GW - 72

MONITORING REPORTS

DATE:

1997-1996

BROWN AND CALDWELL

FINAL

DECEMBER 1996 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

MAY 19, 1997

FINAL
DECEMBER 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: 2832.12

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May 19, 1997

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1.0 INTRODUCTION

Brown and Caldwell conducted field activities associated with the December 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 in Figure 1.

The facility formerly operated an above-grade on-site fueling system. Subsurface impact near the fueling system from a diesel fuel release 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. As the result of the diesel fuel release, the New Mexico OCD has required a quarterly groundwater monitoring program to assess the hydrocarbon constituents in the groundwater. A biosparging system was fully activated in November, 1995 to remediate soil and groundwater at the facility. A site chronology detailing the history of the fueling system, the groundwater recovery system, and the previous sampling events is presented on Table 1.

During the December 1996 sampling event, groundwater samples were collected and analyzed for total petroleum hydrocarbons (TPH), gasoline and diesel; and for benzene, toluene, ethylbenzene, and total xylene (BTEX). This report presents the results of the groundwater sampling event conducted for BJ Services, a description of the field activities, and a summary of the analytical results. Also included is a groundwater potentiometric surface map, a benzene concentration map, and a hydrocarbon distribution map.

2.0 GROUNDWATER SAMPLING AND ANALYSES

On December 2, 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

Ten monitoring wells were sampled during the December 1996 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 the 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 0.004 ft/ft. 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 the monitoring wells on December 2, 1996. The samples were collected after purging the wells with a submersible pump to remove at least three well volumes of groundwater. 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.

Additional groundwater parameters were measured during the purging and sampling activities to assess the potential for natural attenuation at the site. These parameters were dissolved oxygen, dissolved ferrous iron, and reduction-oxidation potential (redox). The field parameter readings were recorded in the field log book and are listed on the groundwater sampling forms included in Appendix A. The field screening results for groundwater samples are presented on Table 3.

Following recovery, 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 Southern Petroleum Laboratories (SPL) in Houston, Texas. Each cooler was accompanied by completed chain-of-custody documentation.

The field measurement equipment was decontaminated prior to and after each use. Decontamination procedures consisted of washing with fresh water and a non-phosphate detergent and 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 5030/8020, and for TPH by EPA Method 8015 Modified for gasoline and diesel.

Comparison of the distribution of benzene and total BTEX dissolved in groundwater in November 1995 with December 1996 (Figures 3 and 4) shows that a substantial reduction in the areal extent and concentrations of the BTEX plume has occurred since the operation of the biosparging system began.

Total concentrations of BTEX constituents above the laboratory detection limit are reported in 7 of the 10 groundwater samples obtained during this sampling event. Benzene concentrations range from below the detection limit of 1.0 micrograms per liter (µg/L) in MW-5, MW-6, MW-7, and MW-8 to 5,600 µg/L in MW-1. Total BTEX concentrations range from below the detection limit of 1.0 µg/L in MW-5, MW-7, and MW-8 to 26,900 µg/L in MW-1. TPH gasoline concentrations range from below the detection limit of 0.1 milligrams per liter (mg/L) to 64 mg/L in MW-1. TPH diesel concentrations range from below the detection limit of 0.1 mg/L to 100 mg/L in MW-1. A cumulative summary of analytical results for groundwater samples is included on Table 4. The laboratory analytical reports and chain of custody record are included in Appendix B.

Increases in BTEX concentrations were observed in MW-1, which is in the central portion of the dissolved phase hydrocarbon plume. During December, the amount of air flow in this area was increased from 6 cubic feet per minute (cfm) to 14 cfm. This is expected to increase the biodegradation of BTEX compounds in the central portion of the plume.

An increase in BTEX constituents was also observed in MW-11, which is downgradient of the area of active remediation. This is considered to be a transient condition for which the groundwater has sufficient assimilative capacity. The total BTEX assimilative capacity of 35,760 µg/L was calculated based on background levels of electron acceptors measured at the facility during the August 1996 sampling event. This exceeds the BTEX concentration measured in MW-11 (984 µg/L) by more than an order of magnitude.

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 New Mexico OCD approved the RAP on August 11, 1994. The installation of the biosparging system was conducted between August 2 through 24, 1995. Nineteen combined injection/extraction wells, three vacuum extraction wells, associated piping, one extraction blower and one injection blower were installed. 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 Department 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, effluent air samples were collected on a monthly basis from the recovered vapors to monitor the bioremediation process and emission rate. Upon receiving approval from the State of New Mexico that an air permit is not required, effluent air samples have

been collected on a quarterly basis. The air samples are analyzed for TPH using EPA Method Modified 8015A (Air) and for total volatile aromatic hydrocarbons (BTEX) using EPA Method 5030/8020 (modified). The analytical results demonstrate a significant reduction in hydrocarbon vapor concentrations since November 1995. Total BTEX concentrations have decreased from 180 part per million by volume (ppmv) to below the practical quantitation limits of 1.0 ppmv. TPH concentrations have decreased from 1,870 ppmv to below the practical quantitation limit of 5.0 ppmv. A cumulative summary of analytical results for the air emissions is included on Table 5. The laboratory analytical reports and chain-of-custody documentation are included in Appendix C.

During the December 1996 monitoring event, a crack in the 4-inch, above-grade, extraction piping was observed adjacent to well AV-7. Interviews with site personnel indicated that the damage may be attributed to recent construction activity in the area. The pipe was repaired and a temporary concrete curb was placed adjacent to the above-grade piping at the west end of the property to prevent any vehicles from damaging the pipe. To prevent further damage, traffic bollards are planned to be installed around the perimeter of the above-grade system piping.

The vapor extraction system is currently operating at an average flow of 165 cfm at 100°F. The air injection system is operating at an average flow of 45 cfm at 4.5 psi, 160°F. Total BTEX emissions of 0.01 lb/hour and TPH emissions of 0.01 lb/hour are reported for the December 1996 monitoring event.

4.0 CONCLUSIONS AND RECOMMENDATIONS

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

4.1 Conclusions

- Groundwater flow remains to the southeast with an average hydraulic gradient of 0.004 ft/ft.
- Current results indicate a substantial reduction in the areal extent and concentrations of the BTEX plume since the biosparging system was installed. The dissolved-phase groundwater plume is shrinking.
- Modifications to the air injection and extraction rates have been made to increase the rate of degradation of BTEX hydrocarbons in the central portion of the plume.
- Benzene concentrations in monitor wells MW-5, MW-6, 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
December 1996 Groundwater Sampling Report
Hobbs, New Mexico

May 19, 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: BJ Services Company, U.S.A.
8701 New Trails Drive
The Woodlands, 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. Brad Brooks

1 copy to: Brown and Caldwell
Project File

QUALITY CONTROL REVIEWER

Robert N. Jennings, P.E.
Vice President

WAH:elg:uak

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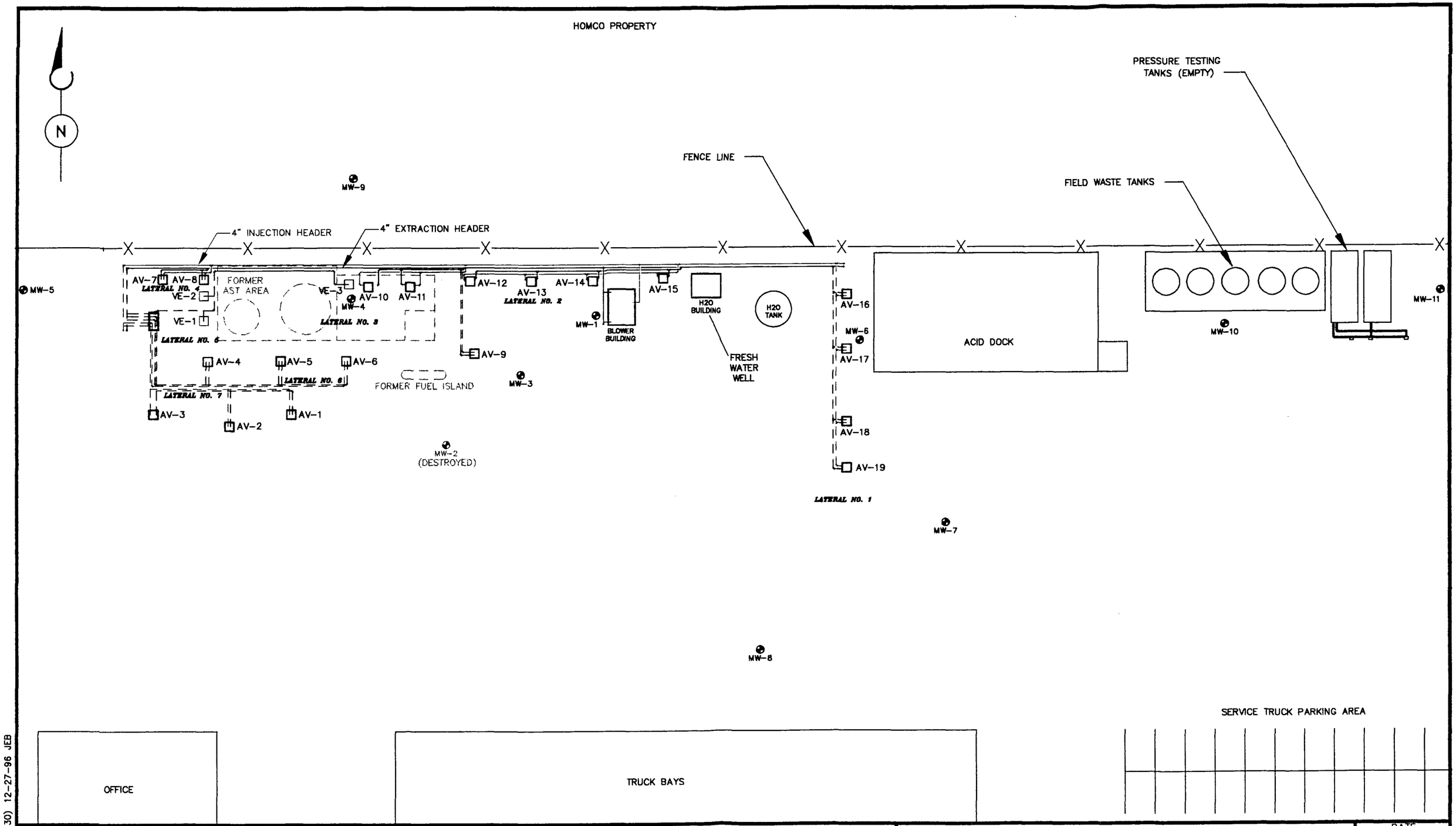
FIGURES



T:\2832\SITE02 (1=30) 12-27-96 JEB

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 15 30
SCALE: 1" = 30'
DRAWN BY: JEB DATE 12/27
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

- MW-6 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: SITEMAP	DATE: 12/27/96
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 2832-12
SITE: HOBBS, NEW MEXICO	FIGURE NUMBER: 1

HOMCO PROPERTY

N

PRESSURE TESTING TANKS (EMPTY)

FENCE LINE

FIELD WASTE TANKS

(47.60) MW-9

4" INJECTION HEADER

4" EXTRACTION HEADER

(47.87) MW-5

AV-7 AV-8 LATERAL NO. 4 VE-2

VE-1 LATERAL NO. 5

FORMER AST AREA

VE-3 AV-10

(47.01) MW-4

LATERAL NO. 3

AV-11

AV-12 AV-13 LATERAL NO. 2 AV-14

(46.17) MW-1

BLOWER BUILDING

AV-15

H2O BUILDING

H2O TANK

AV-16

MW-6 (46.40)

AV-17

ACID DOCK

(45.49) MW-10

(45.03) MW-11

AV-4 AV-5 AV-6 LATERAL NO. 6

AV-9

(46.53) MW-3

FORMER FUEL ISLAND

FRESH WATER WELL

LATERAL NO. 7

AV-3 AV-2 AV-1

AV-18

AV-19

LATERAL NO. 1

MW-2 (DESTROYED)

(46.44) MW-7

47.0

(46.69) MW-8

46.0

45.0

NOTE: BASED ON MEASUREMENTS OBTAINED ON DECEMBER 2, 1996.

SERVICE TRUCK PARKING AREA

OFFICE

TRUCK BAYS

T:\2832\POTEN02 (1=30) 01-03-97 JEB

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 15 30
SCALE: 1" = 30'
DRAWN BY: JEB DATE 1/3
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

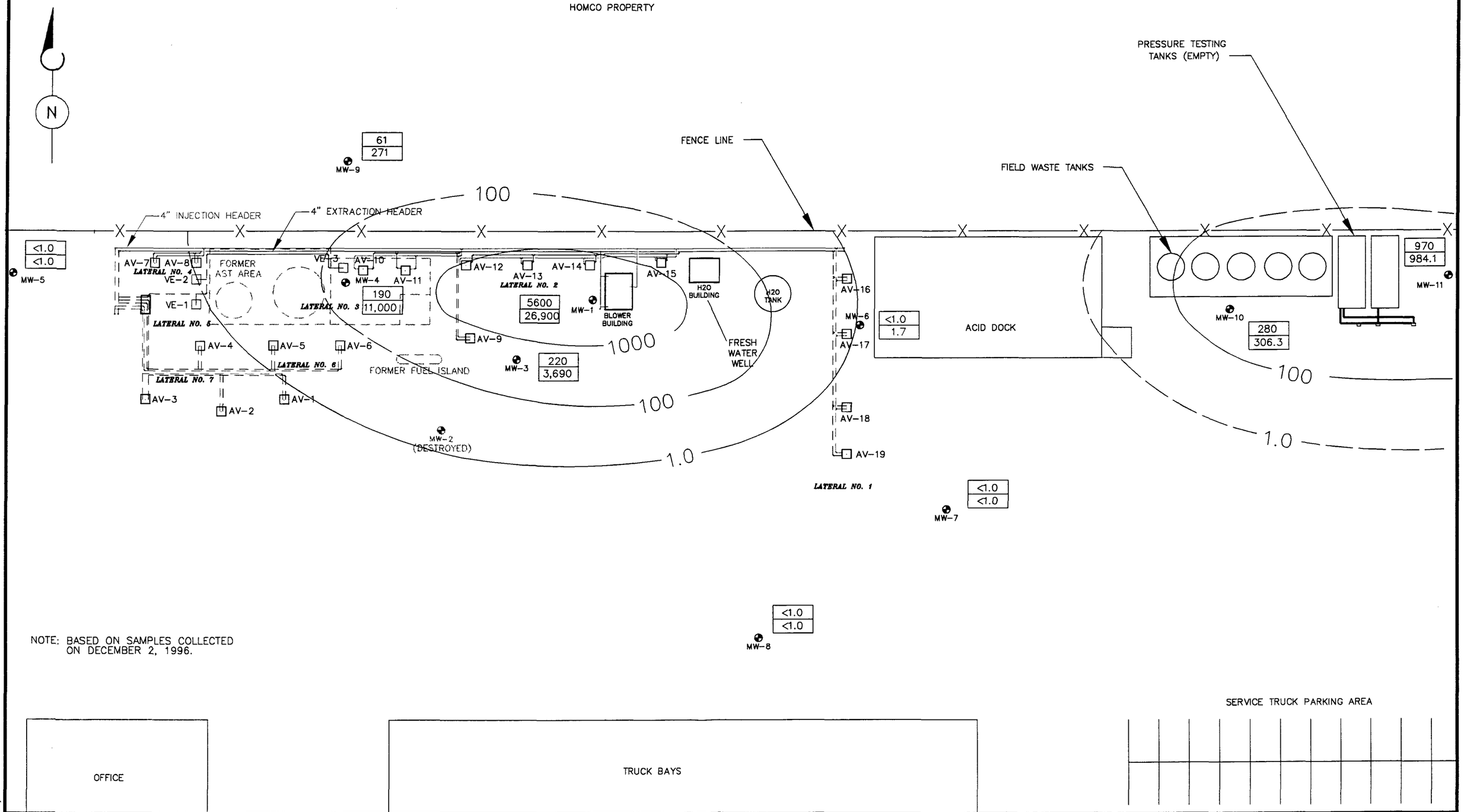
MW-8 MONITORING WELL LOCATION AND IDENTIFICATION

(46.69) POTENTIOMETRIC SURFACE ELEVATION (FEET)

46.0 POTENTIOMETRIC SURFACE CONTOUR, (FEET)

GROUNDWATER FLOW DIRECTION

TITLE: POTENTIOMETRIC SURFACE MAP	DATE: 01/03/97
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 2832-12
SITE: HOBBS, NEW MEXICO	FIGURE NUMBER: 2



NOTE: BASED ON SAMPLES COLLECTED ON DECEMBER 2, 1996.

T:\2832\HYDROCO2 (1=30) 05-19-97 JEB

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 15 30
SCALE: 1" = 30'
DRAWN BY: JEB DATE 5/97
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-5 MONITORING WELL LOCATION AND IDENTIFICATION

280 BENZENE CONCENTRATION (ug/L)
306.3 TOTAL BTEX CONCENTRATION (ug/L)

1.0 BENZENE CONCENTRATION CONTOUR (ug/L)

TITLE: BENZENE ISOCONCENTRATION AND TOTAL BTEX DISTRIBUTION MAP, DECEMBER 1996

DATE: 05/19/97

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

PROJECT NUMBER: 2832-12

SITE: HOBBS, NEW MEXICO

FIGURE NUMBER: 3

HOMCO PROPERTY

N

PRESSURE TESTING TANKS (EMPTY)

FENCE LINE

FIELD WASTE TANKS

240
415
MW-9

100

500

1,000

4" INJECTION HEADER

4" EXTRACTION HEADER

<0.3
2.7
MW-5

AV-7 AV-8
LATERAL NO. 4
VE-2
VE-1
LATERAL NO. 5
FORMER AST AREA
490
3,500
LATERAL NO. 3
VE-3 AV-10
MW-4
AV-11
AV-12
AV-13
LATERAL NO. 2
AV-14
880
3,950
MW-1
BLOWER BUILDING
AV-15
H2O BUILDING
H2O TANK
AV-16
MW-6
8,900
34,300
ACID DOCK
AV-17
AV-9
AV-4 AV-5 AV-6
LATERAL NO. 6
LATERAL NO. 7
FORMER FUEL ISLAND
MW-3
250
1,870
FRESH WATER WELL
AV-3
AV-2
AV-1
AV-18
AV-19
MW-2
(DESTROYED)
1,000
1,075
MW-10
190
210
MW-11

LATERAL NO. 1
8.4
10.1
MW-7

<0.3

<0.3
0.52
MW-8

NOTE: BASED ON SAMPLES COLLECTED IN NOVEMBER 1995.

SERVICE TRUCK PARKING AREA

OFFICE

TRUCK BAYS

T:\2832\HYDROC01 (1=30) 05-19-97 JEB

BROWN AND CALDWELL
HOUSTON, TEXAS
SUBMITTED: _____ DATE: _____
PROJECT MANAGER
APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 15 30
SCALE: 1" = 30'
DRAWN BY: JEB DATE 5/97
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-8 MONITORING WELL LOCATION AND IDENTIFICATION

880 / 3,950 BENZENE CONCENTRATION (ug/L) / TOTAL BTEX CONCENTRATION (ug/L)

1.0 BENZENE CONCENTRATION CONTOUR (ug/L)

TITLE: BENZENE ISOCONCENTRATION AND TOTAL BTEX DISTRIBUTION MAP, NOVEMBER 1995

DATE: 05/19/97

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

PROJECT NUMBER: 2832-12

SITE: HOBBS, NEW MEXICO

FIGURE NUMBER: 4

Tables

TABLES

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

DATE	ACTIVITY
February 7, 1991	The State of New Mexico Oil Conservation Division (OCD) conducted an on-site inspection, including sampling of the on-site fresh water well.
August 6, 1991	OCD 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.
July 11 and August 23, 1996	Brown and Caldwell conducted quarterly groundwater sampling event
December 2, 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	
	101.44	12/2/96	55.27	0.00	46.17	
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	
	98.76	12/2/96	52.23	0.00	46.53	

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	
	99.33	12/2/96	52.32	0.00	47.01	
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	
	101.85	12/2/96	53.98	0.00	47.87	
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	
	99.25	12/2/96	52.85	0.00	46.40	

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	
	98.96	12/2/96	52.52	0.00	46.44	
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	
	99.12	12/2/96	52.43	0.00	46.69	
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	
	99.18	12/2/96	51.58	0.00	47.60	

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	
	98.90	12/2/96	53.41	0.00	45.49	
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	
	98.82	12/2/96	53.79	0.00	45.03	

MW-2 could not be located and assumed detroyed 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								
	12/2/96	1	6.85	1,470	18.1	-90	0.5	
		2	6.88	1,460	18.0	-105	0.5	
		3	6.88	1,460	18.0	-105	0.5	1
MW-3								
	12/2/96	1	7.12	1,360	17.9	-125	0.8	
		2	7.15	1,350	17.9	-119	0.8	
		3	7.10	1,350	17.9	-119	0.8	0
MW-4								
	12/2/96	1	7.10	1,100	18.0	-115	0.5	
		2	7.12	998	18.0	-115	0.5	
		3	7.09	1,100	18.0	-115	0.5	1
MW-5								
	12/2/96	1	7.28	1,080	18.1	15	1.8	
		2	7.26	1,110	18.1	22	1.8	
		3	7.26	1,110	18.1	22	1.8	0
MW-6								
	12/2/96	1	7.42	1,280	18.0	10	1.5	
		2	7.48	1,320	17.8	16	1.5	
		3	7.52	1,290	17.8	20	1.5	0
MW-7								
	12/2/96	1	6.82	1,710	17.6	75	1.8	
		2	6.76	1,700	17.6	56	2.0	
		3	6.78	1,720	17.6	62	2.0	0
MW-8								
	12/2/96	1	6.46	968	17.8	95	2.0	
		2	6.52	1,260	18.0	95	2.2	
		3	6.60	1,240	18.0	95	2.0	0

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								
	12/2/96	1	7.01	1,490	17.8	35	1.8	
		2	6.99	1,520	17.6	37	1.8	
		3	6.98	1,520	17.6	35	1.8	1
MW-10								
	12/2/96	1	7.10	3,400	17.8	-5	1.0	
		2	7.12	4,160	17.8	-8	1.0	
		3	7.10	4,210	17.8	-22	1.0	9
MW-11								
	12/2/96	1	6.71	13,100	17.9	48	1.8	
		2	6.82	12,890	18.3	51	1.0	0

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.

