GW - 190

MONITORING REPORTS

DATE:

2000 - 1995

1 OF 64

BROWN AND CALDWELL

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

TRANSMITTAL MEMORANDUM

To: Wayne Price New Mexico Oil Conservation Division 2040 South Pacheco Street Santa Fe, New Mexico 87505	Date: April 12, 2000	Job No: 12988-015
	Subject: BJ Services Company, U.S.A., Artesia, NM Facility	
	Certified Mail Registration # : P076 598 816	
	Equipment No:	
	Spec. Ref:	
	Submittal No:	

WE ARE SENDING:
☒ Attached ☐ Under separate cover via **Certified Mail** the following items:
☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change Order ☒ Other: Report

THESE ARE TRANSMITTED AS CHECKED BELOW:
- ☐ Second submittal
- ☒ For your use
- ☐ For approval
- ☐ For review and comment
- ☐ With submittal review action noted

SUBMITTAL REVIEW ACTIONS:
- ☐ No exceptions taken
- ☐ Make revisions
- ☐ Amend and resubmit
- ☐ Rejected--see Remarks
- ☐ None

Copies	Date	No.	Description
1	4/11/00		Annual Groundwater Sampling and Analysis Report, Artesia, New Mexico, BJ Services Company, U.S.A.

REMARKS:

RECEIVED
APR 17 2000
Environmental Bureau
Oil Conservation Division

cc: Tim W. Gum, New Mexico Oil Conservation Division
Jo Ann Cobb, BJ Services Company, U.S.A.
Mike Wiggins, BJ Services Company, U.S.A.
Brown and Caldwell Project File
Transmittal File w/o attachments
Client File w/o attachments

Timothy L. Jenkins

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

ANNUAL GROUNDWATER SAMPLING AND ANALYSIS REPORT
ARTESIA, NEW MEXICO
BJ SERVICES COMPANY, U.S.A.

APRIL 11, 2000

ANNUAL GROUNDWATER SAMPLING AND ANALYSIS REPORT
ARTESIA, NEW MEXICO
BJ SERVICES COMPANY, U.S.A.

Prepared for

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

BC Project Number: 12988.015

RECEIVED

APR 17 2000

Environmental Bureau
Oil Conservation Division

Timothy Jenkins
Project Manager

April 11, 2000

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

CONTENTS

1.0 EXECUTIVE SUMMARY

Brown and Caldwell conducted the second of two scheduled annual groundwater sampling events at the BJ Services Company, U.S.A. (BJ Services) District Facility in Artesia, New Mexico on January 25, 2000. Groundwater samples were submitted to an analytical laboratory to determine the concentration of benzene, toluene, ethylbenzene, and xylenes (BTEX) in groundwater at the former Fuel Island Area of the site. There were no exceedences of New Mexico Water Quality Control Commission (NMWQCC) standards in any of the former Fuel Island Area wells. Brown and Caldwell recommends closure of the former Fuel Island Area according to Discharge Plan GW-190 for the BJ Services Artesia, New Mexico facility that was approved by the New Mexico Oil Conservation Division (NMOCD) on June 15, 1995.

2.0 BACKGROUND

The BJ Services Artesia District Facility is located in Eddy County, in the SE/4, Section 32, Township 16 South, Range 26 East. The facility address is 2401 Sivley, Artesia, New Mexico. A site location map and site plan map are attached as Figures 1 and 2, respectively.

BJ Services performed excavation of impacted soil from the former Fuel Island Area from November 18 through 22, 1997. Excavation activities were summarized in a January 8, 1998 letter from Brown and Caldwell to Mr. Mark Ashley of the NMOCD.

Subsequent to the November 1997 field activities, Brown and Caldwell conducted a soil and groundwater assessment at the facility from January 21-23, 1998. This soil and groundwater assessment was performed to further characterize impact resulting from the operation of the former fuel island at the facility. On January 22, 1998, Brown and Caldwell completed three soil borings at the facility, as requested in NMOCD correspondence dated January 21, 1998. Soil borings SB-FIA-1, SB-FIA-2, and SB-FIA-3 were completed as monitor wells MW-5, MW-7, and MW-6, respectively. Groundwater samples and groundwater elevation data were collected from the monitor wells on January 23, 1998. On March 24, 1998, the Soil and Groundwater Assessment Report for the former Fuel Island Area was submitted to the NMOCD. In May 1998, NMOCD verbally accepted the report and requested that two years of annual sampling be performed.

On January 20, 1999, Brown and Caldwell conducted the first of two scheduled annual groundwater sampling events at the former Fuel Island Area of the BJ Services facility in Artesia, New Mexico. The results of the January 1999 annual groundwater sampling event were provided to NMOCD on April 1, 1999. This report presents the results of the second of these two scheduled sampling events.

3.0 FIELD ACTIVITIES

Brown and Caldwell conducted the second of two scheduled annual groundwater sampling events at the BJ Services District Facility in Artesia, New Mexico on January 25, 2000. Correspondence and telephone conversation logs regarding the agreement to perform two years of annual groundwater sampling agreement are included as Appendix A. The following subsections describe the field activities during which the groundwater from monitor wells MW-5, MW-6, and MW-7 was sampled in accordance with the above-referenced NMOCD agreement. Field activities were performed in accordance with the Groundwater Sampling and Analysis Plan (GWSAP) dated January 21, 2000. The GWSAP is included as Appendix B.

3.1 Water Level Measurement and Groundwater Gradient

Water level measurements were collected from the three monitor wells at the site on January 25, 2000 to determine groundwater flow direction in the southern portion of the site. The depth-to-groundwater measurements were used in conjunction with the top of casing elevations for each monitor well to compute the relative groundwater elevations. The groundwater elevation calculations are presented in Table 1. These data were used to create the January 25, 2000 potentiometric surface map presented as Figure 3. Groundwater flow in the Fuel Island Area is to the east-southeast.

3.2 Monitor Well Purging and Sampling Procedures

Each of the monitor wells (MW-5, MW-6, and MW-7) was purged with a submersible pump. A minimum of three well casing volumes was purged from each monitor well prior to collection of groundwater samples. Temperature, pH, conductivity, and oxidation-reduction potential were measured using a YSI-600XL device during purging of the monitor wells. Groundwater samples were collected from the discharge tube from the pump when these parameters stabilized. Refer to the Groundwater Sampling Field Data Sheets in Appendix C for well purging documentation.

Groundwater samples were transferred to laboratory-supplied containers, labeled, and immediately placed on ice in an insulated cooler for shipment. At the conclusion of sampling, the samples were delivered with completed chain-of-custody documentation to the analytical laboratory. The laboratory analytical report is included as Appendix D.

3.3 Decontamination Procedures

Field sampling equipment was decontaminated prior to use at each well location by washing with a laboratory grade detergent, rinsing with potable water, and completing a final rinse with distilled water.

3.4 Sample Analysis

The groundwater samples were analyzed for BTEX by EPA Method 8021 B.

4.0 ANALYTICAL RESULTS

Analytical results for groundwater samples collected during the January 1998 and January 1999 sampling events are summarized in Table 2. Analytical results for groundwater samples collected during the January 2000 sampling event are also presented in Table 2, along with a summary of NMWQCC Standards.

Laboratory analysis of groundwater samples collected during the January 2000 sampling event indicated that benzene, toluene, ethylbenzene and xylenes were not detected in any of the former Fuel Island monitor wells (MW-5, MW-6, and MW-7). Detection limits were less than applicable NMWQCC Standards for all parameters in these wells.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Laboratory results for the groundwater samples were compared to NMWQCC Groundwater Standards. There were no exceedences of NMWQCC groundwater standards among the groundwater samples.

5.2 Recommendations

Brown and Caldwell recommends final closure of the former Fuel Island Area at the BJ Services Artesia, New Mexico facility, in accordance with the requirements of Discharge Plan GW-190 for the facility.

DISTRIBUTION

Annual Groundwater Sampling and Analysis Report
Artesia, New Mexico
BJ Services Company, U.S.A.

April 11, 2000

1 copy to: New Mexico Oil Conservation Division
2040 South Pacheco Street
Santa Fe, New Mexico 87505

Attention: Mr. Wayne Price

1 copy to: New Mexico Oil Conservation Division
811 South 1st Street
Artesia, New Mexico 88211

Attention: Mr. Tim W. Gum

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

Attention: Ms. Jo Ann Cobb

1 copy to: BJ Services Company, U.S.A.
2401 Sivley
Artesia, New Mexico 88210

Attention: Mr. Mike Wiggins

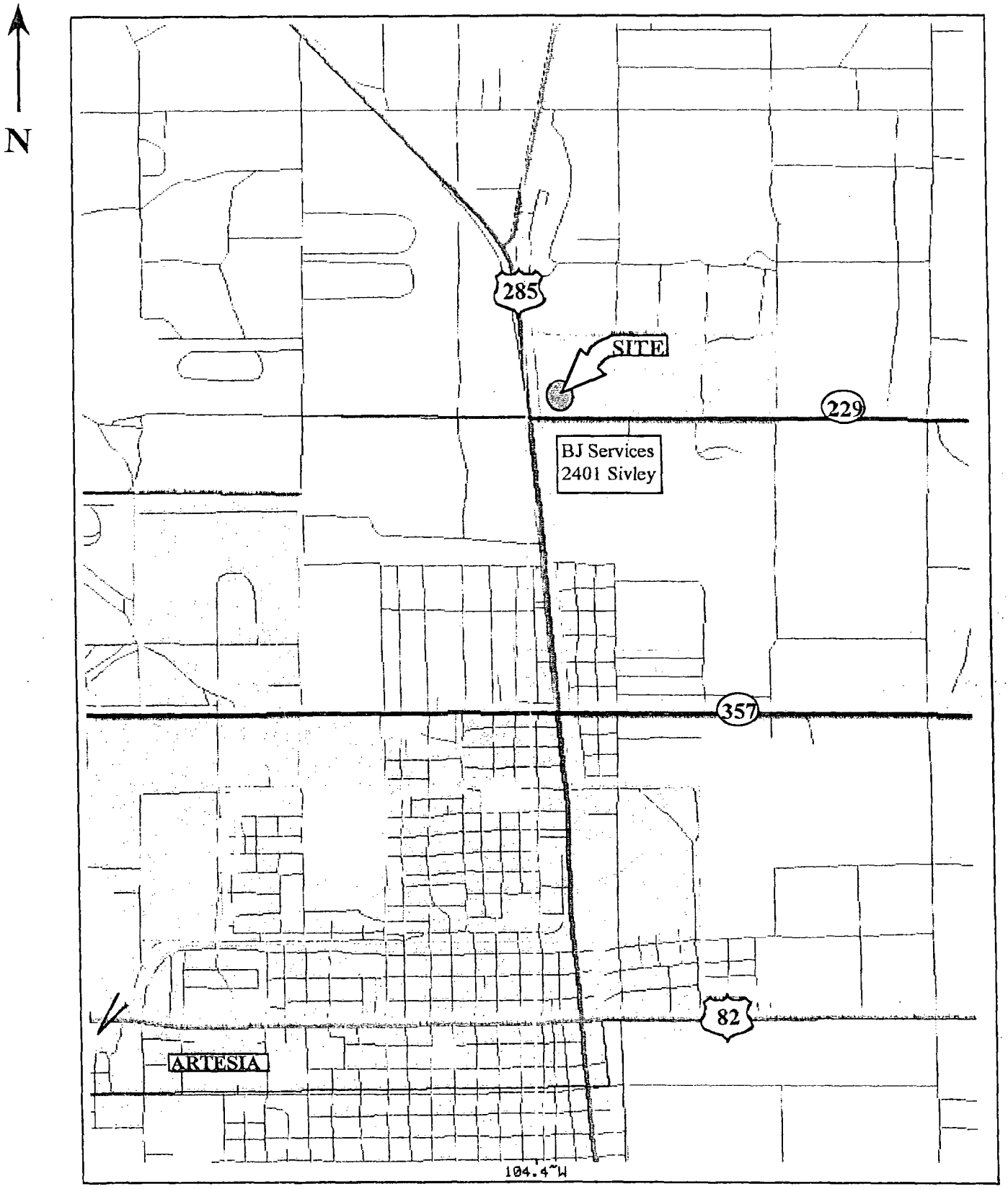
1 copy to: Brown and Caldwell
File

QUALITY CONTROL REVIEWER:

Richard L. Rexroad
Principal in Charge

TLJ/uak

FIGURES



BROWN AND CALDWELL HOUSTON, TEXAS	0 0.5 1 miles	TITLE SITE LOCATION MAP	DATE 03/25/99
		CLIENT BJ SERVICES COMPANY, U.S.A.	PROJECT NO. 12988-014
		SITE LOCATION ARTESIA, NEW MEXICO	FIGURE NO. 1

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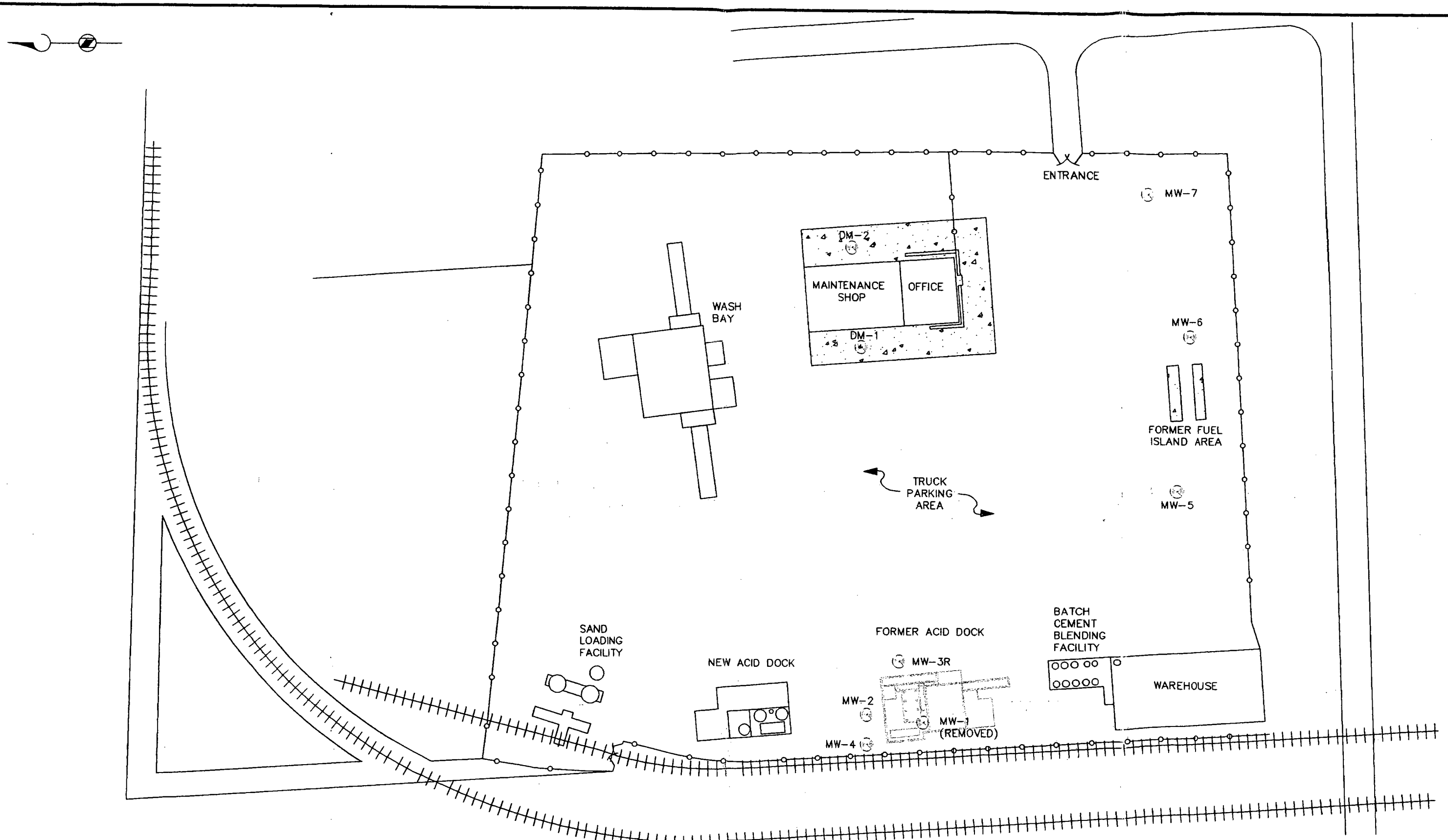

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BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

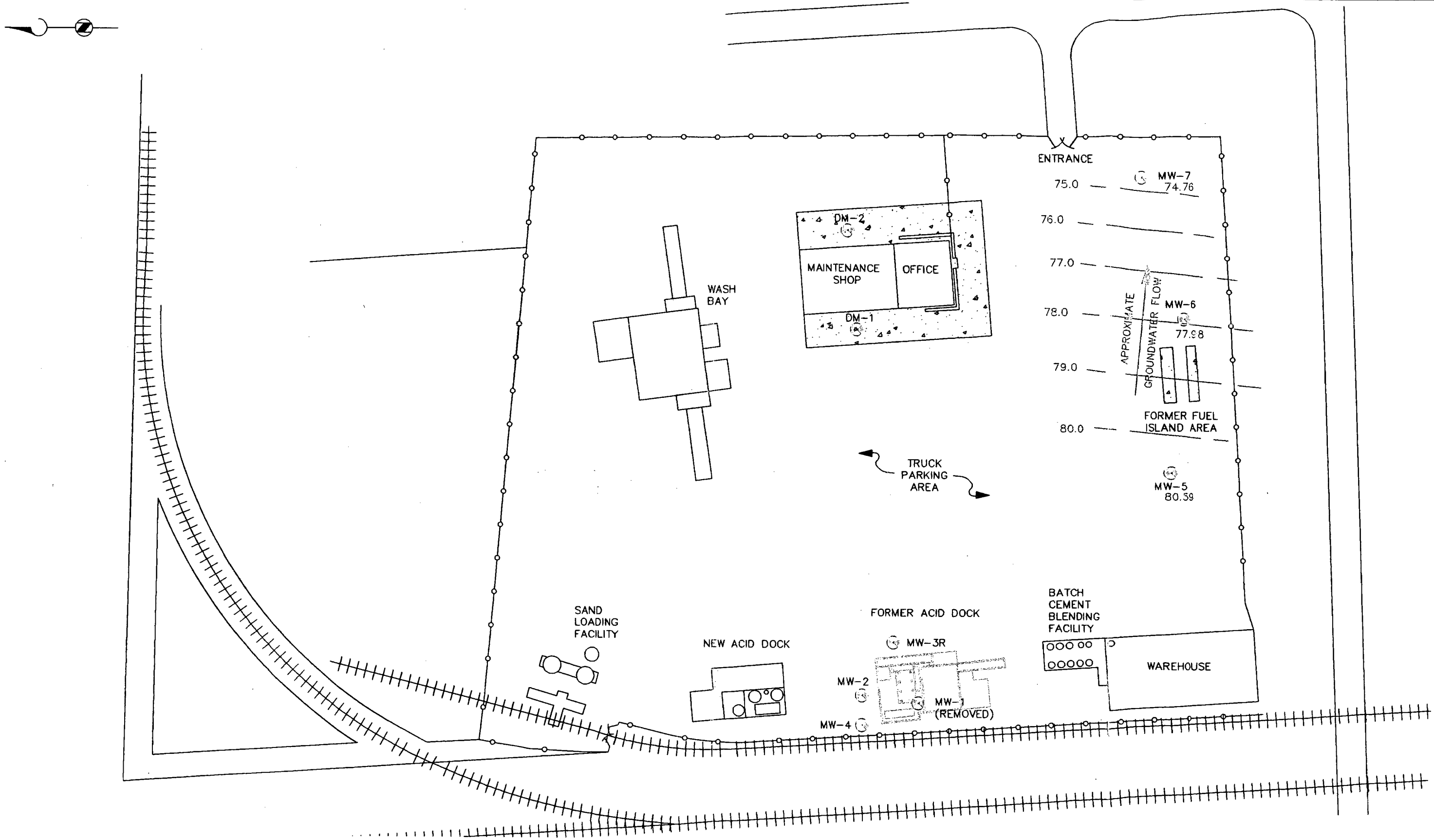
0 50 100
SCALE: 1" = 100'
DRAWN BY: TLJ DATE 2/00
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-1 MONITOR WELL LOCATIONS

CONCRETE DRIVES, APRON

TITLE: SITE PLAN MAP	DATE: 02/23/00
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 12988.015
SITE: ARTESIA, NEW MEXICO	FIGURE NUMBER: 2



P:\cad\jobs\12988\FIA-PROJ\GW-Elev-000125 02/00 TLJ

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 50 100
SCALE: 1" = 100'
DRAWN BY: TLJ DATE 2/00
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-1 MONITOR WELL LOCATIONS

CONCRETE DRIVES, APRON

TITLE	POTENTIOMETRIC SURFACE MAP FOR JANUARY 25, 2000
CLIENT	BJ SERVICES COMPANY, U.S.A.
SITE	ARTESIA, NEW MEXICO
DATE	02/23/00
PROJECT NUMBER	12988.015
FIGURE NUMBER	3

TABLES

Table 1

Groundwater Elevation Data
BJ Services Company, U.S.A.
Artesia, New Mexico

Monitor Well	Top of Casing (Relative Elevation)	Measurement Date	Depth to Water (feet)	Groundwater Elevation [1]
MW-5	99.10	1/23/98	13.38	85.72
		1/20/99	17.81	81.29
		1/25/00	18.51	80.59
MW-6	97.69	1/23/98	14.00	83.69
		1/20/99	18.54	79.13 [2]
		1/25/00	19.71	77.98
MW-7	97.61	1/23/98	15.51	82.10
		1/20/99	20.34	77.27
		1/25/00	22.85	74.76

[1] Elevations of well casings were established relative to the office building slab, which was assigned an arbitrary elevation of 100.00 feet.

