 4.6 = 4.03 at 34.9 °C Time 1120 pH 7.0 = 7.01 at 34 °C Time 1120 Conductance Standard: 2500 µmhos/cm at 25°C Time _____ Measured Value: _____ µmhos/cm at 25°C		Dissolved Oxygen Calibrated to 7.8 mg/l at 21 °C Time 0730		Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH 8.3 5.1 4.8 4.5			
Casing Stickup _____ ft.		☐ Sample Equipment ☒ Other Disc Poly		Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____		#Clicks		Color					
Total Well Depth (from TOC) 64.31 ft.		☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer: O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft. SERIAL NO. _____		Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. _____		Sample Depth: (ft.)							
Static Water Level (from TOC) 53.92 ft.													
Water Thickness 10.39 ft.													
Casing Volume 1.7 gal.													
Screened Interval (from GS) _____ ft.													
Purge Contaminized? ☒ Yes ☐ No Destination: ON-SITE Drum													

Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. µmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
	1 vol	2.0	—	19.3	1380	6.84	0.9	—	51	DIRTY, SILTY STAINY COLOR
	2 vol	2.5	—	19.1	1220	6.98	1.8	—	51	11
	3 vol	5.5	✓	19.1	1230	6.99	2.0	—	51	FC = 02 CLEAR
1200	Collected full sample suite.									

Analyses Requested (see COC) GC Samples: GC/MS Additional Analyses:				☒ Full Suite ☐ Partial Suite (explain) Rinse Blank Field Blank Trip Blank		Initial Readings: ☐ HNu TOC _____ ☐ OVA BZ _____ ☐ Microtip Bkgnd _____		Sample Readings: TOC _____ BZ _____ Bkgnd _____	
Additional Comments:				SERIAL NO. _____		HSD Signature: _____		Protective Level: _____	
				Condition of Well, Remarks:					
				Sampler's Signature: _____					

GROUNDWATER SAMPLING FIELD DATA SHEET

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Well ID. No. <u>MW-4</u>	Purge Equipment ☒ Other <u>Peristaltic</u> ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailor O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. ☐ 1.85" ☐ 3 ft. ☐ 3.75" ☐ 4 ft. ☐ SERIAL NO. _____	Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____ Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☐ Other _____ SERIAL NO. _____ Dissolved Oxygen Meter: ☐ YSI Model 50B SERIAL NO. _____ Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____ Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. _____	Sampler's Initials <u>MRO/AF</u> Time _____ Date <u>8/1/95</u> Meter Calibration pH <u>4.0</u> = <u>4.05</u> at <u>34.8</u> °C Time <u>0735</u> pH <u>7.0</u> = <u>7.02</u> at <u>34.1</u> °C Time <u>073</u> Conductance Standard: <u>2200</u> µmhos/cm at 25°C Time _____ Measured Value: _____ µmhos/cm at 25°C Dissolved Oxygen Calibrated to <u>7.8</u> mg/l at <u>21</u> °C Time <u>0730</u> Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u> #Clicks _____ Color _____ Sample Depth: (ft.) _____
Casing Diameter <u>2</u> in.	Sample Equipment ☒ Other <u>Dispo. Poly</u> ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailor O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. ☐ 1.85" ☐ 3 ft. ☐ 3.75" ☐ 4 ft. ☐ SERIAL NO. _____	Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____ Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. _____	Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u> #Clicks _____ Color _____ Sample Depth: (ft.) _____
Casing Stickup _____ ft.			
Total Well Depth (from TOC) _____ ft.			
Static Water Level (from TOC) <u>51.74</u> ft.			
Water Thickness _____ ft.			
Casing Volume <u>1.75</u> gal.			
Screened Interval (from GS) _____ ft.			
Purge Containerized? ☒ Yes ☐ No Destination: <u>on site drum</u>			

Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. µmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
	<u>1 vol</u>	<u>1.75</u>	<u>-</u>	<u>14.3</u>	<u>2020</u>	<u>6.82</u>	<u>1.1</u>			<u>very dark, silty</u>
	<u>2 vol</u>	<u>3.5</u>	<u>-</u>	<u>19.0</u>	<u>1870</u>	<u>6.64</u>	<u>1.9</u>			<u>"</u>
	<u>3 vol</u>	<u>5.5</u>	<u>-</u>	<u>19.0</u>	<u>1840</u>	<u>6.83</u>	<u>1.9</u>			<u>clear</u>
										<u>PSH present</u>
										<u>52=1.2</u>
										<u>oys collect full sample suite</u>

Analyses Requested (see COC)

GC Samples: GC/MS

Additional Analyses:

Additional Comments:

Full Suite

Rinse Blank

Partial Suite (explain)

Field Blank

Trip Blank

Initial Readings:

☐ HNu
☐ OVA
☐ Microtip

 TOC _____
 BZ _____
 Bkgnd _____

Sample Readings:

 TOC _____
 BZ _____
 Bkgnd _____

 Protective Level:
 B C D

SERIAL NO. _____

HSO Signature: _____

Condition of Well, Remarks: _____

Sampler's Signature: _____

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Sampler's Signature:

GROUNDWATER SAMPLING FIELD DATA SHEET

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Well ID. No. <u>UW-6</u>		Purge Equipment ☒ Other <u>Dispo</u>		Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____		Sampler's Initials <u>MRD/AF</u>		Time 		Date <u>7/31/95</u>											
Casing Diameter <u>2</u> in.		☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer: O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft. SERIAL NO. _____		Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☐ Other _____ SERIAL NO. _____		Meter Calibration pH <u>4.0</u> = <u>4.03</u> at <u>34.9</u> °C Time <u>1120</u> pH <u>7.0</u> = <u>7.01</u> at <u>34.0</u> °C Time <u>1120</u> Conductance Standard: <u>2500</u> µmhos/cm at 25°C Time _____ Measured Value: _____ µmhos/cm at 25°C		Dissolved Oxygen Meter: ☐ YSI Model 50B SERIAL NO. _____		Dissolved Oxygen Calibrated to <u>5.8</u> mg/l at <u>38</u> °C Time <u>1125</u>		Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u>									
Total Well Depth (from TOC) <u>60.17</u> ft.		☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer: O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft. SERIAL NO. _____		Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____		Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter		#Clicks		Color		Sample Depth: (ft.)									
Static Water Level (from TOC) <u>51.90</u> ft.		Sample Equipment ☒ Other <u>Dispo Pdm</u>		Water Level Meter: ☐ Solinst SERIAL NO. _____		Water Thickness <u>8.27</u> ft.		Casing Volume <u>1.35</u> gal.		Screened Interval (from GS) ft.		Purge Contaminized? ☒ Yes ☐ No Destination: <u>ON SITE 020M</u>									
Time		Number of Casing Volumes		Gallons Removed		Water Level		Temp °C		E.C. µmhos/cm		pH		Dissolved O ₂ mg/liter		Pump Rate GPM		Approx. Pump Depth ft.		Visual Description	
1:00		1.3		—		21.2		2030		6.71		6.9		—		—					
2:00		2.6		—		19.7		2030		6.71		1.0		—		—					
3:00		4.25		—		19.6		2030		6.72		1.2		—		—					
1330 - collect 401 sample site on 8/1/95.																					
Analyses Requested (see COC) GC/MS Rinse Blank <u>Full Suite</u> Field Blank Trip Blank												Initial Readings: ☐ HNu ☐ OVA ☐ Microtip TOC _____ BZ _____ Bkgnd _____									
Additional Comments:												Sample Readings: TOC _____ BZ _____ Bkgnd _____ Protective Level: B C D									
Additional Comments:												SERIAL NO. _____ HSO Signature: <u>Mymu Dehnert</u> Condition of Well, Remarks:									
Additional Comments:												Sampler's Signature: <u>Mymu Dehnert</u>									

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Well ID. No. <u>NW-7</u>	☒ Purge Equipment ☐ Other <u>Edi 10</u>	Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____	Sampler's Initials <u>MAD JAF</u>	Time _____	Date <u>7/31/95</u>					
Casing Diameter <u>2</u> in.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer: O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft.	Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☐ Other _____ SERIAL NO. _____	Meter Calibration pH <u>4.0</u> = <u>4.03</u> at <u>34.9</u> °C <u>1120</u> Time pH <u>7.0</u> = <u>7.01</u> at <u>34.0</u> °C <u>1120</u> Time Conductance Standard: <u>2500</u> µmhos/cm at 25°C Time Measured Value: _____ µmhos/cm at 25°C							
Casing Stickup _____ ft.	☐ Sample Equipment ☒ Other <u>D.S.O. Pump</u>	Dissolved Oxygen Meter: ☐ YSI Model 50B SERIAL NO. _____	Dissolved Oxygen Calibrated to <u>5.8</u> mg/l at <u>38</u> °C <u>1125</u> Time							
Total Well Depth (from TOC) <u>161.46</u> ft.	☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer: O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft.	Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____	Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u>							
Static Water Level (from TOC) <u>51.92</u> ft.	☐ Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter	Water Level Meter: ☐ Solinst SERIAL NO. _____	#Clicks _____							
Water Thickness <u>9.54</u> ft.			Color _____							
Casing Volume <u>1.55</u> gal.			Sample Depth: (ft.) _____							
Screened Interval (from GS) _____ ft.										
Purge Containerized? ☐ Yes ☐ No Destination: <u>On-site Arum</u>										
Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. µmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
	<u>160</u>	<u>1.5</u>	<u>—</u>	<u>21.2</u>	<u>1770</u>	<u>6.52</u>	<u>0.3</u>	<u>—</u>	<u>58</u>	<u>TRANSILIT 7</u>
	<u>240</u>	<u>3</u>	<u>—</u>	<u>20.6</u>	<u>1840</u>	<u>6.51</u>	<u>0.5</u>	<u>—</u>	<u>58</u>	<u>"</u>
	<u>310</u>	<u>5.5</u>	<u>—</u>	<u>20.9</u>	<u>1820</u>	<u>6.53</u>	<u>0.5</u>	<u>—</u>	<u>58</u>	<u>clear</u>
<u>1430 collect full sample suite. on 8/1/95.</u>										
Analyses Requested (see COC) GC/MS <u>Full Suite</u> <u>Rinse Blank</u> Partial Suite (explain) <u>Field Blank</u> <u>Trip Blank</u> Additional Analyses: _____										
Initial Readings: <u>HNu</u> <u>OVA</u> <u>Microtip</u> Sample Readings: <u>TOC</u> <u>BZ</u> <u>Bkgnd</u> Protective Level: <u>B</u> <u>C</u> <u>D</u> SERIAL NO. _____ HSO Signature: <u>M. J. Adams</u> Condition of Well, Remarks: _____ * Sampler's Signature: <u>M. J. Adams</u>										

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Sampler's Signature: Mona Schmitt

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Well ID. No. <u>WW-9</u>	☒ Other <u>Peristaltic Sub.</u> ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer O.D. ☐ 1.65" ☐ 1.85" ☐ 3.75" LENGTH ☐ 2 ft. ☐ 3 ft. ☐ 4 ft. ☐ _____ ft. SERIAL NO. _____	Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____ Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☐ Other _____ SERIAL NO. _____ Dissolved Oxygen Meter: ☐ YSI Model 50B SERIAL NO. _____ Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____ Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. _____	Sampler's Initials <u>WAD/AF</u> Time <u>1410</u> Date <u>7/31/95</u> Meter Calibration pH <u>7.0</u> = <u>7.01</u> at <u>34.0</u> °C Time <u>1120</u> pH <u>4.0</u> = <u>4.03</u> at <u>34.9</u> °C Time <u>1120</u> Conductance Standard: <u>300</u> µmhos/cm at 25°C Time _____ Measured Value: _____ µmhos/cm at 25°C Dissolved Oxygen Calibrated to <u>5.8</u> mg/l at <u>38</u> °C Time <u>1125</u> Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u> #Clicks _____ Color _____ Sample Depth: (ft.) _____
Casing Diameter <u>2</u> in.	Sample Equipment ☒ Other <u>Open Bailer</u> ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer O.D. ☐ 1.65" ☐ 1.85" ☐ 3.75" LENGTH ☐ 2 ft. ☐ 3 ft. ☐ 4 ft. ☐ _____ ft. SERIAL NO. _____	Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____ Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. _____	Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u> #Clicks _____ Color _____ Sample Depth: (ft.) _____
Casing Stickup _____ ft.			
Total Well Depth (from TOC) <u>60.27</u> ft.			
Static Water Level (from TOC) <u>50.97</u> ft.			
Water Thickness <u>9.3</u> ft.	Purge Contained? ☒ Yes ☐ No Destination: <u>ON SITE FROM</u>	Time Number of Casing Volumes Gallons Removed Water Level Temp °C E.C. µmhos/cm pH Dissolved O ₂ mg/liter Pump Rate GPM Approx. Pump Depth ft. Visual Description	
Casing Volume <u>1.52</u> gal.			
Screened Interval (from GS) _____ ft.			

Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. µmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
	<u>1 vol</u>	<u>113</u>	<u>—</u>	<u>20.4</u>	<u>1409</u>	<u>6.60</u>	<u>0.4</u>	<u>—</u>	<u>48'</u>	<u>TAN-SILT-1</u>
	<u>2 vol</u>	<u>116</u>	<u>—</u>	<u>20.2</u>	<u>1314</u>	<u>6.59</u>	<u>0.8</u>	<u>—</u>	<u>48'</u>	<u>" "</u>
	<u>3 vol</u>	<u>12</u>	<u>—</u>	<u>20.7</u>	<u>1420</u>	<u>6.60</u>	<u>0.4</u>	<u>—</u>	<u>48'</u>	<u>CLEAR</u>
							<u>0.6 ⇒ w/ kit</u>			
<u>Fe=0.4</u>										
<u>1100</u>	<u>collect full suite from 8/1/95.</u>									

Analyses Requested (see COC) .OC Samples: <u>GC/MS</u> Additional Analyses: _____ Additional Comments: _____	☒ Full Suite ☐ Rinse Blank ☐ Field Blank ☐ Trip Blank	Initial Readings: ☐ HNu ☐ OVA ☐ Microtip TOC _____ BZ _____ Bkgnd _____ Sample Readings: TOC _____ BZ _____ Bkgnd _____ Protective Level: <u>B</u> <u>C</u> <u>D</u> SERIAL NO. _____ HSO Signature: <u>Nancy Johnson</u> Condition of Well, Remarks: _____ Sampler's Signature: <u>Nancy Johnson</u>
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GROUNDWATER SAMPLING FIELD DATA SHEET

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Well ID. No. <u>MW-10</u>		☒ Purge Equipment Other <u>Well No.</u> ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer. O.D. ☐ 1.65" ☐ 1.85" ☐ 3.75" ☐ _____ LENGTH ☐ 2 ft. ☐ 3 ft. ☐ 4 ft. ☐ _____ ft. SERIAL NO. _____		Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____ Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☐ Other _____ SERIAL NO. _____ Dissolved Oxygen Meter: ☐ YSI Model 50B SERIAL NO. _____ Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____ Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. _____		Sampler's Initials <u>MRO IAF</u>		Time <u>7/31/95</u>	
Casing Diameter <u>2</u> in.		Casing Stickup ft.		Total Well Depth (from TOC) <u>63.60</u> ft.		Meter Calibration pH <u>4.0</u> = <u>4.03</u> at <u>34.9</u> °C Time <u>1120</u> pH <u>7.0</u> = <u>7.01</u> at <u>34</u> °C Time <u>1120</u> Conductance Standard: <u>7500</u> µmhos/cm at 25°C Time _____ Measured Value: _____ µmhos/cm at 25°C			
Static Water Level (from TOC) <u>52.87</u> ft.		Sample Equipment ☒ Other <u>Disc. Pdz.</u> ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailer. O.D. ☐ 1.65" ☐ 1.85" ☐ 3.75" ☐ _____ LENGTH ☐ 2 ft. ☐ 3 ft. ☐ 4 ft. ☐ _____ ft. SERIAL NO. _____		Water Thickness <u>10.73</u> ft.		Casing Volume <u>1.75</u> gal.		Screened Interval (from GS) ft.	
Purge Containerized? ☒ Yes ☐ No Destination: <u>ON SITE FROM</u>		Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH <u>8.3</u> <u>5.1</u> <u>4.8</u> <u>4.5</u> #Clicks _____ Color _____ Sample Depth: (ft.) _____		Visual Description <u>slight odor grey-silky</u>					

Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. µmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description
	1 vol	2.2	—	21.8	16930	6.54	0.8	—	60'	
	2 vol	4.2	—	23.1	7020	6.59	0.4	—	60'	
	3 vol	6.4	—	23.7	6460	6.61	0.2	—	60'	Fe=1.5
1515 collect full suite on 8/1/95.										

Analyses Requested (see COC) ☒ GC/MS ☒ Full Suite ☐ Rinse Blank ☐ Field Blank ☐ Trip Blank				Initial Readings: ☐ HNu ☐ TOC ☐ OVA ☐ BZ ☐ Microtip ☐ Bkgnd		Sample Readings: ☐ TOC ☐ BZ ☐ Bkgnd	
Additional Comments: 				Protective Level: <u>B</u> <u>C</u> <u>D</u> SERIAL NO. _____ HSO Signature: <u>Nigra R...</u> Condition of Well, Remarks: _____ Sampler's Signature: <u>Nigra R...</u>			

Task 10 Log Book # _____
Job # 2832 Page 1 of 1

Well ID. No. MW-11		Purge Equipment ☒ Other Relin ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailor: O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft. SERIAL NO. _____		Analytical Equipment pH Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____ Conductivity Meter: ☐ YSI Model 33 ☐ Orion 122 ☐ Other _____ SERIAL NO. _____ Dissolved Oxygen Meter: ☐ YSI Model 50B SERIAL NO. _____ Temperature Meter: ☐ Beckman phi 21 ☐ Beckman phi 10 ☐ Orion SA250 ☐ Other _____ SERIAL NO. _____ Filtration Equipment: ☐ Geotech Peristaltic Pump ☐ Geotech 0.45 micron filter ☐ Dispos. 0.45 micron filter Water Level Meter: ☐ Solinst SERIAL NO. _____		Sampler's Initials MED / AF Time Date 7/31/95 Meter Calibration pH 4.0 = 4.03 at 39.4 °C Time 11:20 pH 7.0 = 7.61 at 34 °C Time 11:20 Conductance Standard: 2500 µmhos/cm at 25°C Time Measured Value: _____ µmhos/cm at 25°C Dissolved Oxygen Calibrated to 5.8 mg/l at 38 °C Time 11:25 Alkalinity Titration Results (Acid Concentration: 0.16N, 1.6N) Start Point _____ pH 8.3 5.1 4.8 4.5 #Clicks _____ Color _____ Sample Depth: (ft.) _____							
Casing Diameter 2" in.		Total Well Depth (from TOC) 59.78 ft.		Sample Equipment ☒ Other BDO Pkbr ☐ 1.40" Bennett Pump (Teflon Tubing) ☐ 1.80" Bennett Pump (Teflon Tubing) ☐ Meyers Pump (PVC Tubing) ☐ Grundfos Pump (Neoprene Tubing) ☐ 2 in. ☐ 3 in. ☐ Stainless Bailor: O.D. _____ LENGTH _____ 1.65" ☐ 2 ft. 1.85" ☐ 3 ft. 3.75" ☐ 4 ft. SERIAL NO. _____		Static Water Level (from TOC) 53.35 ft.		Water Thickness 6.43 ft.		Casing Volume 1.0 gal.		Screened Interval (from GS) 47-62 ft.	
Purge Containerized? ☒ Yes ☐ No Destination: ON SITE DRUM													
Time	Number of Casing Volumes	Gallons Removed	Water Level	Temp °C	E.C. µmhos/cm	pH	Dissolved O ₂ mg/liter	Pump Rate GPM	Approx. Pump Depth ft.	Visual Description			
	1 vol	1.0	—	22.5	10,950	6.67	1.6	—	57				
	2 vol	2.0	—	19.5	10,080	6.64	3.8	—	57				
	3 vol	3.0	—	19.7	10,300	6.67	2.5	—	57				
Removed total of 3.0 gallon + well went dry													
PC=0.2													
Kf=0 - collect full sample suite on 8/1/95.													
Analyses Requested (see COC) OC Samples: GC/MS Rinse Blank Field Blank Trip Blank Additional Analyses: Additional Comments:						Initial Readings: Sample Readings: ☐ HNu TOC _____ TOC _____ ☐ OVA BZ _____ BZ _____ ☐ Microtip Bkgnd _____ Bkgnd _____ Protective Level: _____ SERIAL NO. _____ HSO Signature: <i>[Signature]</i> Condition of Well, Remarks: _____ Sampler's Signature: <i>[Signature]</i>							

B



APPENDIX B
LABORATORY ANALYTICAL REPORTS

B C Analytical

.....

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

August 18, 1995

Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Tx 77002
Attn: Ms. Myna Dehnert

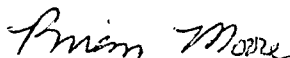
Dear Mr. Dehnert,

Enclosed is the analytical report for chemical testing for samples taken on 08/01/95.
It includes the following:

- 1) Analytical Report of results
- 2) QC summary including LCS/LCSD, MS/MSD, duplicate samples, method blanks, and surrogates.
- 3) Cross reference sheet containing analyte, date analyzed, method, and batch number.
- 4) Case narrative explaining QC deficiencies and/or problems encountered in testing.
- 5) Electronic data in agreed upon format (previously sent via Banyan).

If you have any questions, please do not hesitate to call.

Very truly yours,



Brian Moore
Program Specialist

**BCA**

B C Analytical

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Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

Case Narrative

All quality objectives were met including holding times, LCS/LCSD, MS/MSD, Duplicate samples, and Method Blanks as applicable with the following exceptions:

Semivolatiles method 625 batch 95146:

Hexachlorocyclopentadiene and N-Nitrosodimethylamine LCS/LCSD greater than upper control limit.

Bis(2-ethylhexyl)phthalate detected in method blank at 8 times the reporting limit. Bis(2-ethylhexyl)phthalate detected in project sample G95-08-072-4 (MW-5) at the same concentration level as the method blank. Bis(2-ethylhexyl)phthalate detected in project sample G95-08-072-1 (MW-1) at 12 times the method blank concentration. Bis(2-ethylhexyl)phthalate detected in project sample G95-08-072-3 (MW-4) at 180 times the method blank concentration (Note: Project sample MW-4 was re-extracted and reanalyzed to verify the concentration level of this compound). Bis(2-ethylhexyl)phthalate was not detected in any other project samples.

2-Chlorophenol, 4-Nitrophenol, and Pentachlorophenol MSD recovery less than the lower control limit. 2,4-Dinitrotoluene; 2-Chlorophenol; 4-Chloro-3-methylphenol; Acenaphthalene; N-Nitrosodi-n-propylamine; and Phenol MS/MSD RPD greater than upper control limit. The LCS/LCSD recovery and RPD was within criteria for these compounds.

Surrogate 2-Fluorobiphenyl matrix spike duplicate less than lower control limit.

Chloride method 300.0 batches 950803 and 950807:

Chloride detected in method blank above the reporting limit. All project samples are at least 10 times greater than the method blank concentrations.

Mercury method 7470 batch 951165:

MS/MSD RPD greater than control limit. The LCS/LCSD recovery and RPD was within criteria.

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Gas TPH / BTEX method 8105M batch 95238:

Surrogate in matrix spike was greater than upper control limit.

No analytical difficulties were encountered with any project samples except:

Samples G95-08-072-(1,3) (MW-1, MW-4) were diluted at least 1:10 for method 8270, therefore surrogate recovery was reported as "NC" for "Not Calculated".

Sample G95-08-072-5 (MW-6) surrogate recovery for method 8015M was greater than the upper control limit.

Samples G95-08-072-(6,7,10,11) (MW-7, MW-8, MW-11, 080195) surrogate 2-Fluorophenol recovery for method 8270 was less than the lower control limit. This meets method guidelines.