Well ID	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, µg/L				milligrams per liter, mg/L	
MW-1								
	8/10/92	Regular	5550	12090	2160	7370	NA	NA
	2/9/93	Regular	2100	6500	1300	7400	NA	NA
	8/19/93	Regular	3200	7300	1200	3700	NA	NA
	1/27/94	Regular	1930	4580	672	2390	NA	NA
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	390	1300	230	800	NA	5.7
	11/15/95	Regular	880	1800	300	970	NA	6.8
	2/23/96	Regular	1500	3700	620	2200	NA	21
	5/31/96	Regular	1100	1700	380	990	NA	7.5
	8/23/96	Regular	1800	3300	570	2100	NA	17
	12/2/96	Regular	5600	9600	2100	9600	100	64
MW-2								
	8/10/92	Regular	14.9	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	100	12	3	13	NA	NA
	1/27/94	Regular	< 1	1.2	2	2.5	NA	NA
MW-3								
	8/10/92	Regular	304.9	2099	6760	1586	NA	NA
	2/9/93	Regular	130	< 10	< 10	190	NA	NA
	8/19/93	Regular	560	3100	630	1900	NA	NA
	1/27/94	Regular	1070	5380	510	3120	NA	NA
	5/4/95	Regular	770	3300	470	1800	NA	NA
	8/1/95	Regular	490	2900	890	1600	NA	14
	11/15/95	Regular	250	1000	180	440	NA	2.9
	2/23/96	Regular	120	810	170	560	NA	4
	5/31/96	Regular	670	3900	1200	2300	NA	15
	8/23/96	Regular	330	2200	590	1500	NA	12
	12/2/96	Regular	220	1800	670	1000	0.89	7.4

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-D	TPH-G
			micrograms per liter, µg/L				milligrams per liter, mg/L	
MW-4								
	8/10/92	Regular	2594	10360	2160	6740	NA	NA
	2/9/93	Regular	5200	15000	2200	10000	NA	NA
	8/19/93	Regular	3000	12000	< 2000	7000	NA	NA
	1/27/94	Regular	NSP	NSP	NSP	NSP	NA	NSP
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	5700	17000	3500	13000	NA	120
	11/15/95	Regular	490	1600	310	1100	NA	5.2
	2/23/96	Regular	360	2800	560	2500	NA	18
	5/31/96	Regular	84	830	280	1100	NA	6.2
	8/23/96	Regular	110	1400	430	1800	NA	9.8
	12/2/96	Regular	190	2000	1800	7200	56	43
MW-5								
	8/10/92	Regular	< 4	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94	Regular	8.7	29.9	4	11.3	NA	NA
	5/3/95	Regular	3.7	5.3	0.92	4.6	NA	NA
	8/1/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	11/15/95	Regular	< 0.3	1.2	< 0.3	1.5	NA	NA
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	5/31/96	Regular	31	86	10	20	NA	NA
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
MW-6								
	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	7000	19000	3100	7200	NA	NA
	8/19/93	Regular	8100	19000	3500	6400	NA	NA
	1/27/94	Regular	7960	20200	3830	6150	NA	NA
	5/4/95	Regular	11000	17000	2900	6000	NA	NA
	8/1/95	Regular	8300	12000	2500	5100	NA	60
	11/15/95	Regular	8900	17000	2900	5500	NA	57
	2/23/96	Regular	8100	10000	2300	4000	NA	58
	5/31/96	Regular	83	150	15	51	NA	0.57
	5/31/96	Duplicate	87	160	13	47	NA	0.52
	8/23/96	Regular	31	28	9.4	7.9	NA	0.46
	12/2/96	Regular	< 1	< 1	< 1	1.7	5.6	< 0.1

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-D	TPH-G
			micrograms per liter, µg/L				milligrams per liter, mg/L	
MW-7								
	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	3	< 2	< 2	NA	NA
	1/27/94	Regular	1.1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	52	3.4	0.67	2.8	NA	NA
	8/1/95	Regular	22	2.2	0.85	2.8	NA	< 0.1
	11/15/95	Regular	8.4	0.77	< 0.3	0.93	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Duplicate	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	29	83	10	21	NA	0.25
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
MW-8								
	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	3	4.9	0.75	3.7	NA	NA
	8/1/95	Regular	3.1	1.2	0.47	1.6	NA	< 0.001
	8/1/95	Duplicate	3.6	1.5	0.51	1.5	NA	< 0.1
	11/15/95	Regular	< 0.3	0.52	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1

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-D	TPH-G
			micrograms per liter, µg/L				milligrams per liter, mg/L	
MW-9								
	4/22/93	Regular	570	380	< 50	870	NA	NA
	7/15/93	Regular	121	7.3	3	458	NA	NA
	8/19/93	Regular	390	290	40	250	NA	NA
	1/27/94	Regular	327	357	51.1	293	NA	NA
	5/3/95	Regular	380	110	19	120	NA	NA
	8/1/95	Regular	660	410	91	310	NA	6.2
	11/15/95	Regular	240	24	11	140	NA	1.5
	11/15/95	Duplicate	170	18	10	120	NA	1.9
	2/23/96	Regular	170	18	2.3	160	NA	4.3
	5/31/96	Regular	120	16	3	200	NA	NA
	8/23/96	Regular	82	13	6	270	NA	4
	8/23/96	Duplicate	76	14	4.8	250	NA	4.4
	12/2/96	Regular	61	< 25	< 25	210	2.6	2.8
	12/2/96	Duplicate	86	13	2.4	270	3.7	2.9
MW-10								
	8/19/93	Regular	190	460	< 200	240	NA	NA
	1/27/94	Regular	13.4	4	5.5	33.6	NA	NA
	5/4/95	Regular	980	15	11	84	NA	NA
	8/1/95	Regular	1300	32	32	100	NA	3.6
	11/15/95	Regular	1000	24	15	36	NA	1.7
	2/23/96	Regular	810	23	27	44	NA	2.4
	5/31/96	Regular	700	24	34	28	NA	2
	8/23/96	Regular	290	3.4	6.4	13	NA	1.4
	12/2/96	Regular	280	1.3	17	8	0.94	0.97
MW-11								
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	8/1/95	Regular	44	29	5.5	13	NA	0.2
	11/15/95	Regular	190	2.8	6.2	11	NA	0.4
	2/23/96	Regular	49	1.2	0.51	4	NA	0.25
	5/31/96	Regular	300	83	12	28	NA	0.8
	8/23/96	Regular	100	1.2	0.3	4.7	NA	0.26
	12/2/96	Regular	970	< 5	6	8.1	2	1.3

MW-2 destroyed on May 3, 1995 NA = Not Analysed NS = Not Sampled

NSP = Not Sampled due to Phase Separated Hydrocarbons

Table 5
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
Effluent120296-01	12/2/96	< 1	< 1	< 1	< 1	< 5	129.04	0.00	0.01	0.01

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

APPENDIX A

GROUNDWATER SAMPLING FORMS

BROWN AND CALDWELL

WELL ID: mw-1

Groundwater Sampling Field Data Sheet

Project Number: 2832 Task Number: 12 Date: 12/2/96

Casing Diameter: 2 inches	Purge Equipment: Sub. pump	Equipment Calibration - Time: pH 7.01 = 6.91 at 20 °C; pH 4.01 = 4.08 at 20 °C
Total Depth of Well from TOC: 64.42 feet	Sample Equipment: DI. bailer	
Static Water from TOC: 55.27 feet		Conductivity: Conductance Standard: 1314 µmhos/cm at 25°C; Measured Value: 1314 µmhos/cm at 25°C
Product Level from TOC: — feet		
Length of Water Column: 9.15 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI HandCalf (DO, SC, Redox, Temp) D.O. probe DO kit	Dissolved Oxygen: DO Meter Calibrated to: N/A mg/L
Well Volume: 1.49 gal		
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1743	—	—	6.98	18.1	1.38	-055	0.5	clear
1748	1	1.5	6.85	18.1	1.47	-090	0.5	cloudy
1753	2	1.5	6.88	18.0	1.46	-105	0.5	"
1758	3	1.5	6.88	18.0	1.46	-105	0.5	"

Geochemical Parameters		*Comments:*
Ferrous Iron:	1 mg/L	2020 Sample mw-1, wl 55.54
Dissolved Oxygen:	0 mg/L	
Nitrate:	mg/L	
Sulfate:	mg/L	

PPE Worn: gloves, glasses	*Sampler's Signature:*
Disposition of Purge Water: down	

BROWN AND CALDWELL

WELL ID: mw-3

Groundwater Sampling Field Data Sheet

Project Number: 2832 Task Number: 12 Date: 12/2/96

Casing Diameter	Purge Equipment	Equipment Calibration - Time
2 inches	Sub. pump	pH 7.01 = 6.94 at 20 °C
Total Depth of Well from TOC: 64.31 feet		pH 4.01 = 4.08 at 20 °C
Static Water from TOC: 52.23 feet	Sample Equipment: DIS bailer	Conductivity
Product Level from TOC: — feet		Conductance Standard: 1314 µmhos/cm at 25° C
Length of Water Column: 12.08 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI flow cell (pH, SC, Redox, Temp) D.O. Meter Dahle kit	Measured Value: 13.14 µmhos/cm at 25° C
Well Volume: 1.96 gal		Dissolved Oxygen
Screened Interval (from GS): feet		DO Meter Calibrated to: N/A mg/L

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1708	—	—	6.98	17.9	1.34	-132	1.0	cloudy
1713	1	2	7.12	17.9	1.36	-125	0.8	"
1718	2	2	7.15	17.9	1.35	-119	0.8	"
1723	3	2	7.10	17.9	1.35	-119	0.8	"

Geochemical Parameters		Comments:
Ferrous Iron:	0 mg/L	2010 Sample mw-3, wl 52.40
Dissolved Oxygen:	0 mg/L	
Nitrate:	mg/L	
Sulfate:	mg/L	

PPE Worn:	Sampler's Signature:
gloves, glasses	
Disposition of Purge Water: drum	

BROWN AND CALDWELL

WELL ID: mw-4

Groundwater Sampling Field Data Sheet

Project Number: 2832 Task Number: 12 Date: 12/2/96

Casing Diameter	Purge Equipment	Equipment Calibration - Time
2 inches	Sub. pump	pH 7.01 = 694 at 20 °C
Total Depth of Well from TOC: 61.43 feet		pH 4.01 = 4.08 at 20 °C
Static Water from TOC: 52.32 feet	Sample Equipment: Disp. bailer	
Product Level from TOC: — feet		Conductivity: Conductance Standard: 1314 µmhos/cm at 25° C
Length of Water Column: 9.11 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI flow cell (pH, SC, Redox, Temp) DO. meter DO. titration kit	Measured Value: 1314 µmhos/cm at 25° C
Well Volume: 1.48 gal		Dissolved Oxygen: DO Meter Calibrated to: N/A mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1818	—	—	7.04	17.9	1.08	-120	0.5	cloudy
1822	1	1.5	7.10	18.0	1.10	-115	0.5	"
1826	2	1.5	7.12	18.0	.998	-115	0.5	"
1830	3	1.5	7.09	18.0	1.10	-115	0.5	"

Geochemical Parameters		Comments:
Ferrous Iron:	1 mg/L	2030 Sample mw-4, WL 52.39
Dissolved Oxygen:	0 mg/L	
Nitrate:	mg/L	
Sulfate:	mg/L	

PPE Worn: gloves, glasses

Disposition of Purge Water: drum

Sampler's Signature: [signature]

BROWN AND CALDWELL

WELL ID: mw-5

Groundwater Sampling Field Data Sheet

Project Number: 2832 Task Number: 12 Date: 12/2/96

Casing Diameter: 2 inches	Purge Equipment: ~~D-50~~ Sub. pump	Equipment Calibration - Time
Total Depth of Well from TOC: 64.60 feet		pH 7.01 = 6.94 at 20 °C
Static Water from TOC: 53.98 feet	Sample Equipment: Dis. bailer	pH 4.01 = 4.08 at 20 °C
Product Level from TOC: — feet		Conductivity: Conductance Standard: 1314 µmhos/cm at 25° C
Length of Water Column: 10.62 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI Horiba (pH, SC, Redox, Temp) D.O. meter D.O. Hach kit	Measured Value: 1314 µmhos/cm at 25° C
Well Volume: 1.73 gal		Dissolved Oxygen: DO Meter Calibrated to: N/A mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1343	—	—	7.21	18.3	1,100	025	2.0	clear
1348	1	2	7.28	18.1	1,080	015	1.8	"
1353	2	2	7.26	18.1	1,110	022	1.8	"
1358	3	2	7.26	18.1	1,110	022	1.8	"

Geochemical Parameters		Comments:
Ferrous Iron:	0 mg/L	1920 Sample mw-5, WL 54.00
Dissolved Oxygen:	2.0 mg/L	
Nitrate:	mg/L	
Sulfate:	mg/L	

PPE Worn: gloves, glasses	Sampler's Signature:
Disposition of Purge Water: drum	

BROWN AND CALDWELL

WELL ID: mw-6

Groundwater Sampling Field Data Sheet

Project Number: 2832 Task Number: 12 Date: 12/2/96

Casing Diameter: 2 inches	Purge Equipment: Sub. pump	Equipment Calibration - Time
Total Depth of Well from TOC: 60.17 feet		pH 7.01 = 6.94 at 20 °C
Static Water from TOC: 52.85 feet	Sample Equipment: Dis. bailer	pH 4.01 = 4.08 at 20 °C
Product Level from TOC: — feet		Conductivity: Conductance Standard: 1314 µmhos/cm at 25° C
Length of Water Column: 7.32 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI Flow Cell (pH, SC, Redox, Temp) D.O. meter D.O. Hf kit	Measured Value: 1314 µmhos/cm at 25° C
Well Volume: 1.5 gal		Dissolved Oxygen: DO Meter Calibrated to: N/A mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1423	—	—	7.14	17.8	1,100	015	2.0	clear
1427	1	1.5	7.42	18.0	1,280	010	1.5	clear / Sediments
1432	2	1.5	7.48	17.8	1,320	016	1.5	"
1436	3	1.5	7.52	17.8	1,290	020	1.5	"

Geochemical Parameters		Comments:
Ferrous Iron:	0 mg/L	1430 Sample mw-6, WL 52.90
Dissolved Oxygen:	1.5 mg/L	
Nitrate:	mg/L	
Sulfate:	mg/L	

PPE Worn: gloves, glasses	Sampler's Signature:
Disposition of Purge Water: drum	

BROWN AND CALDWELL

WELL ID: mw-7

Groundwater Sampling Field Data Sheet

Project Number: 2832 Task Number: 12 Date: 12/2/96

Casing Diameter: 2 inches	Purge Equipment: Sub. pump	Equipment Calibration - Time: pH 7.01 = 6.94 at 20 °C
Total Depth of Well from TOC: 61.46 feet		pH 4.01 = 4.08 at 20 °C
Static Water from TOC: 52.52 feet	Sample Equipment: DIS. Bailer	
Product Level from TOC: — feet		Conductivity: Conductance Standard: 1314 µmhos/cm at 25° C
Length of Water Column: 8.94 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI Flow Cell (pH, SC, Redox, Temp) DO. Meter DO. Ifc kit	Measured Value: 1314 µmhos/cm at 25° C
Well Volume: 1.45 gal		Dissolved Oxygen: DO Meter Calibrated to: N/A mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1245	—	—	6.76	18.1	1.82	068	2.0	clear
1250	1	1.5	6.82	17.6	1.71	075	1.8	cloudy
1255	2	1.5	6.76	17.6	1.70	056	2.0	"
1300	3	1.5	6.78	17.6	1.72	062	2.0	"

Geochemical Parameters		Comments:
Ferrous Iron:	0 mg/L	1910 Sample mw-7, WL 52.51
Dissolved Oxygen:	2.5 mg/L	
Nitrate:	mg/L	
Sulfate:	mg/L	

PPE Worn: gloves, glasses	Sampler's Signature:
Disposition of Purge Water: drum	

BROWN AND CALDWELL

WELL ID: MW-8

Groundwater Sampling Field Data Sheet

Project Number: 2832 Task Number: 12 Date: 12/2/96

Casing Diameter: 2 inches	Purge Equipment: Sub. pump	Equipment Calibration - Time: pH 7.01 = 6.94 at 20 °C; pH 4.01 = 4.08 at 20 °C
Total Depth of Well from TOC: 62.37 feet		
Static Water from TOC: 52.43 feet	Sample Equipment: Dis. Bailer	
Product Level from TOC: — feet		Conductivity: Conductance Standard: 1314 µmhos/cm at 25° C; Measured Value: 1314 µmhos/cm at 25° C
Length of Water Column: 9.94 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI Flow Cell (pH, SC, Redox, T); D.O. METER; D.O./Ft ampuls	
Well Volume: 1.62 gal		Dissolved Oxygen: DO Meter Calibrated to: N/A mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1155	—	—	6.28	17.8	.880	098	2.5	clear
1200	1	2	6.46	17.8	.968	095	2.0	"
1206	2	2	6.52	18.0	1.26	095	2.2	"
1211	3	2	6.60	18.0	1.24	095	2.0	"

Geochemical Parameters		Comments:
Ferrous Iron:	0 mg/L	1900 Sample MW-8, WL 52.48
Dissolved Oxygen:	2.5 mg/L	
Nitrate:	mg/L	
Sulfate:	mg/L	

PPE Worn: gloves, glasses

Disposition of Purge Water: drum

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: mw-9

Groundwater Sampling Field Data Sheet

Project Number: 2832 Task Number: 12 Date: 12/2/96

Casing Diameter: 2 inches	Purge Equipment: Sub-pump	Equipment Calibration - Time: pH 7.01 = 6.94 at 20 °C
Total Depth of Well from TOC: 60.27 feet		pH 4.01 = 4.08 at 20 °C
Static Water from TOC: 51.58 feet	Sample Equipment: Dis. bailer	Conductivity: Conductance Standard: 1314 µmhos/cm at 25° C
Product Level from TOC: — feet		Measured Value: 1314 µmhos/cm at 25° C
Length of Water Column: 8.69 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI Flow Cell (pH, SC, Redox, Temp) D.O. Meter D.O./Fe kit	Dissolved Oxygen: DO Meter Calibrated to: N/A mg/L
Well Volume: 1.41 gal		
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1458	—	—	6.86	17.5	1.46	032	1.8	clear
1503	1	1.5	7.01	17.8	1.49	035	1.8	cloudy
1508	2	1.5	6.99	17.6	1.52	037	1.8	"
1512	3	1.5	6.98	17.6	1.52	035	1.8	"

Geochemical Parameters		Comments:
Ferrous Iron:	1.0 mg/L	1940 Sample mw-9, wl 51.61
Dissolved Oxygen:	2.0 mg/L	Duplicate sample 2832
Nitrate:	mg/L	also collected.
Sulfate:	mg/L	

PPE Worn: gloves, glasses	Sampler's Signature:
Disposition of Purge Water: drum	

BROWN AND CALDWELL

WELL ID: mw-10

Groundwater Sampling Field Data Sheet

Project Number: 2832 Task Number: 12 Date: 12/2/96

Casing Diameter: 2 inches	Purge Equipment: Sub. pump	Equipment Calibration - Time: pH 7.01 = 6.94 at 20 °C; pH 4.01 = 4.08 at 20 °C
Total Depth of Well from TOC: 63.60 feet	Sample Equipment: Pis. bailer	
Static Water from TOC: 53.41 feet		
Product Level from TOC: — feet		Conductivity: Conductance Standard: 1314 µmhos/cm at 25° C; Measured Value: 1314 µmhos/cm at 25° C
Length of Water Column: 10.19 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI Hanna (DH, SC, Redox, Temp) D.O. meter D.O. Hach kit	
Well Volume: 1.66 gal		Dissolved Oxygen: DO Meter Calibrated to: N/A mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1633	—	—	7.02	17.6	3.28	010	1.0	clear
1638	1	2	7.10	17.8	3.40	-005	1.0	cloudy
1643	2	2	7.12	17.8	4.16	-008	1.0	"
1648	3	2	7.10	17.8	4.21	-022	1.0	"

Geochemical Parameters		Comments:
Ferrous Iron:	9 mg/L	2000 Sample mw-10, wl 53.42
Dissolved Oxygen:	0 mg/L	
Nitrate:	mg/L	
Sulfate:	mg/L	

PPE Worn: glasses, gloves	Sampler's Signature:
Disposition of Purge Water: drum	

BROWN AND CALDWELL

WELL ID: mw-11

Groundwater Sampling Field Data Sheet

Project Number: 2832 Task Number: 12 Date: 12/2/96

Casing Diameter: 2 inches	Purge Equipment: Sub-pump	Equipment Calibration - Time
Total Depth of Well from TOC: 59.78 feet		pH 7.01 = 6.94 at 20 °C
Static Water from TOC: 53.79 feet	Sample Equipment: Dis. bailer	pH 4.01 = 4.08 at 20 °C
Product Level from TOC: — feet		Conductivity: Conductance Standard: 1314 µmhos/cm at 25° C
Length of Water Column: 5.99 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI flow Cell (pH, SC, Redox, Temp) D.O. meter D.O. Hach kit	Measured Value: 1314 µmhos/cm at 25° C
Well Volume: 0.97 gal		Dissolved Oxygen: DO Meter Calibrated to: N/A mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1548	—	—	6.68	18.2	11.28	042	1.8	cloudy
1553	1	1	6.71	17.9	13.10	048	1.8	"
1558	2	1	6.82	18.3	12.89	051	1.0	"
	3	well dry.						