[2] Elevation corrected to account for phase separated hydrocarbons present at a thickness of 0.03 ft. in this monitor well. Correction assumes specific gravity of product is 0.8.

Table 2
Cumulative Analytical Results[1]
BJ Services Company, U.S.A.
Artesia, New Mexico

Analytical Parameters	NMWQCC[2] Groundwater Standards	MW-5			MW-6			MW-7		
		Jan-98	Jan-99	Jan-00	Jan-98	Jan-99	Jan-00	Jan-98	Jan-99	Jan-00
VOLATILES by Method 8020 (mg/L)										
Benzene	0.01	< 0.0010	< 0.0010	< 0.001	< 0.0010	0.0040	< 0.001	0.0021	<0.0010	< 0.001
Toluene	0.75	< 0.0010	0.0022	< 0.001	< 0.0010	< 0.0010	< 0.001	< 0.0010	0.0019	< 0.001
Ethylbenzene	0.75	< 0.0010	< 0.0010	< 0.001	0.0080	0.019	< 0.001	< 0.0010	< 0.0010	< 0.001
Total Xylenes	0.62	< 0.0010	0.0022	< 0.001	< 0.0010	0.0011	< 0.001	< 0.0010	0.0037	< 0.001
PAHs by Method 8310 (mg/L)										
Fluorene	NL[3]	< 0.0003	0.0001 B[4]	NA[5]	0.008	0.38	NA	< 0.0030	0.001 B	NA
Phenanthrene	NL	< 0.0001	0.0001 B	NA	0.011	0.088	NA	0.003	0.002 B	NA
Naphthalene	0.03 [6]	0.0004	0.0001 B	NA	0.002	<0.0020	NA	0.001	0.0006 B	NA
Pyrene	NL	< 0.0001	<0.0001	NA	<0.0020	0.011	NA	<0.0001	0.0004	NA
Benzo (k) fluoranthene	NL	< 0.0001	<0.0001	NA	<0.0020	0.002	NA	<0.0001	<0.0001	NA
Acenaphthene	NL	< 0.0003	<0.0001	NA	<0.0060	<0.0020	NA	< 0.0030	0.002 B	NA
Chrysene	NL	< 0.0001	<0.0001	NA	<0.0020	<0.0020	NA	<0.0001	0.0002	NA
Benzo (a) anthracene	NL	< 0.0001	<0.0001	NA	<0.0020	<0.0020	NA	<0.0001	0.002	NA
RCRA Metals by Method 3010A/3020A/6010B/7000 Series (mg/L)										
Arsenic	0.1	< 0.005	< 0.005	NA	0.005	0.008	NA	< 0.005	0.007	NA
Barium	1.0	0.027	0.009	NA	0.195	0.125	NA	0.012	0.053	NA
Cadmium	0.01	< 0.005	< 0.005	NA	< 0.005	< 0.005	NA	< 0.005	< 0.005	NA
Chromium	0.05	< 0.01	< 0.01	NA	0.02	<0.01	NA	< 0.01	< 0.01	NA
Mercury	0.002	< 0.0002	< 0.0002	NA	< 0.0002	< 0.0002	NA	< 0.0002	0.0003	NA
Lead	0.05	0.014	<0.005	NA	0.011	<0.005	NA	0.006	0.006	NA
Selenium	0.05	0.006	0.026	NA	< 0.005	0.010	NA	< 0.005	0.010	NA
Silver	0.05	< 0.01	< 0.01	NA	< 0.01	< 0.01	NA	< 0.01	< 0.01	NA

[1] Chemicals reported at concentrations less than applicable Practical Quantitation Limit (PQL) are not listed.

[2] NMWQCC = New Mexico Water Quality Control Commission

[3] NL - Not listed

[4] B indicates that constituent was detected in the laboratory method blank.

[5] NA - Not analyzed

[6] Value is for PAHs: total naphthalene plus monomethylnaphthalenes.

APPENDICES

APPENDIX A

Relevant Correspondence and Telephone Conversation Logs with the NMOCD

NEW MEXICO ENERGY, MINERALS & NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

April 2, 1998

Post-it™ Fax Note 7671	Date 4-8	# of pages ▶ 1
To Bob	From JO Ann	
Co./Dept.	Co.	
Phone #	Phone #	
Fax #	Fax #	

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-259-049

Ms. Jo Ann Cobb
BJ Services Company, U.S.A.
8701 New Trails Drive
The Woodlands, Texas 77381

APR 07 1998
ENVIRONMENTAL

RE: Fuel Island Soil and Ground Water Assessment
Artesia Facility
Eddy County, New Mexico

Dear Ms. Cobb:

The New Mexico Oil Conservation Division (OCD) has completed a review of the BJ Services Company, U.S.A. (BJ) "Final Soil and Ground Water Assessment Report" dated March 24, 1998. This report was submitted by Brown and Caldwell on behalf of BJ. It contains a summary of activities performed to date and a request for final closure at the former fuel island area.

The above referenced report is approved with the following condition:

1. At future discharge plan renewals MW-5, MW-6 and MW-7 will be sampled for BTEX using EPA approved methods.

Please be advised that OCD approval does not relieve BJ of liability if contamination exists which is beyond the scope of the report or if the activities failed to adequately determine the extent of contamination related to BJ's activities. In addition, OCD approval does not relieve BJ of responsibility for compliance with any other federal, state or local laws and/or regulations.

If BJ has any questions, please call me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

xc: OCD Artesia Office

April 21, 1998

Mr. Mark Ashley
State of New Mexico
Energy, Minerals, and Natural Resources Department
Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505

2988-09

Subject: BJ Services Facility – Artesia, New Mexico
Fuel Island Soil and Groundwater Assessment

Dear Mr. Ashley:

Thank you for reviewing BJ Services "Final Soil and Groundwater Assessment Report" of March 24, 1998, and your subsequent letter response dated April 2, 1998. In your letter response, the NMOCD granted closure of the Fuel Island Area on the condition that groundwater monitoring be conducted for MW-5, MW-6, and MW-7 at the time of each discharge plan renewal (approximately once every 5 years). As an alternative to this time frame, which appears to be unlimited in scope, Brown and Caldwell suggests that a groundwater monitoring program be performed annually for two years, with the first event scheduled for January 1999 (approximately one year from the initial sampling event). As requested in the NMOCD letter of April 2, 1998, groundwater samples collected during these annual events would be analyzed for BTEX by EPA Method 8020. Pending results of these groundwater monitoring events, BJ Services would propose either final closure of the Fuel Island Area or continued monitoring.

Thank you for considering this alternate plan for groundwater monitoring. If you have any questions, please do not hesitate to contact me at (713) 646-1138.

Very truly yours,

BROWN AND CALDWELL

Timothy L. Jenkins
Associate Engineer

cc: NMOCD Artesia District Office
Jo Ann Cobb, BJ Services Company, U.S.A.
Rick N. Johnson, BJ Services Company, U.S.A.

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FILE: 2988-09

BROWN AND CALDWELL

RECORD OF TELEPHONE CONVERSATION

DATE: 05/14/98	JOB/DESCRIPTION: BJ Artesia - Former Fuel Island Area	
INDIVIDUAL	ORGANIZATION	TELEPHONE NO.
FROM: Tim Jenkins	Brown and Caldwell	713-646-1138
TO: Mark Ashley	NMOCD	505-827-7155
SUBJECT: Monitoring Wells and Proposed Sampling Events – FIA		

GOALS OF THE CONVERSATION:

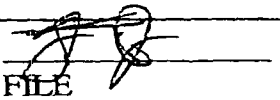
1) Determine whether proposed sampling of FIA wells twice over next two years is acceptable
2) Verify conclusions and procedures for future correspondence

NOTES:

1. The letter from BJ Services to the NMOCD proposing monitor well sampling once a year for the next two years has been verbally agreed upon. This would allow sampling to be performed twice prior to discharge plan renewal (the current Discharge Plan will expire on June 13, 2000).
2. Future activities will be performed as requested by the OCD and approved by BJ Services. Only upon receipt of written approval shall these activities be scheduled and performed. All approvals and proposed actions will be followed up with official letter correspondence.

ACTION REQUIRED:

1) Tentatively plan a sampling event for January 1999 and January 2000 for MW-5 through MW-7.
2) Await OCD correspondence with suggestions and recommendations for these activities.

INITIALS: 

ROUTING: FILE
Robert N. Jennings
Richard Rexroad

APPENDIX B

Groundwater Sampling and Analysis Plan
January 21, 2000

GROUNDWATER SAMPLING AND ANALYSIS PLAN
FORMER FUEL ISLAND AREA
BJ SERVICES COMPANY, U.S.A.
ARTESIA, NEW MEXICO

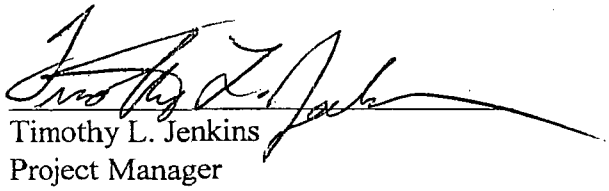
JANUARY 21, 2000

GROUNDWATER SAMPLING AND ANALYSIS PLAN
FORMER FUEL ISLAND AREA
BJ SERVICES COMPANY, U.S.A.
ARTESIA, NEW MEXICO

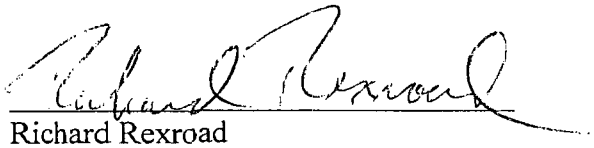
Prepared for

BJ Services Company, U.S.A.
11211 FM 2920
Engineering Bldg., Rm. 2006
Tomball, TX 77375

Project Number: 12988-015



Timothy L. Jenkins
Project Manager



Richard Rexroad
Principal-in-Charge

January 21, 2000

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

CONTENTS

FIGURES

APPENDICES

1.0 INTRODUCTION

Groundwater sampling of monitor wells at the former Fuel Island Area (FIA), MW-5, MW-6, and MW-7 will be performed at the BJ Services facility in Artesia, New Mexico. Figure 1 is a map showing the location of the site. Figure 2 is a facility map for the Artesia facility. The Site Safety Health Plan for the site is included as Appendix A.

Prior to commencement of the sampling event, the following personnel will be notified of the upcoming sampling event:

- Brown and Caldwell Client Services Manager (CSM) - Bob Jennings
- Brown and Caldwell Principal-in-Charge (PIC) – Richard Rexroad
- BJ Services Project Manager - Rick Johnson (281-357-2573)
- BJ Services Site Personnel – Mike Wiggins (505-746-3140).

This notification will be the responsibility of the Brown and Caldwell project manager, who may designate individual notification responsibilities, as appropriate.

2.0 REQUIRED EQUIPMENT

Following is a partial list of equipment that will be required for the semiannual sampling events to be performed at the BJ Services - Artesia facility.

- Water Level Indicator and Oil/Water Interface Probe
- Decontamination Supplies
- Pump (1.5-inch diameter car battery pump with 60-foot lead) (Geosquirt)
- Groundwater Sampling Forms (i.e., Field Data Sheets, included as Appendix B)
- YSI Flow Cell (600 XL) (pH, specific conductivity, dissolved oxygen, and temperature probes)
- Sample Containers for Required Analytical Parameters (see Section 5.0)
- 9/16-inch wrench, ¾-inch wrench, and a flat head screwdriver
- Pry bar for removing well caps, etc.
- Steel-toed Boots, Hard Hat, Safety Glasses, and Hearing Protection.

3.0 GROUNDWATER SAMPLING PROCEDURES

The following wells will be sampled at the BJ Services Artesia facility during the groundwater sampling event in the order listed, based on historical impact:

- MW-5
- MW-7
- MW-6

3.1 Groundwater Level Measurements

Groundwater level measurements will be obtained from the monitor wells (MW-5 through MW-7) prior to purging and sampling the wells. Additionally, groundwater level measurements will be obtained from other monitor wells at the site, specifically, the two monitor wells located at the maintenance bay area, DM-1 and DM-2. These wells should be gauged last, as they have had product in measurable quantities. They also have product recovery devices that should be removed prior to gauging the product/water level. See Figure 2 for a site plan map showing the location of all the groundwater monitor wells. All groundwater level measurements should be obtained during the same calendar day. The groundwater levels will be measured with a water level indicator and/or an oil/water interface probe to the nearest 0.01 foot and recorded in the field log book. The presence and thickness of PSH and/or sheen, if observed in any monitor wells, will be noted.

The groundwater elevation data will be used to calculate well purge volumes, using the following formula for a 2-inch diameter well:

Well volume (gallons) = 0.163 x thickness (ft) of water column in the well.

3.2 Well Purging

The water level in the well will be verified immediately prior to well purging using a decontaminated water level indicator. The water level indicator will remain in the well during the purging process, if possible, in order to monitor water level throughout the purging process.

The wells will be purged with a 1.5-inch diameter submersible pump. The flow rate of the pump should be adjusted so that the water level in the well is maintained at no less than 80% of the static water level in the well.

Field parameter measurements for pH, specific conductivity, dissolved oxygen (DO), oxidation-reduction potential (ORP), and temperature will be collected using a YSI 600 XL flow cell after each well volume is purged. Field parameter readings will be listed on Field Data Sheets (see Attachment 2). Two consecutive readings within ten percent (or within 0.2 pH units) will be used to indicate that groundwater has stabilized. At least three well volumes will be removed from each well, unless the well pumps dry prior to removal of three well volumes.

Field Data Sheets will be completed, as applicable with water level and purge data. Additionally, general observations concerning water quality will be noted in the space provided. At least three well volumes will be removed from each well, unless the well pumps dry prior to removal of three well volumes.

Water removed from the well during the purging process will be temporarily stored in a drum provided by BJ Services until it can be further managed (see Section 6.2).

3.3 Groundwater Sampling

Upon completion of purging operations, groundwater samples will be using a new disposable bailer, as the parameters to be analyzed include only volatile constituents. Each sample will be

transferred into laboratory-supplied, clean glass or plastic containers containing the appropriate preservatives, labeled, and placed on ice in an insulated cooler for shipment.

Sample containers should be labeled immediately upon filling in order to avoid possible confusion as to which sample came from which well.

4.0 SAMPLE MANAGEMENT

Filled and labeled sample containers should be placed in "bubble wrap" as supplied by the analytical laboratory and then sealed within "zip-lock" plastic bags. If the container size is such that the sample container will not seal, place the sample container in the bag with the neck of the sample container extending through the top of the bag.

Place the sample containers in an ice chest containing ice for temporary storage until ready to prepare the samples for shipment. A supply of ice is present at the facility in the locker room adjacent to the dispatcher's office. Therefore, it is not necessary and not advisable to purchase ice for sample preservation.

Samples should be prepared for shipment according to the following procedures:

- Place a previously unused large volume plastic trash bag in the ice chest or cooler.
- Place the sample containers in the plastic bag. The sample containers should be placed upright in the cooler in such a manner that they will not touch during shipment.
- Place inert packing material (e.g., vermiculite, kitty litter, etc.) to partially cover the sample containers (approximately halfway). Place ice or chemical ice (i.e., "blue ice") on top of the sample containers and seal the plastic bag. Ice will be double bagged inside "zip lock" plastic bags.
- Fill the remainder of the cooler with cushioning material.
- Place the completed chain of custody form in a waterproof plastic bag and tape it to the interior lid of the shipping container.
- Tape the drain plug of the ice chest or cooler shut (if present).
- Secure the lid by taping with clear packing/strapping tape at a minimum of two locations.
- Attach the completed shipping label to the top of the cooler. Secure it with clear packing/strapping tape.
- Affix signed and dated custody seals on the front right and back left sides of the shipping container. Cover the seals with clear packing/strapping tape.

If samples are to be delivered to the laboratory on Saturday, arrangements for receipt of the samples by laboratory personnel on Saturday must be made prior to shipment of the samples. The laboratory to be used is Southern Petroleum Labs of Houston, Texas.

5.0 ANALYTICAL PARAMETERS

The following subsections detail analytical requirements for groundwater sampling events at the former Fuel Island Area as well as requirements for QA/QC sample collection.

5.1 Analytical Requirements

Groundwater samples collected from MW-5, MW-6, and MW-7 during the sampling event will be analyzed for the following parameters as per NMOCD directive dated April 2,1998; a letter dated April 21, 1998 summarizing the agreement between the NMOCD and BJ Services is included as Appendix C.

The analytical parameters are:

- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) by EPA Method 8021B.

5.2 QA/QC Samples

A trip blank will also be included in the sample shipment cooler. The trip blank will be analyzed for BTEX (method 8021B). No duplicates will be will be required.

6.0 DECONTAMINATION AND WASTE MANAGEMENT

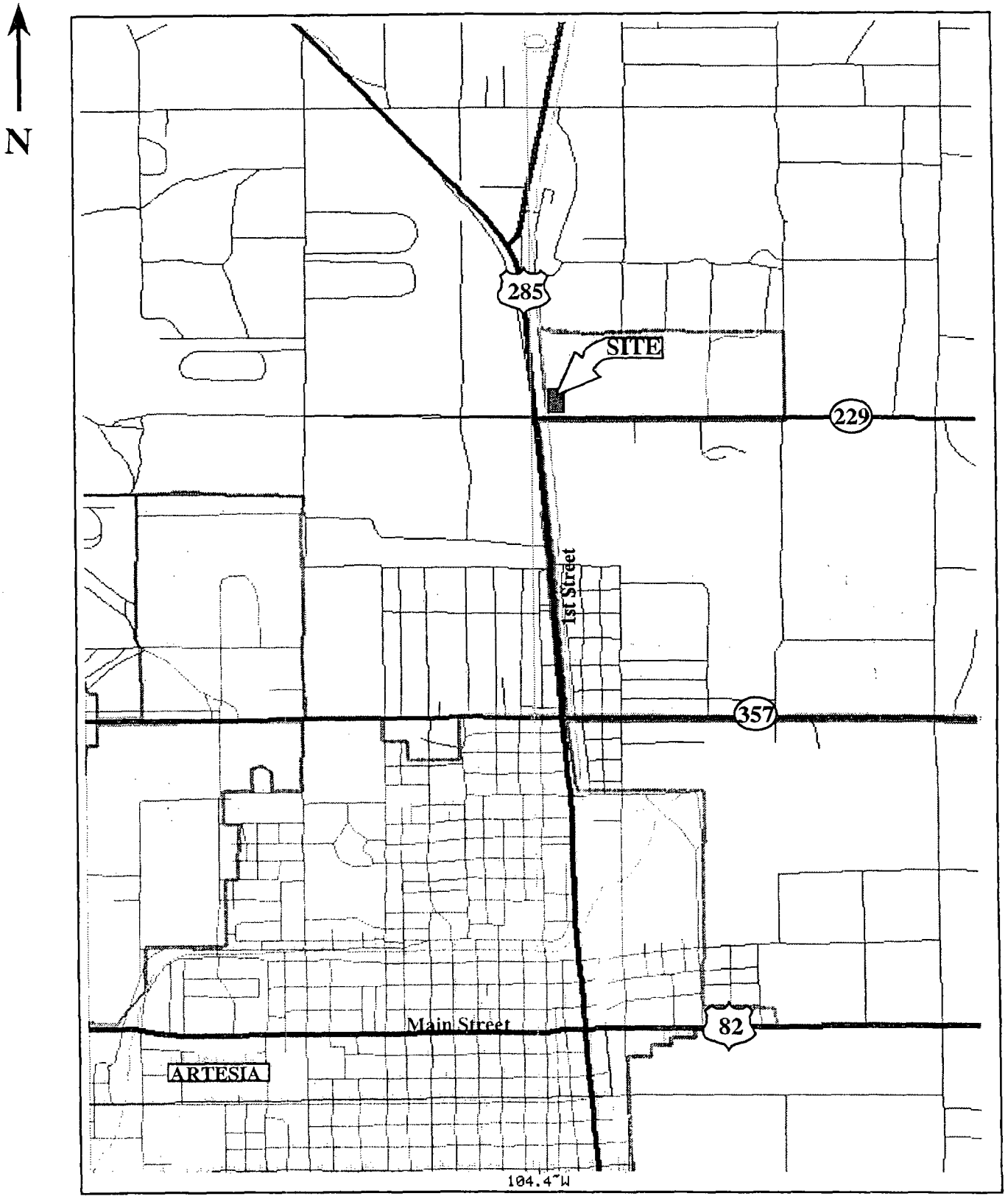
6.1 Decontamination

The submersible pump and field measurement equipment will be decontaminated prior to and after each use. Decontamination procedures will consist of washing with a laboratory grade detergent, rinsing with tap water, and then rinsing with distilled water.