ANALYTICAL REPORT

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G95-08-072

Received: 03 AUG 95

Mailed: AUG 17 1995

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

CC: Mr. Alan Fear (BC Dallas)

Project: 2832.10

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES			DATE SAMPLED	
08-072-1	MW-1			01 AUG 95	
08-072-2	MW-3			01 AUG 95	
08-072-3	MW-4			01 AUG 95	
08-072-4	MW-5			01 AUG 95	
08-072-5	MW-6			01 AUG 95	
PARAMETER	08-072-1	08-072-2	08-072-3	08-072-4	08-072-5
Mercury (7470), mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic (7060), mg/L	0.0076	0.0043	<0.002	0.0059	0.028
Selenium (7740), mg/L	<0.004	<0.004	<0.004	<0.004	<0.004
Lead (7421), mg/L	<0.002	<0.002	0.0044	<0.002	<0.002
Silver (6010), mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium (6010), mg/L	0.069	0.38	0.34	0.049	1.1
Cadmium (7131), mg/L	<0.001	<0.001	0.0052	<0.001	<0.001
Chromium (6010), mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Furnace Digestion (3020), Date	08/08/95	08/08/95	08/08/95	08/08/95	08/08/95
Digestion (3010), Date	08/08/95	08/08/95	08/08/95	08/08/95	08/08/95
Ion Balance (CALC), Percent	8.34	11.28	3.40	0.13	5.96
Chloride (300.0), mg/L	160	150	310	130	380
Nitrate (300.0), mg/L	4.7	5.6	15	28	1.3
Sulfate (300.0), mg/L	150	150	210	230	6.7
Alkalinity (310.1)					
Carbonate Alk (as CaCO3), mg/L	<10	<10	<10	<10	<10
Bicarbonate Alk (as CaCO3), mg/L	380	430	490	290	670
Hydroxide Alk (as CaCO3), mg/L	<10	<10	<10	<10	<10
Total Alkalinity (as CaCO3), mg/L	380	430	490	290	670
Calcium (6010), mg/L	120	120	220	160	320
Magnesium (6010), mg/L	34	36	58	27	72
Potassium (6010), mg/L	2.4	2.6	3.5	4.2	3.0
Sodium (6010), mg/L	100	93	140	110	130

B C Analytical

801 Western Avenue
Glendale, CA 91201
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Fax: 818/247-9797

LOG NO: G95-08-072

Received: 03 AUG 95

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

CC: Mr. Alan Fear (BC Dallas)

Project: 2832.10

REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-072-1	MW-1	01 AUG 95
08-072-2	MW-3	01 AUG 95
08-072-3	MW-4	01 AUG 95
08-072-4	MW-5	01 AUG 95
08-072-5	MW-6	01 AUG 95

PARAMETER	08-072-1	08-072-2	08-072-3	08-072-4	08-072-5
B/N,A Ext.Pri.Poll. (8270)					
Date Analyzed	08/11/95	08/11/95	08/15/95	08/10/95	08/14/95
Date Extracted	08/08/95	08/08/95	08/08/95	08/08/95	08/08/95
Dilution Factor, Times	10	2	100	1	5
1,2,4-Trichlorobenzene, ug/L	<50	<10	<500	<5	<30
1,2-Dichlorobenzene, ug/L	<60	<20	<600	<6	<30
1,2-Diphenylhydrazine, ug/L	<50	<10	<500	<5	<30
1,3-Dichlorobenzene, ug/L	<50	<10	<500	<5	<30
1,4-Dichlorobenzene, ug/L	<50	<10	<500	<5	<30
2,4,5-Trichlorophenol, ug/L	<60	<20	<600	<6	<30
2,4,6-Trichlorophenol, ug/L	<50	<10	<500	<5	<30
2,4-Dichlorophenol, ug/L	<50	<10	<500	<5	<30
2,4-Dimethylphenol, ug/L	<50	97	<500	<5	42
2,4-Dinitrophenol, ug/L	<100	<20	<1000	<10	<50
2,4-Dinitrotoluene, ug/L	<50	<10	<500	<5	<30
2,6-Dinitrotoluene, ug/L	<50	<10	<500	<5	<30
2-Chloronaphthalene, ug/L	<60	<20	<600	<6	<30
2-Chlorophenol, ug/L	<50	<10	<500	<5	<30
2-Methyl-4,6-dinitrophenol, ug/L	<50	<10	<500	<5	<30
2-Methylnaphthalene, ug/L	280	62	1500	<5	150
2-Methylphenol (o-Cresol), ug/L	<50	56	<500	<5	130
2-Nitroaniline, ug/L	<50	<10	<500	<5	<30
2-Nitrophenol, ug/L	<50	<10	<500	<5	<30

B C Analytical

801 Western Avenue
Glendale, CA 91201
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Fax: 818/247-9797

LOG NO: G95-08-072

Received: 03 AUG 95

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

CC: Mr. Alan Fear (BC Dallas)

Project: 2832.10

REPORT OF ANALYTICAL RESULTS

Page 3

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED				
08-072-1	MW-1	01 AUG 95				
08-072-2	MW-3	01 AUG 95				
08-072-3	MW-4	01 AUG 95				
08-072-4	MW-5	01 AUG 95				
08-072-5	MW-6	01 AUG 95				
PARAMETER	08-072-1	08-072-2	08-072-3	08-072-4	08-072-5	
3,3'-Dichlorobenzidine, ug/L	<200	<40	<2000	<20	<100	
3-Nitroaniline, ug/L	<50	<10	<500	<5	<30	
4-Bromophenylphenylether, ug/L	<50	<10	<500	<5	<30	
4-Chloro-3-methylphenol, ug/L	<50	<10	<500	<5	<30	
4-Chloroaniline, ug/L	<50	<10	<500	<5	<30	
4-Chlorophenylphenylether, ug/L	<50	<10	<500	<5	<30	
4-Methylphenol (p-Cresol), ug/L	<80	<20	<800	<8	150	
4-Nitroaniline, ug/L	<60	<20	<600	<6	<30	
4-Nitrophenol, ug/L	<50	<10	<500	<5	<30	
Acenaphthene, ug/L	<50	<10	<500	<5	<30	
Acenaphthylene, ug/L	<50	<10	<500	<5	<30	
Aniline, ug/L	<50	<10	<500	<5	<30	
Anthracene, ug/L	<50	<10	<500	<5	<30	
Benzidine, ug/L	<1000	<200	<10000	<100	<500	
Benzo(a)anthracene, ug/L	<50	<10	<500	<5	<30	
Benzo(a)pyrene, ug/L	<50	<10	<500	<5	<30	
Benzo(b)fluoranthene, ug/L	<50	<10	<500	<5	<30	
Benzo(g,h,i)perylene, ug/L	<50	<10	<500	<5	<30	
Benzo(k)fluoranthene, ug/L	<50	<10	<500	<5	<30	
Benzyl Alcohol, ug/L	<50	<10	<500	<5	<30	
Benzoic acid, ug/L	<500	<100	<5000	<50	<300	
Butylbenzylphthalate, ug/L	<50	<10	<500	<5	<30	
Chrysene, ug/L	<50	<10	<500	<5	<30	

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G95-08-072

Received: 03 AUG 95

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

CC: Mr. Alan Fear (BC Dallas)

Project: 2832.10

REPORT OF ANALYTICAL RESULTS

Page 4

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-072-1	MW-1	01 AUG 95
08-072-2	MW-3	01 AUG 95
08-072-3	MW-4	01 AUG 95
08-072-4	MW-5	01 AUG 95
08-072-5	MW-6	01 AUG 95

PARAMETER	08-072-1	08-072-2	08-072-3	08-072-4	08-072-5
Di-n-octylphthalate, ug/L	<50	<10	<500	<5	<30
Dibenzo(a,h)anthracene, ug/L	<50	<10	<500	<5	<30
Dibenzofuran, ug/L	<50	<10	<500	<5	<30
Dibutylphthalate, ug/L	<50	<10	<500	<5	<30
Diethylphthalate, ug/L	<50	<10	<500	<5	<30
Dimethylphthalate, ug/L	<50	<10	<500	<5	<30
Fluoranthene, ug/L	<50	<10	<500	<5	<30
Fluorene, ug/L	<50	<10	<500	<5	<30
Hexachlorobenzene, ug/L	<50	<10	<500	<5	<30
Hexachlorobutadiene, ug/L	<50	<10	<500	<5	<30
Hexachlorocyclopentadiene, ug/L	<50	<10	<500	<5	<30
Hexachloroethane, ug/L	<50	<10	<500	<5	<30
Indeno(1,2,3-c,d)pyrene, ug/L	<70	<20	<700	<7	<40
Isophorone, ug/L	<50	<10	<500	<5	<30
N-Nitrosodimethylamine, ug/L	<60	<20	<600	<6	<30
N-Nitrosodiphenylamine, ug/L	<50	<10	<500	<5	<30
N-Nitrosodi-n-propylamine, ug/L	<60	<20	<600	<6	<30
Nitrobenzene, ug/L	<50	<10	<500	<5	<30
Naphthalene, ug/L	500	210	1700	<5	470
Phenanthrene, ug/L	<50	<10	<500	<5	<30
Phenol, ug/L	<50	<10	<500	<5	<30
Pentachlorophenol, ug/L	<50	<10	<500	<5	<30
Pyrene, ug/L	<50	<10	<500	<5	<30

B C Analytical

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Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

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Project: 2832.10

REPORT OF ANALYTICAL RESULTS

Page 5

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-072-1	MW-1	01 AUG 95
08-072-2	MW-3	01 AUG 95
08-072-3	MW-4	01 AUG 95
08-072-4	MW-5	01 AUG 95
08-072-5	MW-6	01 AUG 95

PARAMETER	08-072-1	08-072-2	08-072-3	08-072-4	08-072-5
Pyridine, ug/L	<100	<20	<1000	<10	<50
Bis(2-chloroethoxy)methane, ug/L	<50	<10	<500	<5	<30
Bis(2-chloroethyl)ether, ug/L	<50	<10	<500	<5	<30
Bis(2-chloroisopropyl)ether, ug/L	<60	<20	<600	<6	<30
Bis(2-ethylhexyl)phthalate, ug/L	750	<20	10000	40	<40
TPH/BTEX (8015M)					
Date Analyzed	08/04/95	08/04/95	08/04/95	08/04/95	08/08/95
Dilution Factor, Times	10	50	200	1	100
Benzene, ug/L	390	490	5700	<0.3	8300
Toluene, ug/L	1300	2900	17000	<0.3	12000
Ethylbenzene, ug/L	230	890	3500	<0.3	2500
Total Xylene Isomers, ug/L	800	1600	13000	<0.6	5100
Carbon Range, .	C6-C12	C6-C12	C6-C12	C6-C12	C6-C12
TPH (Gasoline Range), ug/L	5700	14000	120000	<100	60000

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1415 Louisiana, Suite 2500
Houston, Texas 77002

CC: Mr. Alan Fear (BC Dallas)

Project: 2832.10

REPORT OF ANALYTICAL RESULTS

Page 6

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-072-6	MW-7	01 AUG 95
08-072-7	MW-8	01 AUG 95
08-072-8	MW-9	01 AUG 95
08-072-9	MW-10	01 AUG 95
08-072-10	MW-11	01 AUG 95

PARAMETER	08-072-6	08-072-7	08-072-8	08-072-9	08-072-10
Mercury (7470), mg/L	0.0005	<0.0002	<0.0002	<0.0002	<0.0002
Arsenic (7060), mg/L	0.0033	0.0034	0.0055	0.015	0.0086
Selenium (7740), mg/L	<0.004	<0.004	<0.004	<0.004	<0.004
Lead (7421), mg/L	<0.002	<0.002	<0.002	<0.002	0.0025
Silver (6010), mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Barium (6010), mg/L	0.069	0.075	0.089	0.37	0.20
Cadmium (7131), mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (6010), mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Furnace Digestion (3020), Date	08/08/95	08/08/95	08/08/95	08/08/95	08/08/95
Digestion (3010), Date	08/08/95	08/08/95	08/08/95	08/08/95	08/08/95
Ion Balance (CALC), Percent	2.10	5.08	3.73	2.88	4.63
Chloride (300.0), mg/L	310	350	110	2200	3400
Nitrate (300.0), mg/L	9.2	11	38	<0.1	5.5
Sulfate (300.0), mg/L	180	160	150	130	230
Alkalinity (310.1)					
Carbonate Alk (as CaCO3), mg/L	<10	<10	<10	<10	<10
Bicarbonate Alk (as CaCO3), mg/L	440	360	570	520	560
Hydroxide Alk (as CaCO3), mg/L	<10	<10	<10	<10	<10
Total Alkalinity (as CaCO3), mg/L	440	360	570	520	560
Calcium (6010), mg/L	300	300	180	610	490
Magnesium (6010), mg/L	42	49	43	130	130
Potassium (6010), mg/L	3.4	5.0	4.1	35	46
Sodium (6010), mg/L	95	94	98	660	2000

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G95-08-072

Received: 03 AUG 95

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

CC: Mr. Alan Fear (BC Dallas)

Project: 2832.10

REPORT OF ANALYTICAL RESULTS

Page 7

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-072-6	MW-7	01 AUG 95
08-072-7	MW-8	01 AUG 95
08-072-8	MW-9	01 AUG 95
08-072-9	MW-10	01 AUG 95
08-072-10	MW-11	01 AUG 95