Geochemical Parameters		Comments:
Ferrous Iron:	0 mg/L	Dry @ 2.5 gal.
Dissolved Oxygen:	1.5 mg/L	1950 Sample mw-11, wl 53.86
Nitrate:	mg/L	
Sulfate:	mg/L	

PPE Worn: glasses, gloves

Disposition of Purge Water: down

Sampler's Signature:

APPENDIX B

LABORATORY ANALYTICAL REPORTS GROUNDWATER SAMPLES

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

Southern Petroleum Laboratories, Inc.

Certificate of Analysis Number: 96-12-131

Approved for Release by:

Bernadette A. Fini, Project Manager

Date: 12-19-96

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.: 9612131

Southern Petroleum Laboratories (SPL) is pleased to present the results of this project to Brown & Caldwell. The samples were received intact at our Houston facility with a temperature of 4 degrees Celsius on December 4, 1996. One Air and eleven water samples were analyzed for parameters and methods as specified on the Chain of Custody document. The following is a description of analytical exceptions which are associated with this sample delivery group.

Based on the conditions of the sample, procedures performed and quality controls implemented for this project, the following exception was noted for this data package.

Sample 2832 (SPL ID#9612131-11) exhibited a surrogate recovery of 200% for 4-Bromofluorobenzene in the Total Volatile Aromatics Hydrocarbon (8020) analysis. This surrogate recovery was outside QC limits due to a matrix interference. However the surrogate 1,4-Difluorobenzene was within quality control limits.

Sample MW-1 (SPL ID#9612131-09) exhibited a surrogate recovery of 595% and MW-4 (SPL ID#9612131-10) exhibited a surrogate recovery of 235% for 2- Fluorobiphenyl in the Total Petroleum Hydrocarbon-Diesel (8015) analysis. This surrogate recovery was outside QC limits due to a matrix interference. However the surrogate o-Terphenyl was within quality control limits.

Please refer to this project by 9612131 to expedite any further discussions. I will be happy to address any questions or concerns you may have.

Bernadette A. Fini
Project Manager

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

****SUMMARY REPORT*****

12/16/96

Company: Brown and Caldwell
Site: Hobbs, NM
Project No: 2832.12
Project: Hobbs

ANALYTICAL DATA
NOTE: ND - Not Detected

SPL ID MATRIX	CLIENT ID DATE SAMPLED	BENZENE PQL	TOLUENE PQL	ETHYLBENZ. PQL	XYLENE PQL	TPH-G PQL	TPH-D PQL	LEAD	MTBE
9612131-01 WATER	MW-8 12/02/96 19:00:00	ND 1.0µg/L	ND 1.0µg/L	ND 1.0µg/L	ND 1.0µg/L	ND 0.1mg/L	ND 0.1mg/L		
9612131-02 WATER	MW-7 12/02/96 19:10:00	ND 1.0µg/L	ND 1.0µg/L	ND 1.0µg/L	ND 1.0µg/L	ND 0.1mg/L	ND 0.1mg/L		
9612131-03 WATER	MW-5 12/02/96 19:20:00	ND 1.0µg/L	ND 1.0µg/L	ND 1.0µg/L	ND 1.0µg/L	ND 0.1mg/L	ND 0.1mg/L		
9612131-04 WATER	MW-6 12/02/96 19:30:00	ND 1.0µg/L	ND 1.0µg/L	ND 1.0µg/L	1.7 1.0µg/L	ND 0.1mg/L	5.6 0.1mg/L		
9612131-05 WATER	MW-9 12/02/96 19:40:00	61 25µg/L	ND 25µg/L	ND 25µg/L	210 25µg/L	2.8 2mg/L	2.6 0.1mg/L		
9612131-06 WATER	MW-11 12/02/96 19:50:00	970 5.0µg/L	ND 5.0µg/L	6.0 5.0µg/L	8.1 5.0µg/L	2.0 0.1mg/L	1.3 0.1mg/L		
9612131-07 WATER	MW-10 12/02/96 20:00:00	280 1.0µg/L	1.3 1.0µg/L	17 1.0µg/L	8.0 1.0µg/L	0.97 0.1mg/L	0.94 0.1mg/L		
9612131-08 WATER	MW-3 12/02/96 20:10:00	220 25µg/L	1800 25µg/L	670 25µg/L	1000 25µg/L	7.4 2mg/L	0.89 0.1mg/L		
9612131-09 WATER	MW-1 12/02/96 20:20:00	5600 500µg/L	9600 500µg/L	2100 500µg/L	9600 500µg/L	64 50mg/L	100 5mg/L		
9612131-10 WATER	MW-4 12/02/96 20:30:00	ND 250µg/L	2000 250µg/L	1800 250µg/L	7200 250µg/L	43 20mg/L	56 0.1mg/L		
9612131-11 WATER	2832 12/02/96	86 1.0µg/L	13 1.0µg/L	2.4 1.0µg/L	270 1.0µg/L	2.9 1mg/L	3.7 0.5mg/L		

BTEX - METHOD 5030/8020 ***
TPH-G - Modified 8015 - Gasoline
TPH-D - Mod. 8015 - Diesel

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

****SUMMARY REPORT****

12/16/96

Company: Brown and Caldwell
Site: Hobbs, NM
Project No: 2832.12
Project: Hobbs

ANALYTICAL DATA
NOTE: ND - Not Detected

SPL ID MATRIX	CLIENT ID DATE SAMPLED	BENZENE PQL	TOLUENE PQL	ETHYLBENZ. PQL	XYLENE PQL	TPH-G PQL	TPH-D PQL	LEAD	MTBE
9612131-12 AIR	EFFLUENT-1 12/02/96 18:45:00	ND 1.0ppm	ND 1.0ppm	ND 1.0ppm	ND 1.0ppm				
9612131-13 WATER	Trip Blank 12/02/96	ND 1.0µg/L	ND 1.0µg/L	ND 1.0µg/L	ND 1.0µg/L				

BTEX - METHOD 5030/8020 (Modified)***

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

Certificate of Analysis No. H9-9612131-09

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-1

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 20:20:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	5600	500 P	µg/L
TOLUENE	9600	500 P	µg/L
ETHYLBENZENE	2100	500 P	µg/L
TOTAL XYLENE	9600	500 P	µg/L
TOTAL BTEX	26900		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	80		
4-Bromofluorobenzene	93		
METHOD 5030/8020 ***			
Analyzed by: RL			
Date: 12/07/96			
Petroleum Hydrocarbons - Gasoline	64	50 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	73		
4-Bromofluorobenzene	73		
Modified 8015 - Gasoline			
Analyzed by: RL			
Date: 12/07/96			
Total Petroleum Hydrocarbons-Diesel	100	5 P	mg/L
Surrogate	**% Recovery**		
o-Terphenyl	140		

(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.

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

Certificate of Analysis No. H9-9612131-09

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-1

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 20:20:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
2-Fluorobiphenyl	595 «		
Mod. 8015 - Diesel			
Analyzed by: RR			
Date: 12/12/96 05:37:00			
Liquid-liquid extraction	12/06/96		
METHOD 3510B ***			
Analyzed by: SW			
Date: 12/06/96 11:00:00			

« - Recovery beyond control limits.

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.

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

Certificate of Analysis No. H9-9612131-08

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-3

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 20:10:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	220	25 P	µg/L
TOLUENE	1800	25 P	µg/L
ETHYLBENZENE	670	25 P	µg/L
TOTAL XYLENE	1000	25 P	µg/L
TOTAL BTEX	3690		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	84		
4-Bromofluorobenzene	96		
METHOD 5030/8020 ***			
Analyzed by: RL			
Date: 12/07/96			
Petroleum Hydrocarbons - Gasoline	7.4	2 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	75		
4-Bromofluorobenzene	68		
Modified 8015 - Gasoline			
Analyzed by: RL			
Date: 12/07/96			
Total Petroleum Hydrocarbons-Diesel	0.89	0.1 P	mg/L
Surrogate	**% Recovery**		
o-Terphenyl	117		
2-Fluorobiphenyl	79		
Mod. 8015 - Diesel			
Analyzed by: RR			
Date: 12/10/96 09:52:00			

(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.

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

Certificate of Analysis No. H9-9612131-08

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-3

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 20:10:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	12/06/96		
METHOD 3510B ***			
Analyzed by: SW			
Date: 12/06/96 11:00:00			

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.

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

Certificate of Analysis No. H9-9612131-10

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

DATE: 12/20/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-4

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 20:30:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	190 J	250 P	µg/L
TOLUENE	2000	250 P	µg/L
ETHYLBENZENE	1800	250 P	µg/L
TOTAL XYLENE	7200	250 P	µg/L
TOTAL BTEX	11000		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	81		
4-Bromofluorobenzene	99		
METHOD 5030/8020 ***			
Analyzed by: RL			
Date: 12/07/96			
Petroleum Hydrocarbons - Gasoline	43	20 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	75		
4-Bromofluorobenzene	67		
Modified 8015 - Gasoline			
Analyzed by: RL			
Date: 12/07/96			
Total Petroleum Hydrocarbons-Diesel	56	0.1 P	mg/L
Surrogate	**% Recovery**		
o-Terphenyl	121		

J - Defined in COMMENTS below. (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.

COMMENTS: J=Compound detected below the PQL.

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

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

Certificate of Analysis No. H9-9612131-10

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-4

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 20:30:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
2-Fluorobiphenyl	235 «		
Mod. 8015 - Diesel			
Analyzed by: RR			
Date: 12/10/96 11:23:00			
Liquid-liquid extraction	12/06/96		
METHOD 3510B ***			
Analyzed by: SW			
Date: 12/06/96 11:00:00			

« - Recovery beyond control limits.

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.

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

Certificate of Analysis No. H9-9612131-03

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-5

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 19:20:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	ND	1.0 P	µg/L
TOTAL XYLENE	ND	1.0 P	µg/L
TOTAL BTEX	ND		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	80		
4-Bromofluorobenzene	93		
METHOD 5030/8020 ***			
Analyzed by: RL			
Date: 12/06/96			
Petroleum Hydrocarbons - Gasoline	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	77		
4-Bromofluorobenzene	93		
Modified 8015 - Gasoline			
Analyzed by: RL			
Date: 12/06/96			
Total Petroleum Hydrocarbons-Diesel	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
o-Terphenyl	110		
2-Fluorobiphenyl	76		
Mod. 8015 - Diesel			
Analyzed by: RR			
Date: 12/10/96 06:50:00			

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.

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

Certificate of Analysis No. H9-9612131-03

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-5

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 19:20:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	12/06/96		
METHOD 3510B ***			
Analyzed by: SW			
Date: 12/06/96 11:00:00			

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.

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

Certificate of Analysis No. H9-9612131-04

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-6

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 19:30:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	ND	1.0 P	µg/L
TOTAL XYLENE	1.7	1.0 P	µg/L
TOTAL BTEX	1.7		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	77		
4-Bromofluorobenzene	87		
METHOD 5030/8020 ***			
Analyzed by: RL			
Date: 12/06/96			
Petroleum Hydrocarbons - Gasoline	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	80		
4-Bromofluorobenzene	83		
Modified 8015 - Gasoline			
Analyzed by: RL			
Date: 12/06/96			
Total Petroleum Hydrocarbons-Diesel	5.6	0.1 P	mg/L
Surrogate	**% Recovery**		
o-Terphenyl	127		
2-Fluorobiphenyl	104		
Mod. 8015 - Diesel			
Analyzed by: RR			
Date: 12/10/96 07:36:00			

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.

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

Certificate of Analysis No. H9-9612131-04

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-6

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 19:30:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	12/06/96		
METHOD 3510B ***			
Analyzed by: SW			
Date: 12/06/96 11:00:00			

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.

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

Certificate of Analysis No. H9-9612131-02

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-7

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 19:10:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	ND	1.0 P	µg/L
TOTAL XYLENE	ND	1.0 P	µg/L
TOTAL BTEX	ND		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	80		
4-Bromofluorobenzene	90		
METHOD 5030/8020 ***			
Analyzed by: HS			
Date: 12/06/96			
Petroleum Hydrocarbons - Gasoline	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	70		
4-Bromofluorobenzene	60		
Modified 8015 - Gasoline			
Analyzed by: HS			
Date: 12/06/96			
Total Petroleum Hydrocarbons-Diesel	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
o-Terphenyl	100		
2-Fluorobiphenyl	71		
Mod. 8015 - Diesel			
Analyzed by: RR			
Date: 12/11/96 03:55:00			

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.

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

Certificate of Analysis No. H9-9612131-02

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-7

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 19:10:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	12/06/96		
METHOD 3510B ***			
Analyzed by: SW			
Date: 12/06/96 11:00:00			

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.

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

Certificate of Analysis No. H9-9612131-01

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-8

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 19:00:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	ND	1.0 P	µg/L
TOTAL XYLENE	ND	1.0 P	µg/L
TOTAL BTEX	ND		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	80		
4-Bromofluorobenzene	90		
METHOD 5030/8020 ***			
Analyzed by: HS			
Date: 12/06/96			
Petroleum Hydrocarbons - Gasoline	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	73		
4-Bromofluorobenzene	90		
Modified 8015 - Gasoline			
Analyzed by: HS			
Date: 12/06/96			
Total Petroleum Hydrocarbons-Diesel	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
o-Terphenyl	117		
2-Fluorobiphenyl	76		
Mod. 8015 - Diesel			
Analyzed by: RR			
Date: 12/11/96 03:09:00			

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.

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

Certificate of Analysis No. H9-9612131-01

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-8

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 19:00:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	12/06/96		
METHOD 3510B ***			
Analyzed by: SW			
Date: 12/06/96 11:00:00			

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.

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

Certificate of Analysis No. H9-9612131-05

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-9

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 19:40:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	61	25 P	µg/L
TOLUENE	ND	25 P	µg/L
ETHYLBENZENE	ND	25 P	µg/L
TOTAL XYLENE	210	25 P	µg/L
TOTAL BTEX	271		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	80		
4-Bromofluorobenzene	99		
METHOD 5030/8020 ***			
Analyzed by: RL			
Date: 12/07/96			
Petroleum Hydrocarbons - Gasoline	2.8	2 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	72		
4-Bromofluorobenzene	61		
Modified 8015 - Gasoline			
Analyzed by: RL			
Date: 12/07/96			
Total Petroleum Hydrocarbons-Diesel	2.6	0.1 P	mg/L
Surrogate	**% Recovery**		
o-Terphenyl	103		
2-Fluorobiphenyl	69		
Mod. 8015 - Diesel			
Analyzed by: RR			
Date: 12/10/96 08:21:00			

(P) - Practical Quantitation Limit ND - Not detected.

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.

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

Certificate of Analysis No. H9-9612131-05

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-9

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 19:40:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	12/06/96		
METHOD 3510B ***			
Analyzed by: SW			
Date: 12/06/96 11:00:00			

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.

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

Certificate of Analysis No. H9-9612131-07

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-10

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 20:00:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	280	1.0 P	µg/L
TOLUENE	1.3	1.0 P	µg/L
ETHYLBENZENE	17	1.0 P	µg/L
TOTAL XYLENE	8.0	1.0 P	µg/L
TOTAL BTEX	306.3		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	77		
4-Bromofluorobenzene	123		
METHOD 5030/8020 ***			
Analyzed by: AA			
Date: 12/07/96			
Petroleum Hydrocarbons - Gasoline	0.97	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	97		
Modified 8015 - Gasoline			
Analyzed by: AA			
Date: 12/07/96			
Total Petroleum Hydrocarbons-Diesel	0.94	0.1 P	mg/L
Surrogate	**% Recovery**		
o-Terphenyl	110		
2-Fluorobiphenyl	74		
Mod. 8015 - Diesel			
Analyzed by: RR			
Date: 12/12/96 06:23:00			

(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.

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

Certificate of Analysis No. H9-9612131-07

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-10

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 20:00:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	12/06/96		
METHOD 3510B ***			
Analyzed by: SW			
Date: 12/06/96 11:00:00			

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.

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

Certificate of Analysis No. H9-9612131-06

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-11

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 19:50:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	970	5.0 P	µg/L
TOLUENE	ND	5.0 P	µg/L
ETHYLBENZENE	6.0	5.0 P	µg/L
TOTAL XYLENE	8.1	5.0 P	µg/L
TOTAL BTEX	984.1		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	107		
4-Bromofluorobenzene	87		
METHOD 5030/8020 ***			
Analyzed by: VHZ			
Date: 12/08/96			
Petroleum Hydrocarbons - Gasoline	2.0	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	107		
4-Bromofluorobenzene	117		
Modified 8015 - Gasoline			
Analyzed by: RL			
Date: 12/07/96			
Total Petroleum Hydrocarbons-Diesel	1.3	0.1 P	mg/L
Surrogate	**% Recovery**		
o-Terphenyl	115		
2-Fluorobiphenyl	109		
Mod. 8015 - Diesel			
Analyzed by: RR			
Date: 12/10/96 03:48:00			

(P) - Practical Quantitation Limit ND - Not detected.

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.

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

Certificate of Analysis No. H9-9612131-06

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-11

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96 19:50:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	12/06/96		
METHOD 3510B ***			
Analyzed by: SW			
Date: 12/06/96 11:00:00			

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.

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

Certificate of Analysis No. H9-9612131-11

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: 2832

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	86	1.0 P	µg/L
TOLUENE	13	1.0 P	µg/L
ETHYLBENZENE	2.4	1.0 P	µg/L
TOTAL XYLENE	270	1.0 P	µg/L
TOTAL BTEX	371.4		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	90		
4-Bromofluorobenzene	200 «		
METHOD 5030/8020 ***			
Analyzed by: AA			
Date: 12/08/96			
Petroleum Hydrocarbons - Gasoline	2.9	1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	73		
4-Bromofluorobenzene	147		
Modified 8015 - Gasoline			
Analyzed by: RL			
Date: 12/07/96			
Total Petroleum Hydrocarbons-Diesel	3.7	0.5 P	mg/L
Surrogate	**% Recovery**		
o-Terphenyl	128		
2-Fluorobiphenyl	91		
Mod. 8015 - Diesel			
Analyzed by: RR			
Date: 12/12/96 04:52:00			

(P) - Practical Quantitation Limit « - Recovery beyond control limits.

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.