6.2 Waste Management

Purged water and decontamination water will be placed into a 55-gallon drum to be provided by BJ Services. Water drums will be properly labeled. Any recovered product will be placed separately in the facility's waste oil receptacle.

FIGURES



BROWN AND CALDWELL HOUSTON, TEXAS	0 0.5 1 miles	TITLE SITE LOCATION MAP	DATE 03/23/98
		CLIENT BJ SERVICES COMPANY, U.S.A.	PROJECT NO. 2988-09
		SITE LOCATION ARTESIA, NEW MEXICO	FIGURE NO. 1

g:\BJServ\2988\09\1-ARTES.ppt

APPENDIX A

Site-Specific Health and Safety Plan

APPENDIX C

Groundwater Sampling Field Data Sheets

BROWN AND CALDWELL

GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-5 773278 9547

1. PROJECT INFORMATION

Project Number: 12588 Task Number: CS 5 Date: 1/25/00 Time: 1536

Client: BJ Services Personnel: Chris Hagel

Project Location: Artesia NM Weather: Sunny and Cool

2. WELL DATA

Casing Diameter: 2 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other:
Screen Diameter: 2 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other:
Total Depth of Well: 27.65 feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Static Water: 16.54 feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Product: 0 feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Length of Water Column: 9.11 feet	Well Volume: 1.46 gal

Screened Interval (from GS): _____

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

3. PURGE DATA

Purge Method: ☐ Bailer, Size: ___ ☐ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

Equipment Model(s)

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____ ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

1. _____

Materials: Rope/Tubing ☐ Polyethylene ☒ Polypropylene ☐ Teflon® ☐ Other: _____ ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

2. _____

Was well purged dry? ☐ Yes ☒ No Pumping Rate: 0.25 gal/min

3. _____

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1623	0.125	7.52	18.80	3907.0	153.4	2.72.1	—		Clear
1629	1.0	7.10	20.46	3876.0	159.5	333	—		Clear
1634	3.5	6.99	20.23	3802	164.6	445.9	—		Clear
1640	5.1	6.98	20.62	3781.4	166.1	516.9	—		Clear
1645	55.2	7.01	20.85	3852.3	178.8	591.0			Clear

4. SAMPLING DATA

Method(s): ☒ Bailer, Size: 1" ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: _____ ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: _____ ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

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

Sample ID: MW-5 Sample Time: 1649 # of Containers: 3

Duplicate Sample Collected? ☐ Yes ☒ No ID:

Geochemical Analyses

Ferrous Iron: ____ mg/L

DO: ____ mg/L

Nitrate: ____ mg/L

Sulfate: ____ mg/L

Alkalinity: ____ mg/L

5. COMMENTS

Dissolve Oxygen Does not appear to be functioning.

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

Signature

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

BROWN AND CALDWELL

GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-6

1. PROJECT INFORMATION

Project Number: 12988 Task Number: 005 Date: 2/5/00 Time: 1536

Client: BJ Services Personnel: Chris Angel

Project Location: Artesia, NM Weather: Sunny and Cool

2. WELL DATA

Casing Diameter: 2 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other:
Screen Diameter: 2 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other:
Total Depth of Well: 30.16 feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Static Water: 19.71 feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Product: ( ) feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Length of Water Column: 10.45 feet	Well Volume: 1.70 gal Screened Interval (from GS):

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

3. PURGE DATA

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

Equipment Model(s)

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

1.

Materials: Rope/Tubing ☐ Polyethylene ☒ Polypropylene ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

2.

Was well purged dry? ☒ Yes ☒ No Pumping Rate: 0.40 gal/min

3.

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1756	9.25	7.11	19.40	49/4	72.8	21.29	—	—	Clear
1800	2.0	6.80	20.19	4988	-63.7	21.82	—		
1806	4.0	6.76	26.40	4729	-24.6	30.16			
1812	6.0		20.27	4932		0.69			

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: ___ ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☒ Polyethylene ☐ Polypropylene ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☒ Disposable

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

Sample ID: MW-6 Sample Time: 1815 # of Containers: 3

Duplicate Sample Collected? ☐ Yes ☒ No ID:

Geochemical Analyses

Ferrous Iron: — mg/L

DO: — mg/L

Nitrate: — mg/L

Sulfate: — mg/L

Alkalinity: — mg/L

5. COMMENTS

Well cap not on well. Sheen seen on the water in the manhole. Dissolved oxygen meter Does not appear to be functioning

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

Signature

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

BROWN AND CALDWELL

GROUNDWATER SAMPLING FIELD DATA SHEET

WELL ID: MW-7

1. PROJECT INFORMATION

Project Number: 12988 Task Number: 005 Date: 1/25/00 Time: 1547

Client: BJ Services Personnel: Chris Angel

Project Location: Artesia, NM Weather: Sunny & Cool

2. WELL DATA

Casing Diameter: 2 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other:
Screen Diameter: 2 inches	Type: ☒ PVC ☐ Stainless ☐ Galv. Steel ☐ Teflon® ☐ Other:
Total Depth of Well: 30.40 feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Static Water: 22.85 feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Depth to Product: 0 feet	From: ☒ Top of Well Casing (TOC) ☐ Top of Protective Casing ☐ Other:
Length of Water Column: 7.55 feet	Well Volume: 1.25 gal Screened Interval (from GS):

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

3. PURGE DATA

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

Equipment Model(s)

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

1.

Materials: Rope/Tubing ☐ Polyethylene ☒ Polypropylene ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

2.

Was well purged dry? ☐ Yes ☒ No Pumping Rate: 0.25 gal/min

3.

Time	Cum. Gallons Removed	pH	Temp	Spec. Cond.	Eh	Dissolved Oxygen	Turbidity	Other:	Comments
1722	0.25	6.82	20.00	4418	164.5	22.02	—		Cloudy
1728	1.25	6.72	20.62	4463	161.6	23.76			Cl
1733	2.5	6.71	20.65	4421	158.8	24.36			Clear
1740	3.75	6.72	20.65	4426	158.1	24.31			Clear

4. SAMPLING DATA

Method(s): ☐ Bailer, Size: ___ ☐ Bladder Pump ☒ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:

Materials: Pump/Bailer ☐ Stainless ☒ PVC ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

Materials: Tubing/Rope ☐ Polyethylene ☒ Polypropylene ☐ Teflon® ☐ Other: ☐ Dedicated ☐ Prepared Off-Site ☐ Field Cleaned ☐ Disposable

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

Sample ID: MW-7 Sample Time: 1744 # of Containers:

Duplicate Sample Collected? ☐ Yes ☒ No ID:

Geochemical Analyses

Ferrous Iron: mg/L

DO: mg/L

Nitrate: mg/L

Sulfate: mg/L

Alkalinity: mg/L

5. COMMENTS

Dissolved oxygen meter Does not Appear to be Working

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

Signature

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

APPENDIX D

Laboratory Analytical Report

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

Case Narrative for:

Brown & Caldwell

Certificate of Analysis Number:

00010652

Report To:		Project Name:	BJ Services-Artesia #12899.005
Brown & Caldwell		Site:	BJ Services-Artesia
Tim Jenkins		Site Address:	
1415 Louisiana			Artesia NM
Suite 2500		PO Number:	
Houston		State:	New Mexico
TX		State Cert. No.:	N/A
77002-		Date Reported:	
ph: (713) 759-0999	fax: (713) 308-3886		

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

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

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

Fini, Bernadette
Customer Service Manager

2/3/00
Date

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

Brown & Caldwell

Certificate of Analysis Number:

00010652

Report To:	Brown & Caldwell Tim Jenkins 1415 Louisiana Suite 2500 Houston TX 77002- ph: (713) 759-0999 fax: (713) 308-3886	**Project Name:**	BJ Services-Artesia #12899.005
		Site:	BJ Services-Artesia
		Site Address:	
			Artesia NM
		PO Number:	
		State:	New Mexico
		State Cert. No.:	N/A
Fax To:	*Brown & Caldwell* *Tim Jenkins fax: (713) 308-3886*	**Date Reported:**	

Client Sample ID	Lab Sample ID	Matrix	Date Collected	Date Received	COC ID	HOLD
W-5	00010652-01	Water	1/25/00 4:49:00 PM	1/27/00 10:00:00 AM	084674	☐
MW-7	00010652-02	Water	1/25/00 5:44:00 PM	1/27/00 10:00:00 AM	084674	☐
MW-6	00010652-03	Water	1/25/00 6:15:00 PM	1/27/00 10:00:00 AM	084674	☐
p Blank 1/21/00	00010652-04	Water	1/25/00	1/27/00 10:00:00 AM	084674	☐

2/3/00

Date

Fini, Bernadette
Customer Service Manager

Joel Grice
Laboratory Director

Ted Yen
Quality Assurance Officer

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

Client Sample ID MW-5 **Collected:** 1/25/00 4:49:00 **SPL Sample ID:** 00010652-01

Site: BJ Services-Artesia

Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS				**MCL**	**SW8021B**		**Units: ug/L**		
Benzene	ND		1		1		01/28/00 19:36	WR	174807
Ethylbenzene	ND		1		1		01/28/00 19:36	WR	174807
Toluene	ND		1		1		01/28/00 19:36	WR	174807
Xylenes,Total	ND		1		1		01/28/00 19:36	WR	174807
Surr: 1,4-Difluorobenzene	107	%	72-137		1		01/28/00 19:36	WR	174807
Surr: 4-Bromofluorobenzene	105	%	48-156		1		01/28/00 19:36	WR	174807

Qualifiers:

ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Surrogate Recovery Outside Advisable QC Limits
J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

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

Client Sample ID MW-7 | Collected: 1/25/00 5:44:00 | SPL Sample ID: 00010652-02

Site: BJ Services-Artesia

Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS				MCL	SW8021B		Units: ug/L		
Benzene	ND		1		1		01/28/00 20:02	WR	174808
Ethylbenzene	ND		1		1		01/28/00 20:02	WR	174808
Toluene	ND		1		1		01/28/00 20:02	WR	174808
Xylenes,Total	ND		1		1		01/28/00 20:02	WR	174808
Surr: 1,4-Difluorobenzene	105	%	72-137		1		01/28/00 20:02	WR	174808
Surr: 4-Bromofluorobenzene	104	%	48-156		1		01/28/00 20:02	WR	174808

Qualifiers:
ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Surrogate Recovery Outside Advisable QC Limits
J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

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

Client Sample ID MW-6 **Collected:** 1/25/00 6:15:00 **SPL Sample ID:** 00010652-03

Site: BJ Services-Artesia

Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS				**MCL**	**SW8021B**		**Units: ug/L**		
Benzene	ND		1		1		01/28/00 20:28	WR	174809
Ethylbenzene	ND		1		1		01/28/00 20:28	WR	174809
Toluene	ND		1		1		01/28/00 20:28	WR	174809
Xylenes,Total	ND		1		1		01/28/00 20:28	WR	174809
Surr: 1,4-Difluorobenzene	105	%	72-137		1		01/28/00 20:28	WR	174809
Surr: 4-Bromofluorobenzene	104	%	48-156		1		01/28/00 20:28	WR	174809

Qualifiers:
ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Surrogate Recovery Outside Advisable QC Limits
J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

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

Client Sample ID Trip Blank 1/21/00 **Collected:** 1/25/00 **SPL Sample ID:** 00010652-04

Site: BJ Services-Artesia

Analyses/Method	Result		Rep.Limit		Dil. Factor	QUAL	Date Analyzed	Analyst	Seq. #
PURGEABLE AROMATICS				**MCL**	**SW8021B**		**Units: ug/L**		
Benzene	ND		1		1		01/28/00 19:10	WR	174799
Ethylbenzene	ND		1		1		01/28/00 19:10	WR	174799
Toluene	ND		1		1		01/28/00 19:10	WR	174799
Xylenes,Total	ND		1		1		01/28/00 19:10	WR	174799
Surr: 1,4-Difluorobenzene	105	%	72-137		1		01/28/00 19:10	WR	174799
Surr: 4-Bromofluorobenzene	106	%	48-156		1		01/28/00 19:10	WR	174799

Qualifiers:
ND/U - Not Detected at the Reporting Limit
B - Analyte detected in the associated Method Blank
* - Surrogate Recovery Outside Advisable QC Limits
J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

Quality Control Documentation

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

Quality Control Report

Brown & Caldwell

BJ Services-Artesia #12899.005

Analysis: Purgeable Aromatics
Method: SW8021B
WorkOrder: 00010652
Lab Batch ID: R8348

Method Blank

RunID: HP_N_000128A-174796 Units: ug/L
Analysis Date: 01/28/2000 17:26 Analyst: WR

Analyte	Result	Rep Limit
Benzene	ND	1.0
Ethylbenzene	ND	1.0
Toluene	ND	1.0
Xylenes,Total	ND	1.0
Surr: 1,4-Difluorobenzene	103.9	72-137
Surr: 4-Bromofluorobenzene	105.5	48-156

Samples in Analytical Batch:

Lab Sample ID	Client Sample ID
00010652-01A	MW-5
00010652-02A	MW-7
00010652-03A	MW-6
00010652-04A	Trip Blank 1/21/00

Laboratory Control Sample (LCS)

RunID: HP_N_000128A-174795 Units: ug/L
Analysis Date: 01/28/2000 17:00 Analyst: WR

Analyte	Spike Added	Result	Percent Recovery	Lower Limit	Upper Limit
Benzene	50	53	106	61	119
Ethylbenzene	50	52	103	70	118
Toluene	50	54	108	65	125
Xylenes,Total	150	164	109	72	117

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

Sample Spiked: 00010652-01
RunID: HP_N_000128A-174797 Units: ug/L
Analysis Date: 01/28/2000 17:52 Analyst: WR

Analyte	Sample Result	MS Spike Added	MS Result	MS % Recovery	MSD Spike Added	MSD Result	MSD % Recovery	RPD	RPD Limit	Low Limit	High Limit
enzene	ND	20	23	114	20	23	112	1.50	21	32	164
Ethylbenzene	ND	20	23	112	20	22	111	0.869	19	52	142
Toluene	ND	20	23	115	20	23	115	0.0659	20	38	159
lenes,Total	ND	60	68	113	60	68	113	0	18	53	144

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

Chain of Custody

And

Sample Receipt Checklist

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 00010652

084674

page 1 of 1

Client Name: Brown + Caldwell

Address/Phone: 1415 Louisiana

Client Contact: Tim Jenkins

Project Name: BJ Services Artesia

Project Number: 12899.005

Project Location: Artesia, New Mexico

Invoice To: Tim Jenkins

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 8021B
MW-5	1/26/00	1649		✓	W	G V	40	1	3	✓
MW-7	1/25/00	1744		✓	W	G V	40	1	3	✓
MW-6	1/25/00	1815		✓	W	G V	40	1	2	✓
Trip	1/25/00				W	G V	40	1		✓
						G				

Client/Consultant Remarks:

Laboratory remarks:

Intact? ☐ Y ☐ N

Temp: 3

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): BAF

	date	time		date	time
1. Relinquished by Sampler:	1/26/00	1013	2. Received by:		
3. Relinquished by:			4. Received by:		
5. Relinquished by:			6. Received by Laboratory: D'Anna Kelly	1/27/00	

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

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

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

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

Sample Receipt Checklist

Workorder:	00010652	Received by:	Stelly, D'Anna
Date and Time Received:	1/27/00 10:00:00 AM	Carrier name:	FedEx
Temperature:	3		

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Water - VOA vials have zero headspace?	Yes ☑	No ☐	Not Present ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	

BROWN AND CALDWELL

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

TRANSMITTAL MEMORANDUM

To: Mr. Wayne Price	Date: April 1, 1999	Job No: 12988.014
New Mexico Oil Conservation Division	Subject: Artesia, New Mexico, BJ Services	
2040 South Pacheco Street	Contract No:	
Santa Fe, Mexico 87505	Equipment No:	
	Spec. Ref:	
	Submittal No:	

WE ARE SENDING: ☐ Attached ☐ Under separate cover via **1st Class Mail** the following items:
☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change Order ☒ Other: Final Report

THESE ARE TRANSMITTED AS CHECKED BELOW:
- ☐ For approval
- ☒ For your use
- ☐ As requested
- ☐ For review and comment
- ☐ With submittal review action noted

SUBMITTAL REVIEW ACTIONS:
- ☐ No exceptions taken
- ☐ Make revisions
- ☐ Amend and resubmit
- ☐ Rejected--see Remarks
- ☐ None

Copies	Date	No.	Description
1	4/1/99	12988.014	Annual Groundwater Sampling and Analysis Report, Artesia, New Mexico, BJ Services Company, U.S.A.

REMARKS:

cc: Mr. Tim W. Gum (NMOCD – Artesia, NM)
Jo Ann Cobb (BJ Services Company, U.S.A. - Houston)
Mr. Mike Wiggins (BJ Services Company, U.S.A. – Artesia, NM)
Brown and Caldwell File
Transmittal File w/o attachment

Timothy L. Jenkins

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

P:\Wp\BJSER\TRANSMIT\355tr.doc

ANNUAL GROUNDWATER SAMPLING AND ANALYSIS REPORT
ARTESIA, NEW MEXICO
BJ SERVICES COMPANY, U.S.A.

APRIL 1, 1999

RECEIVED
APR 0 1999
Environmental Bureau
Oil Conservation Division

ANNUAL GROUNDWATER SAMPLING AND ANALYSIS REPORT
ARTESIA, NEW MEXICO
BJ SERVICES COMPANY, U.S.A.

Prepared for

BJ Services Company, U.S.A.
8701 New Trials Drive
The Woodlands, Texas 77381

BC Project Number: 12988.014

Timothy Jenkins
Associate Engineer

April 1, 1999

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

CONTENTS

1.0 EXECUTIVE SUMMARY

Brown and Caldwell conducted the first of two scheduled annual groundwater sampling events at the BJ Services Company, U.S.A. (BJ Services) District Facility in Artesia, New Mexico on January 20, 1999. Groundwater samples were submitted to an analytical laboratory to determine the concentration of organics and metals in groundwater at the former Fuel Island Area of the site. There were no exceedences of New Mexico Water Quality Control Commission (NMWQCC) standards in any of the former Fuel Island Area wells. A thin layer of phase-separated hydrocarbons (PSH) was detected in monitor well MW-6. Brown and Caldwell recommends performing the second scheduled annual sampling event in January 2000 for the former Fuel Island Area. We also propose testing the well for PSH while onsite for other activities in April 1999. If PSH is present in MW-6 at that time, Brown and Caldwell recommends the installation of a hydrophobic hydrocarbon recovery filter to recover PSH.