PARAMETER	08-072-6	08-072-7	08-072-8	08-072-9	08-072-10
B/N, A Ext. Pri. Poll. (8270)					
Date Analyzed	08/14/95	08/14/95	08/14/95	08/14/95	08/14/95
Date Extracted	08/08/95	08/08/95	08/08/95	08/08/95	08/08/95
Dilution Factor, Times	1	1	1	1	1
1,2,4-Trichlorobenzene, ug/L	<5	<5	<5	<5	<5
1,2-Dichlorobenzene, ug/L	<6	<6	<6	<6	<6
1,2-Diphenylhydrazine, ug/L	<5	<5	<5	<5	<5
1,3-Dichlorobenzene, ug/L	<5	<5	<5	<5	<5
1,4-Dichlorobenzene, ug/L	<5	<5	<5	<5	<5
2,4,5-Trichlorophenol, ug/L	<6	<6	<6	<6	<6
2,4,6-Trichlorophenol, ug/L	<5	<5	<5	<5	<5
2,4-Dichlorophenol, ug/L	<5	<5	<5	<5	<5
2,4-Dimethylphenol, ug/L	<5	<5	<5	<5	<5
2,4-Dinitrophenol, ug/L	<10	<10	<10	<10	<10
2,4-Dinitrotoluene, ug/L	<5	<5	<5	<5	<5
2,6-Dinitrotoluene, ug/L	<5	<5	<5	<5	<5
2-Chloronaphthalene, ug/L	<6	<6	<6	<6	<6
2-Chlorophenol, ug/L	<5	<5	<5	<5	<5
2-Methyl-4,6-dinitrophenol, ug/L	<5	<5	<5	<5	<5
2-Methylnaphthalene, ug/L	<5	<5	36	23	<5
2-Methylphenol (o-Cresol), ug/L	<5	<5	<5	<5	<5
2-Nitroaniline, ug/L	<5	<5	<5	<5	<5
2-Nitrophenol, ug/L	<5	<5	<5	<5	<5

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REPORT OF ANALYTICAL RESULTS

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LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED				
08-072-6	MW-7	01 AUG 95				
08-072-7	MW-8	01 AUG 95				
08-072-8	MW-9	01 AUG 95				
08-072-9	MW-10	01 AUG 95				
08-072-10	MW-11	01 AUG 95				
PARAMETER	08-072-6	08-072-7	08-072-8	08-072-9	08-072-10	
3,3'-Dichlorobenzidine, ug/L	<20	<20	<20	<20	<20	
3-Nitroaniline, ug/L	<5	<5	<5	<5	<5	
4-Bromophenylphenylether, ug/L	<5	<5	<5	<5	<5	
4-Chloro-3-methylphenol, ug/L	<5	<5	<5	<5	<5	
4-Chloroaniline, ug/L	<5	<5	<5	<5	<5	
4-Chlorophenylphenylether, ug/L	<5	<5	<5	<5	<5	
4-Methylphenol (p-Cresol), ug/L	<8	<8	<8	<8	<8	
4-Nitroaniline, ug/L	<6	<6	<6	<6	<6	
4-Nitrophenol, ug/L	<5	<5	<5	<5	<5	
Acenaphthene, ug/L	<5	<5	<5	<5	<5	
Acenaphthylene, ug/L	<5	<5	<5	<5	<5	
Aniline, ug/L	<5	<5	<5	<5	<5	
Anthracene, ug/L	<5	<5	<5	<5	<5	
Benidine, ug/L	<100	<100	<100	<100	<100	
Benzo(a)anthracene, ug/L	<5	<5	<5	<5	<5	
Benzo(a)pyrene, ug/L	<5	<5	<5	<5	<5	
Benzo(b)fluoranthene, ug/L	<5	<5	<5	<5	<5	
Benzo(g,h,i)perylene, ug/L	<5	<5	<5	<5	<5	
Benzo(k)fluoranthene, ug/L	<5	<5	<5	<5	<5	
Benzyl Alcohol, ug/L	<5	<5	<5	<5	<5	
Benzoic acid, ug/L	<50	<50	<50	<50	<50	
Butylbenzylphthalate, ug/L	<5	<5	<5	<5	<5	
Chrysene, ug/L	<5	<5	<5	<5	<5	

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08-072-6	MW-7	01 AUG 95				
08-072-7	MW-8	01 AUG 95				
08-072-8	MW-9	01 AUG 95				
08-072-9	MW-10	01 AUG 95				
08-072-10	MW-11	01 AUG 95				
PARAMETER	08-072-6	08-072-7	08-072-8	08-072-9	08-072-10	
Di-n-octylphthalate, ug/L	<5	<5	<5	<5	<5	
Dibenzo(a,h)anthracene, ug/L	<5	<5	<5	<5	<5	
Dibenzofuran, ug/L	<5	<5	<5	<5	<5	
Dibutylphthalate, ug/L	<5	<5	<5	<5	<5	
Diethylphthalate, ug/L	<5	<5	<5	<5	<5	
Dimethylphthalate, ug/L	<5	<5	<5	<5	<5	
Fluoranthene, ug/L	<5	<5	<5	<5	<5	
Fluorene, ug/L	<5	<5	<5	<5	<5	
Hexachlorobenzene, ug/L	<5	<5	<5	<5	<5	
Hexachlorobutadiene, ug/L	<5	<5	<5	<5	<5	
Hexachlorocyclopentadiene, ug/L	<5	<5	<5	<5	<5	
Hexachloroethane, ug/L	<5	<5	<5	<5	<5	
Indeno(1,2,3-c,d)pyrene, ug/L	<7	<7	<7	<7	<7	
Isophorone, ug/L	<5	<5	<5	<5	<5	
N-Nitrosodimethylamine, ug/L	<6	<6	<6	<6	<6	
N-Nitrosodiphenylamine, ug/L	<5	<5	<5	<5	<5	
N-Nitrosodi-n-propylamine, ug/L	<6	<6	<6	<6	<6	
Nitrobenzene, ug/L	<5	<5	<5	<5	<5	
Naphthalene, ug/L	<5	<5	15	92	<5	
Phenanthrene, ug/L	<5	<5	<5	<5	<5	
Phenol, ug/L	<5	<5	<5	8.2	<5	
Pentachlorophenol, ug/L	<5	<5	<5	<5	<5	
Pyrene, ug/L	<5	<5	<5	<5	<5	

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08-072-6	MW-7	01 AUG 95				
08-072-7	MW-8	01 AUG 95				
08-072-8	MW-9	01 AUG 95				
08-072-9	MW-10	01 AUG 95				
08-072-10	MW-11	01 AUG 95				
PARAMETER	08-072-6	08-072-7	08-072-8	08-072-9	08-072-10	
Pyridine, ug/L	<10	<10	<10	<10	<10	
Bis(2-chloroethoxy)methane, ug/L	<5	<5	<5	<5	<5	
Bis(2-chloroethyl)ether, ug/L	<5	<5	<5	<5	<5	
Bis(2-chloroisopropyl)ether, ug/L	<6	<6	<6	<6	<6	
Bis(2-ethylhexyl)phthalate, ug/L	<7	<7	<7	<7	<7	
TPH/BTEX (8015M)						
Date Analyzed	08/04/95	08/04/95	08/08/95	08/04/95	08/04/95	
Dilution Factor, Times	1	1	10	10	1	
Benzene, ug/L	22	3.1	660	1300	44	
Toluene, ug/L	2.2	1.2	410	32	29	
Ethylbenzene, ug/L	0.85	0.47	91	32	5.5	
Total Xylene Isomers, ug/L	2.8	1.6	310	100	13	
Carbon Range, .	C6-C12	C6-C12	C6-C12	C6-C12	C6-C12	
TPH (Gasoline Range), ug/L	<100	<100	6200	3600	200	

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Page 11

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-072-11	080195	01 AUG 95
PARAMETER	08-072-11	
Mercury (7470), mg/L	<0.0002	
Arsenic (7060), mg/L	0.0038	
Selenium (7740), mg/L	<0.004	
Lead (7421), mg/L	<0.002	
Silver (6010), mg/L	<0.01	
Barium (6010), mg/L	0.069	
Cadmium (7131), mg/L	<0.001	
Chromium (6010), mg/L	<0.01	
Furnace Digestion (3020), Date	08/08/95	
Digestion (3010), Date	08/08/95	
Ion Balance (CALC), Percent	5.18	
Chloride (300.0), mg/L	350	
Nitrate (300.0), mg/L	11	
Sulfate (300.0), mg/L	150	
Alkalinity (310.1)		
Carbonate Alk (as CaCO3), mg/L	<10	
Bicarbonate Alk (as CaCO3), mg/L	360	
Hydroxide Alk (as CaCO3), mg/L	<10	
Total Alkalinity (as CaCO3), mg/L	360	
Calcium (6010), mg/L	230	
Magnesium (6010), mg/L	46	
Potassium (6010), mg/L	4.9	
Sodium (6010), mg/L	88	

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LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-072-11	080195	01 AUG 95
PARAMETER	08-072-11	
B/N,A Ext.Pri.Poll. (8270)		
Date Analyzed	08/14/95	
Date Extracted	08/08/95	
Dilution Factor, Times	1	
1,2,4-Trichlorobenzene, ug/L	<5	
1,2-Dichlorobenzene, ug/L	<6	
1,2-Diphenylhydrazine, ug/L	<5	
1,3-Dichlorobenzene, ug/L	<5	
1,4-Dichlorobenzene, ug/L	<5	
2,4,5-Trichlorophenol, ug/L	<6	
2,4,6-Trichlorophenol, ug/L	<5	
2,4-Dichlorophenol, ug/L	<5	
2,4-Dimethylphenol, ug/L	<5	
2,4-Dinitrophenol, ug/L	<10	
2,4-Dinitrotoluene, ug/L	<5	
2,6-Dinitrotoluene, ug/L	<5	
2-Chloronaphthalene, ug/L	<6	
2-Chlorophenol, ug/L	<5	
2-Methyl-4,6-dinitrophenol, ug/L	<5	
2-Methylnaphthalene, ug/L	<5	
2-Methylphenol (o-Cresol), ug/L	<5	
2-Nitroaniline, ug/L	<5	
2-Nitrophenol, ug/L	<5	
3,3'-Dichlorobenzidine, ug/L	<20	
3-Nitroaniline, ug/L	<5	
4-Bromophenylphenylether, ug/L	<5	
4-Chloro-3-methylphenol, ug/L	<5	

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LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-072-11	080195	01 AUG 95
PARAMETER	08-072-11	
4-Chloroaniline, ug/L	<5	
4-Chlorophenylphenylether, ug/L	<5	
4-Methylphenol (p-Cresol), ug/L	<8	
4-Nitroaniline, ug/L	<6	
4-Nitrophenol, ug/L	<5	
Acenaphthene, ug/L	<5	
Acenaphthylene, ug/L	<5	
Aniline, ug/L	<5	
Anthracene, ug/L	<5	
Benzidine, ug/L	<100	
Benzo(a)anthracene, ug/L	<5	
Benzo(a)pyrene, ug/L	<5	
Benzo(b)fluoranthene, ug/L	<5	
Benzo(g,h,i)perylene, ug/L	<5	
Benzo(k)fluoranthene, ug/L	<5	
Benzyl Alcohol, ug/L	<5	
Benzoic acid, ug/L	<50	
Butylbenzylphthalate, ug/L	<5	
Chrysene, ug/L	<5	
Di-n-octylphthalate, ug/L	<5	
Dibenzo(a,h)anthracene, ug/L	<5	
Dibenzofuran, ug/L	<5	
Dibutylphthalate, ug/L	<5	
Diethylphthalate, ug/L	<5	
Dimethylphthalate, ug/L	<5	
Fluoranthene, ug/L	<5	
Fluorene, ug/L	<5	

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REPORT OF ANALYTICAL RESULTS

Page 14

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-072-11	080195	01 AUG 95
PARAMETER	08-072-11	
Hexachlorobenzene, ug/L	<5	
Hexachlorobutadiene, ug/L	<5	
Hexachlorocyclopentadiene, ug/L	<5	
Hexachloroethane, ug/L	<5	
Indeno(1,2,3-c,d)pyrene, ug/L	<7	
Isophorone, ug/L	<5	
N-Nitrosodimethylamine, ug/L	<6	
N-Nitrosodiphenylamine, ug/L	<5	
N-Nitrosodi-n-propylamine, ug/L	<6	
Nitrobenzene, ug/L	<5	
Naphthalene, ug/L	<5	
Phenanthrene, ug/L	<5	
Phenol, ug/L	<5	
Pentachlorophenol, ug/L	<5	
Pyrene, ug/L	<5	
Pyridine, ug/L	<10	
Bis(2-chloroethoxy)methane, ug/L	<5	
Bis(2-chloroethyl)ether, ug/L	<5	
Bis(2-chloroisopropyl)ether, ug/L	<6	
Bis(2-ethylhexyl)phthalate, ug/L	<7	

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LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-072-11	080195	01 AUG 95
PARAMETER	08-072-11	
TPH/BTEX (8015M)		
Date Analyzed	08/04/95	
Dilution Factor, Times	1	
Benzene, ug/L	3.6	
Toluene, ug/L	1.5	
Ethylbenzene, ug/L	0.51	
Total Xylene Isomers, ug/L	1.5	
Carbon Range, .	C6-C12	
TPH (Gasoline Range), ug/L	<100	

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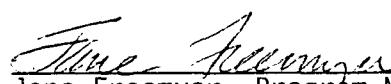
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LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
08-072-12	Trip Blank	01 AUG 95
PARAMETER	08-072-12	
TPH/BTEX (8015M)		
Date Analyzed	08/08/95	
Dilution Factor, Times	1	
Benzene, ug/L	<0.3	
Toluene, ug/L	<0.3	
Ethylbenzene, ug/L	<0.3	
Total Xylene Isomers, ug/L	<0.6	
Carbon Range, .	C6-C12	
TPH (Gasoline Range), ug/L	<100	