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

Certificate of Analysis No. H9-9612131-11

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: 2832

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	12/06/96		
METHOD 3510B ***			
Analyzed by: SW			
Date: 12/06/96 11:00:00			

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

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

** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020***

Matrix: Aqueous
Units: µg/L

Batch Id: HP_S961207114600

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50.0	44	88.0	62 - 121
Toluene	ND	50.0	47	94.0	66 - 136
EthylBenzene	ND	50.0	49	98.0	70 - 136
O Xylene	ND	50.0	48	96.0	74 - 134
M & P Xylene	ND	100.0	100	100	77 - 140

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
BENZENE	ND	20.0	17	85.0	17	85.0	0	25	39 - 150
TOLUENE	ND	20.0	15	75.0	14	70.0	6.90	26	56 - 134
ETHYLBENZENE	ND	20.0	16	80.0	16	80.0	0	38	61 - 128
O XYLENE	ND	20.0	17	85.0	17	85.0	0	29	40 - 130
M & P XYLENE	ND	40.0	34	85.0	33	82.5	2.99	20	43 - 152

Analyst: AA
Sequence Date: 12/07/96
SPL ID of sample spiked: 9612388-01A
Sample File ID: SSL6159.TX0
Method Blank File ID:
Blank Spike File ID: SSL6148.TX0
Matrix Spike File ID: SSL6154.TX0
Matrix Spike Duplicate File ID: SSL6155.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>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (3rd Q '95)
(***) = Source: SPL-Houston Historical Data (4th Q '94)

SAMPLES IN BATCH(SPL ID): 9612131-11A 9612183-05A 9612168-02A 9612298-01A 9612407-01A 9612168-04A 9612131-06A 9612247-04A 9612168-01A

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PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020***

Matrix: Aqueous
Units: µg/L

Batch Id: HP_S961206200600

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	47.7	95.4	62 - 121
Toluene	ND	150	161.3	108	66 - 136
EthylBenzene	ND	50	48.8	97.6	70 - 136
O Xylene	ND	100	101.3	101	74 - 134
M & P Xylene	ND	200	198.3	99.2	77 - 140

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
BENZENE	ND	50	44	88.0	45	90.0	2.25	25	39 - 150
TOLUENE	ND	150	150	100	150	100	0	26	56 - 134
ETHYLBENZENE	ND	50	45	90.0	46	92.0	2.20	38	61 - 128
O XYLENE	ND	100	91	91.0	94	94.0	3.24	29	40 - 130
M & P XYLENE	ND	100	95	95.0	96	96.0	1.05	20	43 - 152

Analyst: RL
Sequence Date: 12/06/96
SPL ID of sample spiked: 9612156-02A
Sample File ID: SSL6120A.TX0
Method Blank File ID:
Blank Spike File ID: SSL6113A.TX0
Matrix Spike File ID: SSL6116A.TX0
Matrix Spike Duplicate File ID: SSL6117A.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>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (3rd Q '95)
(***) = Source: SPL-Houston Historical Data (4th Q '94)

SAMPLES IN BATCH(SPL ID):

9612131-05A 9612131-08A 9612131-09A 9612131-10A
9612258-01A 9612183-01A 9612156-01A 9612183-06A
9612297-01A 9612299-01A 9612121-02A 9612167-02A
9612131-07A 9612156-03A 9612156-02A 9612131-04A

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** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020***

Matrix: Aqueous
Units: µg/L

Batch Id: HP_S961205124900

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	45	90.0	62 - 121
Toluene	ND	150	150	100	66 - 136
EthylBenzene	ND	50	45	90.0	70 - 136
O Xylene	ND	100	94	94.0	74 - 134
M & P Xylene	ND	200	180	90.0	77 - 140

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
BENZENE	ND	50	53	106	54	108	1.87	25	39 - 150
TOLUENE	ND	150	180	120	170	113	6.01	26	56 - 134
ETHYLBENZENE	ND	50	52	104	52	104	0	38	61 - 128
O XYLENE	ND	100	110	110	110	110	0	29	40 - 130
M & P XYLENE	ND	100	110	110	110	110	0	20	43 - 152

Analyst: HS
Sequence Date: 12/05/96
SPL ID of sample spiked: 9612154-01A
Sample File ID: SSL6127.TX0
Method Blank File ID:
Blank Spike File ID: SSL6118.TX0
Matrix Spike File ID: SSL6121.TX0
Matrix Spike Duplicate File ID: SSL6122.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>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (3rd Q '95)
(***) = Source: SPL-Houston Historical Data (4th Q '94)

SAMPLES IN BATCH(SPL ID):

9612161-03A 9612154-01A 9612178-02A 9612161-01A
9612147-02A 9611C36-03A 9612131-13A 9612183-08A
9612157-01A 9612131-03A 9612154-02A 9612147-01A
9612161-02A 9612131-01A 9612131-02A 9612147-03A
9612154-03A

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** SPL BATCH QUALITY CONTROL REPORT **
Modified 8015 - Gasoline

Matrix: Aqueous
Units: mg/L

Batch Id: HP_S961205124910

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Gasoline Petr. Hydrocarbon	ND	1.0	0.97	97.0	56 - 130

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
GASOLINE PETR. HYDROCARBON	ND	0.9	0.95	106	0.92	102	3.85	22	37 - 169

Analyst: HS
Sequence Date: 12/05/96
SPL ID of sample spiked: 9612154-01A
Sample File ID: S_L6127.TX0
Method Blank File ID:
Blank Spike File ID: S_L6118.TX0
Matrix Spike File ID: S_L6121.TX0
Matrix Spike Duplicate File ID: S_L6122.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>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical data (3rd Q '95)
(***) = Source: SPL-Houston Historical Data (3rd Q '95)

SAMPLES IN BATCH(SPL ID):

9612161-03A 9612154-01A 9612161-01A 9612147-02A
9612131-01A 9612131-03A 9612154-02A 9612147-01A
9612161-02A 9612131-02A 9612147-03A 9612154-03A

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** SPL BATCH QUALITY CONTROL REPORT **
Modified 8015 - Gasoline

Matrix: Aqueous
Units: mg/L

Batch Id: HP_S961206200610

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Gasoline Petr. Hydrocarbon	ND	1.0	1.0	100	56 - 130

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
GASOLINE PETR. HYDROCARBON	ND	0.9	0.83	92.2	0.85	94.4	2.36	22	37 - 169

Analyst: RL
Sequence Date: 12/06/96
SPL ID of sample spiked: 9612156-02A
Sample File ID: S_L6151.TX0
Method Blank File ID:
Blank Spike File ID: S_L6144.TX0
Matrix Spike File ID: S_L6147.TX0
Matrix Spike Duplicate File ID: S_L6148.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>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical data (3rd Q '95)
(***) = Source: SPL-Houston Historical Data (3rd Q '95)

SAMPLES IN BATCH(SPL ID): 9612131-07A 9612156-02A 9612131-04A 9612131-05A 9612131-06A 9612131-08A 9612131-09A 9612131-10A 9612131-11A

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** SPL BATCH QUALITY CONTROL REPORT **

Mod. 8015 - Diesel

Matrix: Aqueous
Units: mg/L

Batch Id: HP_T961210023002

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Diesel Petr. Hydrocarbons	ND	5.0	5.88	118	20 - 130

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
DIESEL PETR. HYDROCARBONS	1.33	5.0	6.21	97.6	6.59	105	7.31	43	20 - 177

Analyst: RR
Sequence Date: 12/10/96
SPL ID of sample spiked: 9612131-06B
Sample File ID: T_I6833.TX0
Method Blank File ID:
Blank Spike File ID: TTI6858.TX0
Matrix Spike File ID: T_I6834.TX0
Matrix Spike Duplicate File ID: T_I6835.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>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (2nd Q '94)
(***) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID):

9612131-03B 9612131-04B 9612131-05B 9612131-08B
9612131-10B 9612131-01B 9612131-02B 9612131-07B
9612161-02B 9612131-11B 9612131-09B 9612161-01B
9612131-06B

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** SPL BATCH QUALITY CONTROL REPORT **
Mod. 8015 - Diesel

Matrix: Aqueous
Units: mg/L

Batch Id: HP_T961209124100

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Diesel Petr. Hydrocarbons	ND	5.0	5.31	106	20 - 130

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
DIESEL PETR. HYDROCARBONS	1.33	5.0	6.21	97.6	6.59	105	7.31	43	20 - 177

Analyst: RR
Sequence Date: 12/10/96
SPL ID of sample spiked: 9612131-06B
Sample File ID: T_I6833.TX0
Method Blank File ID:
Blank Spike File ID: TTI6857.TX0
Matrix Spike File ID: T_I6834.TX0
Matrix Spike Duplicate File ID: T_I6835.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>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (2nd Q '94)
(***) = Source: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID): 9612234-01B 9612292-11C 9612340-12B 9612340-14A 9612292-10C 9612234-02B 9612131-06B

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 96-12-131

H- 11227

page ___ of ___

Client Name: Brown and Caldwell

Address/Phone: 1415 Louisiana Ste 2500

Client Contact: Myna Denhart

Project Name: Hobbs

Project Number: 2832.12

Project Location: Hobbs, NM.

Invoice To: BC

SAMPLE ID	DATE	TIME	comp	grab	matrix (W=water SL=sludge S=soil O=other:)	bottle (P=plastic G=glass A=amber glass V=vial)	size (1=1 liter 8=8oz 4=4oz 16=16oz 40=vial)	pres. (1=HCl 3=H2SO4 2=HNO3 O=other:)	Number of Containers	Requested Analysis: BTEX (8020)	TPH - GRO (8015)	TPH - DRO (8015)
mw-8	12/2/96	1900		X	W	G	1/4	1	5	X	X	X
mw-7		1910										
mw-5		1920										
mw-6		1930										
mw-9		1940										
mw-11		1950										
mw-10		2000										
mw-3		2010										
mw-1		2020										
mw-4		2030										

PH = 12 4/96 ST

Client/Consultant Remarks:

Laboratory remarks:

Intact? ☑ Y ☐ N

Temp: 4° C Ice

Requested TAT

24hr ☐ 72hr ☐

48hr ☐ Standard ☒

Other ☐ _____

Special Reporting Requirements: Fax Results ☐ Raw Data ☐ Standard QC ☐ Level 3 QC ☐ Level 4 QC ☐

Special Detection Limits (specify):

PM review (initial):

	date	time		date	time
1. Relinquished by Sampler:	12/2/96	2100	2. Received by:	12/4/96	@ 0930
3. Relinquished by:			4. Received by:		
5. Relinquished by:			6. Received by Laboratory:		

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

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

☐ 1511 E. Orangethorpe Avenue, Fullerton, CA 92631 (714) 447-6868

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 96-12-131

H- 11226

page ___ of ___

Client Name: Brown and Caldwell

Address/Phone: 1415 Louisiana Ste 2500

Client Contact: Myra Dunbar

Project Name: Hobbs

Project Number: 2832-12

Project Location: Hobbs, NM.

Invoice To: BC

SAMPLE ID	DATE	TIME	comp	grab	matrix (W=water SL=sludge S=soil O=other:)	bottle (P=plastic G=glass A=amber glass V=vial)	size (1=1 liter 4=4oz 8=8oz 16=16oz 40=vial)	pres. (1=HCl 2=HNO3 3=H2SO4 O=other:)	Number of Containers	Requested Analysis: BTEX (8020)	TPH - GRO (8015)	TPH - DRO (8015)	BTEX (4030/8020)	TPH (8015)	TPH (8015)			
2832	12/2/96	—		X	W	G	1/4	1	5	X	X	X						
EFFLUENT-1	↓	1845		X	O	P	Bag	—	1	~~X~~ SP			X		X			
TRIP BLANK	↓	—	—	—	W	V	4	1	2	X								

Client/Consultant Remarks:

* Contact Myra Dunbar if needed.

Laboratory remarks:

Intact? ☑ Y ☐ N

Temp: 4°C ice

Requested TAT

24hr ☐ 72hr ☐

48hr ☐ Standard ☒

Other ☐ _____

Special Reporting Requirements: Fax Results ☐ Raw Data ☐ Standard QC ☐ Level 3 QC ☐ Level 4 QC ☐

Special Detection Limits (specify):

PM review (initial):

	date	time		date	time
1. Relinquished by Sampler:	12/2/96	2100	2. Received by:	12/4/96	@ 0930
3. Relinquished by:	date	time	4. Received by:		
5. Relinquished by:	date	time	6. Received by Laboratory:		

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SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
12-4-96	0930

SPL Sample ID:
96-12-131

			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:		4° C	
10	Method of sample delivery to SPL:	SPL Delivery		
		Client Delivery		
		FedEx Delivery (airbill #)	914 5940 501 914 5940 517	
		Other:	828674270 4	
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name:	Date:
[signature]	12-4-96

C

APPENDIX C

LABORATORY ANALYTICAL REPORTS
AIR SAMPLES

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

Certificate of Analysis No. H9-9612131-12

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: EFFLUENT-1

PROJECT NO: 2832.12
MATRIX: AIR
DATE SAMPLED: 12/02/96 18:45:00
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	ppm
TOLUENE	ND	1.0 P	ppm
ETHYLBENZENE	ND	1.0 P	ppm
TOTAL XYLENE	ND	1.0 P	ppm
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		ppm
METHOD 5030/8020 (Modified)***			
Analyzed by: SLB			
Date: 12/05/96			
Total Petroleum Hydrocarbons	ND	5	ppm
Method Modified 8015A Air***			
Analyzed by: DAO			
Date: 12/05/96 07:38:00			

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.

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HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9612131-13

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

DATE: 12/16/96

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: Trip Blank

PROJECT NO: 2832.12
MATRIX: WATER
DATE SAMPLED: 12/02/96
DATE RECEIVED: 12/04/96

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	ND	1.0 P	µg/L
TOTAL XYLENE	ND	1.0 P	µg/L
TOTAL BTEX	ND		µg/L

Surrogate	% Recovery
1,4-Difluorobenzene	80
4-Bromofluorobenzene	93

METHOD 5030/8020 ***
Analyzed by: HS
Date: 12/06/96

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.

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8880 INTERCHANGE DR
HOUSTON, TEXAS 77
PHONE (713) 660-090

Matrix: Air
Units: ppm

Batch Id: HP_P961203094301

BLANK SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(**) (Advisory) RPD Max.	QC Limits(**) (Advisory) Recovery Range
MTBE	ND	100.0	90	90.0	91	91.0	1.10	30	20 - 150
BENZENE	ND	20.0	16	80.0	15	75.0	6.45	30	20 - 150
TOLUENE	ND	20.0	13	65.0	13	65.0	0	30	20 - 150
ETHYLBENZENE	ND	20.0	13	65.0	12	60.0	8.00	30	20 - 150
O XYLENE	ND	20.0	13	65.0	13	65.0	0	30	20 - 150
M & P XYLENE	ND	40.0	12	30.0	12	30.0	0	30	20 - 150

Analyst: AA
Sequence Date: 12/03/96
Method Blank File ID:
Sample File ID:
Blank Spike File ID: P_L6007.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):

9612174-01A 9612097-01A 9612131-12A 9612230-01A
9612263-01A 9612263-02A 9612341-01A 9612341-02A
9612395-01A

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PHONE (713) 660-0901

** SPL BATCH QUALITY CONTROL REPORT ** PAGE

METHOD 8015 (Modified)

Matrix: Air

Batch Id: HP_P961204021900

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 Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(**) (Advisory) RPD Max.	QC Limits(**) (Advisory) Recovery Range
TPHAIR	ND	200	114	57.0	99	49.5	14.1	30	20 - 150

Analyst: AA

Sequence Date: 12/04/96

Method Blank File ID:

Sample File ID:

Blank Spike File ID: PPL6007.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): 9611230-01A 9612341-01A 9612341-02A 9612395-01A 9612077-01A 9612174-01A 9612077-01A 9612131-01A

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

** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020***

Matrix: Air
Units: ppm

Batch Id: HP_P961203094301

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
MTBE	ND	50	45	90.0	20 - 150
Benzene	ND	50	48	96.0	20 - 150
Toluene	ND	50	47	94.0	20 - 150
EthylBenzene	ND	50	49	98.0	20 - 150
O Xylene	ND	50	49	98.0	20 - 150
M & P Xylene	ND	100	100	100	20 - 150

Analyst: AA
Sequence Date: 12/03/96
SPL ID of sample spiked: LCS_50
Sample File ID:
Method Blank File ID:
Blank Spike File ID: P_L6002.TX0
Matrix Spike File ID:
Matrix Spike Duplicate File ID: P_L6002.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>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: Temporary Limits
(***) = Source: Temporary Limits

SAMPLES IN BATCH(SPL ID): 9612174-01A 9612097-01A 9612131-12A 9612230-01A 9612263-01A 9612263-02A 9612341-01A 9612341-02A 9612395-01A

BROWN AND CALDWELL

FINAL

MARCH 1997 GROUNDWATER SAMPLING REPORT HOBBS, NEW MEXICO FACILITY

BJ SERVICES COMPANY, U.S.A.

SEPTEMBER 10, 1997

FINAL
MARCH 1997 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: 2832.12

Alan Hopkins, P.G.
Geoscientist
Certified Scientist #066

September 10, 1997

Brown and Caldwell
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Houston, Texas 77002 - (713) 759-0999

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CONTENTS

1.0 INTRODUCTION

Brown and Caldwell conducted field activities associated with the March 1997 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 in Figure 1.

The facility formerly operated an above-grade on-site fueling system. Subsurface impact near the fueling system from a diesel fuel release 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. As the result of the diesel fuel release, the New Mexico OCD has required a quarterly groundwater monitoring program to assess the hydrocarbon constituents in the groundwater. A biosparging system was fully activated in November 1995 to remediate soil and groundwater at the facility. A site chronology detailing the history of the fueling system, the installation and operation the biosparging system, and the previous sampling events is presented on Table 1.

During the March 1997 sampling event, groundwater samples were collected and analyzed for gasoline and diesel range total petroleum hydrocarbons (TPH), and for benzene, toluene, ethylbenzene, and total xylene (BTEX). This report presents the results of the groundwater sampling event conducted for BJ Services, a description of the field activities, and a summary of the analytical results. Also included is a groundwater potentiometric surface map, a benzene concentration map, and a hydrocarbon distribution map. On April 10, 1997, a survey was conducted to determine the top of casing elevations relative to mean sea level (MSL) and the state plane coordinates of the 10 monitor wells at the site. The survey data has been used to update the applicable maps and tables presented in this report.

2.0 GROUNDWATER SAMPLING AND ANALYSES

On March 12, 1997 Brown and Caldwell purged and sampled the groundwater monitoring wells to determine concentrations of dissolved-phase hydrocarbons in groundwater at the facility. The following subsections describe the activities conducted during this sampling event.

2.1 Groundwater Measurements and Sampling

Ten monitoring wells were sampled during the March 1997 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 the 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 east-northeast with a hydraulic gradient of 0.006 ft/ft. A potentiometric surface map is presented in Figure 2. Phase-separated hydrocarbons were detected in monitoring wells MW-1 (0.27 ft), MW-4 (0.05 ft), and MW-9 (0.05 ft), during this sampling event. The phase-separated hydrocarbons present in these wells were removed from the wells during monitoring well purging activities and were placed into a salvage drum at the site and held on-site until collected by a licensed disposal company for off-site disposal.

Groundwater samples were collected from the monitoring wells on March 12, 1997. The samples were collected after purging the wells with a submersible pump to remove at least three well volumes of groundwater. 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.

Additional groundwater parameters were measured during the purging and sampling activities to assess the potential for natural attenuation. These parameters were dissolved oxygen, dissolved ferrous iron, and reduction-oxidation potential (redox). The field parameter readings were recorded in the field log book and are listed on the groundwater sampling forms included in Appendix A. The field screening results for groundwater samples are presented on Table 3.

Following recovery, 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 the analytical laboratory. Each cooler was accompanied by completed chain-of-custody documentation.

The field measurement equipment was decontaminated prior to and after each use. Decontamination procedures consisted of washing with fresh water and a non-phosphate detergent and rinsing with deionized (DI) water. Purged water and excess water generated by equipment cleaning operations were 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 5030/8020 and for TPH by EPA Method 8015 Modified for gasoline and diesel.

BTEX constituent concentrations in excess of applicable laboratory detection limits were reported in 8 of the 10 groundwater samples obtained during this sampling event. Current and cumulative analytical results for BTEX and TPH gasoline and diesel are presented in Table 4. Benzene

concentrations are below the New Mexico Water Quality Control Commission Standard of 0.01 mg/L in monitor wells MW-5, MW-7, and MW-8. Figure 3 presents a benzene isoconcentration and total BTEX distribution map for the March 1997 sampling event. A total petroleum hydrocarbons distribution map for the March 1997 sampling event is presented in Figure 4. The laboratory analytical report and chain of custody record for the groundwater samples are included in Appendix B.

A total BTEX assimilative capacity for the site of 35,760 micrograms per liter (µg/L) was calculated based on background levels of electron acceptors measured at the facility during the August 1996 sampling event. This assimilative capacity exceeds the maximum BTEX concentration measured during the March 1997 sampling event of 26,000 ug/L in MW-1. Therefore, it appears that there are adequate electron acceptors present to degrade even the most concentrated portion of the BTEX plume at the site.

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

The New Mexico OCD approved the RAP on August 11, 1994. The installation of the biosparging system was conducted between August 2 through 24, 1995. Nineteen combined injection/extraction wells, three vacuum extraction wells, associated piping, and one extraction blower and one injection blower were installed. 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. Additional data pertaining to the system operation parameters and emission rates was required and was 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, effluent air samples were collected on a monthly basis from the recovered vapors to monitor the bioremediation process and emission rate. Upon receiving approval from the State of New Mexico that an air permit is not required, effluent air samples have been collected on a quarterly basis. The air samples are analyzed for TPH using EPA Method Modified 8015A (Air) and for total volatile aromatic hydrocarbons (BTEX) using EPA Method 5030/8020 (modified). The analytical results demonstrate a significant reduction in hydrocarbon vapor concentrations since November 1995. Total BTEX concentrations have decreased from 391 part per million by volume (ppmv) to 36.7 ppmv. TPH concentrations have decreased from 1,870 ppmv to 250 ppmv. A cumulative summary of analytical results for air emissions testing is included on Table 5. The laboratory analytical report and chain-of-custody documentation for the air sample are included in Appendix C.