2.0 INTRODUCTION

The BJ Services Artesia District Facility is located in Eddy County, in the SE/4, Section 32, Township 16 South, Range 26 East. The facility address is 2401 Sivley, Artesia, New Mexico. A site location map and site plan map are attached as Figures 1 and 2, respectively.

Brown and Caldwell conducted a soil and groundwater assessment at the facility from January 21-23, 1998. This soil and groundwater assessment was performed to determine what, if any, impact may have occurred from the operation of a former fuel island at the facility. Excavation of impacted soil from the former Fuel Island Area was performed from November 18 through 22, 1997. Excavation activities were summarized in a January 8, 1998 letter from Brown and Caldwell to Mr. Mark Ashley of the New Mexico Oil Conservation Division (NMOCD).

On January 22, 1998, Brown and Caldwell completed three soil borings at the facility as requested in NMOCD correspondence dated January 21, 1998. Soil borings SB-FIA-1, SB-FIA-2, and SB-FIA-3 were completed as monitor wells MW-5, MW-7, and MW-6, respectively. Groundwater samples and groundwater elevation data were collected from the monitor wells on January 23, 1998. On March 24, 1998, the Final Soil and Groundwater Assessment Report for the former Fuel Island Area was submitted to the NMOCD. In May 1998, NMOCD verbally accepted the report and requested two years of annual sampling be performed. This report presents the results of the first of these two scheduled sampling events.

3.0 FIELD ACTIVITIES

On January 20, 1999, Brown and Caldwell conducted the first of two scheduled annual groundwater sampling events at the BJ Services facility in Artesia, New Mexico, as requested by the NMOCD in conversations with Brown and Caldwell. Correspondence and telephone conversation logs regarding the annual groundwater sampling agreement are included as Appendix A. The following subsections describe the field activities during which the groundwater from monitor wells MW-5, MW-6, and MW-7 was sampled in accordance with the above-referenced NMOCD agreement.

3.1 Water Level Measurement and Groundwater Gradient

Water level measurements were collected from the three monitor wells at the site on January 20, 1999 to determine groundwater flow direction in the southern portion of the site. While collecting water level data using an interface probe, the Brown and Caldwell field representative noted a thin layer of product (approximately 0.03 feet) present in MW-6. The appearance of a product layer coincides with a depressed groundwater level as compared to historical groundwater elevation measurements. The depth-to-groundwater measurements were compared with the top of casing elevations for each monitor well to compute a relative groundwater elevation. The groundwater elevation calculations are presented in Table 1. This data was used to create the January 20, 1999 potentiometric surface map presented as Figure 3. Groundwater flow in the Fuel Island Area is to the east-southeast.

3.2 Monitor Well Purging and Sampling Procedures

Each of the monitor wells (MW-5, MW-6, and MW-7) was purged with a submersible pump. A minimum of three well casing volumes was purged from each monitor well prior to collection of groundwater samples. Temperature, pH, conductivity, redox, and dissolved oxygen were measured using a YSI-600XL device during purging of monitor wells MW-5 and MW-7. Groundwater samples were collected when these parameters stabilized. These parameters were not measured

from MW-6 due to the presence of a thin layer of product which would interfere with the probes. Refer to the Groundwater Sampling Field Data Sheets in Appendix B for well purging documentation.

Groundwater samples were transferred to laboratory-supplied containers, labeled, and immediately placed on ice in an insulated cooler for shipment. At the conclusion of sampling, the samples were delivered with completed chain-of-custody documentation to the analytical laboratory. The laboratory analytical report is included as Appendix C.

3.3 Decontamination Procedures

Field sampling equipment was decontaminated prior to use at each well location by washing with a laboratory grade detergent, rinsing with potable water, and completing a final rinse with distilled water.

3.4 Sample Analysis

The groundwater samples were analyzed for total RCRA metals by SW-846 Method 3010A/3020A/6010/7000 Series, polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8310, and BTEX by EPA Method 8020.

4.0 ANALYTICAL RESULTS

Analytical results for groundwater samples collected during the January 1998 sampling event are summarized in Table 2; analytical results for groundwater samples collected during the January 1999 sampling event and the applicable NMWQCC standards are summarized in Table 3.

The groundwater sample collected from MW-6, the monitor well immediately downgradient of the former Fuel Island Area, indicated detectable concentrations of benzene, ethylbenzene, and xylenes below NMWQCC Standards. Various semivolatile constituents and metals were also detected, but none exceeded NMWQCC Standards. Toluene was not detected in this sample.

Groundwater samples were also collected from MW-5 and MW-7, the upgradient and far downgradient wells relative to the former Fuel Island Area, respectively. Laboratory analysis of these groundwater samples indicated that benzene and ethylbenzene were not detected during the January 1999 sampling event. Toluene and xylenes were detected at concentrations below the NMWQCC Standards. Various semivolatile constituents and metals were also detected, but none exceeded NMWQCC Standards.

Naphthalene, acenaphthalene, fluorene, phenanthrene, pyrene, chrysene, benzo(k)fluoranthene, and benzo(a)anthracene (PAHs) were detected in at least one groundwater sample collected from the monitor wells. Detections of naphthalene, acenaphthalene, fluorene, and phenanthrene in MW-5 and MW-7 are questionable, as these constituents were detected in the laboratory method blank.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Laboratory results for groundwater samples were compared to NMWQCC Groundwater Standards. There were no exceedences of NMWQCC groundwater standards among groundwater samples. A depressed groundwater level may have caused the increases in concentrations of organics and metals observed in MW-6 groundwater samples relative to the previous sampling event (January 1998). Additionally, the appearance of a thin PSH layer in MW-6 may also be the result of a depressed groundwater level.

5.2 Recommendations

Brown and Caldwell recommends performing the second of two scheduled annual sampling event in January 2000 for the former Fuel Island Area. We also propose testing the well for PSH while onsite for other activities in April 1999. If PSH is present in MW-6 at that time, Brown and Caldwell recommends the installation of a hydrophobic hydrocarbon recovery filter to recover PSH.

DISTRIBUTION

Annual Groundwater Sampling and Analysis Report
Artesia, New Mexico
BJ Services Company, U.S.A.

April 1, 1999

1 copy to: New Mexico Oil Conservation Division
2040 South Pacheco Street
Santa Fe, New Mexico 87505

Attention: Mr. Wayne Price

1 copy to: New Mexico Oil Conservation Division
811 South 1st Street
Artesia, New Mexico 88211

Attention: Mr. Tim W. Gum

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.
2401 Sivley
Artesia, New Mexico 88210

Attention: Mr. Mike Wiggins

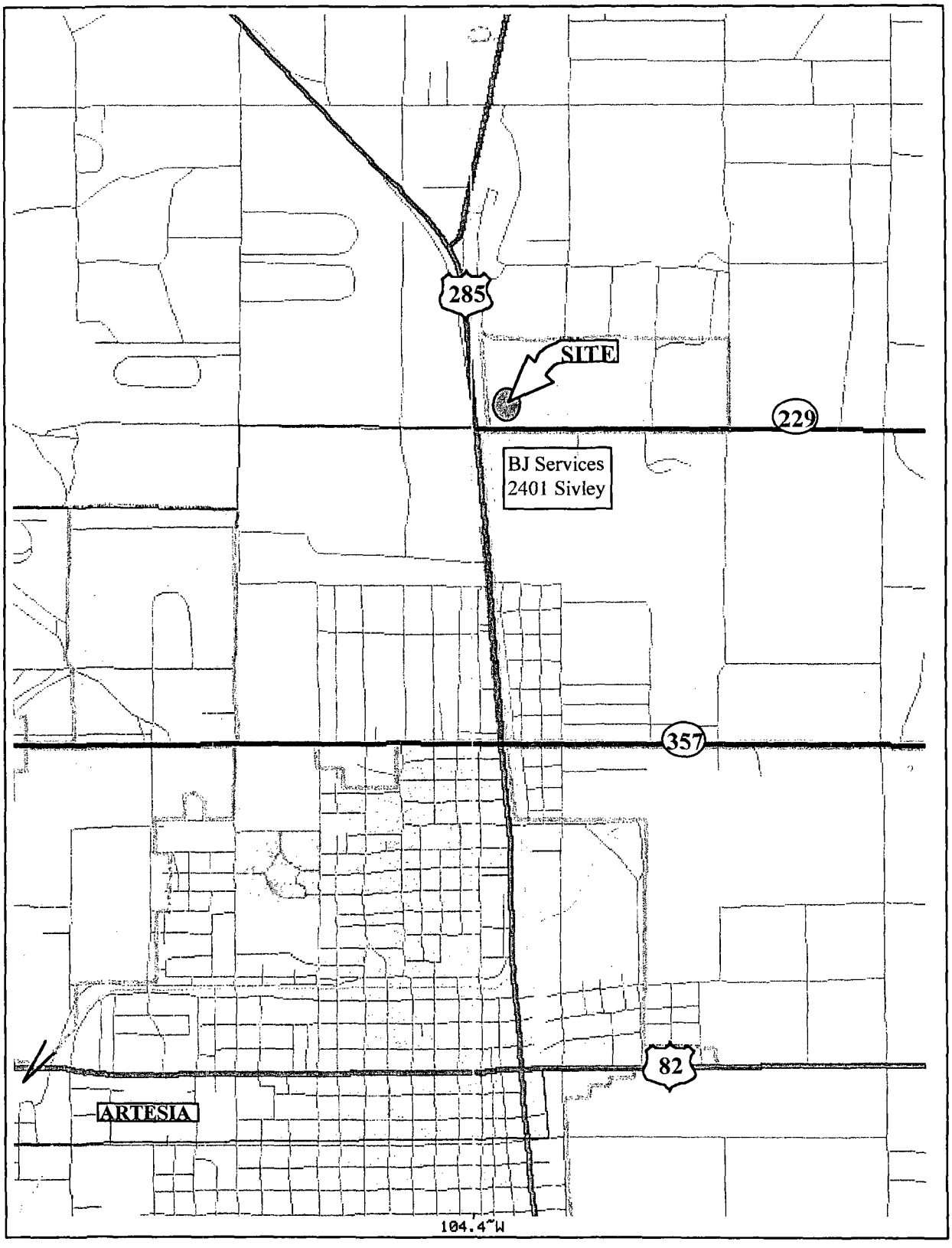
1 copy to: Brown and Caldwell
File

QUALITY CONTROL REVIEWER:

Richard Rexroad
Principal in Charge

TLJ/srd

FIGURES



BROWN AND CALDWELL HOUSTON, TEXAS	0 0.5 1 miles	TITLE SITE LOCATION MAP	DATE 03/25/99
		CLIENT BJ SERVICES COMPANY, U.S.A.	PROJECT NO. 12988-014
		SITE LOCATION ARTESIA, NEW MEXICO	FIGURE NO. 1

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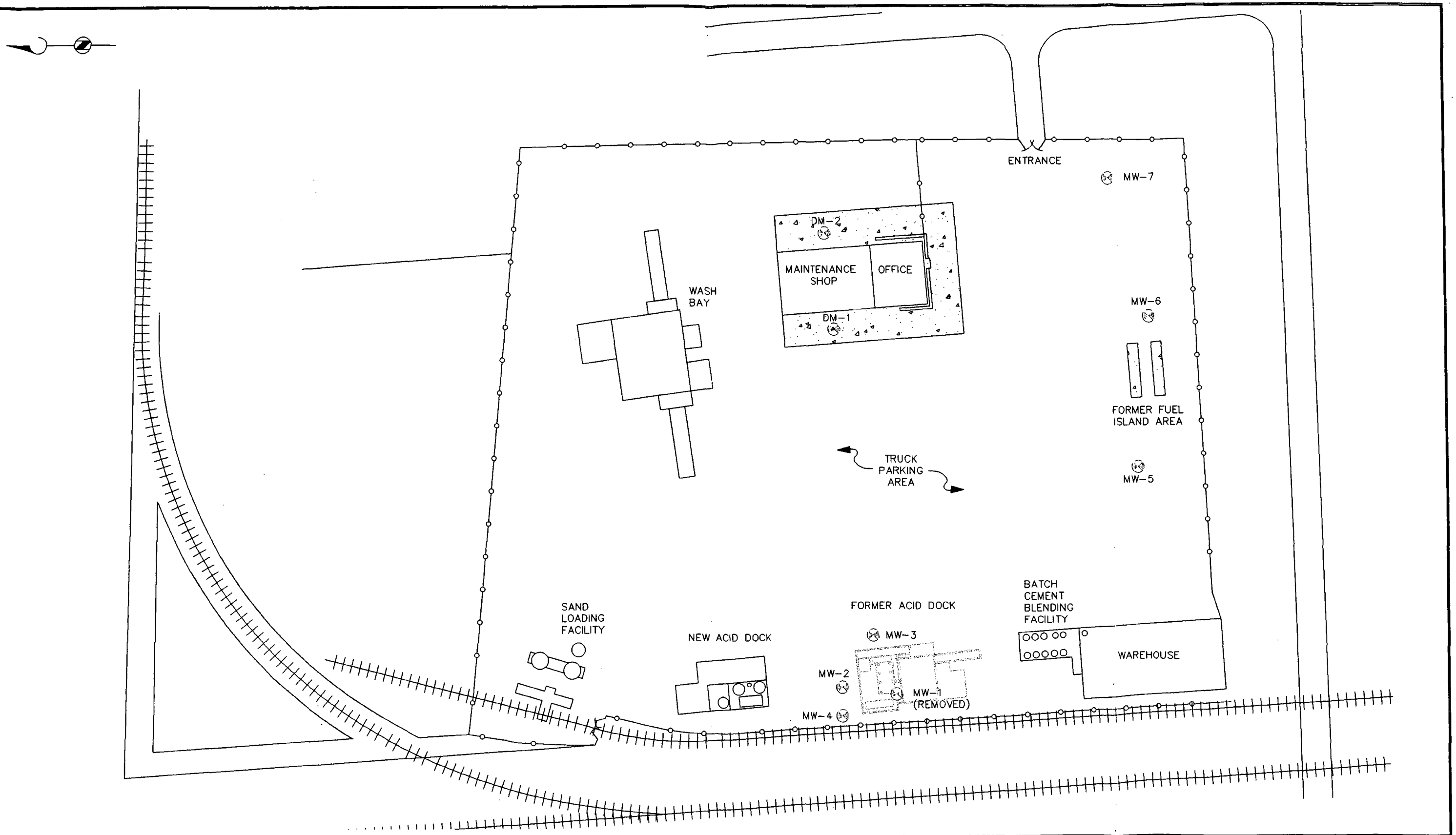


P:\cad\jobs\12988\09\Site Plan Map 03-25-99 CLK

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

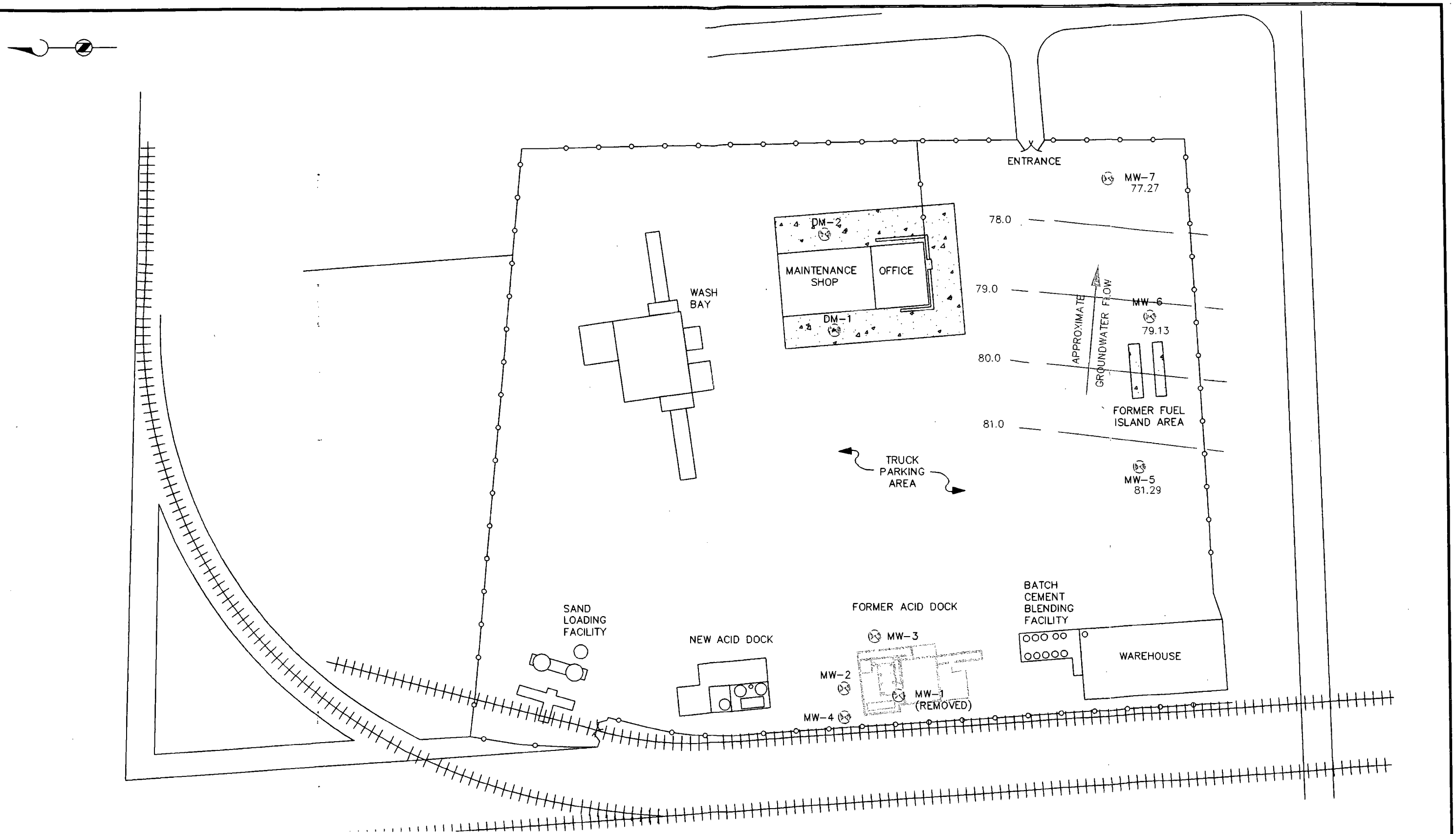
0 50 100
SCALE: 1" = 100'
DRAWN BY: CK DATE 3/99
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-1 MONITOR WELL LOCATIONS

CONCRETE DRIVES, APRON

TITLE: SITE PLAN MAP	DATE: 03/25/99
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 12988.014
SITE: ARTESIA, NEW MEXICO	FIGURE NUMBER: 2



P:\cad\jobs\12988\09\Site Plan Map 03-25-99 CLK

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 50 100
SCALE: 1" = 100'
DRAWN BY: CLK DATE 3/99
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-1 MONITOR WELL LOCATIONS

CONCRETE DRIVES, APRON

TITLE: POTENTIOMETRIC SURFACE MAP FOR JANUARY 20, 1999	DATE: 03/25/99
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 12988.014
SITE: ARTESIA, NEW MEXICO	FIGURE NUMBER: 3

TABLES

Table 1

Groundwater Elevation Data
BJ Services Company, U.S.A.
Artesia, New Mexico

Monitor Well	Top of Casing (Relative Elevation)	Measurement Date	Depth to Water (feet)	Groundwater Elevation [1]
MW-5	99.10	1/23/98	13.38	85.72
		1/20/99	17.81	81.29
MW-6	97.69	1/23/98	14.00	83.69
		1/20/99	18.54	79.13 [2]
MW-7	97.61	1/23/98	15.51	82.10
		1/20/99	20.34	77.27

[1] Elevations of well casings were established relative to the office building slab, which was assigned an arbitrary elevation of 100.00 feet.

[2] Elevation corrected to account for phase separated hydrocarbons present at a thickness of 0.03 ft. in this monitor well. Correction assumes specific gravity of product is 0.8.