Jane Freemyer, Program Manager

The analytical results within this report relate only to the sp compounds and samples investigated and may not necessarily refl other apparently similar material from the same or a similar lo

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REPORT OF ANALYTICAL RESULTS

Page 1

Log Number : 95-08-072-1
Sample Description: MW-1

General Mineral Analysis
Sampled Date 01 AUG 95

Anions	mg/L	meq/L	Determination	mg/L
Nitrate	4.7	0.076	Hydroxide Alk (as CaCO ₃)	<10
Chloride	160	4.5	Carbonate Alk (as CaCO ₃)	<10
Sulfate	150	3.1	Bicarbonate Alk (as CaCO ₃)	380
Bicarbonate (as HCO ₃)	460	7.6	Ca Hardness (as CaCO ₃)	300
Carbonate (as CO ₃)	<6	<0.2	Mg Hardness (as CaCO ₃)	140
Hydroxide (as OH)	<3.4	<0.2		
Total Millequivalents per Liter			Total Hardness	440
Cations	mg/L	meq/L		
Magnesium	34	2.8		
Sodium	100	4.4		
Potassium	2.4	0.061		
Calcium	120	6		
Total Millequivalents per Liter			Ion balance in percent	8.34

* Conforms to Title 22, California Administrative Code

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REPORT OF ANALYTICAL RESULTS

Page 2

Log Number : 95-08-072-2
Sample Description: MW-3

General Mineral Analysis
Sampled Date 01 AUG 95

Anions	mg/L	meq/L	Determination	mg/L
Nitrate	5.6	0.09	Hydroxide Alk (as CaCO3)	<10
Chloride	150	4.2	Carbonate Alk (as CaCO3)	<10
Sulfate	150	3.1	Bicarbonate Alk (as CaCO3)	430
Bicarbonate (as HCO3)	520	8.6	Ca Hardness (as CaCO3)	300
Carbonate (as CO3)	<6	<0.2	Mg Hardness (as CaCO3)	150
Hydroxide (as OH)	<3.4	<0.2		
Total Millequivalents per Liter		16.4	Total Hardness	450
Cations	mg/L	meq/L		
Magnesium	36	3		
Sodium	93	4		
Potassium	2.6	0.066		
Calcium	120	6		
Total Millequivalents per Liter		13.1	Ion balance in percent	11.28

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Log Number : 95-08-072-3
Sample Description: MW-4

General Mineral Analysis
Sampled Date 01 AUG 95

Anions	mg/L	meq/L	Determination	mg/L
Nitrate	15	0.24	Hydroxide Alk (as CaCO3)	<10
Chloride	310	8.7	Carbonate Alk (as CaCO3)	<10
Sulfate	210	4.4	Bicarbonate Alk (as CaCO3)	490
Bicarbonate (as HCO3)	600	9.8	Ca Hardness (as CaCO3)	550
Carbonate (as CO3)	<6	<0.2	Mg Hardness (as CaCO3)	240
Hydroxide (as OH)	<3.4	<0.2		
Total Millequivalents per Liter			Total Hardness	790
Cations	mg/L	meq/L		
Magnesium	58	4.8		
Sodium	140	6.1		
Potassium	3.5	0.089		
Calcium	220	11		
Total Millequivalents per Liter			Ion balance in percent	3.40

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Log Number : 95-08-072-4
Sample Description: MW-5

General Mineral Analysis
Sampled Date 01 AUG 95

Anions	mg/L	meq/L	Determination	mg/L
Nitrate	28	0.45	Hydroxide Alk (as CaCO3)	<10
Chloride	130	3.7	Carbonate Alk (as CaCO3)	<10
Sulfate	230	4.8	Bicarbonate Alk (as CaCO3)	290
Bicarbonate (as HCO3)	350	5.8	Ca Hardness (as CaCO3)	400
Carbonate (as CO3)	<6	<0.2	Mg Hardness (as CaCO3)	110
Hydroxide (as OH)	<3.4	<0.2		
Total Millequivalents per Liter		15.2	Total Hardness	510
Cations	mg/L	meq/L		
Magnesium	27	2.2		
Sodium	110	4.8		
Potassium	4.2	0.11		
Calcium	160	8		
Total Millequivalents per Liter		15.1	Ion balance in percent	0.13

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Log Number : 95-08-072-5
Sample Description: MW-6

General Mineral Analysis
Sampled Date 01 AUG 95

Anions	mg/L	meq/L	Determination	mg/L
Nitrate	1.3	0.021	Hydroxide Alk (as CaCO3)	<10
Chloride	380	11	Carbonate Alk (as CaCO3)	<10
Sulfate	6.7	0.14	Bicarbonate Alk (as CaCO3)	670
Bicarbonate (as HCO3)	820	13	Ca Hardness (as CaCO3)	800
Carbonate (as CO3)	<6	<0.2	Mg Hardness (as CaCO3)	300
Hydroxide (as OH)	<3.4	<0.2		
Total Millequivalents per Liter		24.6	Total Hardness	1100
Cations	mg/L	meq/L		
Magnesium	72	5.9		
Sodium	130	5.7		
Potassium	3.0	0.077		
Calcium	320	16		
Total Millequivalents per Liter		27.7	Ion balance in percent	5.96

* Conforms to Title 22, California Administrative Code

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G95-08-072

Received: 03 AUG 95

Mailed:

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

Project: 2832.10

REPORT OF ANALYTICAL RESULTS

Page 6

Log Number : 95-08-072-6
Sample Description: MW-7

General Mineral Analysis
Sampled Date 01 AUG 95

Anions	mg/L	meq/L	Determination	mg/L
Nitrate	9.2	0.15	Hydroxide Alk (as CaCO3)	<10
Chloride	310	8.7	Carbonate Alk (as CaCO3)	<10
Sulfate	180	3.7	Bicarbonate Alk (as CaCO3)	440
Bicarbonate (as HCO3)	540	8.8	Ca Hardness (as CaCO3)	750
Carbonate (as CO3)	<6	<0.2	Mg Hardness (as CaCO3)	170
Hydroxide (as OH)	<3.4	<0.2		
Total Millequivalents per Liter			Total Hardness	920
Cations	mg/L	meq/L		
Magnesium	42	3.5		
Sodium	95	4.1		
Potassium	3.4	0.087		
Calcium	300	15		
Total Millequivalents per Liter			22.7	Ion balance in percent 2.10

* Conforms to Title 22, California Administrative Code

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G95-08-072

Received: 03 AUG 95

Mailed:

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

Project: 2832.10

REPORT OF ANALYTICAL RESULTS

Page 7

Log Number : 95-08-072-7
Sample Description: MW-8

General Mineral Analysis
Sampled Date 01 AUG 95

Anions	mg/L	meq/L	Determination	mg/L
Nitrate	11	0.18	Hydroxide Alk (as CaCO3)	<10
Chloride	350	9.9	Carbonate Alk (as CaCO3)	<10
Sulfate	160	3.3	Bicarbonate Alk (as CaCO3)	360
Bicarbonate (as HCO3)	440	7.2	Ca Hardness (as CaCO3)	750
Carbonate (as CO3)	<6	<0.2	Mg Hardness (as CaCO3)	200
Hydroxide (as OH)	<3.4	<0.2		
Total Millequivalents per Liter		21.0	Total Hardness	950
Cations	mg/L	meq/L		
Magnesium	49	4		
Sodium	94	4.1		
Potassium	5.0	0.13		
Calcium	300	15		
Total Millequivalents per Liter		23.2	Ion balance in percent	5.08

* Conforms to Title 22, California Administrative Code

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G95-08-072

Received: 03 AUG 95

Mailed:

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

Project: 2832.10

REPORT OF ANALYTICAL RESULTS

Page 8

Log Number : 95-08-072-8
Sample Description: MW-9

General Mineral Analysis
Sampled Date 01 AUG 95

Anions	mg/L	meq/L	Determination	mg/L
Nitrate	38	0.61	Hydroxide Alk (as CaCO ₃)	<10
Chloride	110	3.1	Carbonate Alk (as CaCO ₃)	<10
Sulfate	150	3.1	Bicarbonate Alk (as CaCO ₃)	570
Bicarbonate (as HCO ₃)	700	11	Ca Hardness (as CaCO ₃)	450
Carbonate (as CO ₃)	<6	<0.2	Mg Hardness (as CaCO ₃)	180
Hydroxide (as OH)	<3.4	<0.2		
Total Millequivalents per Liter		18.2	Total Hardness	630
Cations	mg/L	meq/L		
Magnesium	43	3.5		
Sodium	98	4.3		
Potassium	4.1	0.1		
Calcium	180	9		
Total Millequivalents per Liter		16.9	Ion balance in percent	3.73

* Conforms to Title 22, California Administrative Code

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G95-08-072

Received: 03 AUG 95

Mailed:

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

Project: 2832.10

REPORT OF ANALYTICAL RESULTS

Page 9

Log Number : 95-08-072-9
Sample Description: MW-10

General Mineral Analysis
Sampled Date 01 AUG 95

Anions	mg/L	meq/L	Determination	mg/L
Nitrate	<0.1	<0.0016	Hydroxide Alk (as CaCO3)	<10
Chloride	2200	62	Carbonate Alk (as CaCO3)	<10
Sulfate	130	2.7	Bicarbonate Alk (as CaCO3)	520
Bicarbonate (as HCO3)	630	10	Ca Hardness (as CaCO3)	1500
Carbonate (as CO3)	<6	<0.2	Mg Hardness (as CaCO3)	530
Hydroxide (as OH)	<3.4	<0.2		
Total Millequivalents per Liter		75.1	Total Hardness	2030
Cations	mg/L	meq/L		
Magnesium	130	11		
Sodium	660	29		
Potassium	35	0.89		
Calcium	610	30		
Total Millequivalents per Liter		70.9	Ion balance in percent	2.88

* Conforms to Title 22, California Administrative Code

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G95-08-072

Received: 03 AUG 95

Mailed:

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

Project: 2832.10

REPORT OF ANALYTICAL RESULTS

Page 10

Log Number : 95-08-072-10
Sample Description: MW-11

General Mineral Analysis
Sampled Date 01 AUG 95

Anions	mg/L	meq/L	Determination	mg/L
Nitrate	5.5	0.089	Hydroxide Alk (as CaCO3)	<10
Chloride	3400	96	Carbonate Alk (as CaCO3)	<10
Sulfate	230	4.8	Bicarbonate Alk (as CaCO3)	560
Bicarbonate (as HCO3)	680	11	Ca Hardness (as CaCO3)	1200
Carbonate (as CO3)	<6	<0.2	Mg Hardness (as CaCO3)	530
Hydroxide (as OH)	<3.4	<0.2		
Total Millequivalents per Liter		112.3	Total Hardness	1730
Cations	mg/L	meq/L		
Magnesium	130	11		
Sodium	2000	87		
Potassium	46	1.2		
Calcium	490	24		
Total Millequivalents per Liter		123.2	Ion balance in percent	4.63

* Conforms to Title 22, California Administrative Code

BCA

B C Analytical

801 Western Avenue
Glendale, CA 91201
818/247-5737
Fax: 818/247-9797

LOG NO: G95-08-072

Received: 03 AUG 95

Mailed:

Ms. Myna Dehnert
Brown and Caldwell Consultants
1415 Louisiana, Suite 2500
Houston, Texas 77002

Project: 2832.10

REPORT OF ANALYTICAL RESULTS

Page 11

Log Number : 95-08-072-11
Sample Description: 080195

General Mineral Analysis
Sampled Date 01 AUG 95

Anions	mg/L	meq/L	Determination	mg/L
Nitrate	11	0.18	Hydroxide Alk (as CaCO3)	<10
Chloride	350	9.9	Carbonate Alk (as CaCO3)	<10
Sulfate	150	3.1	Bicarbonate Alk (as CaCO3)	360
Bicarbonate (as HCO3)	440	7.2	Ca Hardness (as CaCO3)	570
Carbonate (as CO3)	<6	<0.2	Mg Hardness (as CaCO3)	190
Hydroxide (as OH)	<3.4	<0.2		
Total Millequivalents per Liter			Total Hardness	760

Cations	mg/L	meq/L
Magnesium	46	3.8
Sodium	88	3.8
Potassium	4.9	0.13
Calcium	230	11

Total Millequivalents per Liter	18.7	Ion balance in percent	5.18
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* Conforms to Title 22, California Administrative Code

BCA

ORDER PLACED FOR CLIENT: Brown and Caldwell Consultants 9508072 :
 BC ANALYTICAL : GLEN LAB : 11:27:28 17 AUG 1995 - P. 1 :

SAMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE..... ANALYZED	METHOD.....	EQUIP.	BATCH..	ID.NO		
9508072*1	MW-1	HG	08.08.95	7470	534-06	951165	7396		
		AS,GFA	08.08.95	7060	534-04	951170	7396		
		SE,GFA	08.08.95	7740	534-04	951170	7396		
		PB,GFA	08.09.95	7421	534-04	951170	7396		
		AG	08.09.95	6010	535-03	951172	7396		
		BA	08.09.95	6010	535-03	951172	7396		
		CD,GFA	08.09.95	7131	534-04	951170	7396		
		CR	08.09.95	6010	535-03	951172	7396		
		DIG,AQ,GFA	08.08.95	3020		951170	7620		
		DIG,AQ.HCL	08.08.95	3010		951172	7620		
		ANIONS,CL	08.03.95	300.0	533-23	950803	8095		
		ANIONS,NO3	08.03.95	300.0	533-23	950803	8095		
		ANIONS,SO4	08.03.95	300.0	533-23	950803	8095		
		ALK	08.05.95	310.1	533-08	9542.1	8106		
		CA	08.09.95	6010	535-03	951172	7396		
		MG	08.09.95	6010	535-03	951172	7396		
		K	08.09.95	6010	535-03	951172	7396		
		NA	08.09.95	6010	535-03	951172	7396		
		BNA.8270.HSL	08.11.95	8270	537-11	95146	6750		
		GAS.TPH.BTEX	08.04.95	8015M	536-21	95237	8042		
		ION.BALANCE	08.10.95	CALC			8488		
		9508072*2	MW-3	HG	08.08.95	7470	534-06	951165	7396
				AS,GFA	08.08.95	7060	534-04	951170	7396
				SE,GFA	08.08.95	7740	534-04	951170	7396
				PB,GFA	08.09.95	7421	534-04	951170	7396
				AG	08.09.95	6010	535-03	951172	7396
				BA	08.09.95	6010	535-03	951172	7396
CD,GFA	08.09.95			7131	534-04	951170	7396		
CR	08.09.95			6010	535-03	951172	7396		
DIG,AQ,GFA	08.08.95			3020		951170	7620		
DIG,AQ.HCL	08.08.95			3010		951172	7620		
ANIONS,CL	08.03.95			300.0	533-23	950803	8095		
ANIONS,NO3	08.03.95			300.0	533-23	950803	8095		
ANIONS,SO4	08.03.95			300.0	533-23	950803	8095		
ALK	08.05.95			310.1	533-08	9542.1	8106		
CA	08.09.95			6010	535-03	951172	7396		
MG	08.09.95			6010	535-03	951172	7396		
K	08.09.95			6010	535-03	951172	7396		
NA	08.09.95			6010	535-03	951172	7396		
BNA.8270.HSL	08.11.95			8270	537-11	95146	6750		
GAS.TPH.BTEX	08.04.95			8015M	536-21	95237	8042		
ION.BALANCE	08.10.95			CALC			8488		
9508072*3	MW-4			HG	08.08.95	7470	534-06	951165	7396
				AS,GFA	08.08.95	7060	534-04	951170	7396

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

ORDER PLACED FOR CLIENT: Brown and Caldwell Consultants 9508072 :
 BC ANALYTICAL : GLEN LAB : 11:27:29 17 AUG 1995 - P. 2 :

SAMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE..... ANALYZED	METHOD.....	EQUIP.	BATCH..	ID.NO
	SE,GFA		08.08.95	7740		534-04	951170 7396
	PB,GFA		08.09.95	7421		534-04	951170 7396
	AG		08.09.95	6010		535-03	951172 7396
	BA		08.09.95	6010		535-03	951172 7396
	CD,GFA		08.09.95	7131		534-04	951170 7396
	CR		08.09.95	6010		535-03	951172 7396
	DIG,AQ,GFA		08.08.95	3020			951170 7620
	DIG,AQ.HCL		08.08.95	3010			951172 7620
	ANIONS,CL		08.03.95	300.0		533-23	950803 8095
	ANIONS,NO3		08.03.95	300.0		533-23	950803 8095
	ANIONS,SO4		08.03.95	300.0		533-23	950803 8095
	ALK		08.05.95	310.1		533-08	9542.1 8106
	CA		08.09.95	6010		535-03	951172 7396
	MG		08.09.95	6010		535-03	951172 7396
	K		08.09.95	6010		535-03	951172 7396
	NA		08.09.95	6010		535-03	951172 7396
	BNA.8270.HSL		08.15.95	8270		537-11	95146 6750
	GAS.TPH.BTEX		08.04.95	8015M		536-21	95237 8042
	ION.BALANCE		08.10.95	CALC			8488
9508072*4 MW-5	HG		08.08.95	7470		534-06	951165 7396
	AS,GFA		08.08.95	7060		534-04	951170 7396
	SE,GFA		08.08.95	7740		534-04	951170 7396
	PB,GFA		08.09.95	7421		534-04	951170 7396
	AG		08.09.95	6010		535-03	951172 7396
	BA		08.09.95	6010		535-03	951172 7396
	CD,GFA		08.09.95	7131		534-04	951170 7396
	CR		08.09.95	6010		535-03	951172 7396
	DIG,AQ,GFA		08.08.95	3020			951170 7620
	DIG,AQ.HCL		08.08.95	3010			951172 7620
	ANIONS,CL		08.03.95	300.0		533-23	950803 8095
	ANIONS,NO3		08.03.95	300.0		533-23	950803 8095
	ANIONS,SO4		08.03.95	300.0		533-23	950803 8095
	ALK		08.05.95	310.1		533-08	9542.1 8106
	CA		08.09.95	6010		535-03	951172 7396
	MG		08.09.95	6010		535-03	951172 7396
	K		08.09.95	6010		535-03	951172 7396
	NA		08.09.95	6010		535-03	951172 7396
	BNA.8270.HSL		08.10.95	8270		537-11	95146 6750
	GAS.TPH.BTEX		08.04.95	8015M		536-21	95238 8501
	ION.BALANCE		08.10.95	CALC			8488
9508072*5 MW-6	HG		08.08.95	7470		534-06	951165 7396
	AS,GFA		08.08.95	7060		534-04	951170 7396
	SE,GFA		08.08.95	7740		534-04	951170 7396
	PB,GFA		08.09.95	7421		534-04	951170 7396

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

ORDER PLACED FOR CLIENT: Brown and Caldwell Consultants 9508072 :
 BC ANALYTICAL : GLEN LAB : 11:27:29 17 AUG 1995 - P. 3 :

SAMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE..... ANALYZED	METHOD.....	EQUIP.	BATCH..	ID.NO	
	AG		08.09.95	6010	535-03	951172	7396	
	BA		08.09.95	6010	535-03	951172	7396	
	CD,GFA		08.09.95	7131	534-04	951170	7396	
	CR		08.09.95	6010	535-03	951172	7396	
	DIG,AQ,GFA		08.08.95	3020		951170	7620	
	DIG,AQ.HCL		08.08.95	3010		951172	7620	
	ANIONS,CL		08.03.95	300.0	533-23	950803	8095	
	ANIONS,NO3		08.03.95	300.0	533-23	950803	8095	
	ANIONS,SO4		08.03.95	300.0	533-23	950803	8095	
	ALK		08.05.95	310.1	533-08	9542.1	8106	
	CA		08.09.95	6010	535-03	951172	7396	
	MG		08.09.95	6010	535-03	951172	7396	
	K		08.09.95	6010	535-03	951172	7396	
	NA		08.09.95	6010	535-03	951172	7396	
	BNA.8270.HSL		08.14.95	8270	537-11	95146	6750	
	GAS.TPH.BTEX		08.08.95	8015M	536-21	95240	8501	
	ION.BALANCE		08.10.95	CALC			8488	
08072*6	MW-7		HG	08.08.95	7470	534-06	951165	7396
	AS,GFA		08.08.95	7060	534-04	951170	7396	
	SE,GFA		08.08.95	7740	534-04	951170	7396	
	PB,GFA		08.09.95	7421	534-04	951170	7396	
	AG		08.09.95	6010	535-03	951172	7396	
	BA		08.09.95	6010	535-03	951172	7396	
	CD,GFA		08.09.95	7131	534-04	951170	7396	
	CR		08.09.95	6010	535-03	951172	7396	
	DIG,AQ,GFA		08.08.95	3020		951170	7620	
	DIG,AQ.HCL		08.08.95	3010		951172	7620	
	ANIONS,CL		08.03.95	300.0	533-23	950803	8095	
	ANIONS,NO3		08.03.95	300.0	533-23	950803	8095	
	ANIONS,SO4		08.03.95	300.0	533-23	950803	8095	
	ALK		08.05.95	310.1	533-08	9542.1	8106	
	CA		08.09.95	6010	535-03	951172	7396	
	MG		08.09.95	6010	535-03	951172	7396	
	K		08.09.95	6010	535-03	951172	7396	
	NA		08.09.95	6010	535-03	951172	7396	
	BNA.8270.HSL		08.14.95	8270	537-11	95146	6750	
	GAS.TPH.BTEX		08.04.95	8015M	536-21	95238	8501	
	ION.BALANCE		08.10.95	CALC			8488	
9508072*7	MW-8		HG	08.08.95	7470	534-06	951165	7396
	AS,GFA		08.08.95	7060	534-04	951170	7396	
	SE,GFA		08.08.95	7740	534-04	951170	7396	
	PB,GFA		08.09.95	7421	534-04	951170	7396	
	AG		08.09.95	6010	535-03	951172	7396	
	BA		08.09.95	6010	535-03	951172	7396	

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

ORDER PLACED FOR CLIENT: Brown and Caldwell Consultants 9508072 :
 BC ANALYTICAL : GLEN LAB : 11:27:30 17 AUG 1995 - P. 4 :

SAMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE..... ANALYZED	METHOD.....	EQUIP.	BATCH..	ID.NO
	CD,GFA		08.09.95	7131	534-04	951170	7396
	CR		08.09.95	6010	535-03	951172	7396
	DIG,AQ,GFA		08.08.95	3020		951170	7620
	DIG,AQ.HCL		08.08.95	3010		951172	7620
	ANIONS,CL		08.03.95	300.0	533-23	950803	8095
	ANIONS,NO3		08.03.95	300.0	533-23	950803	8095
	ANIONS,SO4		08.03.95	300.0	533-23	950803	8095
	ALK		08.05.95	310.1	533-08	9542.1	8106
	CA		08.09.95	6010	535-03	951172	7396
	MG		08.09.95	6010	535-03	951172	7396
	K		08.09.95	6010	535-03	951172	7396
	NA		08.09.95	6010	535-03	951172	7396
	BNA.8270.HSL		08.14.95	8270	537-11	95146	6750
	GAS.TPH.BTEX		08.04.95	8015M	536-21	95238	8501
	ION.BALANCE		08.10.95	CALC			8488
9508072*8 MW-9	HG		08.08.95	7470	534-06	951165	7396
	AS,GFA		08.08.95	7060	534-04	951170	7396
	SE,GFA		08.08.95	7740	534-04	951170	7396
	PB,GFA		08.09.95	7421	534-04	951170	7396
	AG		08.09.95	6010	535-03	951172	7396
	BA		08.09.95	6010	535-03	951172	7396
	CD,GFA		08.09.95	7131	534-04	951170	7396
	CR		08.09.95	6010	535-03	951172	7396
	DIG,AQ,GFA		08.08.95	3020		951170	7620
	DIG,AQ.HCL		08.08.95	3010		951172	7620
	ANIONS,CL		08.03.95	300.0	533-23	950803	8095
	ANIONS,NO3		08.03.95	300.0	533-23	950803	8095
	ANIONS,SO4		08.03.95	300.0	533-23	950803	8095
	ALK		08.05.95	310.1	533-08	9542.1	8106
	CA		08.09.95	6010	535-03	951172	7396
	MG		08.09.95	6010	535-03	951172	7396
	K		08.09.95	6010	535-03	951172	7396
	NA		08.09.95	6010	535-03	951172	7396
	BNA.8270.HSL		08.14.95	8270	537-11	95146	6750
	GAS.TPH.BTEX		08.08.95	8015M	536-21	95240	8501
	ION.BALANCE		08.10.95	CALC			8488
9508072*9 MW-10	HG		08.08.95	7470	534-06	951165	7396
	AS,GFA		08.08.95	7060	534-04	951170	7396
	SE,GFA		08.08.95	7740	534-04	951170	7396
	PB,GFA		08.09.95	7421	534-04	951170	7396
	AG		08.09.95	6010	535-03	951172	7396
	BA		08.09.95	6010	535-03	951172	7396
	CD,GFA		08.09.95	7131	534-04	951170	7396
	CR		08.09.95	6010	535-03	951172	7396