During the December 1996 monitoring event, the total BTEX and TPH concentrations were below applicable detection limits of 1 ppmv and 5 ppmv, respectively. These low values are believed to be the result of bleeding of ambient air created by a crack in the 4-inch, above-grade, extraction piping located adjacent to well AV-7. Interviews with site personnel indicated that the damage was attributed to construction activity which occurred in the area in November 1996. The pipe was repaired immediately after the discovery of the crack by Brown and Caldwell in December 1996, and a temporary concrete curb was placed adjacent to the above-grade piping at the west end of the property to prevent vehicles from damaging the pipe.

The vapor extraction system is currently operating at an average flow of 165 cubic feet per minute (cfm) at 100°F. The air injection system is operating at an average flow of 45 cfm at 4.5 pounds per square inch (psi) at 160°F. Total BTEX emissions of 0.001 pounds per hour (lb/hr) and TPH emissions of 0.06 lb/hr were calculated for the March 1997 monitoring event.

Review of data presented in Table 4 indicates that substantial reductions in benzene and total BTEX concentrations in groundwater from monitor wells MW-6, MW-10, and MW-11, located in

the downgradient portion of the plume, have occurred during the time period from the start-up of the biosparging system in November 1995 to the present.

During the March 1997 monitoring event, a soil boring was completed near the center of the former AST area. This location had been inaccessible during the installation of the biosparging system in November 1995. To accelerate remediation in this upgradient area of the plume, a soil vapor extraction well was installed in this boring. This soil vapor extraction well was designated as VE-4 and was connected to Lateral #4 of the biosparging system on April 10, 1997. Before connecting VE-4 to the biosparging system, air emissions were determined to be 300 ppmv in 150 cfm flow at 110 °F using a flame ionization detector (FID); the corresponding hydrocarbon emission rate was 0.65 lb/hr. After connecting VE-4 to the biosparging system for approximately 4 hours, the air emissions increased to 450 ppmv at a flow rate of 150 cfm at 110 °F; the corresponding hydrocarbon emission rate is 0.97 lb/hr. The increased hydrocarbon emission rate is well below the regulatory limit of 10 lb/hr. Therefore, the new vapor extraction well will be allowed to operate continuously.

4.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based on information obtained during the March 1997 quarterly groundwater sampling event.

4.1 Conclusions

- Groundwater flow is to the east-northeast with an average hydraulic gradient of 0.006 ft/ft.
- Current analytical results indicate reductions in benzene concentrations in monitor wells MW-10 and MW-11 relative to those detected in the December 1996 sampling event. BTEX constituent concentrations have generally decreased in monitor well MW-4 during the time period from December 1996 to March 1997; BTEX constituent concentrations have generally increased in monitor wells MW-3, MW-6, and MW-9 during this time period. These short term variations in BTEX concentrations are expected during operation of the biosparging system.
- An additional vapor extraction well, VE-4, was installed and connected to the vapor extraction system in April 1997. In addition, modifications to air injection and extraction rates have been made to increase the rate of degradation of BTEX hydrocarbons in the central portion of the plume.
- 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
March 1997 Groundwater Sampling Report
Hobbs, New Mexico

September 10, 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: BJ Services Company, U.S.A.
8701 New Trails Drive
The Woodlands, 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

1 copy to: Brown and Caldwell
Project File

QUALITY CONTROL REVIEWER

Robert N. Jennings, P.E.
Vice President

WAH:uak

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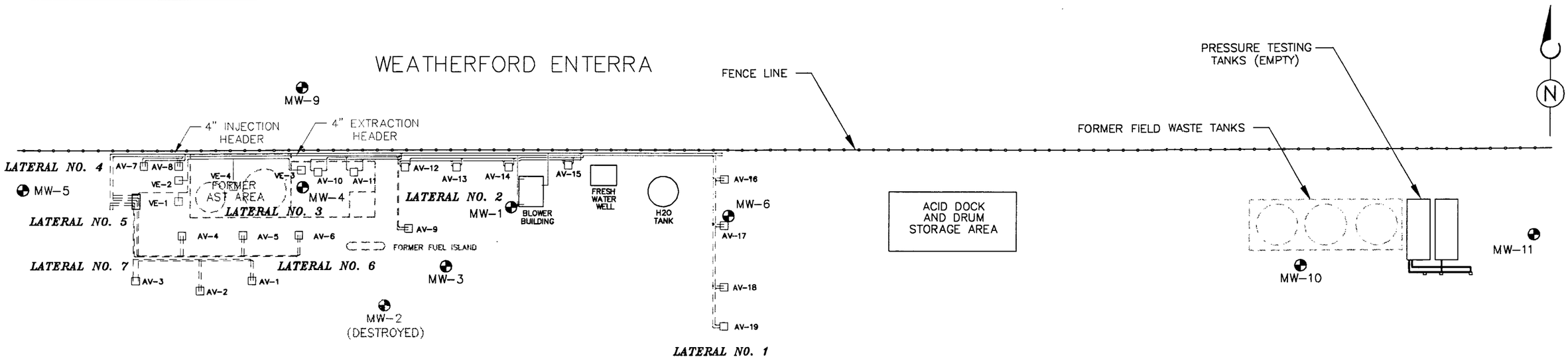
Figures

FIGURES

WEATHERFORD ENTERRA



T:\2832\NEWSURVY (1=30) 05-07-97 JEB

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

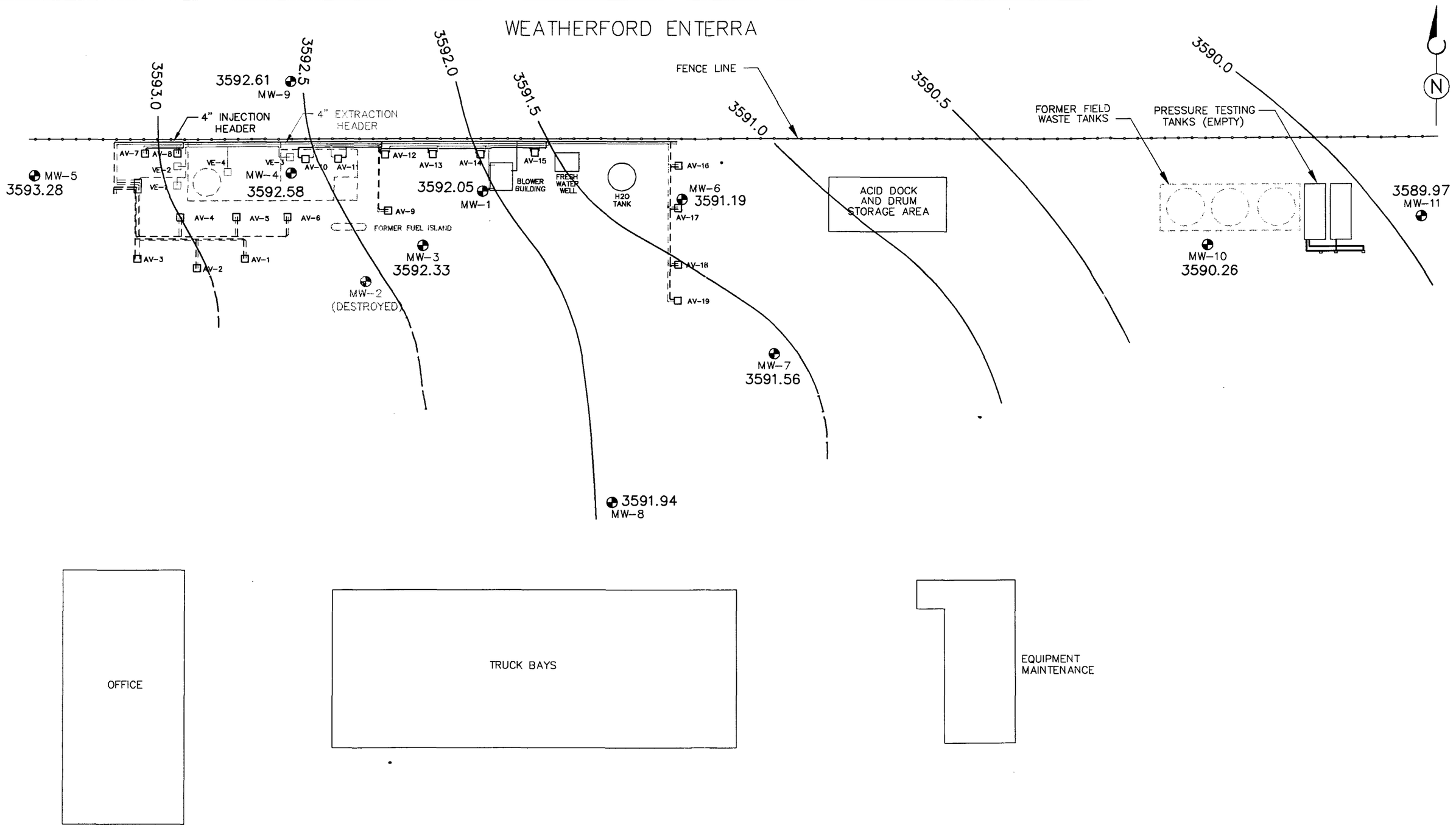
0 20 40
SCALE: 1" = 40'
DRAWN BY: JEB DATE 5/97
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

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	SITE MAP
DATE	05/07/97
CLIENT	BJ SERVICES COMPANY, U.S.A.
PROJECT NUMBER	2832-12
SITE	HOBBS, NEW MEXICO
FIGURE NUMBER	1

WEATHERFORD ENTERRA



T:\2832\POTN (1=30) 05-15-97 JEB

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

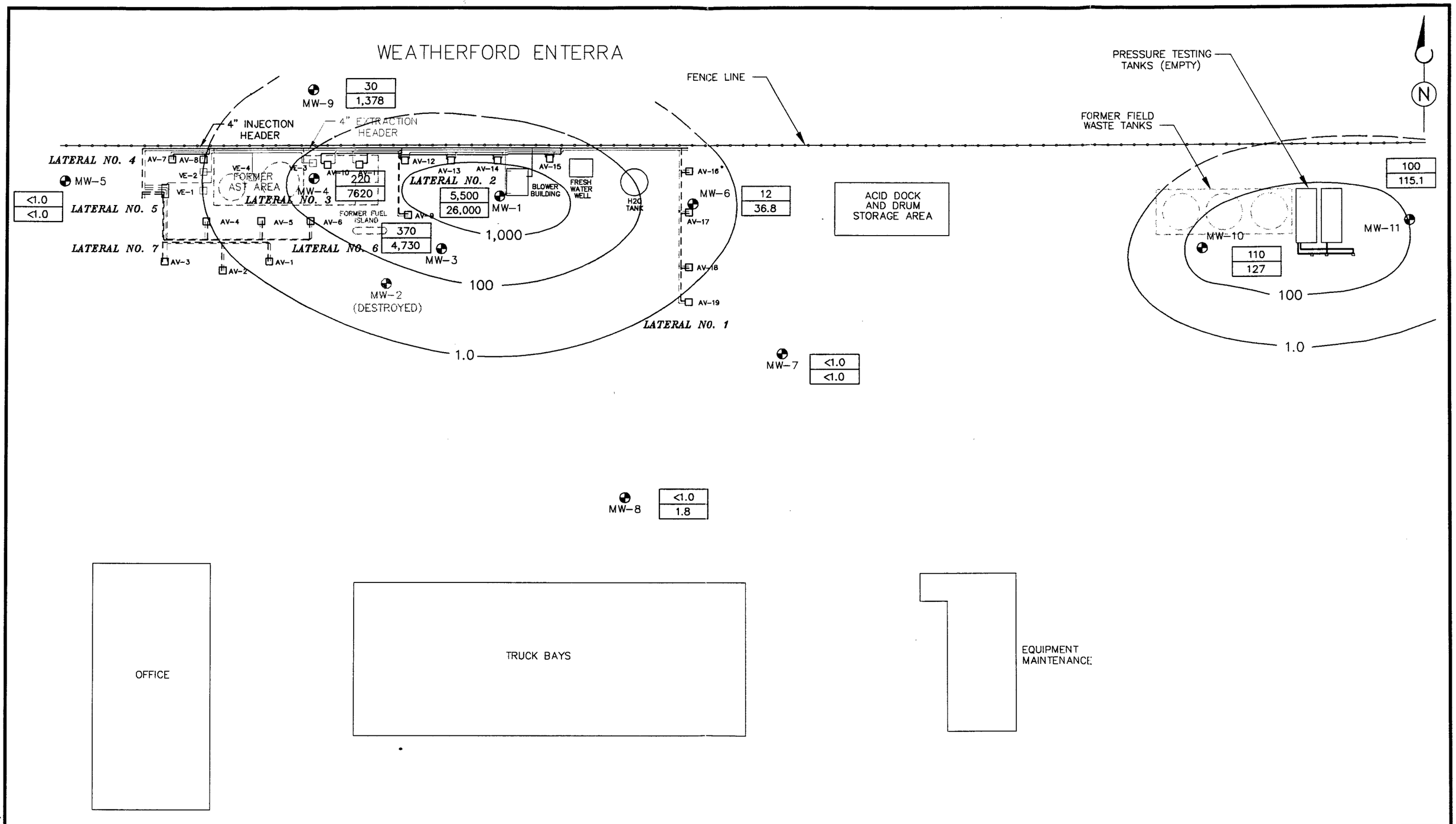
0 20 40
SCALE: 1" = 40'
DRAWN BY: JEB DATE 5/97
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-8 — MONITORING WELL LOCATION AND IDENTIFICATION
3592.33 — POTENTIOMETRIC SURFACE ELEVATION, FT.
3592.5 — POTENTIOMETRIC SURFACE CONTOUR, FT.

TITLE: POTENTIOMETRIC SURFACE MAP FOR MARCH 12, 1997	DATE: 05/15/97
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 2832-12
SITE: HOBBS, NEW MEXICO	FIGURE NUMBER: 2

WEATHERFORD ENTERRA



T:\2832\BENZ (1=30) 05-15-97 JEB

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

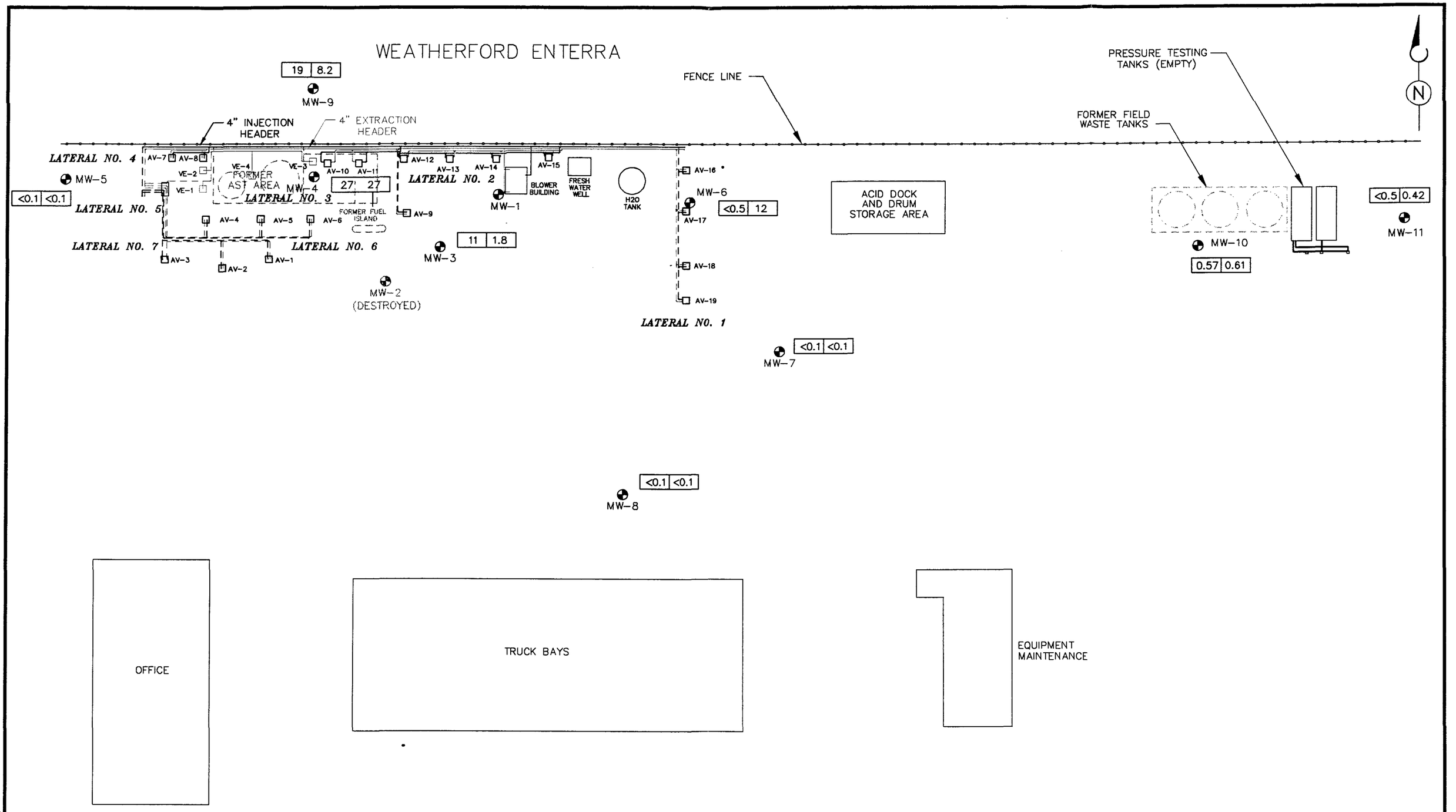
0 20 40
SCALE: 1" = 40'
DRAWN BY: JEB DATE 5/97
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

MW-8
220
7620
1.0

LEGEND
MONITORING WELL LOCATION AND IDENTIFICATION
BENZENE CONCENTRATION (ug/L)
TOTAL BTEX CONCENTRATION (ug/L)
BENZENE CONCENTRATION CONTOUR (ug/L) – MARCH 1997

TITLE: BENZENE ISOCONCENTRATION AND TOTAL BTEX DISTRIBUTION MAP FOR MARCH 12, 1997
DATE: 05/15/97
CLIENT: BJ SERVICES COMPANY, U.S.A.
PROJECT NUMBER: 2832-12
SITE: HOBBS, NEW MEXICO
FIGURE NUMBER: 3

WEATHERFORD ENTERRA



T:\2832\HYDROCB (1=30) 05-15-97 JEB

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 20 40
SCALE: 1" = 40'
DRAWN BY: JEB DATE 5/97
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-8 MONITORING WELL LOCATION AND IDENTIFICATION

11 | 1.8 TPH-G | TPH-D (ug/L)

TITLE	TOTAL PETROLEUM HYDROCARBONS DISTRIBUTION MAP FOR MARCH 12, 1997
CLIENT	BJ SERVICES COMPANY, U.S.A.
SITE	HOBBS, NEW MEXICO
DATE	05/15/97
PROJECT NUMBER	2832-12
FIGURE NUMBER	4

Tables

TABLES

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

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

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. submitted the tank tightness test report to Brown and Caldwell. The report indicated that both tanks and their associated piping passed.
August 16-19, 1993	Brown and Caldwell installed two additional downgradient monitoring wells. Brown and Caldwell sampled each of the existing monitoring and the newly installed monitoring wells.
January 26, 1994	Brown and Caldwell performed groundwater monitoring event; existing monitoring wells and the fresh water well were purged and sampled. Groundwater samples were analyzed for BTEX.
May 6, 1994	Remedial Action Plan (RAP) submitted to the OCD.
August 11, 1994	RAP approved by the OCD.
May 3, 1995	Brown and Caldwell conducted the May 1995 groundwater sampling event.
July 31, 1995	Brown and Caldwell conducted the July 1995 groundwater sampling event.
August 2-9, 1995	Installation of biosparging system was initiated. Nineteen combined injection/extraction wells and three vacuum extraction wells were installed.
August 14-26, 1995	Remedial Construction Services, Inc. (RCS) began construction of the biosparging system.
September 19, 1995	Began operation of the extraction portion of the biosparging system.
November 13, 1995	Began operation of the injection portion of the biosparging system.
November 14, 1995	Brown and Caldwell conducted the November 1995 groundwater sampling event.
February 23, 1996	Brown and Caldwell conducted the February 1996 groundwater sampling event.
May 31, 1996	Brown and Caldwell conducted the May 1996 groundwater sampling event.
August 23, 1996	Brown and Caldwell conducted the August 1996 groundwater sampling event.
December 2, 1996	Brown and Caldwell conducted the December 1996 groundwater sampling event.
March 12, 1997	Brown and Caldwell conducted the March 1997 groundwater sampling event.