Table 2
Analytical Results for January 1998 Groundwater Sampling Event
BJ Services Company, U.S.A.
Artesia, New Mexico

MONITORING WELL	MW-5	MW-6	MW-6D[a]	MW-7	Trip Blank	NMWQCC[b] Groundwater Standards
VOLATILES by Method 8020 (mg/L)						
Benzene	< 0.0010	< 0.0010	0.0015	0.0021	< 0.001	0.01
Toluene	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.001	0.75
Ethylbenzene	< 0.0010	0.0080	0.0080	< 0.0010	< 0.001	0.75
Total Xylenes	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.001	0.62
PAHs by Method 8310 (mg/L) [c]						
Fluorene	< 0.0003	0.008	0.008	< 0.0030	NA	NL
Phenanthrene	< 0.0001	0.011	0.010	0.003	NA	NL
Naphthalene	0.0004	0.002	0.002	0.001	NA	0.03 [d]
RCRA Metals by Method 3010A/3020A/6010B/7000 Series (mg/L)						
Arsenic	< 0.005	0.005	< 0.005	< 0.005	NA	0.1
Barium	0.027	0.195	0.032	0.012	NA	1.0
Cadmium	< 0.005	< 0.005	< 0.006	< 0.005	NA	0.01
Chromium	< 0.01	0.02	< 0.01	< 0.01	NA	0.05
Mercury	< 0.0002	< 0.0002	< 0.0002	< 0.0002	NA	0.002
Lead	0.014	0.011	0.008	0.006	NA	0.05
Selenium	0.006	< 0.005	< 0.005	< 0.005	NA	0.05
Silver	< 0.01	< 0.01	< 0.01	< 0.01	NA	0.05

[a] Duplicate sample collected from MW-6

[b] NMWQCC = New Mexico Water Quality Control Commission

[c] Chemicals with concentrations below Practical Quantitation Limit (PQL) are not listed in this table

[d] Value is for PAHs: total naphthalene plus monomethylnaphthalenes.

NA - Not analyzed

NL - Not listed

B - Laboratory Method Blank Showed Detectable Concentration of This Constituent

Table 3
Analytical Results for January 1999 Groundwater Sampling Event
BJ Services Company, U.S.A.
Artesia, New Mexico

MONITORING WELL	MW-5	MW-6	MW-7	Trip Blank	NMWQCC[a] Groundwater Standards
VOLATILES by Method 8020 (mg/L)					
Benzene	< 0.0010	0.0040	<0.0010	< 0.0010	0.01
Toluene	0.0022	< 0.0010	0.0019	< 0.0010	0.75
Ethylbenzene	< 0.0010	0.019	< 0.0010	< 0.0010	0.75
Total Xylenes	0.0022	0.0011	0.0037	< 0.0010	0.62
PAHs by Method 8310 (mg/L) [b]					
Fluorene	0.0001 B	0.38	0.001 B	NA	NL
Phenanthrene	0.0001 B	0.088	0.002 B	NA	NL
Naphthalene	0.0001 B	<0.0020	0.0006 B	NA	0.03 [c]
Pyrene	<0.0001	0.011	0.0004	NA	NL
Benzo (k) fluoranthene	<0.0001	0.002	<0.0001	NA	NL
Acenaphthene	<0.0001	<0.0020	0.002 B	NA	NL
Chrysene	<0.0001	<0.0020	0.0002	NA	NL
Benzo (a) anthracene	<0.0001	<0.0020	0.002	NA	NL
RCRA Metals by Method 3010A/6010B/7000 Series (mg/L)					
Arsenic	< 0.005	0.008	0.007	NA	0.1
Barium	0.009	0.125	0.053	NA	1.0
Cadmium	< 0.005	< 0.005	< 0.005	NA	0.01
Chromium	< 0.01	<0.01	< 0.01	NA	0.05
Mercury	< 0.0002	< 0.0002	0.0003	NA	0.002
Lead	<0.005	<0.005	0.006	NA	0.05
Selenium	0.026	0.010	0.010	NA	0.05
Silver	< 0.01	< 0.01	< 0.01	NA	0.05

[a] NMWQCC = New Mexico Water Quality Control Commission

[b] Chemicals with concentrations below Practical Quantitation Limit (PQL) are not listed in this table

[c] Value is for PAHs: total naphthalene plus monomethylnaphthalenes.

NA - Not analyzed

NL - Not listed

B - Laboratory Method Blank Showed Detectable Concentration of This Constituent

APPENDICES

APPENDIX A

Relevant Correspondence and Telephone Conversation Logs with the NMOCD

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

April 2. 1998

Post-it® Fax Note 7671	Date 4-8	# of pages ▶ 1
To Bob	From JO Ann	
Co./Dept.	Co.	
Phone #	Phone #	
Fax #	Fax #	

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-259-049

Ms. Jo Ann Cobb
BJ Services Company, U.S.A.
8701 New Trails Drive
The Woodlands, Texas 77381

APR 07 1998

ENVIRONMENTAL

RE: Fuel Island Soil and Ground Water Assessment
Artesia Facility
Eddy County, New Mexico

Dear Ms. Cobb:

The New Mexico Oil Conservation Division (OCD) has completed a review of the BJ Services Company, U.S.A. (BJ) "Final Soil and Ground Water Assessment Report" dated March 24, 1998. This report was submitted by Brown and Caldwell on behalf of BJ. It contains a summary of activities performed to date and a request for final closure at the former fuel island area.

The above referenced report is approved with the following condition:

1. At future discharge plan renewals MW-5, MW-6 and MW-7 will be sampled for BTEX using EPA approved methods.

Please be advised that OCD approval does not relieve BJ of liability if contamination exists which is beyond the scope of the report or if the activities failed to adequately determine the extent of contamination related to BJ's activities. In addition, OCD approval does not relieve BJ of responsibility for compliance with any other federal, state or local laws and/or regulations.

If BJ has any questions, please call me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

xc: OCD Artesia Office

April 21, 1998

Mr. Mark Ashley
State of New Mexico
Energy, Minerals, and Natural Resources Department
Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505

2988-09

Subject: BJ Services Facility – Artesia, New Mexico
Fuel Island Soil and Groundwater Assessment

Dear Mr. Ashley:

Thank you for reviewing BJ Services "Final Soil and Groundwater Assessment Report" of March 24, 1998, and your subsequent letter response dated April 2, 1998. In your letter response, the NMOCD granted closure of the Fuel Island Area on the condition that groundwater monitoring be conducted for MW-5, MW-6, and MW-7 at the time of each discharge plan renewal (approximately once every 5 years). As an alternative to this time frame, which appears to be unlimited in scope, Brown and Caldwell suggests that a groundwater monitoring program be performed annually for two years, with the first event scheduled for January 1999 (approximately one year from the initial sampling event). As requested in the NMOCD letter of April 2, 1998, groundwater samples collected during these annual events would be analyzed for BTEX by EPA Method 8020. Pending results of these groundwater monitoring events, BJ Services would propose either final closure of the Fuel Island Area or continued monitoring.

Thank you for considering this alternate plan for groundwater monitoring. If you have any questions, please do not hesitate to contact me at (713) 646-1138.

Very truly yours,

BROWN AND CALDWELL

Timothy L. Jenkins
Associate Engineer

cc: NMOCD Artesia District Office
Jo Ann Cobb, BJ Services Company, U.S.A.
Rick N. Johnson, BJ Services Company, U.S.A.

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FILE: 2988-09

BROWN AND CALDWELL

RECORD OF TELEPHONE CONVERSATION

DATE: 05/14/98	JOB/DESCRIPTION: BJ Artesia - Former Fuel Island Area	
INDIVIDUAL	ORGANIZATION	TELEPHONE NO.
FROM: Tim Jenkins	Brown and Caldwell	713-646-1138
TO: Mark Ashley	NMOCD	505-827-7155
SUBJECT: Monitoring Wells and Proposed Sampling Events – FIA		

GOALS OF THE CONVERSATION:

1) Determine whether proposed sampling of FIA wells twice over next two years is acceptable
2) Verify conclusions and procedures for future correspondence

NOTES:

1. The letter from BJ Services to the NMOCD proposing monitor well sampling once a year for the next two years has been verbally agreed upon. This would allow sampling to be performed twice prior to discharge plan renewal (the current Discharge Plan will expire on June 13, 2000).
2. Future activities will be performed as requested by the OCD and approved by BJ Services. Only upon receipt of written approval shall these activities be scheduled and performed. All approvals and proposed actions will be followed up with official letter correspondence.

ACTION REQUIRED:

1) Tentatively plan a sampling event for January 1999 and January 2000 for MW-5 through MW-7.
2) Await OCD correspondence with suggestions and recommendations for these activities.

INITIALS: 

ROUTING: FILE
Robert N. Jennings
Richard Rexroad

APPENDIX B

Groundwater Sampling Field Data Sheets

BROWN AND CALDWELL

WELL ID: MW-7

Groundwater Sampling Field Data Sheet

Project Number: 12-958 **Task Number:** 014 **Date:** 1-20-09 ~~1-20-08~~

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 30.2 feet		Ferrous iron: 0 mg/l
Static Water from TOC: 20.34 feet	Sample Equipment: pump	Dissolved oxygen: 3 mg/l
Product Level from TOC: — feet		Nitrate: >40 mg/l
Length of Water Column: 9.86 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach Field Kits	Alkalinity: — mg/l
Well Volume: 1.64 gal		Sulfate: — mg/l
Screened Interval (from GS): 15-30 feet		Sample Time: 14:30
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
	—	7.55	20.19	3175	137.4	9.31	cloudy
	1.0	6.70	20.91	3153	133.2	4.25	clear
	4.0	6.60	20.89	3221	125.4	5.01	clear
	5.0	6.59	20.55	3207	126.5	5.02	clear

Comments:

Stable @ 5.0 gals

PPE Worn: Gloves

Disposition of Purge Water: drummed onsite

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: MW-5

Groundwater Sampling Field Data Sheet

Project Number: 1984 **Task Number:** 014 **Date:** 1-20-99

Casing Diameter: 2 inches	Purge Equipment: pump	Geochemical Parameters
Total Depth of Well from TOC: 27.6 feet		Ferrous iron: 0 mg/l
Static Water from TOC: 17.81 feet	Sample Equipment: pump	Dissolved oxygen: 4.0 mg/l
Product Level from TOC: — feet		Nitrate: — mg/l
Length of Water Column: 9.79 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.): YSI, Hach field kits	Alkalinity: 340 mg/l
Well Volume: 1.64 gal		Sulfate: — mg/l
Screened Interval (from GS): 13.28 feet		Sample Time: 15:30
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description
	—	7.38	20.54	3060	115.8	7.23	cloudy
	2.0	6.91	20.72	3049	120.4	7.64	~~clear~~ clear
	4.0	6.77	20.53	3042	117.0	7.48	clear
	5.0	6.74	20.53	3040	115.9	7.50	clear

Comments:

STABLE @ 5.0 GALS

PPE Worn: gloves

Disposition of Purge Water: Drummed onsite

Sampler's Signature:

BROWN AND CALDWELL

WELL ID: mw-6

Groundwater Sampling Field Data Sheet

Project Number: 12588 **Task Number:** 014 **Date:** 1-20-99

Casing Diameter: 2 inches	Purge Equipment	Geochemical Parameters
Total Depth of Well from TOC: feet		Ferrous iron: mg/l
Static Water from TOC: 18.51 feet	Sample Equipment	Dissolved oxygen: mg/l
Product Level from TOC: 18.54 feet		Nitrate: mg/l
Length of Water Column: 0.03 feet	Analytical Equipment (pH, DO, Redox, filtration, etc.)	Alkalinity: mg/l
Well Volume: gal		Sulfate: mg/l
Screened Interval (from GS): 15-30 feet		Sample Time: 16:30
		Note: 2" well= .167 gal/ft.,4"well=.667gal/ft.

Time	Gallons Removed	pH	Temp	Conductivity	Redox	Dissolved Oxygen	Visual Description

Comments:

product in well; 0.03 feet of diesel

PPE Worn: gloves

Disposition of Purge Water:

Sampler's Signature:

APPENDIX C

Laboratory Analytical Report

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

February 5, 1999

Mr. Tim Jenkins
BROWN AND CALDWELL
1415 Louisiana
Houston, TX 77002

The following report contains analytical results for the sample(s) received at Southern Petroleum Laboratories (SPL) on January 22, 1999. The sample(s) was assigned to Certificate of Analysis No. (s) 9901939 and analyzed for all parameters as listed on the chain of custody.

The Method Blank associated (Batch ID: 2990126005200) with the analysis run for Polynuclear Aromatic Hydrocarbons method 8310 had detected results for Naphthalene at .18 ppb, Fluorene at .14ppb, Phenanthrene at .13 and Anthracene at .20 ppb. These detected results may be contributed to laboratory contamination. Some of these compounds were detected at low levels in your samples, which could be contributed to laboratory contamination. These results will be "B" flagged.

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

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
Senior Project Manager

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

Southern Petroleum Laboratories, Inc.

Certificate of Analysis Number: 99-01-939

Approved for Release by:

Bernadette A. Fini, Senior Project Manager — 2-5-99 Date

Greg Grandits
Laboratory Director

Cynthia Schreiner
Quality Assurance Officer

The results relate only to the samples tested.
Results reported on a Wet Weight Basis unless otherwise noted.

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

Certificate of Analysis No. H9-9901939-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

DATE: 02/05/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-5

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 01/20/99 15:30:00
DATE RECEIVED: 01/22/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	ug/L
TOLUENE	2.2	1.0 P	ug/L
ETHYLBENZENE	ND	1.0 P	ug/L
TOTAL XYLENE	2.2	1.0 P	ug/L
TOTAL BTEX	4.4		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	107		
4-Bromofluorobenzene	107		
METHOD 5030/8020 ***			
Analyzed by: LJ			
Date: 01/26/99			
Silver, Total	ND	0.01	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 01/25/99 09:26:00			
Arsenic, Total	ND	0.005	mg/L
Method 6010B ***			
Analyzed by: EG			
Date: 01/26/99 11:09:00			
Barium, Total	0.009	0.005	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 01/25/99 09:26:00			

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. H9-9901939-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

DATE: 02/05/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-5

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 01/20/99 15:30:00
DATE RECEIVED: 01/22/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 01/25/99 09:26:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 01/25/99 09:26:00	ND	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 01/29/99 14:29:00	ND	0.0002	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: MR Date: 01/25/99 07:30:00	01/25/99		
Lead, Total Method 6010B *** Analyzed by: EG Date: 01/26/99 11:09:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 01/26/99 11:09:00	0.026	0.005	mg/L

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. H9-9901939-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

02/05/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-5

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 01/20/99 15:30:00
DATE RECEIVED: 01/22/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	0.1 B	0.1	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	0.1	ug/L
Fluorene	0.1 B	0.1	ug/L
Phenanthrene	0.1 B	0.1	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	ND	0.1	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	ND	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	44MI	50	150
Phenanthrene d-10	0.50 ug/L	72	50	150

ANALYZED BY: KA DATE/TIME: 01/27/99 08:56:57
EXTRACTED BY: KL DATE/TIME: 01/25/99 15:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed
MI - Matrix Interference.

COMMENTS: B - Compound Was Detected In Method Blank.

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. H9-9901939-02

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

DATE: 02/05/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-6

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 01/20/99 16:30:00
DATE RECEIVED: 01/22/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	4.0	1.0 P	ug/L
TOLUENE	ND	1.0 P	ug/L
ETHYLBENZENE	19	1.0 P	ug/L
TOTAL XYLENE	1.1	1.0 P	ug/L
TOTAL BTEX	24.1		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	110		
4-Bromofluorobenzene	103		
METHOD 5030/8020 ***			
Analyzed by: LJ			
Date: 01/26/99			
Silver, Total	ND	0.01	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 01/25/99 09:26:00			
Arsenic, Total	0.008	0.005	mg/L
Method 6010B ***			
Analyzed by: EG			
Date: 01/26/99 11:09:00			
Barium, Total	0.125	0.005	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 01/25/99 09:26:00			

(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. H9-9901939-02

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

DATE: 02/05/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-6

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 01/20/99 16:30:00
DATE RECEIVED: 01/22/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 01/25/99 09:26:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 01/25/99 09:26:00	ND	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 01/29/99 14:29:00	ND	0.0002	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: MR Date: 01/25/99 07:30:00	01/25/99		
Lead, Total Method 6010B *** Analyzed by: EG Date: 01/26/99 11:09:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 01/26/99 11:09:00	0.010	0.005	mg/L

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. H9-9901939-02

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

02/05/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-6

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 01/20/99 16:30:00
DATE RECEIVED: 01/22/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	2.0	ug/L
Acenaphthylene	ND	2.0	ug/L
Acenaphthene	ND	50	ug/L
Fluorene	380	50	ug/L
Phenanthrene	88	50	ug/L
Anthracene	ND	2.0	ug/L
Fluoranthene	ND	2.0	ug/L
Pyrene	11	2.0	ug/L
Chrysene	ND	2.0	ug/L
Benzo (a) anthracene	ND	2.0	ug/L
Benzo (b) fluoranthene	ND	2.0	ug/L
Benzo (k) fluoranthene	2	2.0	ug/L
Benzo (a) pyrene	ND	2.0	ug/L
Dibenzo (a,h) anthracene	ND	2.0	ug/L
Benzo (g,h,i) perylene	ND	2.0	ug/L
Indeno (1,2,3-cd) pyrene	ND	2.0	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	D	50	150
Phenanthrene d-10	0.50 ug/L	D	50	150

ANALYZED BY: KA DATE/TIME: 01/27/99 18:51:37
EXTRACTED BY: KL DATE/TIME: 01/25/99 15:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed
D - Diluted, control limits not applicable.

COMMENTS:

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. H9-9901939-03

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

DATE: 02/05/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-7

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 01/20/99 14:30:00
DATE RECEIVED: 01/22/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	ug/L
TOLUENE	1.9	1.0 P	ug/L
ETHYLBENZENE	ND	1.0 P	ug/L
TOTAL XYLENE	3.7	1.0 P	ug/L
TOTAL BTEX	5.6		ug/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	110		
4-Bromofluorobenzene	107		
METHOD 5030/8020 ***			
Analyzed by: LJ			
Date: 01/26/99			
Silver, Total	ND	0.01	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 01/25/99 09:26:00			
Arsenic, Total	0.007	0.005	mg/L
Method 6010B ***			
Analyzed by: EG			
Date: 01/26/99 11:09:00			
Barium, Total	0.053	0.005	mg/L
Method 6010B ***			
Analyzed by: JM			
Date: 01/25/99 09:26:00			

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. H9-9901939-03

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

DATE: 02/05/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-7

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 01/20/99 14:30:00
DATE RECEIVED: 01/22/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total Method 6010B *** Analyzed by: JM Date: 01/25/99 09:26:00	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: JM Date: 01/25/99 09:26:00	ND	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 01/29/99 14:29:00	0.0003	0.0002	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: MR Date: 01/25/99 07:30:00	01/25/99		
Lead, Total Method 6010B *** Analyzed by: EG Date: 01/26/99 11:09:00	0.006	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 01/26/99 11:09:00	0.010	0.005	mg/L

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. H9-9901939-03

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

02/05/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-7

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 01/20/99 14:30:00
DATE RECEIVED: 01/22/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	0.6 B	0.1	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	2 B	0.1	ug/L
Fluorene	1 B	1.0	ug/L
Phenanthrene	2 B	1.0	ug/L
Anthracene	ND	0.1	ug/L
Fluoranthene	ND	0.1	ug/L
Pyrene	0.4	0.1	ug/L
Chrysene	0.2	0.1	ug/L
Benzo (a) anthracene	2	0.1	ug/L
Benzo (b) fluoranthene	ND	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	ND	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	82	50	150
Phenanthrene d-10	0.50 ug/L	153 MI	50	150

ANALYZED BY: KA
DATE/TIME: 01/27/99 10:13:06
EXTRACTED BY: KL
DATE/TIME: 01/25/99 15:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed
MI - Matrix Interference.

COMMENTS: B - Compound Was Detected In Method Blank.