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

ORDER PLACED FOR CLIENT: Brown and Caldwell Consultants 9508072 :
 BC ANALYTICAL : GLEN LAB : 11:27:30 17 AUG 1995 - P. 5 :
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SAMPLES...	SAMPLE DESCRIPTION..	DETERM.....	DATE.....	METHOD.....	EQUIP.	BATCH..	ID.NO
			ANALYZED				
	DIG,AQ,GFA		08.08.95	3020		951170	7620
	DIG,AQ.HCL		08.08.95	3010		951172	7620
	ANIONS,CL		08.07.95	300.0	533-23	950807	8095
	ANIONS,NO3		08.03.95	300.0	533-23	950803	8095
	ANIONS,SO4		08.03.95	300.0	533-23	950803	8095
	ALK		08.05.95	310.1	533-08	9542.1	8106
	CA		08.09.95	6010	535-03	951172	7396
	MG		08.09.95	6010	535-03	951172	7396
	K		08.09.95	6010	535-03	951172	7396
	NA		08.09.95	6010	535-03	951172	7396
	BNA.8270.HSL		08.14.95	8270	537-11	95146	6750
	GAS.TPH.BTEX		08.04.95	8015M	536-21	95238	8501
	ION.BALANCE		08.10.95	CALC			8488
9508072*10 MW-11	HG		08.08.95	7470	534-06	951165	7396
	AS,GFA		08.08.95	7060	534-04	951170	7396
	SE,GFA		08.08.95	7740	534-04	951170	7396
	PB,GFA		08.09.95	7421	534-04	951170	7396
	AG		08.09.95	6010	535-03	951172	7396
	BA		08.09.95	6010	535-03	951172	7396
	CD,GFA		08.09.95	7131	534-04	951170	7396
	CR		08.09.95	6010	535-03	951172	7396
	DIG,AQ,GFA		08.08.95	3020		951170	7620
	DIG,AQ.HCL		08.08.95	3010		951172	7620
	ANIONS,CL		08.07.95	300.0	533-23	950807	8095
	ANIONS,NO3		08.03.95	300.0	533-23	950803	8095
	ANIONS,SO4		08.03.95	300.0	533-23	950803	8095
	ALK		08.05.95	310.1	533-08	9542.1	8106
	CA		08.09.95	6010	535-03	951172	7396
	MG		08.09.95	6010	535-03	951172	7396
	K		08.09.95	6010	535-03	951172	7396
	NA		08.09.95	6010	535-03	951172	7396
	BNA.8270.HSL		08.14.95	8270	537-11	95146	6750
	GAS.TPH.BTEX		08.04.95	8015M	536-21	95238	8501
	ION.BALANCE		08.10.95	CALC			8488
9508072*11 080195	HG		08.08.95	7470	534-06	951165	7396
	AS,GFA		08.08.95	7060	534-04	951170	7396
	SE,GFA		08.08.95	7740	534-04	951170	7396
	PB,GFA		08.09.95	7421	534-04	951170	7396
	AG		08.09.95	6010	535-03	951172	7396
	BA		08.09.95	6010	535-03	951172	7396
	CD,GFA		08.09.95	7131	534-04	951170	7396
	CR		08.09.95	6010	535-03	951172	7396
	DIG,AQ,GFA		08.08.95	3020		951170	7620
	DIG,AQ.HCL		08.08.95	3010		951172	7620

Notes: Equipment = BC Analytical identification number for a particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of analyst.

ORDER PLACED FOR CLIENT: Brown and Caldwell Consultants 9508072 :
BC ANALYTICAL : GLEN LAB : 11:27:31 17 AUG 1995 - P. 6 :
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SAMPLES... SAMPLE DESCRIPTION.. DETERM..... DATE..... METHOD..... EQUIP. BATCH.. ID.NO
ANALYZED

ANIONS,CL	08.03.95	300.0	533-23	950803	8095
ANIONS,N03	08.03.95	300.0	533-23	950803	8095
ANIONS,S04	08.03.95	300.0	533-23	950803	8095
ALK	08.05.95	310.1	533-08	9542.1	8106
CA	08.09.95	6010	535-03	951172	7396
MG	08.09.95	6010	535-03	951172	7396
K	08.09.95	6010	535-03	951172	7396
NA	08.09.95	6010	535-03	951172	7396
BNA.8270.HSL	08.14.95	8270	537-11	95146	6750
GAS.TPH.BTEX	08.04.95	8015M	536-21	95238	8501
ION.BALANCE	08.10.95	CALC			8488
GAS.TPH.BTEX	08.08.95	8015M	536-21	95238	8501

508072*12 Trip Blank

Notes: Equipment = BC Analytical identification number for a
particular piece of analytical equipment.

ID.NO = BC Analytical employee identification number of
analyst.

AQUEOUS SAMPLES

----- METHOD BLANK

LAB CONTROL

MATRIX QC

	UNITS	RESULT	RDL FLG	LCS %REC FLG	LCSO %REC FLG	LCL	RPD UCL	RPD FLG	MS %REC FLG	MSD %REC FLG	LCL	UCL	RPD UCL	RPD RPD FLG
Batch: 950803 Method: 300.0 – Inorganic anions in water, Ion chromatograph														
Chloride	mg/L	0.196	0.05 Q	96 -	99 -	90	110	3 -	101 -	99 -	63	125	1	15 -
Nitrate	mg/L	0	0.2 -	98 -	99 -	90	110	2 -	103 -	99 -	74	110	2	15 -
Sulfate	mg/L	0	0.1 -	101 -	102 -	90	110	2 -	107 -	105 -	73	116	1	15 -
Batch: ANIONS, CL*950807 Method: 300.0 – Inorganic anions in water, Ion chromatograph														
Chloride	mg/L	0.46	0.05 Q	101 -	100 -	90	110	1 -	-	-	-	-	-	-
Batch: ALK*9542.1 Method: 310.1 – Alkalinity, Titrimetric														
Carbonate Alk (as CaCO3)	mg/L	0	10 -	-	-	-	-	-	-	-	-	-	-	-
Bicarbonate Alk (as CaCO3)	mg/L	0	10 -	102 -	-	95	105	-	97 -	100 -	91	107	1	15 -
Hydroxide Alk (as CaCO3)	mg/L	0	10 -	-	-	-	-	-	-	-	-	-	-	-
Total Alkalinity (as CaCO3)	mg/L	0	10 -	101 -	-	95	105	-	97 -	100 -	91	107	1	15 -
Batch: HG*951165 Method: 7470 – Mercury (Liquid), Cold Vapor AA, Manual														
Mercury	mg/L	0.0001	0.0002 -	95 -	98 -	71	123	3 -	75 -	55 -	53	143	31	20 Q
Batch: AS,GFA*951170 Method: 7060 – Arsenic, AA, Furnace														
Arsenic	mg/L	0	0.002 -	102 -	100 -	63	122	2 -	99 -	103 -	52	130	3	20 -
Batch: CD,GFA*951170 Method: 7131 – Cadmium, AA, Furnace														
Cadmium	mg/L	0	0.001 -	93 -	93 -	67	134	0 -	114 -	102 -	63	157	11	20 -
Batch: PB,GFA*951170 Method: 7421 – Lead, AA, Furnace														
Lead	mg/L	0.0005	0.002 -	104 -	100 -	85	112	4 -	105 -	106 -	54	144	1	20 -
Batch: SE,GFA*951170 Method: 7740 – Selenium, AA, Furnace														
Selenium	mg/L	0	0.004 -	99 -	96 -	74	114	3 -	70 -	70 -	4	140	1	20 -
Batch: 951172 Method: 6010 – ICAP Metals														
Silver	mg/L	0	0.01 -	102 -	99 -	72	117	3 -	-	-	-	-	-	-
Barium	mg/L	0.0008	0.005 -	93 -	94 -	75	114	1 -	-	-	-	-	-	-
Calcium	mg/L	0	0.5 -	90 -	90 -	85	116	0 -	-	-	-	-	-	-
Chromium	mg/L	0	0.01 -	96 -	97 -	76	110	1 -	-	-	-	-	-	-
Potassium	mg/L	0	0.5 -	89 -	89 -	81	110	0 -	-	-	-	-	-	-
Magnesium	mg/L	0.042	0.1 -	93 -	93 -	81	110	1 -	-	-	-	-	-	-
Sodium	mg/L	0.352	0.5 -	93 -	94 -	83	112	1 -	-	-	-	-	-	-

AQUEOUS SAMPLES

METHOD BLANK										LAB CONTROL										MATRIX QC									
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UNITS	RESULT	RDL	FLG	LCS	%REC	FLG	%REC	FLG	LCL	UCL	RPD	UCL	RPD	FLG	MS	%REC	FLG	MSD	%REC	FLG	LCL	UCL	RPD	UCL	RPD	FLG			
Batch: GAS*95237 Method: 8015M - Modified 8015																													
Benzene	ug/L	0	0.3	-	124	-	-	-	76	141	-	-	-	-	105	-	102	-	102	-	71	125	3	29	-				
Toluene	ug/L	0	0.3	-	103	-	-	-	73	122	-	-	-	-	101	-	98	-	98	-	63	126	2	33	-				
Ethylbenzene	ug/L	0	0.3	-	96	-	-	-	72	133	-	-	-	-	94	-	93	-	93	-	65	126	1	34	-				
Total Xylene Isomers	ug/L	0	0.6	-	93	-	-	-	64	117	-	-	-	-	92	-	92	-	92	-	69	128	0	35	-				
TPH (Gasoline Range)	ug/L	0	100	-	95	-	-	-	64	152	-	-	-	-	85	-	82	-	82	-	53	166	3	21	-				
[a,a,a-Trifluorotoluene]	Percent	106	-	-	93	-	-	-	75	117	-	-	-	-	118	Q	114	-	114	-	75	117	-	-	-				
Batch: GAS*95238 Method: 8015M - Modified 8015																													
Benzene	ug/L	0	0.3	-	134	-	-	-	76	141	-	-	-	-	102	-	88	-	88	-	71	125	15	29	-				
Toluene	ug/L	0.13	0.3	-	91	-	-	-	73	122	-	-	-	-	74	-	72	-	72	-	63	126	2	33	-				
Ethylbenzene	ug/L	0	0.3	-	99	-	-	-	72	133	-	-	-	-	76	-	79	-	79	-	65	126	3	34	-				
Total Xylene Isomers	ug/L	0.16	0.6	-	94	-	-	-	64	117	-	-	-	-	73	-	76	-	76	-	69	128	4	35	-				
TPH (Gasoline Range)	ug/L	0	100	-	95	-	-	-	64	152	-	-	-	-	95	-	96	-	96	-	53	166	2	21	-				
[a,a,a-Trifluorotoluene]	Percent	91	-	-	108	-	-	-	75	117	-	-	-	-	95	-	93	-	93	-	75	117	-	-	-				
Batch: GAS*95240 Method: 8015M - Modified 8015																													
Benzene	ug/L	0	0.3	-	105	-	-	-	76	141	-	-	-	-	110	-	114	-	114	-	71	125	3	29	-				
Toluene	ug/L	0	0.3	-	105	-	-	-	73	122	-	-	-	-	93	-	97	-	97	-	63	126	5	33	-				
Ethylbenzene	ug/L	0	0.3	-	88	-	-	-	72	133	-	-	-	-	84	-	91	-	91	-	65	126	8	34	-				
Total Xylene Isomers	ug/L	0	0.6	-	85	-	-	-	64	117	-	-	-	-	80	-	88	-	88	-	69	128	9	35	-				
TPH (Gasoline Range)	ug/L	0	100	-	100	-	-	-	64	152	-	-	-	-	102	-	105	-	105	-	53	166	3	21	-				
[a,a,a-Trifluorotoluene]	Percent	104	-	-	85	-	-	-	75	117	-	-	-	-	86	-	86	-	86	-	75	117	-	-	-				

SURROGATE RECOVERIES :

BC ANALYTICAL : GLEN LAB : 11:28:34 17 AUG 1995 - P. 1 :