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

Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-1						
	3,647.53	8/10/92	53.22	0.00	3,594.31	(1)
	3,647.53	2/9/93	53.03	0.00	3,594.50	
	3,647.53	8/18/93	53.10	0.00	3,594.43	
	3,647.53	1/26/94	53.31	0.00	3,594.22	
	3,647.53	5/3/95	54.64	0.20	3,593.05	
	3,647.53	7/31/95	54.14	0.00	3,593.39	
	3,647.53	11/14/95	53.69	0.00	3,593.84	
	3,647.53	2/23/96	54.32	0.00	3,593.21	
	3,647.53	5/31/96	54.14	0.00	3,593.39	
	3,647.53	8/23/96	56.17	0.00	3,591.36	
	3,647.53	12/2/96	55.27	0.00	3,592.26	
	3,647.53	3/12/97	55.70	0.27	3,592.05	(2)
MW-2						
	3,647.59	8/10/92	52.82	0.00	3,594.77	(1)
	3,644.84	2/9/93	49.60	0.00	3,595.24	
	3,644.84	8/18/93	49.71	0.00	3,595.13	
	3,644.84	1/26/94	49.97	0.00	3,594.87	
		5/3/95				Monitor well destroyed
MW-3						
	3,647.68	8/10/92	52.99	0.00	3,594.69	(1)
	3,647.68	2/9/93	52.72	0.00	3,594.96	
	3,647.68	8/18/93	52.82	0.00	3,594.86	
	3,647.68	1/26/94	53.05	0.00	3,594.63	
	3,647.68	5/3/95	54.31	0.00	3,593.37	
	3,645.00	7/31/95	51.24	0.00	3,593.76	
	3,645.00	11/14/95	51.10	0.00	3,593.90	
	3,645.00	2/23/96	51.68	0.00	3,593.32	
	3,645.00	5/31/96	51.45	0.00	3,593.55	
	3,645.00	8/23/96	51.55	0.00	3,593.45	
	3,645.00	12/2/96	52.23	0.00	3,592.77	
	3,645.00	3/12/97	52.67	0.00	3,592.33	(2)

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

Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-4						
	3,645.28	8/10/92	50.55	0.00	3,594.73	(1)
	3,645.28	2/9/93	50.26	0.00	3,595.02	
	3,645.28	8/18/93	50.38	0.00	3,594.90	
	3,645.28	1/26/94	50.90	0.30	3,594.63	
	3,645.28	5/3/95	51.51	0.45	3,594.14	
	3,645.28	7/31/95	51.74	0.26	3,593.75	
	3,645.28	11/14/95	51.03	0.00	3,594.25	
	3,645.28	2/23/96	51.65	0.01	3,593.64	
	3,645.28	5/31/96	51.48	0.00	3,593.80	
	3,645.28	8/23/96	53.49	0.00	3,591.79	
	3,645.28	12/2/96	52.32	0.00	3,592.96	
	3,645.28	3/12/97	52.74	0.05	3,592.58	(2)
MW-5						
	3,647.72	8/10/92	52.38	0.00	3,595.34	(1)
	3,647.72	2/9/93	52.06	0.00	3,595.66	
	3,647.72	8/18/93	52.16	0.00	3,595.56	
	3,647.72	1/26/94	52.50	0.00	3,595.22	
	3,647.72	5/3/95	53.57	0.00	3,594.15	
	3,647.72	7/31/95	53.27	0.00	3,594.45	
	3,647.72	11/14/95	52.83	0.00	3,594.89	
	3,647.72	2/23/96	53.57	0.00	3,594.15	
	3,647.72	5/31/96	53.16	0.00	3,594.56	
	3,647.72	8/23/96	53.41	0.00	3,594.31	
	3,647.72	12/2/96	53.98	0.00	3,593.74	
	3,647.72	3/12/97	54.44	0.00	3,593.28	(2)

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

Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-6						
	3,644.74	2/9/93	50.58	0.00	3,594.16	(1)
	3,644.74	8/18/93	50.78	0.00	3,593.96	
	3,644.74	1/26/94	51.00	0.00	3,593.74	
	3,644.74	5/3/95	52.63	0.00	3,592.11	
	3,644.74	7/31/95	51.90	0.00	3,592.84	
	3,644.74	11/14/95	51.19	0.00	3,593.55	
	3,644.74	2/23/96	52.10	0.00	3,592.64	
	3,644.74	5/31/96	51.76	0.00	3,592.98	
	3,644.74	8/23/96	51.63	0.00	3,593.11	
	3,644.74	12/2/96	52.85	0.00	3,591.89	
	3,644.74	3/12/97	53.55	0.00	3,591.19	(2)
MW-7						
	3,644.55	2/9/93	50.53	0.00	3,594.02	(1)
	3,644.55	8/18/93	50.74	0.00	3,593.81	
	3,644.55	1/26/94	51.01	0.00	3,593.54	
	3,644.55	5/3/95	52.25	0.00	3,592.30	
	3,644.55	7/31/95	51.92	0.00	3,592.63	
	3,644.55	11/14/95	51.48	0.00	3,593.07	
	3,644.55	2/23/96	52.15	0.00	3,592.40	
	3,644.55	5/31/96	51.78	0.00	3,592.77	
	3,644.55	8/23/96	52.02	0.00	3,592.53	
	3,644.55	12/2/96	52.52	0.00	3,592.03	
	3,644.55	3/12/97	52.99	0.00	3,591.56	(2)

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

Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-8						
	3,644.87	2/9/93	50.48	0.00	3,594.39	(1)
	3,644.87	8/18/93	50.67	0.00	3,594.20	
	3,644.87	1/26/94	50.96	0.00	3,593.91	
	3,644.87	5/3/95	52.15	0.00	3,592.72	
	3,644.87	7/31/95	51.77	0.00	3,593.10	
	3,644.87	11/14/95	51.37	0.00	3,593.50	
	3,644.87	2/23/96	52.17	0.00	3,592.70	
	3,644.87	5/31/96	51.55	0.00	3,593.32	
	3,644.87	8/23/96	51.92	0.00	3,592.95	
	3,644.87	12/2/96	52.43	0.00	3,592.44	
	3,644.87	3/12/97	52.93	0.00	3,591.94	(2)
MW-9						
	3,644.78	4/22/93	49.73	0.00	3,595.05	(1)
	3,644.78	7/15/93	49.65	0.00	3,595.13	
	3,644.78	8/18/93	49.85	0.00	3,594.93	
	3,644.78	1/26/94	50.02	0.00	3,594.76	
	3,644.78	5/3/95	51.35	0.00	3,593.43	
	3,644.78	7/31/95	50.97	0.00	3,593.81	
	3,644.78	11/14/95	50.43	0.00	3,594.35	
	3,644.78	2/23/96	51.12	0.00	3,593.66	
	3,644.78	5/31/96	50.89	0.00	3,593.89	
	3,644.78	8/23/96	50.98	0.00	3,593.80	
	3,644.78	12/2/96	51.58	0.00	3,593.20	
	3,644.78	3/12/97	52.21	0.05	3,592.61	(2)

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

Monitoring Well	TOC Elevation	Date Measured	Depth to GW (ft)	Free Product Thickness (ft)	GW Elevation (ft MSL)	Comments
MW-10						
	3,644.47	8/18/93	51.54	0.00	3,592.93	(1)
	3,644.47	1/26/94	51.90	0.00	3,592.57	
	3,644.47	5/3/95	52.97	0.00	3,591.50	
	3,644.47	7/31/95	52.87	0.00	3,591.60	
	3,644.47	11/14/95	52.51	0.00	3,591.96	
	3,644.47	2/23/96	53.05	0.00	3,591.42	
	3,644.47	5/31/96	52.79	0.00	3,591.68	
	3,644.47	8/23/96	53.03	0.00	3,591.44	
	3,644.47	12/2/96	53.41	0.00	3,591.06	
	3,644.47	3/12/97	54.21	0.00	3,590.26	(2)
MW-11						
	3,643.78	8/18/93	51.92	0.00	3,591.86	(1)
	3,643.78	1/26/94	52.32	0.00	3,591.46	
	3,643.78	5/3/95	53.38	0.00	3,590.40	
	3,643.78	7/31/95	53.35	0.00	3,590.43	
	3,643.78	11/14/95	52.96	0.00	3,590.82	
	3,643.78	2/23/96	53.50	0.00	3,590.28	
	3,643.78	5/31/96	53.25	0.00	3,590.53	
	3,643.78	8/23/96	53.49	0.00	3,590.29	
	3,643.78	12/2/96	53.79	0.00	3,589.99	
	3,643.78	3/12/97	53.81	0.00	3,589.97	(2)

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

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

(3) MW-2 could not be located and is assumed detroyed after January, 1994.

Table 3
Field Screening Results for Groundwater Samples
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								
	3/12/97	1	7.15	1,680	18.6	-104	2.86	
		2	7.36	1,320	17.9	-140	2.10	
		3	7.32	1,380	17.9	-150	2.00	1.5
MW-3								
	3/12/97	1	7.49	1,100	20.5	-50	5.80	
		2	7.14	1,110	18.8	-60	5.10	
		3	7.14	1,110	18.9	-55	5.10	0.0
MW-4								
	3/12/97	1	7.10	1,210	18.0	-130	2.98	
		2	7.09	1,090	17.9	-148	2.00	
		3	7.15	1,130	18.0	-150	1.50	1.0
MW-5								
	3/12/97	1	7.07	1,080	18.4	110	5.04	
		2	7.10	1,040	18.4	85	4.86	
		3	7.10	1,030	18.4	60	4.52	0.0
MW-6								
	3/12/97	1	7.20	1,300	18.1	20	3.25	
		2	7.21	1,340	18.4	25	2.98	
		3	7.20	1,340	18.4	15	2.15	0.0
MW-7								
	3/12/97	1	6.61	1,480	18.6	115	3.50	
		2	6.64	1,490	18.9	105	2.84	
		3	6.65	1,480	19.0	105	2.72	0.0
MW-8								
	3/12/97	1	6.79	1,630	18.4	85	4.30	
		2	6.77	1,640	18.5	90	3.90	
		3	6.77	1,640	18.5	95	3.64	0.0

Table 3
Field Screening Results for Groundwater Samples
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								
	3/12/97	1	7.01	1,350	18.9	0	3.25	
		2	6.93	707	18.9	-7	2.56	
		3	6.85	707	18.3	24	2.00	0.0
MW-10								
	3/12/97	1	6.53	7,040	20.1	NR	1.32	
		2	6.55	6,950	19.5	NR	0.99	
		3	6.56	6,830	19.5	NR	0.99	8.0
MW-11								
	3/12/97	1	6.68	13,120	18.4	25	3.89	
		2	6.68	12,890	18.4	20	3.10	
		3	6.70	12,880	18.2	25	3.10	0.0

MW-2 could not be located and assumed destroyed after January, 1994.

NR = No Reading

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

Well ID	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, µg/L				milligrams per liter, mg/L	
MW-1								
	8/10/92	Regular	5550	12090	2160	7370	NA	NA
	2/9/93	Regular	2100	6500	1300	7400	NA	NA
	8/19/93	Regular	3200	7300	1200	3700	NA	NA
	1/27/94	Regular	1930	4580	672	2390	NA	NA
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	390	1300	230	800	NA	5.7
	11/15/95	Regular	880	1800	300	970	NA	6.8
	2/23/96	Regular	1500	3700	620	2200	NA	21
	5/31/96	Regular	1100	1700	380	990	NA	7.5
	8/23/96	Regular	1800	3300	570	2100	NA	17
	12/2/96	Regular	5600	9600	2100	9600	100	64
	3/12/97	Regular	5500	9700	2600	8200	22	62
MW-2								
	8/10/92	Regular	14.9	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	100	12	3	13	NA	NA
	1/27/94	Regular	< 1	1.2	2	2.5	NA	NA
MW-3								
	8/10/92	Regular	304.9	2099	6760	1586	NA	NA
	2/9/93	Regular	130	< 10	< 10	190	NA	NA
	8/19/93	Regular	560	3100	630	1900	NA	NA
	1/27/94	Regular	1070	5380	510	3120	NA	NA
	5/4/95	Regular	770	3300	470	1800	NA	NA
	8/1/95	Regular	490	2900	890	1600	NA	14
	11/15/95	Regular	250	1000	180	440	NA	2.9
	2/23/96	Regular	120	810	170	560	NA	4
	5/31/96	Regular	670	3900	1200	2300	NA	15
	8/23/96	Regular	330	2200	590	1500	NA	12
	12/2/96	Regular	220	1800	670	1000	0.89	7.4
	3/12/97	Regular	370	2000	960	1400	1.8	11

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

Well ID	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, µg/L				milligrams per liter, mg/L	
MW-4								
	8/10/92	Regular	2594	10360	2160	6740	NA	NA
	2/9/93	Regular	5200	15000	2200	10000	NA	NA
	8/19/93	Regular	3000	12000	< 2000	7000	NA	NA
	1/27/94	Regular	NSP	NSP	NSP	NSP	NA	NSP
	5/3/95	Regular	NSP	NSP	NSP	NSP	NA	NSP
	8/1/95	Regular	5700	17000	3500	13000	NA	120
	11/15/95	Regular	490	1600	310	1100	NA	5.2
	2/23/96	Regular	360	2800	560	2500	NA	18
	5/31/96	Regular	84	830	280	1100	NA	6.2
	8/23/96	Regular	110	1400	430	1800	NA	9.8
	12/2/96	Regular	190	2000	1800	7200	56	43
	3/12/97	Regular	220	1500	1500	4400	27	27
MW-5								
	8/10/92	Regular	< 4	< 4	< 4	< 4	NA	NA
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/10/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	1/27/94	Regular	8.7	29.9	4	11.3	NA	NA
	5/3/95	Regular	3.7	5.3	0.92	4.6	NA	NA
	8/1/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	11/15/95	Regular	< 0.3	1.2	< 0.3	1.5	NA	NA
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	5/31/96	Regular	31	86	10	20	NA	NA
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1

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

Well ID	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, µg/L				milligrams per liter, mg/L	
MW-6								
	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	7000	19000	3100	7200	NA	NA
	8/19/93	Regular	8100	19000	3500	6400	NA	NA
	1/27/94	Regular	7960	20200	3830	6150	NA	NA
	5/4/95	Regular	11000	17000	2900	6000	NA	NA
	8/1/95	Regular	8300	12000	2500	5100	NA	60
	11/15/95	Regular	8900	17000	2900	5500	NA	57
	2/23/96	Regular	8100	10000	2300	4000	NA	58
	5/31/96	Regular	83	150	15	51	NA	0.57
	5/31/96	Duplicate	87	160	13	47	NA	0.52
	8/23/96	Regular	31	28	9.4	7.9	NA	0.46
	12/2/96	Regular	< 1	< 1	< 1	1.7	5.6	< 0.1
	3/12/97	Regular	12	< 5	6.8	18	12	< 0.5
MW-7								
	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	3	< 2	< 2	NA	NA
	1/27/94	Regular	1.1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	52	3.4	0.67	2.8	NA	NA
	8/1/95	Regular	22	2.2	0.85	2.8	NA	< 0.1
	11/15/95	Regular	8.4	0.77	< 0.3	0.93	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Duplicate	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	29	83	10	21	NA	0.25
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1

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

Well ID	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, µg/L				milligrams per liter, mg/L	
MW-8								
	8/10/92	Regular	NS	NS	NS	NS	NA	NS
	2/9/93	Regular	< 2	< 2	< 2	< 6	NA	NA
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/3/95	Regular	3	4.9	0.75	3.7	NA	NA
	8/1/95	Regular	3.1	1.2	0.47	1.6	NA	< 0.001
	8/1/95	Duplicate	3.6	1.5	0.51	1.5	NA	< 0.1
	11/15/95	Regular	< 0.3	0.52	< 0.3	< 0.6	NA	< 0.1
	2/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	5/31/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	8/23/96	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	< 0.1
	12/2/96	Regular	< 1	< 1	< 1	< 1	< 0.1	< 0.1
	3/12/97	Regular	< 1	< 1	< 1	1.8	< 0.1	< 0.1
MW-9								
	4/22/93	Regular	570	380	< 50	870	NA	NA
	7/15/93	Regular	121	7.3	3	458	NA	NA
	8/19/93	Regular	390	290	40	250	NA	NA
	1/27/94	Regular	327	357	51.1	293	NA	NA
	5/3/95	Regular	380	110	19	120	NA	NA
	8/1/95	Regular	660	410	91	310	NA	6.2
	11/15/95	Regular	240	24	11	140	NA	1.5
	11/15/95	Duplicate	170	18	10	120	NA	1.9
	2/23/96	Regular	170	18	2.3	160	NA	4.3
	5/31/96	Regular	120	16	3	200	NA	NA
	8/23/96	Regular	82	13	6	270	NA	4
	8/23/96	Duplicate	76	14	4.8	250	NA	4.4
	12/2/96	Regular	61	< 25	< 25	210	2.6	2.8
	12/2/96	Duplicate	86	13	2.4	270	3.7	2.9
	3/12/97	Regular	30	48	420	880	8.2	19

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

Well ID	Sample Date	Sample Type	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-D	TPH-G
			micrograms per liter, µg/L				milligrams per liter, mg/L	
MW-10								
	8/19/93	Regular	190	460	< 200	240	NA	NA
	1/27/94	Regular	13.4	4	5.5	33.6	NA	NA
	5/4/95	Regular	980	15	11	84	NA	NA
	8/1/95	Regular	1300	32	32	100	NA	3.6
	11/15/95	Regular	1000	24	15	36	NA	1.7
	2/23/96	Regular	810	23	27	44	NA	2.4
	5/31/96	Regular	700	24	34	28	NA	2
	8/23/96	Regular	290	3.4	6.4	13	NA	1.4
	12/2/96	Regular	280	1.3	17	8	0.94	0.97
	3/12/97	Regular	110	< 5	17	< 5	0.61	0.57
MW-11								
	8/19/93	Regular	< 2	< 2	< 2	< 2	NA	NA
	1/27/94	Regular	< 1	< 1	< 1	< 1	NA	NA
	5/4/95	Regular	< 0.3	< 0.3	< 0.3	< 0.6	NA	NA
	8/1/95	Regular	44	29	5.5	13	NA	0.2
	11/15/95	Regular	190	2.8	6.2	11	NA	0.4
	2/23/96	Regular	49	1.2	0.51	4	NA	0.25
	5/31/96	Regular	300	83	12	28	NA	0.8
	8/23/96	Regular	100	1.2	0.3	4.7	NA	0.26
	12/2/96	Regular	970	< 5	6	8.1	2	1.3
	3/12/97	Regular	130	< 5	13	5.8	0.42	< 0.5
	3/12/97	Duplicate	100	< 5	10	5.1	0.43	< 0.5

MW-2 destroyed after January, 1994 NA = Not Analysed NS = Not Sampled

NSP = Not Sampled due to Phase Separated Hydrocarbons

Table 5
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
Effluent120296-01	12/2/96	< 1	< 1	< 1	< 1	< 5	129.04	0.00	0.01	0.01
Eff-31297-1	3/12/97	2.1	15	4.6	15	250	110.56	0.00	0.06	0.33

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

APPENDIX A

GROUNDWATER SAMPLING FORMS

BROWN AND CALDWELL

WELL ID: mw-1

Groundwater Sampling Field Data Sheet

Project Number: _____ Task Number: _____ Date: 3/12/97

Casing Diameter: 2 inches	Purge Equipment: Bailer	Equipment Calibration - Time: pH 7.18 = 7.01 at 20 °C; pH 10.10 = 10.0 at 20 °C
Total Depth of Well from TOC: 64.42 feet		
Static Water from TOC: 55.70 feet	Sample Equipment: Bailer	
Product Level from TOC: 55.43 feet		*Conductivity* Conductance Standard: Factory µmhos/cm at 25° C
Length of Water Column: 8.72 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI 600XL Flow Cell	Measured Value: 1,000 µmhos/cm at 25° C
Well Volume: 1.42 gal		*Dissolved Oxygen* DO Meter Calibrated to: Factory mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1742	1	1.5	7.15	18.6	1.68	-103.5	2.86	odor, clear
1750	2	1.5	7.36	17.9	1.32	-140	2.10	"
1754	3	1.5	7.32	17.9	1.38	-150	2.00	"

Geochemical Parameters		*Comments:*
Ferrous Iron:	1.5 mg/L	1758 sample mw-1
Dissolved Oxygen:	1.0 mg/L	
Nitrate:	— mg/L	
Sulfate:	— mg/L	

PPE Worn: gloves, glasses	*Sampler's Signature:*
Disposition of Purge Water: drum	

4.76

BROWN AND CALDWELL

WELL ID: mw-3

Groundwater Sampling Field Data Sheet

Project Number: _____ Task Number: _____ Date: 3/

Casing Diameter: 2 inches	Purge Equipment: Sub. Pump	Equipment Calibration - Time
Total Depth of Well from TOC: 64.31 feet		pH 7.18 = 7.01 at 20 °C
Static Water from TOC: 52.67 feet	Sample Equipment: disp. bailer	pH 10.10 = 10.01 at 20 °C
Product Level from TOC: – feet		*Conductivity* Conductance Standard: Factory µmhos/cm at 25° C
Length of Water Column: 11.64 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI 600 VL Flow Cell	Measured Value: 1,000 µmhos/cm at 25° C
Well Volume: 1.89 gal		*Dissolved Oxygen* DO Meter Calibrated to: Factory mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1332	1	1	7.24	19.5	1.08	25	6.25	clear
1340	1	2	7.49	20.5	1.10	-50	5.80	"
1347	2	2	7.14	18.8	1.11	-60	5.10	"
1355	3	2	7.14	18.9	1.11	-55	5.10	"