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. H9-9901939-06

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

DATE: 02/05/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank 1/14/99

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 01/19/99
DATE RECEIVED: 01/22/99

ANALYTICAL DATA

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

Surrogate	% Recovery
1,4-Difluorobenzene	103
4-Bromofluorobenzene	110

METHOD 5030/8020 ***
Analyzed by: LJ
Date: 01/26/99

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

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

** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020

Matrix: Aqueous
Units: ug/L

Batch Id: VARE990126021310

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	48	96.0	72 - 128
Benzene	ND	50	47	94.0	61 - 119
Toluene	ND	50	48	96.0	65 - 125
EthylBenzene	ND	50	48	96.0	70 - 118
O Xylene	ND	50	48	96.0	72 - 117
M & P Xylene	ND	100	97	97.0	72 - 116

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	23	115	22	110	4.44	20	39 - 150
BENZENE	ND	20	20	100	21	105	4.88	21	32 - 164
TOLUENE	ND	20	20	100	21	105	4.88	20	38 - 159
ETHYLBENZENE	ND	20	20	100	21	105	4.88	19	52 - 142
O XYLENE	ND	20	21	105	22	110	4.65	18	53 - 143
M & P XYLENE	ND	40	40	100	42	105	4.88	17	53 - 144

Analyst: LJ
Sequence Date: 01/26/99
SPL ID of sample spiked: 9901974-02A
Sample File ID: E_A4044.TX0
Method Blank File ID:
Blank Spike File ID: E_A4038.TX0
Matrix Spike File ID: E_A4039.TX0
Matrix Spike Duplicate File ID: E_A4040.TX0

* = Values outside QC Range due to Matrix Interference (except RPD)
« = 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 (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID):

9901939-03A 9901962-01A 9901985-01A 9901A05-03A
9901A05-01A 9901A05-02A 9901977-01A 9901862-06A
9901977-04A 9901939-06A 9901974-02A 9901939-01A
9901939-02A

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

** SPL BATCH QUALITY CONTROL REPORT **
Method 8310 ***

Matrix: Aqueous
Units: ug/L

Batch Id: 2990126005200

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Naphthalene	0.18	0.50	0.39	78.0	32 - 148
Acenaphthylene	ND	0.50	0.36	72.0	42 - 138
Acenaphthene	0.14	0.50	0.42	84.0	22 - 133
Fluorene	0.13	0.50	0.43	86.0	11 - 148
Phenanthrene	0.20	0.50	0.47	94.0	40 - 121
Anthracene	ND	0.50	0.37	74.0	32 - 121
Fluoranthene	ND	0.50	0.45	90.0	45 - 133
Pyrene	ND	0.50	0.44	88.0	39 - 136
Chrysene	ND	0.50	0.44	88.0	44 - 122
Benzo (a) anthracene	ND	0.50	0.44	88.0	53 - 137
Benzo (b) fluoranthene	ND	0.50	0.46	92.0	62 - 121
Benzo (k) fluoranthene	ND	0.50	0.46	92.0	66 - 128
Benzo (a) pyrene	ND	0.50	0.46	92.0	42 - 120
Dibenzo (a,h) anthracene	ND	0.50	0.44	88.0	59 - 129
Benzo (g,h,i) perylene	ND	0.50	0.46	92.0	67 - 124
Indeno (1,2,3-cd) pyrene	ND	0.50	0.46	92.0	65 - 125

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
NAPHTHALENE	ND	0.50	0.34	68.0	0.32	64.0	6.06	30	1 - 122
ACENAPHTHYLENE	ND	0.50	0.35	70.0	0.30	60.0	15.4	30	1 - 124
ACENAPHTHENE	ND	0.50	0.34	68.0	0.35	70.0	2.90	30	1 - 124
FLUORENE	ND	0.50	0.49	98.0	0.44	88.0	10.8	30	1 - 142
PHENANTHRENE	ND	0.50	0.63	126	0.68	136	7.63	30	1 - 155
ANTHRACENE	ND	0.50	0.38	76.0	0.46	92.0	19.0	30	1 - 126
FLUORANTHENE	ND	0.50	0.61	122	0.79	158 *	25.7	30	14 - 123
PYRENE	ND	0.50	0.58	116	0.77	154 *	28.1	30	1 - 140
CHRYSENE	ND	0.50	0.48	96.0	0.61	122	23.9	30	1 - 199
BENZO (A) ANTHRACENE	ND	0.50	0.46	92.0	0.62	124	29.6	30	12 - 135
BENZO (B) FLUORANTHENE	ND	0.50	0.50	100	0.72	144	36.1 *	30	6 - 150
BENZO (K) FLUORANTHENE	ND	0.50	0.45	90.0	0.58	116	25.2	30	1 - 159
BENZO (A) PYRENE	ND	0.50	0.47	94.0	0.65	130 *	32.1 *	30	1 - 128
DIBENZO (A,H) ANTHRACENE	ND	0.50	0.37	74.0	0.48	96.0	25.9	30	1 - 110
BENZO (G,H,I) PERYLENE	ND	0.50	0.47	94.0	0.63	126 *	29.1	30	1 - 116
INDENO (1,2,3-CD) PYRENE	ND	0.50	0.45	90.0	0.61	122 *	30.2 *	30	1 - 116

** SPL BATCH QUALITY CONTROL REPORT **
Method 8310 ***

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

Matrix: Aqueous
Units: ug/L

Batch Id: 2990126005200

Analyst: KA
Sequence Date: 01/27/99
SPL ID of sample spiked: 9901873-01K
Sample File ID: 990128B\003-0301
Method Blank File ID:
Blank Spike File ID: 990126B\020-2001
Matrix Spike File ID: 990128B\004-0401
Matrix Spike Duplicate File ID: 990128B\005-0501

* = Values outside QC Range due to Matrix Interference (except RPD)
« = 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 (1st Q '97)
(***) = Source: Temporary Limits

SAMPLES IN BATCH(SPL ID):

9901873-05K	9901874-09G	9901874-08G	9901874-07G
9901873-01K	9901873-03K	9901873-02K	9901874-10G
9901874-06G	9901875-12K	9901964-02D	9901964-06D
9901875-11K	9901939-01B	9901939-03B	9901939-02B
9901873-04K			

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: JM

Matrix: Water Units: mg/L

Date:012599 Time:0926 File Name: 0125PB1

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

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver	ND	2.00	1.93	97	1.60	2.40
Aluminum						
Arsenic						
Barium	ND	2.00	1.89	95	1.60	2.40
Beryllium						
Calcium						
Cadmium	ND	2.00	1.93	97	1.60	2.40
Cobalt						
Chromium	ND	2.00	2.01	100	1.60	2.40
Copper						
Iron						
Potassium						
Magnesium						
Manganese						
Sodium						
Nickel						
Lead						
Antimony						
Selenium						
Thallium						
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-01-939	01C-03C

Matrix Spike - Spike Duplicate Results Work Order Spiked: 9901962-01B

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %	QC Limits %
Silver	ND	1.0	1.005	100.5	1.006	100.6	80	120	0.1	20.0
Aluminum										
Arsenic										
Barium	0.5222	1.0	1.489	96.7	1.502	98.0	80	120	1.3	20.0
Beryllium										
Calcium										
Cadmium	ND	1.0	1.01	101.0	1.016	101.6	80	120	0.6	20.0
Cobalt										
Chromium	ND	1.0	1.014	101.4	1.013	101.3	80	120	0.1	20.0
Copper										
Iron										
Potassium										
Magnesium										
Manganese										
Sodium										
Nickel										
Lead										
Antimony										
Selenium										
Thallium										
Vanadium										
Zinc										

Elements Post Spiked: ALL

Checked: JM 2/1/99

Trace-icp

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: EG

Matrix: Water Units: mg/L

Date:012699 Time:1109 File Name: 0126JM4

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

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic	ND	4.00	3.85	96	3.20	4.80
Barium						
Beryllium						
Calcium						
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Potassium						
Magnesium						
Manganese						
Sodium						
Nickel						
Lead	ND	2.00	1.89	95	1.60	2.40
Antimony						
Selenium	ND	4.00	3.83	96	3.20	4.80
Thallium						
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-01-962	01B-03B
99-01-964	02C,06C
99-01-939	01C-03C
99-01-968	01D
99-01-943	01D
99-01-976	01C-04C
99-01-975	01C,02C

Matrix Spike - Spike Duplicate Results

Work Order Spiked: 9901962-01B

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %	QC Limits %
Silver										
Aluminum										
Arsenic	ND	2.0	1.66	83.0	1.603	80.2	80	120	3.5	20.0
Barium										
Beryllium										
Calcium										
Cadmium										
Cobalt										
Chromium										
Copper										
Iron										
Potassium										
Magnesium										
Manganese										
Sodium										
Nickel										
Lead	ND	1.0	0.9307	93.1	0.9178	91.8	80	120	1.4	20.0
Antimony										
Selenium	ND	2.0	1.987	99.4	1.959	98.0	80	120	1.4	20.0
Thallium										
Vanadium										
Zinc										

Elements Post Spiked: Pb,Se

Checked: EG. 1/27/99

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 01/29/99
Analyzed on: 01/29/99
Analyst: AG

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Mercury, Total
Method 7470 A***

SPL Sample ID Number	Blank Value ug/L	LCS Concentration ug/L	Measured Concentration ug/L	% Recovery	QC Limits Recovery
LCS	ND	2.0	1.9	95.0	80 - 120

-9902001

Samples in batch:

9901939-01C	9901939-02C	9901939-03C	9901962-01B
9901962-02B	9901962-03B	9901A36-02F	9901B43-01F
9901B43-02F	9901B43-03F	9901B43-04F	9901B43-05F
9901B52-06F	9901B52-07F	9901B52-08F	9901B52-09F
9901B52-10F	9901B55-16F	9901B55-17F	

COMMENTS:
LCS= SPL ID# 94-452-49-12

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 01/29/99
Analyzed on: 01/29/99
Analyst: AG

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Mercury, Total
Method 7470 A***

SPL Sample ID Number	Method Blank ug/L	Sample Result ug/L	Spike Added ug/L	Matrix Spike Result ug/L	Matrix Spike Recovery %	Matrix Spike Duplicate Result ug/L	Matrix Spike Duplicate Recovery %	RPD (%)	QC LIMITS (Advisory) RPD Max	QC LIMITS (Advisory) % REC
9901962-01B	ND	ND	2.0	2.0	100	2.1	105	4.9	20	75 -125

-9902001

Samples in batch:

9901939-01C	9901939-02C	9901939-03C	9901962-01B
9901962-02B	9901962-03B	9901A36-02F	9901B43-01F
9901B43-02F	9901B43-03F	9901B43-04F	9901B43-05F
9901B52-06F	9901B52-07F	9901B52-08F	9901B52-09F
9901B52-10F	9901B55-16F	9901B55-17F	

COMMENTS:
LCS= SPL ID# 94-452-49-12

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9901939 — 107281 — page 1 of 1

Client Name: Brown & Caldwell
Address/Phone: 1415 Louisiana
Client Contact: Tim Jenkins
Project Name: BJ Artesia
Project Number: 12988
Project Location: Artesia
Invoice To: Tim Jenkins

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	PAH-8310	RCRA metals	VOCs-8021
MW-5	1.20.99	15:30			W					X	X	X	
MW-6	1.20.99	16:30			W					X	X	X	
MW-7	1.20.99	14:30			W					X	X	X	
DM-1	1.20.99	17:00									X		X
DM-2	1.20.99	17:30									X		X

Client/Consultant Remarks: Hold MW-6, DM-1, DM-2 until permission given

Laboratory remarks:

Intact? ☐ Y ☐ N
Temp: 4°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): BMF

	date	time	
1. Relinquished by Sampler:	1.21.99	17:00	2. Received by:
3. Relinquished by:	date	time	4. Received by:
5. Relinquished by:	date	time	6. Received by Laboratory: 1/22/99 1000

☒ 8880 Interchange Drive, Houston, TX 77054 (713) 660-0901
☐ 500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775
☐ 459 Hughes Drive, Traverse City, MI 49684 (616) 947-5777

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
1-22-99	1000

SPL Sample ID:

9901939

			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 #)	811235820286	
		Other:		
11	Method of sample disposal:	SPL Disposal	—	
		HOLD		
		Return to Client		

Name:	Date:
[signature]	1-22-99

1415 Louisiana, Suite 2500
Houston, TX 77002

Tel: (713) 759-0999
Fax: (713) 308-3886

CERTIFIED MAIL NO. P 076 598 942
RETURN RECEIPT REQUESTED

July 2, 1999

BROWN AND CALDWELL
Environmental Engineering & Consulting

Mr. Wayne Price
New Mexico Energy, Minerals and Natural Resources Department
Oil Conservation Division
2040 South Pacheco Street
Santa Fe, New Mexico 87505

12988-014

RECEIVED
JUL 0 9 1999
Environmental Bureau
Oil Conservation Division

Subject: **Groundwater Sampling Activities**
Acid Dock Area: MW-3R
BJ Services Artesia Facility
Eddy County, New Mexico

Dear Mr. Price:

On May 6, 1999, Brown and Caldwell sampled monitor well MW-3R at the subject facility. The results for this sampling event, as summarized in Attachment 1, indicate that the groundwater does not exceed any listed New Mexico Water Quality Control Commission Standards (NMWQCC) for Human Health. Based on these results, we recommend that the former Acid Dock Area be closed with no further action.

Background:

Based on the previous correspondence with your office dated January 23, 1999, Brown and Caldwell installed a replacement well (MW-3R) on February 24, 1999, in the immediate vicinity of the destroyed MW-3 (within 3 feet). This replacement well was designed to act as the downgradient compliance well for the former Acid Dock Area, and to support final closure for the former Acid Dock Area. Based on historical groundwater elevation data, the groundwater gradient in the area is generally toward the east. (See Attachment 2 for a Site Plan Map showing the location of MW-3R relative to the former Acid Dock Area and MW-3). On February 24, 1999, Brown and Caldwell permanently plugged the destroyed MW-3 well after MW-3R was completed. A groundwater sample was collected from MW-3R on May 6, 1999, and was analyzed for parameters described in your letter dated December 16, 1998. The results of this sampling event are summarized below.

Groundwater Sampling Procedures and Parameters Analyzed:

Sampling was performed in accordance with the Brown and Caldwell Work Plan for Groundwater Investigation Activities for the site. Generally, the monitor well was gauged for water level and purged using a Geosquirt-60 pump. During purging, aquifer characteristics were measured using a YSI 600 XL and Flow Cell. Field testing was performed to measure dissolved oxygen, ferrous iron, and alkalinity. Purge water was placed in a labeled drum provided by BJ Services. At least three well volumes of purge water were removed from the monitor well. Purging was considered complete once aquifer parameters stabilized. Stabilization is defined as variation of less than 10% in consecutive readings for temperature, pH, alkalinity, and dissolved oxygen, after removal of each well volume during the purging process.

A groundwater sample was obtained from the pump discharge line immediately upon completion of purging activities. Sample bottles were filled completely, tightly closed, labeled, packaged in bubble wrapping, and immediately placed on ice. A chain of custody form was completed to reflect the analysis required. The analysis was performed as requested on the chain of custody form. The groundwater sample was analyzed for:

- Volatile Organic Compounds (VOCs, Method 8260)
- Semi-Volatile Organic Compounds (SVOCs, Method 8270C)
- Polynuclear Aromatic Hydrocarbons (PAHs, Method 8310)
- NMWQCC Metals (Arsenic, Barium, Cadmium, Chromium, Lead, Total Mercury, Selenium, Silver, Copper, and Zinc)
- General Chemistry (pH, TDS, Conductivity, Major Cations, and Major Anions).

Analytical Results:

Analytical results for groundwater sample collected during the May 1999 sampling event and the applicable NMWQCC standards are summarized in Attachment 1. The complete analytical report is enclosed as Attachment 3.

The groundwater sample collected from MW-3R indicated non-detectable concentrations of VOCs by Method 8260 and SVOCs by Method 8270C. Several PAHs (by Method 8310) were detected; these detections were below applicable NMWQCC Standards. Various metals compounds were also detected, but none exceeded NMWQCC Standards.

Analytical testing for pH, bicarbonate, carbonate, total dissolved solids (TDS), and alkalinity determined general chemistry and aquifer characteristics. Additionally, major cations and major anions were analyzed. TDS, chlorides, and sulfates exceeded NMWQCC Domestic Water Supply Standards; these parameters do not apply, as the monitor well is not used for consumption of any kind, including domestic water supply.

Conclusions and Recommendations:

Laboratory results for groundwater samples were compared to NMWQCC Groundwater Standards for Human Health; there were no exceedences of applicable NMWQCC groundwater standards.

Since there were no exceedences to Human Health Standards as listed by the NMWQCC, Brown and Caldwell recommends closure with no further action for the former Acid Dock Area at the BJ Services Artesia District Facility. Note that wells MW-2, MW-4 and MW-3R will be slated for plugging and abandonment if final closure status is granted, based on current and previous analytical results for these wells.

If you have any questions regarding the information presented herein, please contact me at (713) 759-0999.

Sincerely,

BROWN AND CALDWELL

Timothy L. Jenkins
Project Manager

BROWN AND CALDWELL

for Richard L. Rexroad, P.G.
Principal In Charge

TLJ:uak

cc: NMOCD – Artesia District Office (w/ Attachments)
Rick N. Johnson (BJ Services Company, U. S. A., w/ Attachments)

ATTACHMENT 1

Groundwater Analytical Results Summary - May 6, 1999
Former Acid Dock Area - MW-3R

Attachment 1

Groundwater Analytical Results Summary - May 6, 1999

Former Acid Dock Area - MW-3R

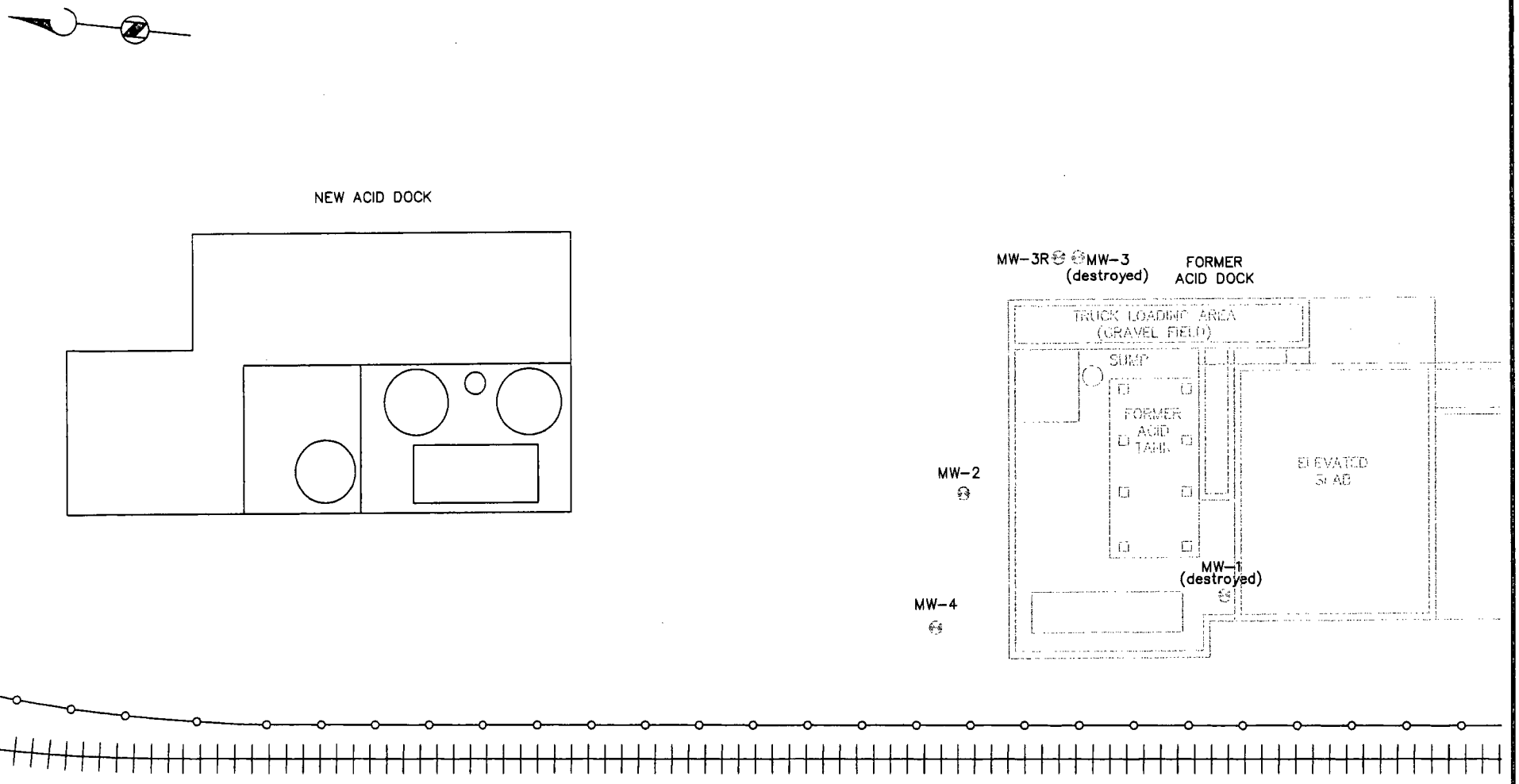
BJ Services Company, U.S.A.