METHOD	ANALYTE	BATCH	ANALYZED	REPORTED	TRUE	%REC	FLAG	LCL	UCL
9508072*1									
8270	2-Fluorophenol	95146	08/11/95	NC	75.0	NC	NC	21	100
	Phenol-d5	95146	08/11/95	NC	75.0	NC	NC	10	94
	Nitrobenzene-d5	95146	08/11/95	NC	50.0	NC	NC	35	114
	2-Fluorobiphenyl	95146	08/11/95	NC	50.0	NC	NC	43	116
	2,4,6-Tribromophenol	95146	08/11/95	NC	75.0	NC	NC	10	123
	Terphenyl-d14	95146	08/11/95	NC	50.0	NC	NC	33	141
015M	a,a,a-Trifluorotoluene	95237	08/04/95	494	500	99		75	117
9508072*2									
8270	2-Fluorophenol	95146	08/11/95	23.5	75.0	31		21	100
	Phenol-d5	95146	08/11/95	21.4	75.0	29		10	94
	Nitrobenzene-d5	95146	08/11/95	42.3	50.0	85		35	114
	2-Fluorobiphenyl	95146	08/11/95	48.0	50.0	96		43	116
	2,4,6-Tribromophenol	95146	08/11/95	73.2	75.0	98		10	123
	Terphenyl-d14	95146	08/11/95	40.7	50.0	81		33	141
015M	a,a,a-Trifluorotoluene	95237	08/04/95	2500	2500	100		75	117
9508072*3									
8270	2-Fluorophenol	95146	08/15/95	NC	75.0	NC	NC	21	100
	Phenol-d5	95146	08/15/95	NC	75.0	NC	NC	10	94
	Nitrobenzene-d5	95146	08/15/95	NC	50.0	NC	NC	35	114
	2-Fluorobiphenyl	95146	08/15/95	NC	50.0	NC	NC	43	116
	2,4,6-Tribromophenol	95146	08/15/95	NC	75.0	NC	NC	10	123
	Terphenyl-d14	95146	08/15/95	NC	50.0	NC	NC	33	141
015M	a,a,a-Trifluorotoluene	95237	08/04/95	9820	10000	98		75	117
9508072*4									
8270	2-Fluorophenol	95146	08/10/95	56.4	75.0	75		21	100
	Phenol-d5	95146	08/10/95	56.3	75.0	75		10	94
	Nitrobenzene-d5	95146	08/10/95	41.1	50.0	82		35	114
	2-Fluorobiphenyl	95146	08/10/95	45.9	50.0	92		43	116
	2,4,6-Tribromophenol	95146	08/10/95	72.2	75.0	96		10	123
	Terphenyl-d14	95146	08/10/95	38.4	50.0	77		33	141
015M	a,a,a-Trifluorotoluene	95238	08/04/95	46.7	50.0	93		75	117
9508072*5									
8270	2-Fluorophenol	95146	08/14/95	25.2	75.0	34		21	100
	Phenol-d5	95146	08/14/95	17.8	75.0	24		10	94
	Nitrobenzene-d5	95146	08/14/95	43.6	50.0	87		35	114
	2-Fluorobiphenyl	95146	08/14/95	39.8	50.0	80		43	116
	2,4,6-Tribromophenol	95146	08/14/95	64.4	75.0	86		10	123
	Terphenyl-d14	95146	08/14/95	34.9	50.0	70		33	141
015M	a,a,a-Trifluorotoluene	95240	08/08/95	5890	5000	118	Q	75	117
9508072*6									
8270	2-Fluorophenol	95146	08/14/95	7.60	75.0	10	Q	21	100
	Phenol-d5	95146	08/14/95	14.0	75.0	19		10	94
	Nitrobenzene-d5	95146	08/14/95	34.5	50.0	69		35	114
	2-Fluorobiphenyl	95146	08/14/95	40.8	50.0	82		43	116

SURROGATE RECOVERIES :

BC ANALYTICAL : GLEN LAB : 11:28:46 17 AUG 1995 - P. 2 :

METHOD	ANALYTE	BATCH	ANALYZED	REPORTED	TRUE	%REC	FLAG	LCL	UCL
8015M	2,4,6-Tribromophenol	95146	08/14/95	28.5	75.0	38		10	123
	Terphenyl-d14	95146	08/14/95	39.0	50.0	78		33	141
	a,a,a-Trifluorotoluene	95238	08/04/95	44.3	50.0	89		75	117

508072*7

8270	2-Fluorophenol	95146	08/14/95	7.57	75.0	10	Q	21	100
	Phenol-d5	95146	08/14/95	17.4	75.0	23		10	94
	Nitrobenzene-d5	95146	08/14/95	40.5	50.0	81		35	114
8015M	2-Fluorobiphenyl	95146	08/14/95	44.4	50.0	89		43	116
	2,4,6-Tribromophenol	95146	08/14/95	22.4	75.0	30		10	123
	Terphenyl-d14	95146	08/14/95	40.4	50.0	81		33	141
	a,a,a-Trifluorotoluene	95238	08/04/95	46.1	50.0	92		75	117

508072*8

8270	2-Fluorophenol	95146	08/14/95	19.8	75.0	26		21	100
	Phenol-d5	95146	08/14/95	14.7	75.0	20		10	94
	Nitrobenzene-d5	95146	08/14/95	32.1	50.0	64		35	114
8015M	2-Fluorobiphenyl	95146	08/14/95	37.7	50.0	75		43	116
	2,4,6-Tribromophenol	95146	08/14/95	64.2	75.0	86		10	123
	Terphenyl-d14	95146	08/14/95	35.3	50.0	71		33	141
	a,a,a-Trifluorotoluene	95240	08/08/95	488	500	98		75	117

508072*9

8270	2-Fluorophenol	95146	08/14/95	24.5	75.0	33		21	100
	Phenol-d5	95146	08/14/95	19.6	75.0	26		10	94
	Nitrobenzene-d5	95146	08/14/95	39.4	50.0	79		35	114
8015M	2-Fluorobiphenyl	95146	08/14/95	42.2	50.0	84		43	116
	2,4,6-Tribromophenol	95146	08/14/95	75.7	75.0	101		10	123
	Terphenyl-d14	95146	08/14/95	34.2	50.0	68		33	141
	a,a,a-Trifluorotoluene	95238	08/04/95	437	500	87		75	117

508072*10

8270	2-Fluorophenol	95146	08/14/95	7.73	75.0	10	Q	21	100
	Phenol-d5	95146	08/14/95	15.5	75.0	21		10	94
	Nitrobenzene-d5	95146	08/14/95	34.6	50.0	69		35	114
8015M	2-Fluorobiphenyl	95146	08/14/95	41.6	50.0	83		43	116
	2,4,6-Tribromophenol	95146	08/14/95	26.4	75.0	35		10	123
	Terphenyl-d14	95146	08/14/95	37.0	50.0	74		33	141
	a,a,a-Trifluorotoluene	95238	08/04/95	45.6	50.0	91		75	117

508072*11

8270	2-Fluorophenol	95146	08/14/95	2.85	75.0	4	Q	21	100
	Phenol-d5	95146	08/14/95	15.6	75.0	21		10	94
	Nitrobenzene-d5	95146	08/14/95	35.3	50.0	71		35	114
8015M	2-Fluorobiphenyl	95146	08/14/95	41.8	50.0	84		43	116
	2,4,6-Tribromophenol	95146	08/14/95	8.03	75.0	11		10	123
	Terphenyl-d14	95146	08/14/95	38.3	50.0	77		33	141
	a,a,a-Trifluorotoluene	95238	08/04/95	46.3	50.0	93		75	117

508072*12

SURROGATE RECOVERIES :
: BC ANALYTICAL : GLEN LAB : 11:28:57 17 AUG 1995 - P. 3 :
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METHOD	ANALYTE	BATCH	ANALYZED	REPORTED	TRUE	%REC	FLAG	LCL	UCL
015M	a,a,a-Trifluorotoluene	95238	08/08/95	48.3	50.0	97		75	117

SURROGATE RECOVERIES :
 : BC ANALYTICAL : GLEN LAB : 11:29:00 17 AUG 1995 - P. 1 :
 =====

METHOD	ANALYTE	BATCH	ANALYZED	REPORTED	TRUE	%REC	FLAG	LCL	UCL
9508040*4*R1									
8015M	a,a,a-Trifluorotoluene	95237	08/03/95	51.6	50.0	103		75	117
9508040*4*S1									
8015M	a,a,a-Trifluorotoluene	95237	08/03/95	59.2	50.0	118	Q	75	117
9508040*4*S2									
8015M	a,a,a-Trifluorotoluene	95237	08/03/95	57.1	50.0	114		75	117
9508072*4*R1									
8015M	a,a,a-Trifluorotoluene	95238	08/04/95	46.7	50.0	93		75	117
8270	2-Fluorophenol	95146	08/10/95	56.4	75.0	75		21	100
	Phenol-d5	95146	08/10/95	56.3	75.0	75		10	94
	Nitrobenzene-d5	95146	08/10/95	41.1	50.0	82		35	114
	2-Fluorobiphenyl	95146	08/10/95	45.9	50.0	92		43	116
	2,4,6-Tribromophenol	95146	08/10/95	72.2	75.0	96		10	123
	Terphenyl-d14	95146	08/10/95	38.4	50.0	77		33	141
9508072*4*S1									
8015M	a,a,a-Trifluorotoluene	95238	08/04/95	47.7	50.0	95		75	117
8270	2-Fluorophenol	95146	08/11/95	56.1	75.0	75		21	100
	Phenol-d5	95146	08/11/95	53.8	75.0	72		10	94
	Nitrobenzene-d5	95146	08/11/95	46.0	50.0	92		35	114
	2-Fluorobiphenyl	95146	08/11/95	52.2	50.0	104		43	116
	2,4,6-Tribromophenol	95146	08/11/95	88.3	75.0	118		10	123
	Terphenyl-d14	95146	08/11/95	45.5	50.0	91		33	141
9508072*4*S2									
8015M	a,a,a-Trifluorotoluene	95238	08/04/95	46.7	50.0	93		75	117
8270	2-Fluorophenol	95146	08/11/95	8.58	75.0	11	Q	21	100
	Phenol-d5	95146	08/11/95	28.8	75.0	38		10	94
	Nitrobenzene-d5	95146	08/11/95	33.0	50.0	66		35	114
	2-Fluorobiphenyl	95146	08/11/95	36.2	50.0	72		43	116
	2,4,6-Tribromophenol	95146	08/11/95	13.2	75.0	18		10	123
	Terphenyl-d14	95146	08/11/95	33.3	50.0	67		33	141
9508138*5*R1									
8015M	a,a,a-Trifluorotoluene	95240	08/08/95	49.4	50.0	99		75	117
9508138*5*S1									
8015M	a,a,a-Trifluorotoluene	95240	08/08/95	43.0	50.0	86		75	117
9508138*5*S2									
8015M	a,a,a-Trifluorotoluene	95240	08/08/95	43.0	50.0	86		75	117
9508253*1*MB									

SURROGATE RECOVERIES :
 : BC ANALYTICAL : GLEN LAB : 11:29:07 17 AUG 1995 - P. 2 :

METHOD	ANALYTE	BATCH	ANALYZED	REPORTED	TRUE	%REC	FLAG	LCL	UCL
D15M	a,a,a-Trifluorotoluene	95238	08/04/95	45.5	50.0	91		75	117
B508268*1*MB									
D15M.TXa	a,a,a-Trifluorotoluene	95237	08/03/95	53.0	50.0	106		75	117
B508346*1*MB									
8270	2-Fluorophenol	95146	08/10/95	32.8	75.0	44		21	100
	Phenol-d5	95146	08/10/95	28.5	75.0	38		10	94
	Nitrobenzene-d5	95146	08/10/95	40.1	50.0	80		35	114
	2-Fluorobiphenyl	95146	08/10/95	43.7	50.0	87		43	116
	2,4,6-Tribromophenol	95146	08/10/95	73.0	75.0	97		10	123
	Terphenyl-d14	95146	08/10/95	37.1	50.0	74		33	141
B508403*1*MB									
D15M	a,a,a-Trifluorotoluene	95240	08/08/95	52.0	50.0	104		75	117
C508465*1*LC									
D15M	a,a,a-Trifluorotoluene	95238	08/04/95	53.8	50.0	108		75	117
C508494*1*LC									
8015M.TXa	a,a,a-Trifluorotoluene	95237	08/04/95	46.5	50.0	93		75	117
C508623*1*LC									
8270	2-Fluorophenol	95146	08/10/95	56.1	75.0	75		21	100
	Phenol-d5	95146	08/10/95	44.7	75.0	60		10	93
	Nitrobenzene-d5	95146	08/10/95	42.8	50.0	86		37	114
	2-Fluorobiphenyl	95146	08/10/95	46.3	50.0	93		43	116
	2,4,6-Tribromophenol	95146	08/10/95	79.7	75.0	106		40	123
	Terphenyl-d14	95146	08/10/95	39.7	50.0	79		33	141
C508624*1*LC									
8270	2-Fluorophenol	95146	08/10/95	53.9	75.0	72		21	100
	Phenol-d5	95146	08/10/95	42.8	75.0	57		10	93
	Nitrobenzene-d5	95146	08/10/95	41.6	50.0	83		37	114
	2-Fluorobiphenyl	95146	08/10/95	45.6	50.0	91		43	116
	2,4,6-Tribromophenol	95146	08/10/95	77.4	75.0	103		40	123
	Terphenyl-d14	95146	08/10/95	36.1	50.0	72		33	141
C508704*1*LC									
D15M	a,a,a-Trifluorotoluene	95240	08/08/95	42.5	50.0	85		75	117