Geochemical Parameters		*Comments:*
Ferrous Iron:	0 mg/L	1455 SAMPLE mw-3
Dissolved Oxygen:	6.0 mg/L	
Nitrate:	– mg/L	
Sulfate:	– mg/L	

PPE Worn: gloves, glasses	*Sampler's Signature:*
Disposition of Purge Water: drum	

5.67

BROWN AND CALDWELL

WELL ID: mw-4

Groundwater Sampling Field Data Sheet

Project Number: _____ Task Number: _____ Date: 3/12/97

Casing Diameter: 2 inches	Purge Equipment: Bailer	Equipment Calibration - Time
Total Depth of Well from TOC: 61.43 feet		pH 7.18 = 7.01 at 20 °C
Static Water from TOC: 52.74 feet	Sample Equipment: Bailer	pH 10.10 = 10.01 at 20 °C
Product Level from TOC: 52.79 52.82 feet		*Conductivity* Conductance Standard: Factory µmhos/cm at 25° C
Length of Water Column: 8.69 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI 600XL Flow cell	Measured Value: 1,000 µmhos/cm at 25° C
Well Volume: 1.41 gal		*Dissolved Oxygen* DO Meter Calibrated to: Factory mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1810	1	1.5	7.10	18.0	1.21	+30	2.98	odor, clear
1816	2	1.5	7.09	17.9	1.09	-148	2.0	"
1820	3	1.5	7.15	18.0	1.13	-150	1.5	"

Geochemical Parameters		*Comments:*
Ferrous Iron:	1.0 mg/L	1825 SAMPLE mw-4
Dissolved Oxygen:	0 mg/L	
Nitrate:	– mg/L	
Sulfate:	– mg/L	

PPE Worn: gloves, glasses	*Sampler's Signature:*
Disposition of Purge Water: drum	

4.23

BROWN AND CALDWELL

WELL ID: MW-5

Groundwater Sampling Field Data Sheet

Project Number: _____ Task Number: _____ Date: 3/12/97

Casing Diameter: 2 inches	Purge Equipment: Sub. Pump	Equipment Calibration - Time
Total Depth of Well from TOC: 64.60 feet		pH 7.18 = 7.01 at 20 °C
Static Water from TOC: 54.44 feet	Sample Equipment: Disp. Bailer	pH 10.10 = 10.01 at 20 °C
Product Level from TOC: — feet		*Conductivity* Conductance Standard: Factory µmhos/cm at 25° C
Length of Water Column: 10.16 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI 600XL Flow Cell	Measured Value: Factory µmhos/cm at 25° C
Well Volume: 1.65 gal		*Dissolved Oxygen* DO Meter Calibrated to: Factory mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1125	P	P	7.29	17.8	1.11	105	5.78	clear
1129	1	1.5	7.07	18.4	1.08	110	5.04	clear
1133	2	1.5	7.10	18.4	1.04	85	4.86	clear
1137	3	1.5	7.10	18.4	1.03	60	4.52	clear

Geochemical Parameters		*Comments:*
Ferrous Iron:	0 mg/L	1720 Sample MW-5
Dissolved Oxygen:	3.0 mg/L	
Nitrate:	— mg/L	
Sulfate:	— mg/L	

PPE Worn: gloves, glasses	*Sampler's Signature:*
Disposition of Purge Water: drum	

4.96

BROWN AND CALDWELL

WELL ID: MW-6

Groundwater Sampling Field Data Sheet

Project Number: _____ Task Number: _____ Date: 3/12/97

Casing Diameter: 2 inches	Purge Equipment: Sub-Pump	Equipment Calibration - Time
Total Depth of Well from TOC: 60.17 feet		pH 7.18 = 7.01 at 20 °C
Static Water from TOC: 55.55 feet	Sample Equipment: Disp. bailer	pH 10.10 = 10.01 at 20 °C
Product Level from TOC: feet		*Conductivity* Conductance Standard: Factory µmhos/cm at 25° C
Length of Water Column: 4.62 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI 600XL Flow cell	Measured Value: Factory µmhos/cm at 25° C
Well Volume: 0.75 gal		*Dissolved Oxygen* DO Meter Calibrated to: Factory mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1155	P	P	7.10	18.0	1.33	25	3.52	clear/gray
1158	1	1	7.20	18.1	1.30	20	3.25	gray
1201	2	1	7.21	18.4	1.34	25	2.98	gray
1205	3	1	7.20	18.4	1.34	15	2.15	gray

Geochemical Parameters		*Comments:*
Ferrous Iron:	ϕ mg/L	1640 SAMPLE MW-6
Dissolved Oxygen:	1.5 mg/L	
Nitrate:	– mg/L	
Sulfate:	– mg/L	

PPE Worn: gloves, glasses	*Sampler's Signature:*
Disposition of Purge Water: DWM	

BROWN AND CALDWELL

WELL ID: MW-7

Groundwater Sampling Field Data Sheet

Project Number: _____ Task Number: _____ Date: 3/12/97

Casing Diameter: 2 inches	Purge Equipment: Sub. Pump	Equipment Calibration - Time
Total Depth of Well from TOC: 61.46 feet		pH 7.18 = 7.01 at 20 °C
Static Water from TOC: 52.99 feet	Sample Equipment: Disp. Bailer	pH 10.10 = 10.01 at 20 °C
Product Level from TOC: — feet		*Conductivity* Conductance Standard: FACTORY µmhos/cm at 25° C
Length of Water Column: 8.47 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI 600XL Flow Cell	Measured Value: FACTORY µmhos/cm at 25° C
Well Volume: 1.38 gal		*Dissolved Oxygen* DO Meter Calibrated to: FACTORY mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1054	P	P	6.62	17.9	1.48	110	4.95	clear
1058	1	1.5	6.61	18.6	1.48	115	3.50	clear
1104	2	1.5	6.64	18.9	1.49	105	2.84	clear
1108	3	1.5	6.65	19.0	1.48	105	2.72	clear

Geochemical Parameters		*Comments:*
Ferrous Iron:	Ø mg/L	1610 SAMPLE MW-7
Dissolved Oxygen:	2.2 mg/L	
Nitrate:	— mg/L	
Sulfate:	— mg/L	

PPE Worn: gloves, glasses	*Sampler's Signature:*
Disposition of Purge Water: drum	

4.14

BROWN AND CALDWELL

WELL ID: mw-8

Groundwater Sampling Field Data Sheet

Project Number: _____ Task Number: _____ Date: 3/12/97

Casing Diameter: 2 inches	Purge Equipment: Sub. Pump	Equipment Calibration - Time
Total Depth of Well from TOC: 62.37 feet		pH 7.18 = 7.01 at 20 °C
Static Water from TOC: 52.93 feet	Sample Equipment: ~~YSI 600XL flow cell~~ STP Disp. bailer	pH 10.10 = 10.01 at 20 °C
Product Level from TOC: — feet		*Conductivity* Conductance Standard: FACTORY µmhos/cm at 25° C
Length of Water Column: 9.44 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI 600XL flow cell	Measured Value: FACTORY µmhos/cm at 25° C
Well Volume: 1.53 gal		*Dissolved Oxygen* DO Meter Calibrated to: FACTORY mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1026	0	0	6.85	18.4	1.63	70	4.92	clear
1031	1	1.5	6.79	18.4	1.63	85	4.30	clear
1034	2	1.5	6.77	18.5	1.64	90	3.90	clear
1038	3	1.5	6.77	18.5	1.64	95	3.64	clear

Geochemical Parameters		*Comments:*
Ferrous Iron:	0 mg/L	1625 SAMPLE mw-8
Dissolved Oxygen:	3.0 mg/L	
Nitrate:	— mg/L	
Sulfate:	— mg/L	

PPE Worn: gloves, glasses	*Sampler's Signature:*
Disposition of Purge Water: drum	

4.59

BROWN AND CALDWELL

WELL ID: mw-9

Groundwater Sampling Field Data Sheet

Project Number: _____ Task Number: _____ Date: 3/12/97

Casing Diameter: 2 inches	Purge Equipment: sub. pump	Equipment Calibration - Time
Total Depth of Well from TOC: 60.27 feet		pH 7.18 = 7.01 at 20 °C
Static Water from TOC: 52.21 feet	Sample Equipment: Disp. bailer	pH 10.10 = 10.01 at 20 °C
Product Level from TOC: 52.14 feet		*Conductivity* Conductance Standard: factory µmhos/cm at 25° C
Length of Water Column: 8.06 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI 600XL Flow cell	Measured Value: 1,000 µmhos/cm at 25° C
Well Volume: 1.31 gal		*Dissolved Oxygen* DO Meter Calibrated to: factory mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1446	1	1.5	7.01	18.9	1.35	-0	3.25	odor, clear
1455	2	1.5	6.93	18.9	0.707	-6.6	2.56	"
1458	3	1.5	6.86	18.3	0.707	23.6	2.0	"

Geochemical Parameters		*Comments:*
Ferrous Iron:	0 mg/L	1505 SAMPLE mw-9
Dissolved Oxygen:	2.0 mg/L	
Nitrate:	mg/L	
Sulfate:	mg/L	

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

BROWN AND CALDWELL

WELL ID: MW-10

Groundwater Sampling Field Data Sheet

Project Number: _____ Task Number: _____ Date: 3/12/98

Casing Diameter: 2 inches	Purge Equipment: Sub. pump	Equipment Calibration - Time
Total Depth of Well from TOC: 63.60 feet		pH 7.18 = 7.01 at 20 °C
Static Water from TOC: 54.21 feet	Sample Equipment: Disp. bailer	pH 10.10 = 10.01 at 20 °C
Product Level from TOC: — feet		*Conductivity* Conductance Standard: Factory µmhos/cm at 25° C
Length of Water Column: 9.39 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI 600xL Flow cell	Measured Value: 1,000 µmhos/cm at 25° C
Well Volume: 1.53 gal		*Dissolved Oxygen* DO Meter Calibrated to: Factory mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1250	P	P	6.50	19.3	4.56	-80	2.49	clear
1256	1	1.5	6.53	20.1	7.04	OFF SCALE	1.32	clear
1302	2	1.5	6.55	19.5	6.95	"	0.99	clear
1308	3	1.5	6.56	19.5	6.83	"	0.99	clear

Geochemical Parameters		*Comments:*
Ferrous Iron:	8.0 mg/L	1600 SAMPLE MW-10
Dissolved Oxygen:	1.0 mg/L	
Nitrate:	— mg/L	
Sulfate:	— mg/L	

PPE Worn: gloves, glasses	*Sampler's Signature:*
Disposition of Purge Water: drum	

4.5

BROWN AND CALDWELL

WELL ID: mw-11

Groundwater Sampling Field Data Sheet

Project Number: _____ Task Number: _____ Date: 3/12/97

Casing Diameter: 2 inches	Purge Equipment: Sub Pump	Equipment Calibration - Time
Total Depth of Well from TOC: 59.78 feet		pH 7.18 = 7.01 at 20 °C
Static Water from TOC: 53.81 feet	Sample Equipment: Disp. bailer	pH 10.10 = 10.01 at 20 °C
Product Level from TOC: — feet		*Conductivity* Conductance Standard: Factory µmhos/cm at 25° C
Length of Water Column: 5.97 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI Flow cell 600XL	Measured Value: 1,000 µmhos/cm at 25° C
Well Volume: 0.97 gal		*Dissolved Oxygen* DO Meter Calibrated to: Factory mg/L
Screened Interval (from GS): feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
1526	P	P	6.72	18.0	14.26	55	4.32	clear
1530	1	1	6.68	18.4	13.12	25	3.89	cloudy
1533	2	1	6.68	18.4	12.89	20	3.10	"
1540	3	1	6.70	18.2	12.88	25	3.10	"

Geochemical Parameters		*Comments:*
Ferrous Iron:	0 mg/L	1545 SAMPLE MW-11
Dissolved Oxygen:	2.0 mg/L	
Nitrate:	— mg/L	
Sulfate:	— mg/L	

PPE Worn: gloves, glasses	*Sampler's Signature:*
Disposition of Purge Water: drum 5P glasses	

2.91

BROWN AND CALDWELL

WELL ID: DUP-1

Groundwater Sampling Field Data Sheet

Project Number: 2832- Task Number: 12 Date: 3/12/97

Casing Diameter inches	Purge Equipment	Equipment Calibration - Time
Total Depth of Well from TOC feet		pH = at °C
Static Water from TOC feet	Sample Equipment	pH = at °C
Product Level from TOC feet		Conductivity Conductance Standard: µmhos/cm at 25° C
Length of Water Column feet	Analytical Equipment (pH, DO, Redox, filtration, etc.)	Measured Value: µmhos/cm at 25° C
Well Volume gal		Dissolved Oxygen DO Meter Calibrated to: mg/L
Screened Interval (from GS) feet		

Time	Well Volume	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
			duplicate			@		
				MW-11				

Geochemical Parameters		Comments:
Ferrous Iron:	mg/L	SAMPLE @ 1545
Dissolved Oxygen:	mg/L	
Nitrate:	mg/L	
Sulfate:	mg/L	

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

B

APPENDIX B

LABORATORY ANALYTICAL REPORT FOR GROUNDWATER SAMPLES

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

March 29, 1997

Ms. Myna Dehnert
BROWN AND CALDWELL
1415 Louisiana
Houston, TX 77002

The following report contains analytical results for samples received at Southern Petroleum Laboratories (SPL) on March 14, 1997. The samples were assigned to Certificate of Analysis No. 9703720 and analyzed for all parameters as listed on the chain of custody.

Based on the conditions of the sample, procedures performed and quality controls implemented for this project, the following exceptions were noted for this data package.

Samples MW-4 (SPL# 9703720-03) exhibited a surrogate recovery of 10% for n-Pentacosane in the Total Petroleum Hydrocarbon-Diesel Ranage (8015) analysis. This surrogate recovery was outside QC limits due to matrix interference.

If you have any questions or comments pertaining to this data report, please do not hesitate to contact me. Please reference the above Certificate of Analysis No. during any inquiries.

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

Southern Petroleum Laboratories

Bernadette A. Fini
Project Manager

SOUTHERN PETROLEUM LABORATORIES, INC.

Certificate of Analysis Number: 97-03-720

Approved for Release by:

Bernadette A. Fini, Project Manager

Date: 3-29-97

Greg Grandits
Laboratory Director

Idelis Williams
Quality Assurance Officer

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

Certificate of Analysis No. H9-9703720-01

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-1

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 17:58:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	5500	100 P	µg/L
TOLUENE	9700	100 P	µg/L
ETHYLBENZENE	2600	100 P	µg/L
TOTAL XYLENE	8200	100 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	26000		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	107		
4-Bromofluorobenzene	90		
Method 8020A ***			
Analyzed by: LJ			
Date: 03/23/97			
Petroleum Hydrocarbons - Gasoline	62	10 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	90		
4-Bromofluorobenzene	93		
Modified 8015A - Gasoline***			
Analyzed by: LJ			
Date: 03/23/97			
Total Petroleum Hydrocarbons-Diesel	22	1 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	50		
Modified 8015A - Diesel ***			
Analyzed by: RR			
Date: 03/25/97 10:38:00			

(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.

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

Certificate of Analysis No. H9-9703720-01

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-1

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 17:58:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction Method 3510B *** Analyzed by: DR Date: 03/19/97 15:00:00	03/19/97		

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.

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

Certificate of Analysis No. H9-9703720-02

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-3

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 16:55:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	370	25 P	µg/L
TOLUENE	2000	25 P	µg/L
ETHYLBENZENE	960	25 P	µg/L
TOTAL XYLENE	1400	25 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	4730		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	99		
4-Bromofluorobenzene	92		
Method 8020A ***			
Analyzed by: LJ			
Date: 03/23/97			
Petroleum Hydrocarbons - Gasoline	11	2 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	88		
4-Bromofluorobenzene	93		
Modified 8015A - Gasoline***			
Analyzed by: LJ			
Date: 03/23/97			
Total Petroleum Hydrocarbons-Diesel	1.8	0.1 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	44		
Modified 8015A - Diesel ***			
Analyzed by: RR			
Date: 03/20/97 07:24:00			

(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.*

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

Certificate of Analysis No. H9-9703720-02

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-3

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 16:55:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	03/19/97		
Method 3510B ***			
Analyzed by: DR			
Date: 03/19/97 15:00:00			

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.

Certificate of Analysis No. H9-9703720-03

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-4

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 18:25:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	220	100 P	µg/L
TOLUENE	1500	100 P	µg/L
ETHYLBENZENE	1500	100 P	µg/L
TOTAL XYLENE	4400	100 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	7620		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	93		
Method 8020A ***			
Analyzed by: LJ			
Date: 03/23/97			
Petroleum Hydrocarbons - Gasoline	27	10 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	93		
Modified 8015A - Gasoline***			
Analyzed by: LJ			
Date: 03/23/97			
Total Petroleum Hydrocarbons-Diesel	27	0.5 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	10 «		
Modified 8015A - Diesel ***			
Analyzed by: RR			
Date: 03/20/97 08:09:00			

(P) - Practical Quantitation Limit « - Recovery beyond control limits.

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.

Certificate of Analysis No. H9-9703720-03

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-4

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 18:25:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	03/19/97		
Method 3510B ***			
Analyzed by: DR			
Date: 03/19/97 15:00:00			

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.

Certificate of Analysis No. H9-9703720-04

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-5

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 17:20:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	ND	1.0 P	µg/L
TOTAL XYLENE	ND	1.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	97		
Method 8020A ***			
Analyzed by: LJ			
Date: 03/22/97			
Petroleum Hydrocarbons - Gasoline	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	93		
Modified 8015A - Gasoline***			
Analyzed by: LJ			
Date: 03/22/97			
Total Petroleum Hydrocarbons-Diesel	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	36		
Modified 8015A - Diesel ***			
Analyzed by: RR			
Date: 03/20/97 08:55:00			

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.

Certificate of Analysis No. H9-9703720-04

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-5

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 17:20:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	03/19/97		
Method 3510B ***			
Analyzed by: DR			
Date: 03/19/97 15:00:00			

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.

Certificate of Analysis No. H9-9703720-05

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-6

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 16:40:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	12	5.0 P	µg/L
TOLUENE	ND	5.0 P	µg/L
ETHYLBENZENE	6.8	5.0 P	µg/L
TOTAL XYLENE	18	5.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	36.8		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	93		
4-Bromofluorobenzene	93		
Method 8020A ***			
Analyzed by: LJ			
Date: 03/22/97			
Petroleum Hydrocarbons - Gasoline	ND	0.5 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	93		
Modified 8015A - Gasoline***			
Analyzed by: LJ			
Date: 03/22/97			
Total Petroleum Hydrocarbons-Diesel	12	0.5 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	32		
Modified 8015A - Diesel ***			
Analyzed by: RR			
Date: 03/25/97 11:24:00			

(P) - Practical Quantitation Limit ND - Not detected.

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.

Certificate of Analysis No. H9-9703720-05

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-6

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 16:40:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction Method 3510B ***	03/19/97		
Analyzed by: DR			
Date: 03/19/97 15:00:00			

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.

Certificate of Analysis No. H9-9703720-06

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-7

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 16:10:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	ND	1.0 P	µg/L
TOTAL XYLENE	ND	1.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	97		
Method 8020A ***			
Analyzed by: LJ			
Date: 03/22/97			
Petroleum Hydrocarbons - Gasoline	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	90		
4-Bromofluorobenzene	93		
Modified 8015A - Gasoline***			
Analyzed by: LJ			
Date: 03/22/97			
Total Petroleum Hydrocarbons-Diesel	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	42		
Modified 8015A - Diesel ***			
Analyzed by: RR			
Date: 03/20/97 10:25:00			

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.

Certificate of Analysis No. H9-9703720-06

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-7

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 16:10:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction Method 3510B *** Analyzed by: DR Date: 03/19/97 15:00:00	03/19/97		

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.

Certificate of Analysis No. H9-9703720-07

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-8

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 16:25:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	ND	1.0 P	µg/L
TOTAL XYLENE	1.8	1.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	1.8		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	93		
Method 8020A ***			
Analyzed by: LJ			
Date: 03/22/97			
Petroleum Hydrocarbons - Gasoline	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	93		
Modified 8015A - Gasoline***			
Analyzed by: LJ			
Date: 03/22/97			
Total Petroleum Hydrocarbons-Diesel	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	40		
Modified 8015A - Diesel ***			
Analyzed by: RR			
Date: 03/20/97 11:11:00			

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.

Certificate of Analysis No. H9-9703720-07

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-8

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 16:25:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction Method 3510B ***	03/19/97		
Analyzed by: DR			
Date: 03/19/97 15:00:00			

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.

Certificate of Analysis No. H9-9703720-08

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-9

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 15:05:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	30	5.0 P	µg/L
TOLUENE	48	5.0 P	µg/L
ETHYLBENZENE	420	5.0 P	µg/L
TOTAL XYLENE	880	5.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	1378		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	93		
Method 8020A ***			
Analyzed by: LJ			
Date: 03/23/97			
Petroleum Hydrocarbons - Gasoline	19	0.5 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	93		
4-Bromofluorobenzene	93		
Modified 8015A - Gasoline***			
Analyzed by: LJ			
Date: 03/23/97			
Total Petroleum Hydrocarbons-Diesel	8.2	0.1 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	60		
Modified 8015A - Diesel ***			
Analyzed by: RR			
Date: 03/20/97 11:57:00			

(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.