Artesia, New Mexico

Analysis	Parameter	Concentration (mg/L)	NMWQCC Standards (mg/L)
Total Metals (Series 6010)			
	Silver	<0.01	0.05 Human Health Standards
	Arsenic	0.014	0.1 Human Health Standards
	Barium	0.052	1 Human Health Standards
	Cadmium	<0.005	0.01 Human Health Standards
	Chromium	<0.01	0.05 Human Health Standards
	Mercury	<0.0002	0.002 Human Health Standards
	Lead	<0.005	0.05 Human Health Standards
	Selenium	<0.005	0.05 Human Health Standards
Major Cations and Anions			
	Calcium	618	NL - None Listed
	Potassium	27	NL - None Listed
	Magnesium	157	NL - None Listed
	Sodium	261	NL - None Listed
	Copper	<0.01	1 Domestic Water Supply
	Zinc	<0.02	10 Domestic Water Supply
	Chloride	656	250 Domestic Water Supply
	Nitrate Nitrogen	<0.1	10 Human Health Standards
	Sulfate	1899	600 Domestic Water Supply
General Chemistry			
	Total Dissolved Solids	4600	1000 Domestic Water Supply
	pH	6.69	6 < pH < 9 Domestic Water Supply
	Bicarbonate	246	NL - None Listed
	Carbonate	<1	NL - None Listed
	Specific Conductance	4800 µmhos/cm	NL - None Listed
Volatile Organics (Method 8260)			
	Benzene	<0.005	0.01 Human Health Standards
	Toluene	<0.005	0.75 Human Health Standards
	Ethylbenzene	<0.005	0.75 Human Health Standards
	Xylenes (total)	<0.005	0.62 Human Health Standards
Semivolatile Organics (Method 8270C)			
	Dibenzofuran	<0.005	NL - None Listed
	2-Methylnaphthalene	<0.005	NL - None Listed
	4-Methyphenol	<0.005	NL - None Listed
Polynuclear Aromatic Hydrocarbons (Method 8310)			
	Naphthalene	0.0007	0.03 Human Health Standards
	Fluorene	0.012	NL - None Listed
	Phenanthrene	0.033	NL - None Listed
	Benzo(a)anthracene	0.004	NL - None Listed
	Benzo(b)fluoranthene	0.0006	NL - None Listed
	Dibenzo(a,h)anthracene	0.0001	NL - None Listed

ATTACHMENT 2

Site Plan Map
Former Acid Dock Area - MW-3R



P:\12988\F12988005 01-14-99 CK

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

LEGEND

MW-3 MONITOR WELL

FENCELINE

80.0 GROUNDWATER ELEVATION

GROUNDWATER FLOW DIRECTION

0 15 30
SCALE 1" = 30'
DRAWN BY: CK DATE 1/99
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

TITLE: SITE LOCATION MAP
FORMER ACID DOCK AREA – MW-3R

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

SITE LOCATION: ARTESIA, NEW MEXICO

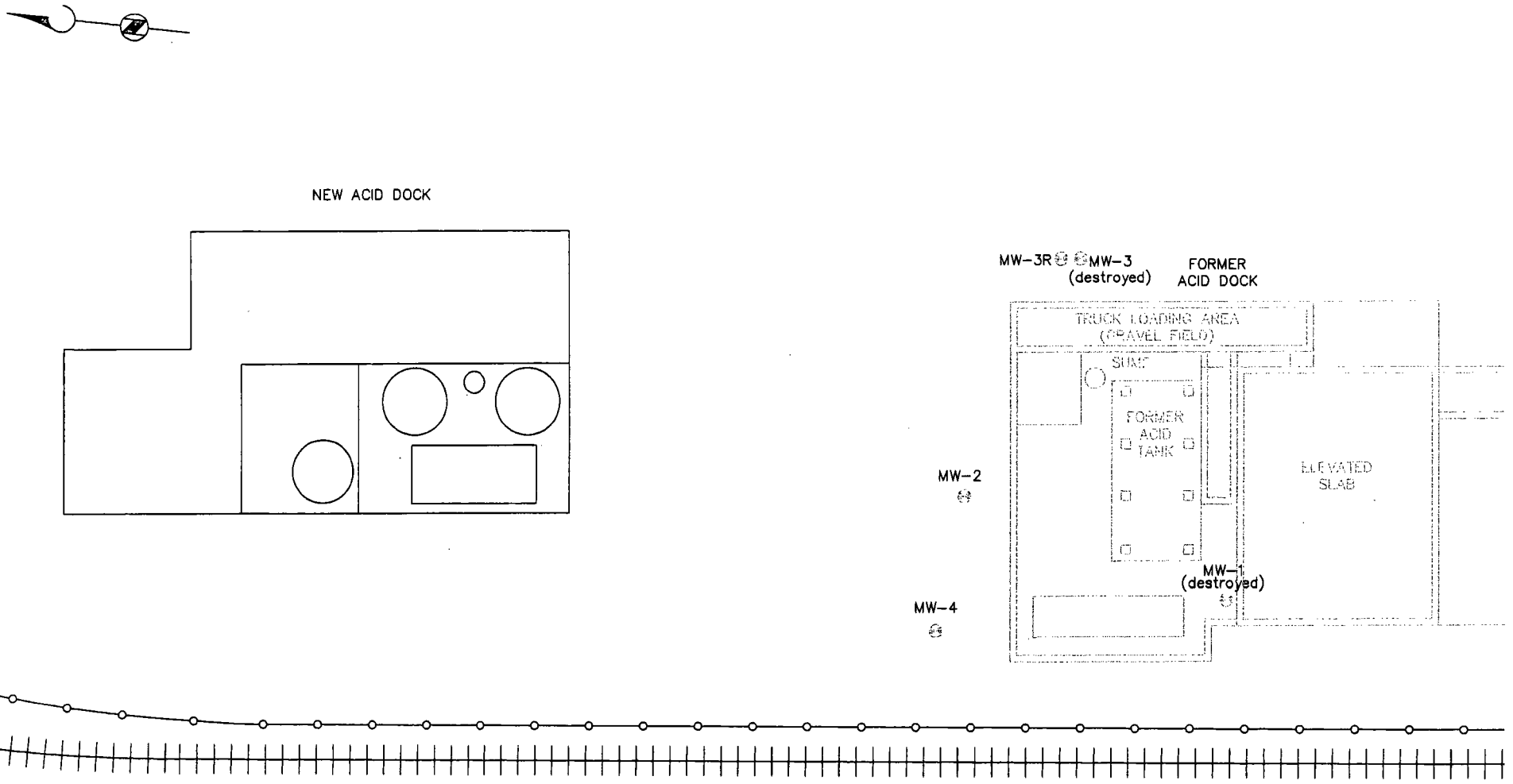
DATE: 06/08/99

PROJECT NUMBER: 2988.009

ATTACHMENT: 2

ATTACHMENT 3

Complete Analytical Report
Former Acid Dock Area - MW-3R



BROWN AND CALDWELL HOUSTON, TEXAS SUBMITTED: _____ DATE: _____ PROJECT MANAGER APPROVED: _____ DATE: _____ BROWN AND CALDWELL	LEGEND MW-3 MONITOR WELL FENCELINE GROUNDWATER ELEVATION GROUNDWATER FLOW DIRECTION	0 15 30 SCALE 1" = 30' DRAWN BY: CK DATE 1/99 CHK'D BY: ____ DATE ____ APPROVED: ____ DATE ____	TITLE SITE LOCATION MAP FORMER ACID DOCK AREA – MW-3R CLIENT BJ SERVICES COMPANY, U.S.A. SITE LOCATION ARTESIA, NEW MEXICO	DATE 06/08/99 PROJECT NUMBER 2988.009 ATTACHMENT 2

P:\12988\F12988005 01-14-99 CK

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

May 25, 1999

Mr. Tim Jenkins
BROWN AND CALDWELL
1415 Louisiana
Houston, TX 77002

The following report contains analytical results for the sample(s) received at Southern Petroleum Laboratories (SPL) on May 7, 1999. The sample(s) was assigned to Certificate of Analysis No. (s) 9905237 and analyzed for all parameters as listed on the chain of custody.

Your sample ID: MW-3R (SPL ID: H9-9905237-01) was randomly selected for the use in SPL's Quality Control program for the Total Metals analysis by SW846 method 6010. The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) were outside of the advisable quality control limits for Calcium, Magnesium and Sodium, due to matrix interference. A Laboratory Control Sample (LCS) was analyzed as a quality control check for the analytical batch and all recoveries were within acceptable.

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

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
Senior Project Manager

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

Southern Petroleum Laboratories, Inc.

Certificate of Analysis Number: 99-05-237

Approved for Release by:

Bernadette A. Fini, Senior Project Manager — 5-25-99 Date

Joel Grice
Laboratory Director

Idelis Williams
Corporate Quality Assurance Director

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

Certificate of Analysis No. H9-9905237-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

DATE: 05/21/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-3R

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 05/06/99 15:00:00
DATE RECEIVED: 05/07/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Liquid-liquid extraction SEMIVOLATILES Method 3520C *** Analyzed by: KL Date: 05/08/99 13:00:00	05/08/99		
Silver, Total Method 6010B *** Analyzed by: PB Date: 05/11/99 08:57:00	ND	0.01	mg/L
Arsenic, Total Method 6010B *** Analyzed by: EG Date: 05/11/99 11:08:00	0.014	0.005	mg/L
Barium, Total Method 6010B *** Analyzed by: PB Date: 05/11/99 08:57:00	0.052	0.005	mg/L
Calcium, Total Method 6010B *** Analyzed by: PB Date: 05/11/99 08:57:00	618	0.1	mg/L
Cadmium, Total Method 6010B *** Analyzed by: PB Date: 05/11/99 08:57:00	ND	0.005	mg/L

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. H9-9905237-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

DATE: 05/21/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-3R

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 05/06/99 15:00:00
DATE RECEIVED: 05/07/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Chromium, Total Method 6010B *** Analyzed by: PB Date: 05/11/99 08:57:00	ND	0.01	mg/L
Copper, Total Method 6010B *** Analyzed by: PB Date: 05/11/99 08:57:00	ND	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 05/10/99 12:00:00	ND	0.0002	mg/L
Potassium, Total Method 6010B *** Analyzed by: PB Date: 05/11/99 08:57:00	27	2	mg/L
Magnesium, Total Method 6010B *** Analyzed by: PB Date: 05/11/99 08:57:00	157	0.1	mg/L
Sodium, Total Method 6010B *** Analyzed by: PB Date: 05/11/99 08:57:00	261	0.5	mg/L

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. H9-9905237-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

DATE: 05/21/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-3R

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 05/06/99 15:00:00
DATE RECEIVED: 05/07/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: MR Date: 05/11/99 07:45:00	05/11/99		
Lead, Total Method 6010B *** Analyzed by: EG Date: 05/11/99 11:08:00	ND	0.005	mg/L
Selenium, Total Method 6010B *** Analyzed by: EG Date: 05/11/99 11:08:00	ND	0.005	mg/L
Zinc, Total Method 6010B *** Analyzed by: PB Date: 05/11/99 08:57:00	ND	0.02	mg/L
Chloride Method 325.3 * Analyzed by: CV Date: 05/14/99 10:30:00	656	10	mg/L
Carbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 05/07/99 10:00:00	ND	1	mg/L

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. H9-9905237-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

DATE: 05/21/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-3R

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 05/06/99 15:00:00
DATE RECEIVED: 05/07/99

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Specific Conductance @ 25°C Method 120.1 * Analyzed by: AB Date: 05/07/99 10:00:00	4800	10	umhos/cm
Bicarbonate, as CaCO3 Method SM 4500-CO2D ** Analyzed by: AB Date: 05/07/99 10:00:00	246	1	mg/L
Nitrate nitrogen(as N) Method 353.3 * Analyzed by: CV Date: 05/07/99 15:30:00	ND	0.1	mg/L
pH Method 150.1 * Analyzed by: AB Date: 05/07/99 10:00:00	6.69		pH units
Sulfate Method 375.4 * Analyzed by: ELS Date: 05/12/99 11:00:00	1899	100	mg/L
Total Dissolved Solids Method 160.1 * Analyzed by: BEN Date: 05/11/99 14:00:00	4600	100	mg/L

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. H9-9905237-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

05/21/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-3R

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 05/06/99 15:00:00
DATE RECEIVED: 05/07/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Benzene	ND	5	ug/L
Bromobenzene	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
Bromoform	ND	5	ug/L
Bromomethane	ND	10	ug/L
n-Butylbenzene	ND	5	ug/L
sec-Butylbenzene	ND	5	ug/L
tert-Butylbenzene	ND	5	ug/L
Carbon tetrachloride	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
Chlorodibromomethane	ND	5	ug/L
Chloroethane	ND	10	ug/L
Chloroform	ND	5	ug/L
Chloromethane	ND	10	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,2-Dibromo-3-chloropropane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Dibromomethane	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
Dichlorodifluoromethane	ND	10	ug/L
1,1-Dichloroethane	ND	5	ug/L
1,2-Dichloroethane	ND	5	ug/L
1,1-Dichloroethene	ND	5	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
trans-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
1,3-Dichloropropane	ND	5	ug/L
2,2-Dichloropropane	ND	5	ug/L
1,1-Dichloropropene	ND	5	ug/L
Ethylbenzene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
Isopropylbenzene	ND	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
Methylene chloride	ND	5	ug/L

METHOD: 8260 Water, Volatile Organics

(continued on next page)

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

Certificate of Analysis No. H9-9905237-01

Brown and Caldwell

SAMPLE ID: MW-3R

ANALYTICAL DATA (continued)

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	5	ug/L
n-Propylbenzene	ND	5	ug/L
Styrene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Toluene	ND	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
1,1,1-Trichloroethane	ND	5	ug/L
1,1,2-Trichloroethane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Trichlorofluoromethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
1,2,4-Trimethylbenzene	ND	5	ug/L
1,3,5-Trimethylbenzene	ND	5	ug/L
Vinyl chloride	ND	10	ug/L
Xylenes (total)	ND	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
trans-1,3-Dichloropropene	ND	5	ug/L
Acetone	ND	100	ug/L
2-Butanone	ND	20	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
2-Hexanone	ND	10	ug/L
Carbon Disulfide	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Chloroethylvinylether	ND	10	ug/L
Methyl t-Butyl Ether	ND	10	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1,2-Dichloroethane-d4	50 ug/L	96	80	120
Toluene-d8	50 ug/L	98	88	110
4-Bromofluorobenzene	50 ug/L	106	86	115

ANALYZED BY: LT DATE/TIME: 05/10/99 18:27:00
METHOD: 8260 Water, Volatile Organics
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9905237-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

05/21/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-3R

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 05/06/99 15:00:00
DATE RECEIVED: 05/07/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Acenaphthene	ND	5	ug/L
Acenaphthylene	ND	5	ug/L
Aniline	ND	5	ug/L
Anthracene	ND	5	ug/L
Benzo(a)Anthracene	ND	5	ug/L
Benzo(b)Fluoranthene	ND	5	ug/L
Benzo(k)Fluoranthene	ND	5	ug/L
Benzo(a)Pyrene	ND	5	ug/L
Benzoic Acid	ND	25	ug/L
Benzo(g,h,i)Perylene	ND	5	ug/L
Benzyl alcohol	ND	5	ug/L
4-Bromophenylphenyl ether	ND	5	ug/L
Butylbenzylphthalate	ND	5	ug/L
di-n-Butyl phthalate	ND	5	ug/L
Carbazole	ND	5	ug/L
4-Chloroaniline	ND	5	ug/L
bis(2-Chloroethoxy)Methane	ND	5	ug/L
bis(2-Chloroethyl)Ether	ND	5	ug/L
bis(2-Chloroisopropyl)Ether	ND	5	ug/L
4-Chloro-3-Methylphenol	ND	5	ug/L
2-Chloronaphthalene	ND	5	ug/L
2-Chlorophenol	ND	5	ug/L
4-Chlorophenylphenyl ether	ND	5	ug/L
Chrysene	ND	5	ug/L
Dibenz(a,h)Anthracene	ND	5	ug/L
Dibenzofuran	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
3,3'-Dichlorobenzidine	ND	10	ug/L
2,4-Dichlorophenol	ND	5	ug/L
Diethylphthalate	ND	5	ug/L
2,4-Dimethylphenol	ND	5	ug/L
Dimethyl Phthalate	ND	5	ug/L
4,6-Dinitro-2-Methylphenol	ND	25	ug/L
2,4-Dinitrophenol	ND	25	ug/L
2,4-Dinitrotoluene	ND	5	ug/L
2,6-Dinitrotoluene	ND	5	ug/L

METHOD: 8270C, Semivolatile Organics - Water

(continued on next page)

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

Certificate of Analysis No. H9-9905237-01

Brown and Caldwell

SAMPLE ID: MW-3R

ANALYTICAL DATA (continued)

PARAMETER	RESULTS	PQL*	UNITS
1,2-Diphenylhydrazine	ND	5	ug/L
bis(2-Ethylhexyl)Phthalate	ND	5	ug/L
Fluoranthene	ND	5	ug/L
Fluorene	ND	5	ug/L
Hexachlorobenzene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
Hexachloroethane	ND	5	ug/L
Hexachlorocyclopentadiene	ND	5	ug/L
Indeno(1,2,3-cd)Pyrene	ND	5	ug/L
Isophorone	ND	5	ug/L
2-Methylnaphthalene	ND	5	ug/L
2-Methylphenol	ND	5	ug/L
4-Methylphenol	ND	5	ug/L
Naphthalene	ND	5	ug/L
2-Nitroaniline	ND	25	ug/L
3-Nitroaniline	ND	25	ug/L
4-Nitroaniline	ND	25	ug/L
Nitrobenzene	ND	5	ug/L
2-Nitrophenol	ND	5	ug/L
4-Nitrophenol	ND	25	ug/L
N-Nitrosodiphenylamine	ND	5	ug/L
N-Nitroso-Di-n-Propylamine	ND	5	ug/L
Di-n-Octyl Phthalate	ND	5	ug/L
Pentachlorophenol	ND	25	ug/L
Phenanthrene	ND	5	ug/L
Phenol	ND	5	ug/L
Pyrene	ND	5	ug/L
Pyridine	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
2,4,5-Trichlorophenol	ND	10	ug/L
2,4,6-Trichlorophenol	ND	5	ug/L

METHOD: 8270C, Semivolatile Organics - Water

(continued on next page)

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

Certificate of Analysis No. H9-9905237-01

Brown and Caldwell

SAMPLE ID: MW-3R

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
Nitrobenzene-d5	50 ug/L	62	35	114
2-Fluorobiphenyl	50 ug/L	66	43	116
Terphenyl-d14	50 ug/L	50	33	141
Phenol-d5	75 ug/L	16	10	110
2-Fluorophenol	75 ug/L	27	21	110
2,4,6-Tribromophenol	75 ug/L	61	10	123

ANALYZED BY: SC DATE/TIME: 05/10/99 19:44:00
EXTRACTED BY: KL DATE/TIME: 05/08/99 13:00:00
METHOD: 8270C, Semivolatile Organics - Water
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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. H9-9905237-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

05/21/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Brown and Caldwell
SAMPLE ID: MW-3R

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 05/06/99 15:00:00
DATE RECEIVED: 05/07/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	0.7	0.1	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	2.0	ug/L
Fluorene	12	2.0	ug/L
Phenanthrene	33	2.0	ug/L
Anthracene	ND	2.0	ug/L
Fluoranthene	ND	2.0	ug/L
Pyrene	ND	2.0	ug/L
Chrysene	ND	0.1	ug/L
Benzo (a) anthracene	4	2.0	ug/L
Benzo (b) fluoranthene	0.6	0.1	ug/L
Benzo (k) fluoranthene	ND	0.1	ug/L
Benzo (a) pyrene	ND	0.1	ug/L
Dibenzo (a,h) anthracene	0.1	0.1	ug/L
Benzo (g,h,i) perylene	ND	0.1	ug/L
Indeno (1,2,3-cd) pyrene	ND	0.1	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.50 ug/L	72	50	150
Phenanthrene d-10	0.50 ug/L	1200MI	50	150

ANALYZED BY: KA
DATE/TIME: 05/17/99 19:32:35
EXTRACTED BY: KL
DATE/TIME: 05/08/99 15:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed
MI - Matrix Interference.