Certificate of Analysis No. H9-9703720-08

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-9

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 15:05:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	03/19/97		
Method 3510B ***			
Analyzed by: DR			
Date: 03/19/97 15:00:00			

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.

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

Certificate of Analysis No. H9-9703720-09

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

DATE: 03/28/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-10

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 16:00:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	110	5.0 P	µg/L
TOLUENE	ND	5.0 P	µg/L
ETHYLBENZENE	17	5.0 P	µg/L
TOTAL XYLENE	ND	5.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	127		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	87		
Method 8020A ***			
Analyzed by: LJ			
Date: 03/23/97			
Petroleum Hydrocarbons - Gasoline	0.57	0.5 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	87		
Modified 8015A - Gasoline***			
Analyzed by: LJ			
Date: 03/23/97			
Total Petroleum Hydrocarbons-Diesel	0.61	0.1 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	44		
Modified 8015A - Diesel ***			
Analyzed by: RR			
Date: 03/21/97 12:42:00			

(P) - Practical Quantitation Limit ND - Not detected.

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.

Certificate of Analysis No. H9-9703720-09

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-10

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 16:00:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	03/19/97		
Method 3510B ***			
Analyzed by: DR			
Date: 03/19/97 15:00:00			

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.

Certificate of Analysis No. H9-9703720-10

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: DUP-1

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	100	5.0 P	µg/L
TOLUENE	ND	5.0 P	µg/L
ETHYLBENZENE	10	5.0 P	µg/L
TOTAL XYLENE	5.1	5.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	115.1		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	93		
Method 8020A ***			
Analyzed by: LJ			
Date: 03/23/97			
Petroleum Hydrocarbons - Gasoline	ND	0.5 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	87		
Modified 8015A - Gasoline***			
Analyzed by: LJ			
Date: 03/23/97			
Total Petroleum Hydrocarbons-Diesel	0.43	0.1 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	42		
Modified 8015A - Diesel ***			
Analyzed by: RR			
Date: 03/21/97 01:29:00			

(P) - Practical Quantitation Limit ND - Not detected.

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.

Certificate of Analysis No. H9-9703720-10

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: DUP-1

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	03/19/97		
Method 3510B ***			
Analyzed by: DR			
Date: 03/19/97 15:00:00			

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.

Certificate of Analysis No. H9-9703720-11

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-11

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 15:45:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	130	5.0 P	µg/L
TOLUENE	ND	5.0 P	µg/L
ETHYLBENZENE	13	5.0 P	µg/L
TOTAL XYLENE	5.8	5.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	148.8		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	87		
Method 8020A ***			
Analyzed by: LJ			
Date: 03/23/97			
Petroleum Hydrocarbons - Gasoline	ND	0.5 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	93		
Modified 8015A - Gasoline***			
Analyzed by: LJ			
Date: 03/23/97			
Total Petroleum Hydrocarbons-Diesel	0.42	0.1 P	mg/L
Surrogate	**% Recovery**		
n-Pentacosane	42		
Modified 8015A - Diesel ***			
Analyzed by: RR			
Date: 03/21/97 06:55:00			

(P) - Practical Quantitation Limit ND - Not detected.

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.

Certificate of Analysis No. H9-9703720-11

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-11

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97 15:45:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction	03/19/97		
Method 3510B ***			
Analyzed by: DR			
Date: 03/19/97 15:00:00			

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.

Certificate of Analysis No. H9-9703720-12

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank

PROJECT NO: 2832
MATRIX: WATER
DATE SAMPLED: 03/12/97
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	ND	1.0 P	µg/L
TOTAL XYLENE	1.3	1.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	1.3		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	93		
Method 8020A ***			
Analyzed by: LJ			
Date: 03/23/97			
Petroleum Hydrocarbons - Gasoline	ND	0.1 P	mg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	93		
Modified 8015A - Gasoline***			
Analyzed by: LJ			
Date: 03/23/97			

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 8020/602

Matrix: Aqueous

Batch Id: HP_N970323054100

Units: µg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
MTBE	ND	50	39	78.0	63 - 120
Benzene	ND	50	41	82.0	62 - 121
Toluene	ND	50	44	88.0	66 - 136
EthylBenzene	ND	50	48	96.0	70 - 136
O Xylene	ND	50	49	98.0	74 - 134
M & P Xylene	ND	100	98	98.0	77 - 140

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
MTBE	ND	20	21	105	20	100	4.88	20	39 - 150
BENZENE	ND	20	23	115	22	110	4.44	25	39 - 150
TOLUENE	ND	20	18	90.0	18	90.0	0	26	56 - 134
ETHYLBENZENE	ND	20	21	105	22	110	4.65	38	61 - 128
O XYLENE	ND	20	22	110	22	110	0	29	40 - 130
M & P XYLENE	ND	40	45	112	45	112	0	20	43 - 152

Analyst: LJ

Sequence Date: 03/23/97

SPL ID of sample spiked: 9703925-01A

Sample File ID: N_C7822.TX0

Method Blank File ID:

Blank Spike File ID: N_C7814.TX0

Matrix Spike File ID: N_C7816.TX0

Matrix Spike Duplicate File ID: N_C7817.TX0

* = Values Outside QC Range. « = Data outside Method Specification limits.

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

ND = Not Detected/Below Detection Limit

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

LCS % Recovery = (<1> / <3>) x 100

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

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

(***) = Source: SPL-Houston Historical Data (2nd Q '95)

SAMPLES IN BATCH(SPL ID): 9703720-01A 9703720-02A 9703720-03A 9703720-08A 9703925-06A 9703925-08A 9703925-09A 9703925-10A 9703927-04A 9703803-01A

** SPL BATCH QUALITY CONTROL REPORT **

METHOD 8020/602

Matrix: Aqueous

Batch Id: HP_N970322145600

Units: µg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
MTBE	ND	50	42	84.0	63 - 120
Benzene	ND	50	42	84.0	62 - 121
Toluene	ND	50	43	86.0	66 - 136
EthylBenzene	ND	50	46	92.0	70 - 136
O Xylene	ND	50	48	96.0	74 - 134
M & P Xylene	ND	100	98	98.0	77 - 140

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
MTBE	ND	20	20	100	21	105	4.88	20	39 - 150
BENZENE	ND	20	22	110	22	110	0	25	39 - 150
TOLUENE	ND	20	19	95.0	19	95.0	0	26	56 - 134
ETHYLBENZENE	ND	20	21	105	21	105	0	38	61 - 128
O XYLENE	ND	20	21	105	22	110	4.65	29	40 - 130
M & P XYLENE	ND	40	45	112	45	112	0	20	43 - 152

Analyst: LJ

Sequence Date: 03/22/97

SPL ID of sample spiked: 9703720-04A

Sample File ID: N_C7790.TX0

Method Blank File ID:

Blank Spike File ID: N_C7784.TX0

Matrix Spike File ID: N_C7786.TX0

Matrix Spike Duplicate File ID: N_C7787.TX0

* = Values Outside QC Range. « = Data outside Method Specification limits.

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

ND = Not Detected/Below Detection Limit

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

LCS % Recovery = (<1> / <3>) x 100

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

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

(***) = Source: SPL-Houston Historical Data (2nd Q '95)

SAMPLES IN BATCH(SPL ID):

9703720-05A 9703720-07A 9703720-09A 9703720-10A
9703720-11A 9703925-01A 9703925-02A 9703925-03A
9703925-04A 9703925-05A 9703720-04A 9703720-06A
9703649-18B 9703649-19B

** SPL BATCH QUALITY CONTROL REPORT **

Modified 8015 - Gasoline

Matrix: Aqueous

Batch Id: HP_N970323060900

Units: mg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Gasoline Petr. Hydrocarbon	ND	1.0	0.84	84.0	56 - 130

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
GASOLINE PETR. HYDROCARBON	ND	0.9	0.94	104	0.93	103	0.966	22	37 - 169

Analyst: LJ

Sequence Date: 03/23/97

SPL ID of sample spiked: 9703925-02A

Sample File ID: NNC7823.TX0

Method Blank File ID:

Blank Spike File ID: NNC7815.TX0

Matrix Spike File ID: NNC7818.TX0

Matrix Spike Duplicate File ID: NNC7819.TX0

* = Values Outside QC Range. « = Data outside Method Specification limits.

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

ND = Not Detected/Below Detection Limit

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

LCS % Recovery = (<1> / <3>) x 100

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

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

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

SAMPLES IN BATCH(SPL ID):

9703720-12A 9703720-01A 9703720-02A 9703720-03A
9703720-08A 9703720-09A 9703720-10A 9703720-11A
9703925-03A 9703925-04A 9703925-05A 9703925-06A
9703925-07A 9703925-08A 9703925-09A 9703925-10A
9703927-05A 9703925-01A 9703925-02A

** SPL BATCH QUALITY CONTROL REPORT **

Modified 8015 - Gasoline

Matrix: Aqueous

Batch Id: HP_N970322152500

Units: mg/L

L A B O R A T O R Y C O N T R O L S A M P L E

S P I K E C O M P O U N D S	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Gasoline Petr. Hydrocarbon	ND	1.0	0.85	85.0	56 - 130

M A T R I X 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 Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
GASOLINE PETR. HYDROCARBON	ND	0.9	0.64	71.1	0.66	73.3	3.05	22	37 - 169

Analyst: LJ

Sequence Date: 03/22/97

SPL ID of sample spiked: 9703720-06A

Sample File ID: NNC7791.TX0

Method Blank File ID:

Blank Spike File ID: NNC7785.TX0

Matrix Spike File ID: NNC7788.TX0

Matrix Spike Duplicate File ID: NNC7789.TX0

* = Values Outside QC Range. « = Data outside Method Specification limits.

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

ND = Not Detected/Below Detection Limit

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

LCS % Recovery = (<1> / <3>) x 100

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

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

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

SAMPLES IN BATCH(SPL ID): 9703720-05A 9703720-07A 9703720-04A 9703720-06A

Mod. 8015 - Diesel

Matrix: Aqueous

Batch Id: HPTT970320042100

Units: mg/L

BLANK SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(**) (Advisory) RPD Max.	QC Limits(**) (Advisory) Recovery Range
DIESEL PETR. HYDROCARBONS	ND	5.0	4.53	90.6	4.63	92.6	2.18	43	20 - 130

Analyst: RR

Sequence Date: 03/21/97

Method Blank File ID:

Sample File ID:

Blank Spike File ID: TTC7273.TX0

Matrix Spike File ID:

Matrix Spike Duplicate File ID:

* = Values Outside QC Range. « = Data outside Method Specification limits.

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: SPL-Houston Historical Data

SAMPLES IN BATCH(SPL ID):

9703720-10B 9703925-01C 9703758-01F 9703720-11B
9703720-01B 9703720-05B 9703720-02B 9703720-03B
9703720-04B 9703720-06B 9703720-07B 9703720-08B
9703720-09B

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 97-03-720

10022

page 1 of 2

Client Name: Brown and Caldwell

Address/Phone: 1415 Louisiana

Client Contact: Myna Dinhart

Project Name: Hobbs

Project Number: 2832

Project Location: Hobbs, N.M.

Invoice To: BC

SAMPLE ID	DATE	TIME	comp	grab	matrix (W=water S=soil SL=sludge O=other:)	bottle (P=plastic A=amber glass G=glass V=vial)	size (1=1 liter 4=4oz 40=vial 8=8oz 16=16oz)	pres. (1=HCl 2=HNO3 3=H2SO4 O=other:)	Number of Containers	Requested Analysis: TPH DRO - 8015	TPH GRO - 8015	BTEX - 8020		pH				
MW-1	3/12/97	1758		X	W	P,G	1,40	1	5	X	X	X		1				
MW-3		1655												1				
MW-4		1825												1				
MW-5		1720												1				
MW-6		1640												1				
MW-7		1610												1				
MW-8		1625												1				
MW-9		1505											DRO	broken upon receipt SPL 3/14/97				
MW-10		1600												1				
DUP-1		—												1				

Client/Consultant Remarks: Post (5) values if dilution is needed. However, try to obtain a 1.0 mg/L detection limit. Possible OSH in MW-1, 4, 39

Laboratory remarks:

Intact? ☒ Y ☐ N

Temp: 5°C

Requested TAT

24hr ☐ 72hr ☐

48hr ☐ Standard ☒

Other ☐ _____

Special Reporting Requirements: Fax Results ☐ Raw Data ☐ Standard QC ☐ Level 3 QC ☐ Level 4 QC ☐

Special Detection Limits (specify):

PM review (initial): SHC 3/5/97

	date	time	
1. Relinquished by Sampler:	3/13/97	0800	2. Received by: SWest 3/14/97 1000
3. Relinquished by:	date	time	4. Received by:
5. Relinquished by:	date	time	6. Received by Laboratory:

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

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

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

☐ 1511 E. Orangethorpe Avenue, Fullerton, CA 92631 (714) 447-6868

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 97-03-720

10026

page 1 of 1

Client Name: BROWN and CALDWELL

Address/Phone: 1415 LOUISIANA

Client Contact: Myna Denhart

Project Name: Hobbs

Project Number: 2832

Project Location: Hobbs, N.M.

Invoice To: BC

SAMPLE ID	DATE	TIME	comp	grab	matrix (W=water S=soil SL=sludge O=other:)	bottle (P=plastic A=amber glass G=glass V=vial)	size (1=1 liter 4=4oz 40=vial 8=8oz 16=16oz)	pres. (1=HCl 2=HNO3 3=H2SO4 O=other:)	Number of Containers	Requested Analysis: TPH PRO-8015	TPH GRO-8015	BTEX-8020		pH				
MW-11	3/12/97	1545		X	W	G	1,40	1	5	X	X	X		-				
TRIP BLANK	-	-			↓	↓	40		2			X		-				

Client/Consultant Remarks:

Laboratory remarks:

Intact? [X] Y [ ] N

Temp: 5°C

Requested TAT

24hr [ ] 72hr [ ]

48hr [ ] Standard [X]

Other [ ] _____

Special Reporting Requirements: Fax Results [ ] Raw Data [ ] Standard QC [ ] Level 3 QC [ ] Level 4 QC [ ]

Special Detection Limits (specify):

PM review (initial):

	date	time	
1. Relinquished by Sampler:	3/13/97	0800	2. Received by: S. West 3/14/97 1000
3. Relinquished by:	date	time	4. Received by:
5. Relinquished by:	date	time	6. Received by Laboratory:

[X] 8880 Interchange Drive, Houston, TX 77054 (713) 660-0901

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

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

[ ] 1511 E. Orangethorpe Avenue, Fullerton, CA 92631 (714) 447-6868

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
3/14/97	1000

SPL Sample ID:
97-03-720

			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:		5° C	
10	Method of sample delivery to SPL:	SPL Delivery		
		Client Delivery		
		FedEx Delivery (airbill #)	830961581 2 830961579 0	
		Other:		
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name:	Date:
Glen Reeds	3/14/97

C

APPENDIX C

LABORATORY ANALYTICAL REPORT FOR AIR SAMPLE

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

March 28, 1997

Ms. Myna Dehnert
BROWN AND CALDWELL
1415 Louisiana
Houston, TX 77002

The following report contains analytical results for samples received at Southern Petroleum Laboratories (SPL) on March 14, 1997. The samples were assigned to Certificate of Analysis No. 9703673 and analyzed for all parameters as listed on the chain of custody.

There were no analytical problems encountered with this group of samples and all quality control data was within acceptance limits.

If you have any questions or comments pertaining to this data report, please do not hesitate to contact me. Please reference the above Certificate of Analysis No. during any inquiries.

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

Southern Petroleum Laboratories

Bernadette A. Fini
Project Manager

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

SOUTHERN PETROLEUM LABORATORIES, INC.

Certificate of Analysis Number: 97-03-673

Approved for Release by:

Bernadette A. Fini, Project Manager

Date: 3/29/97

Greg Grandits
Laboratory Director

Idelis Williams
Quality Assurance Officer

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

Certificate of Analysis No. H9-9703673-01

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

DATE: 03/27/97

PROJECT: Hobbs
SITE: Hobbs, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: EFF-31297-1

PROJECT NO: 2832.31
MATRIX: AIR
DATE SAMPLED: 03/12/97 19:00:00
DATE RECEIVED: 03/14/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	2.1	1.0 P	ppm
TOLUENE	15	1.0 P	ppm
ETHYLBENZENE	4.6	1.0 P	ppm
TOTAL XYLENE	15	1.0 P	ppm
TOTAL VOLATILE AROMATIC HYDROCARBONS	36.7		ppm
Method Modified 5030/8020A***			
Analyzed by: JN			
Date: 03/14/97			
Total Petroleum Hydrocarbons	250	5	ppm
Method Modified 8015A Air ***			
Analyzed by: JN			
Date: 03/14/97 10:43:00			

(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

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

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

Matrix: Air
Units: ppm

Batch Id: HP_P970314153500

BLANK SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(**) (Advisory) RPD Max.	QC Limits(**) (Advisory) Recovery Range
BENZENE	ND	20.0	16	80.0	16	80.0	0	30	20 - 150
TOLUENE	ND	20.0	14	70.0	14	70.0	0	30	20 - 150
ETHYLBENZENE	ND	20.0	12	60.0	12	60.0	0	30	20 - 150
O XYLENE	ND	20.0	11	55.0	12	60.0	8.70	30	20 - 150
M & P XYLENE	ND	20.0	12	60.0	12	60.0	0	30	20 - 150

Analyst: JN
Sequence Date: 03/15/97
Method Blank File ID:
Sample File ID:
Blank Spike File ID: P_C7165.TX0
Matrix Spike File ID:
Matrix Spike Duplicate File ID:

* = Values Outside QC Range. « = Data outside Method Specification limits.
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):

9703718-01A 9703732-09A 9703741-05A 9703707-01A
9703708-01A 9703711-01A 9703712-01A 9703714-01A
9703716-01A 9703719-01A 9703537-01A 9703673-01A
9703684-01A 9703684-02A 9703709-01A 9703710-01A

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

** SPL BATCH QUALITY CONTROL REPORT ** PAGE

METHOD 8015 (Modified)

Matrix: Air

Batch Id: HP_P970314181700

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 Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(**) (Advisory) RPD Max.	QC Limits(**) (Advisory) Recovery Range
TPHAIR	ND	200	144	72.0	152	76.0	5.41	30	20 - 150

Analyst: JN

Sequence Date: 03/15/97

Method Blank File ID:

Sample File ID:

Blank Spike File ID: PPC7165.TX0

Matrix Spike File ID:

Matrix Spike Duplicate File ID:

* = Values Outside QC Range. « = Data outside Method Specification limits.

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):

9703684-02A 9703709-01A 9703710-01A 9703718-01A
9703732-09A 9703741-05A 9703707-01A 9703708-01A
9703711-01A 9703712-01A 9703714-01A 9703716-01A
9703719-01A 9703537-01A 9703548-03A 9703548-04A
9703609-01A 9703673-01A 9703684-01A

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9703673

10025

page 1 of 1

Client Name: BROWN and CALDWELL

Address/Phone: 1415 LOUISIANA

Client Contact: MYRA DENHART

Project Name: Hobbs

Project Number: 2832.31

Project Location: Hobbs, N.M.

Invoice To: BC

SAMPLE ID	DATE	TIME	comp	grab	matrix (W=water S=soil SL=sludge O=other:)	bottle (P=plastic A=amber glass G=glass V=vial)	size (1=1 liter 4=4oz 40=vial 8=8oz 16=16oz)	pres. (1=HCl 2=HNO3 3=H2SO4 O=other:)	Number of Containers	Requested Analysis: BTEX 8020	Requested Analysis: TPH 418.1
EFF-31297-1	3/12/97	1900		X	O	P	BAG	NEAT	1	X	X

Client/Consultant Remarks:

Call Client Contact to CONFIRM ANALYSIS

Laboratory remarks:

Intact? X Y ☐ N

Temp: Ambient

Requested TAT

24hr ☐ 72hr ☐

48hr ☐ Standard ☒

Other ☐ _____

Special Reporting Requirements: Fax Results ☐ Raw Data ☐ Standard QC ☐ Level 3 QC ☐ Level 4 QC ☐

Special Detection Limits (specify):

PM review (initial):

	date	time	
1. Relinquished by Sampler:	3/13/97	0800	2. Received by: S. West 3/14/97 0915
3. Relinquished by:	date	time	4. Received by:
5. Relinquished by:	date	time	6. Received by Laboratory:

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

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

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

☐ 1511 E. Orangethorpe Avenue, Fullerton, CA 92631 (714) 447-6868

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
3/14/97	0915

SPL Sample ID: 9703673

			Yes	No
1	Chain-of-Custody (COC) form is present.		✓	
2	COC is properly completed.		~~✓~~ 3/14/97	✓
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 #)	788242852 3	
		Other:		
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name:	Date:
S. West	3/14/97