COMMENTS:

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. H9-9905237-02

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Tim Jenkins

05/21/99

PROJECT: BJ-Artesia
SITE: Artesia
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank 4/30

PROJECT NO: 12988
MATRIX: WATER
DATE SAMPLED: 05/06/99
DATE RECEIVED: 05/07/99

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Benzene	ND	5	ug/L
Bromobenzene	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
Bromoform	ND	5	ug/L
Bromomethane	ND	10	ug/L
n-Butylbenzene	ND	5	ug/L
sec-Butylbenzene	ND	5	ug/L
tert-Butylbenzene	ND	5	ug/L
Carbon tetrachloride	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
Chlorodibromomethane	ND	5	ug/L
Chloroethane	ND	10	ug/L
Chloroform	ND	5	ug/L
Chloromethane	ND	10	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,2-Dibromo-3-chloropropane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Dibromomethane	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
Dichlorodifluoromethane	ND	10	ug/L
1,1-Dichloroethane	ND	5	ug/L
1,2-Dichloroethane	ND	5	ug/L
1,1-Dichloroethene	ND	5	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
trans-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
1,3-Dichloropropane	ND	5	ug/L
2,2-Dichloropropane	ND	5	ug/L
1,1-Dichloropropene	ND	5	ug/L
Ethylbenzene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
Isopropylbenzene	ND	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
Methylene chloride	ND	5	ug/L

METHOD: 8260 Water, Volatile Organics

(continued on next page)

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

Certificate of Analysis No. H9-9905237-02

Brown and Caldwell

SAMPLE ID: Trip Blank 4/30

ANALYTICAL DATA (continued)

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	ND	5	ug/L
n-Propylbenzene	ND	5	ug/L
Styrene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Toluene	ND	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
1,1,1-Trichloroethane	ND	5	ug/L
1,1,2-Trichloroethane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Trichlorofluoromethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
1,2,4-Trimethylbenzene	ND	5	ug/L
1,3,5-Trimethylbenzene	ND	5	ug/L
Vinyl chloride	ND	10	ug/L
Xylenes (total)	ND	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
trans-1,3-Dichloropropene	ND	5	ug/L
Acetone	ND	100	ug/L
2-Butanone	ND	20	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
2-Hexanone	ND	10	ug/L
Carbon Disulfide	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Chloroethylvinylether	ND	10	ug/L
Methyl t-Butyl Ether	ND	10	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1,2-Dichloroethane-d4	50 ug/L	94	80	120
Toluene-d8	50 ug/L	98	88	110
4-Bromofluorobenzene	50 ug/L	106	86	115

ANALYZED BY: LT DATE/TIME: 05/10/99 14:13:00
METHOD: 8260 Water, Volatile Organics
NOTES: * - Practical Quantitation Limit ND - Not Detected
NA - Not Analyzed

COMMENTS:

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

QUALITY CONTROL

DOCUMENTATION

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SPL Contract:

Lab Code: Case No.: 9905244 SAS No.: SDG No.:

Matrix Spike - EPA Sample No.: W050699-MF-002

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
1,1-Dichloroethene	50	71	130	118	61-145
Trichloroethene	50	6	55	98	71-120
Benzene	50	0	51	102	76-127
Toluene	50	98	140	84	76-125
Chlorobenzene	50	0	43	86	75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	50	130	118	0	14	61-145
Trichloroethene	50	54	96	2	14	71-120
Benzene	50	51	102	0	11	76-127
Toluene	50	150	104	21*	13	76-125
Chlorobenzene	50	44	88	2	13	75-130

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits due to matrix interference

RPD: 1 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

SPL Houston Labs

RECOVERY REPORT

Client Name: Client SDG: l990510
Sample Matrix: LIQUID Fraction: VOA
Lab Smp Id: METHSPIKE-8260W/1X
Level: LOW Operator: LT
Data Type: MS DATA SampleType: METHSPIKE
SpikeList File: 8260_water.spk Quant Type: ISTD
Sublist File: 8260_lcs.sub
Method File: /var/chem/l.i/l990510.b/l8260aw.m
Misc Info: L130W1/L130B01/L130CW1

SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
8 1,1-Dichloroethene	50	57	114.00	61-145
29 Trichloroethene	50	50	100.00	71-120
25 Benzene	50	48	96.00	76-127
37 Toluene	50	46	92.00	76-125
45 Chlorobenzene	50	46	92.00	75-130

SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 21 1,2-Dichloroethane	50	48	96.00	80-120
$ 36 Toluene-d8	50	50	100.00	88-110
$ 56 Bromofluorobenzene	50	54	108.00	86-115

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990510104642

Reported on: 05/13/99 13:59
Analyzed on: 05/10/99 10:51
Analyst: LT

METHOD 8260 L130B01

Compound	Result	Detection Limit	Units
Dichlorodifluoromethane	ND	10	ug/L
Chloromethane	ND	10	ug/L
Vinyl Chloride	ND	10	ug/L
Bromomethane	ND	10	ug/L
Chloroethane	ND	10	ug/L
Trichlorofluoromethane	ND	5	ug/L
Acetone	ND	100	ug/L
1,1-Dichloroethene	ND	5	ug/L
Methylene Chloride	ND	5	ug/L
Carbon Disulfide	ND	5	ug/L
trans-1,2-Dichloroethene	ND	5	ug/L
1,1-Dichloroethane	ND	5	ug/L
Vinyl Acetate	ND	10	ug/L
2-Butanone	ND	20	ug/L
cis-1,2-Dichloroethene	ND	5	ug/L
1,2-Dichloroethene (total)	ND	5	ug/L
2,2-Dichloropropane	ND	5	ug/L
Bromochloromethane	ND	5	ug/L
Chloroform	ND	5	ug/L
1,1,1-Trichloroethane	ND	5	ug/L
1,2-Dichloroethane	ND	5	ug/L
1,1-Dichloropropene	ND	5	ug/L
Benzene	ND	5	ug/L
Carbon Tetrachloride	ND	5	ug/L
1,2-Dichloropropane	ND	5	ug/L
Trichloroethene	ND	5	ug/L
Dibromomethane	ND	5	ug/L
Bromodichloromethane	ND	5	ug/L
2-Chloroethylvinylether	ND	10	ug/L
4-Methyl-2-Pentanone	ND	10	ug/L
cis-1,3-Dichloropropene	ND	5	ug/L
trans-1,3-Dichloropropene	ND	5	ug/L
Toluene	ND	5	ug/L
1,1,2-Trichloroethane	ND	5	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990510104642

Reported on: 05/13/99 13:59
Analyzed on: 05/10/99 10:51
Analyst: LT

METHOD 8260 L130B01

Compound	Result	Detection Limit	Units
1,3-Dichloropropane	ND	5	ug/L
2-Hexanone	ND	10	ug/L
Dibromochloromethane	ND	5	ug/L
1,2-Dibromoethane	ND	5	ug/L
Tetrachloroethene	ND	5	ug/L
Chlorobenzene	ND	5	ug/L
1,1,1,2-Tetrachloroethane	ND	5	ug/L
Ethylbenzene	ND	5	ug/L
Bromoform	ND	5	ug/L
Styrene	ND	5	ug/L
Xylene (Total)	ND	5	ug/L
1,1,2,2-Tetrachloroethane	ND	5	ug/L
1,2,3-Trichloropropane	ND	5	ug/L
Isopropylbenzene	ND	5	ug/L
Bromobenzene	ND	5	ug/L
N-Propylbenzene	ND	5	ug/L
2-Chlorotoluene	ND	5	ug/L
4-Chlorotoluene	ND	5	ug/L
1,3,5-Trimethylbenzene	ND	5	ug/L
tert-Butylbenzene	ND	5	ug/L
1,2,4-Trimethylbenzene	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
sec-Butylbenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
p-Isopropyltoluene	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
n-Butylbenzene	ND	5	ug/L
1,2-Dibromo-3-Chloropropan	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
Naphthalene	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
1,2,3-Trichlorobenzene	ND	5	ug/L
Methyl t-Butyl Ether	ND	10	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: VLBLK
Batch: L990510104642

Reported on: 05/13/99 13:59
Analyzed on: 05/10/99 10:51
Analyst: LT

METHOD 8260 L130B01

Surrogate	Result	QC Criteria	Units
1,2-Dichloroethane-d4	92	80-120	% Recovery
Toluene-d8	96	88-110	% Recovery
Bromofluorobenzene	106	86-115	% Recovery

Samples in Batch 9905237-01 9905237-02

Notes

ND - Not detected.

3C

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: SPL Contract:

Lab Code: Case No: 990508 SAS No: SDG No:

Matrix Spike - EPA Sample No: BLANK Level (low/med):

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC
Phenol	75	0	25	33	12-110
2-Chlorophenol	75	0	54	72	27-123
1,4-Dichlorobenzene	50	0	34	68	36-110
N-Nitroso-di-n-propylamine	50	0	46	92	41-116
1,2,4-Trichlorobenzene	50	0	36	72	39- 110
4-Chloro-3-methylphenol	75	0	59	79	23-110
Acenaphthene	50	0	43	86	46-125
4-Nitrophenol	75	0	26	35	25-150
2,4-Dinitrotoluene	50	0	40	80	50-150
Pentachlorophenol	75	0	66	88	9-125
Pyrene	50	0	53	106	26-127

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC
Phenol	75	20	27	20	42	12-110
2-Chlorophenol	75	44	59	20	40	27-123
1,4-Dichlorobenzene	50	28	56	19	28	36-110
N-Nitroso-di-n-propylamine	50	36	72	24	38	41-116
1,2,4-Trichlorobenzene	50	30	60	18	28	39- 110
4-Chloro-3-methylphenol	75	48	64	21	42	23- 110
Acenaphthene	50	38	76	12	31	46-125
4-Nitrophenol	75	23	31	12	50	25-150
2,4-Dinitrotoluene	50	35	70	13	50	50-150
Pentachlorophenol	75	57	76	15	50	9-125
Pyrene	50	44	88	19	31	26-127

Column to be used to flag recovery and RPD values with an asterisk

RPD: 0 out of 11 outside limits

Spike Recovery: 0 out of 22 outside limits

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: BLANK
Batch: E990508042258

Reported on: 05/13/99 13:59
Analyzed on: 05/10/99 16:59
Analyst: SC

METHOD 8270 H128B03

Compound	Result	Detection Limit	Units
Pyridine	ND	5	ug/L
Phenol	ND	5	ug/L
Aniline	ND	5	ug/L
bis(2-Chloroethyl)ether	ND	5	ug/L
2-Chlorophenol	ND	5	ug/L
1,3-Dichlorobenzene	ND	5	ug/L
1,4-Dichlorobenzene	ND	5	ug/L
Benzyl alcohol	ND	5	ug/L
1,2-Dichlorobenzene	ND	5	ug/L
2-Methylphenol	ND	5	ug/L
bis(2-chloroisopropyl)ethe	ND	5	ug/L
4-Methylphenol	ND	5	ug/L
N-Nitroso-di-n-propylamine	ND	5	ug/L
Hexachloroethane	ND	5	ug/L
Nitrobenzene	ND	5	ug/L
Isophorone	ND	5	ug/L
2-Nitrophenol	ND	5	ug/L
2,4-Dimethylphenol	ND	5	ug/L
Benzoic acid	ND	25	ug/L
bis(2-Chloroethoxy)methane	ND	5	ug/L
2,4-Dichlorophenol	ND	5	ug/L
1,2,4-Trichlorobenzene	ND	5	ug/L
Naphthalene	ND	5	ug/L
4-Chloroaniline	ND	5	ug/L
Hexachlorobutadiene	ND	5	ug/L
4-Chloro-3-methylphenol	ND	5	ug/L
2-Methylnaphthalene	ND	5	ug/L
Hexachlorocyclopentadiene	ND	5	ug/L
2,4,6-Trichlorophenol	ND	5	ug/L
2,4,5-Trichlorophenol	ND	10	ug/L
2-Chloronaphthalene	ND	5	ug/L
2-Nitroaniline	ND	25	ug/L
Dimethylphthalate	ND	5	ug/L
2,6-Dinitrotoluene	ND	5	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: BLANK
Batch: E990508042258

Reported on: 05/13/99 13:59
Analyzed on: 05/10/99 16:59
Analyst: SC

METHOD 8270 H128B03

Compound	Result	Detection Limit	Units
Acenaphthylene	ND	5	ug/L
3-Nitroaniline	ND	25	ug/L
Acenaphthene	ND	5	ug/L
2,4-Dinitrophenol	ND	25	ug/L
4-Nitrophenol	ND	25	ug/L
Dibenzofuran	ND	5	ug/L
2,4-Dinitrotoluene	ND	5	ug/L
Diethylphthalate	ND	5	ug/L
4-Chlorophenyl-phenylether	ND	5	ug/L
Fluorene	ND	5	ug/L
4-Nitroaniline	ND	25	ug/L
4,6-Dinitro-2-methylphenol	ND	25	ug/L
n-Nitrosodiphenylamine	ND	5	ug/L
1,2-Diphenylhydrazine	ND	5	ug/L
4-Bromophenyl-phenylether	ND	5	ug/L
Hexachlorobenzene	ND	5	ug/L
Pentachlorophenol	ND	25	ug/L
Phenanthrene	ND	5	ug/L
Anthracene	ND	5	ug/L
Carbazole	ND	5	ug/L
Di-n-butylphthalate	ND	5	ug/L
Fluoranthene	ND	5	ug/L
Pyrene	ND	5	ug/L
Butylbenzylphthalate	ND	5	ug/L
3,3'-Dichlorobenzidine	ND	10	ug/L
Benzo[a]anthracene	ND	5	ug/L
Chrysene	ND	5	ug/L
bis(2-Ethylhexyl)phthalate	ND	5	ug/L
Di-n-octylphthalate	ND	5	ug/L
Benzo[b]fluoranthene	ND	5	ug/L
Benzo[k]fluoranthene	ND	5	ug/L
Benzo[a]pyrene	ND	5	ug/L
Indeno[1,2,3-cd]pyrene	ND	5	ug/L
Dibenz[a,h]anthracene	ND	5	ug/L

Notes
ND - Not detected.

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

SPL Blank QC Report

Matrix: Aqueous
Sample ID: BLANK
Batch: E990508042258

Reported on: 05/13/99 13:59
Analyzed on: 05/10/99 16:59
Analyst: SC

METHOD 8270 H128B03

Compound	Result	Detection Limit	Units
Benzo[g,h,i]perylene	ND	5	ug/L

Surrogate	Result	QC Criteria	Units
Nitrobenzene-d5	68	35-114	% Recovery
2-Fluorobiphenyl	74	43-116	% Recovery
Terphenyl-d14	76	33-141	% Recovery
Phenol-d5	23	10-110	% Recovery
2-Fluorophenol	35	21-110	% Recovery
2,4,6-Tribromophenol	60	10-123	% Recovery

Samples in Batch 9905237-01

Notes
ND - Not detected.

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

** SPL BATCH QUALITY CONTROL REPORT **
Method 8310 ***

Matrix: Aqueous
Units: ug/L

Batch Id: 2990516002200

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Naphthalene	ND	0.50	0.33	66.0	32 - 148
Acenaphthylene	ND	0.50	0.33	66.0	42 - 138
Acenaphthene	ND	0.50	0.35	70.0	22 - 133
Fluorene	ND	0.50	0.35	70.0	11 - 148
Phenanthrene	ND	0.50	0.36	72.0	40 - 121
Anthracene	ND	0.50	0.30	60.0	32 - 121
Fluoranthene	ND	0.50	0.36	72.0	45 - 133
Pyrene	ND	0.50	0.37	74.0	39 - 136
Chrysene	ND	0.50	0.37	74.0	44 - 122
Benzo (a) anthracene	ND	0.50	0.36	72.0	53 - 137
Benzo (b) fluoranthene	ND	0.50	0.38	76.0	62 - 121
Benzo (k) fluoranthene	ND	0.50	0.37	74.0	66 - 128
Benzo (a) pyrene	ND	0.50	0.37	74.0	42 - 120
Dibenzo (a,h) anthracene	ND	0.50	0.39	78.0	59 - 129
Benzo (g,h,i) perylene	ND	0.50	0.39	78.0	67 - 124
Indeno (1,2,3-cd) pyrene	ND	0.50	0.39	78.0	65 - 125

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
NAPHTHALENE	37	0.50	85	NC	68	NC	NC	30	1 - 122
ACENAPHTHYLENE	ND	0.50	0.0	0 *	0.0	0 *	0	30	1 - 124
ACENAPHTHENE	ND	0.50	2.2	440 *	1.7	340 *	25.6	30	1 - 124
FLUORENE	ND	0.50	0.96	192 *	0.80	160 *	18.2	30	1 - 142
PHENANTHRENE	ND	0.50	2.2	440 *	0.84	168 *	89.5 *	30	1 - 155
ANTHRACENE	ND	0.50	0.47	94.0	0.44	88.0	6.59	30	1 - 126
FLUORANTHENE	ND	0.50	0.85	170 *	0.64	128 *	28.2	30	14 - 123
PYRENE	ND	0.50	4.3	860 *	2.5	500 *	52.9 *	30	1 - 140
CHRYSENE	ND	0.50	1.1	220 *	1.1	220 *	0	30	1 - 199
BENZO (A) ANTHRACENE	ND	0.50	1.4	280 *	0.93	186 *	40.3 *	30	12 - 135
BENZO (B) FLUORANTHENE	ND	0.50	0.78	156 *	0.71	142	9.40	30	6 - 150
BENZO (K) FLUORANTHENE	ND	0.50	0.62	124	0.58	116	6.67	30	1 - 159
BENZO (A) PYRENE	ND	0.50	1.0	200 *	0.98	196 *	2.02	30	1 - 128
DIBENZO (A,H) ANTHRACENE	ND	0.50	0.88	176 *	0.71	142 *	21.4	30	1 - 110
BENZO (G,H,I) PERYLENE	ND	0.50	1.2	240 *	1.2	240 *	0	30	1 - 116
INDENO (1,2,3-CD) PYRENE	ND	0.50	0.67	134 *	0.57	114	16.1	30	1 - 116

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

** SPL BATCH QUALITY CONTROL REPORT **
Method 8310 ***

Matrix: Aqueous
Units: ug/L

Batch Id: 2990516002200

* = Values outside QC Range due to Matrix Interference (except RPD)
« = 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 (1st Q '97)
(***) = Source: Temporary Limits

Analyst: KA
Sequence Date: 05/18/99
SPL ID of sample spiked: 9905143-08E
Sample File ID: 990515A\101-0101
Method Blank File ID:
Blank Spike File ID: 990517A\LC_A0002
Matrix Spike File ID: 990517A\110-0101
Matrix Spike Duplicate File ID: 990517A\111-0101

SAMPLES IN BATCH(SPL ID):

9905263-02B	9905151-01A	9905151-02A	9905151-03A
9905153-01D	9905153-02D	9905153-03D	9905263-03B
9905153-04D	9905153-05D	9905153-06D	9905153-07D
9905237-01C	9905263-05B	9905263-06B	9905263-07B
9905263-08B	9905263-01B	9905263-04B	

ICP

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: PB

Matrix: Water Units: mg/L

Date:051199 Time:0857 File Name: 0511JM6

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

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver	ND	2.00	1.70	85	1.60	2.40
Aluminum						
Arsenic						
Barium	ND	2.00	1.80	90	1.60	2.40
Beryllium	ND	2.00	1.84	92	1.60	2.40
Calcium	ND	20.00	18.02	90	16.00	24.00
Cadmium	ND	2.00	1.73	87	1.60	2.40
Cobalt	ND	2.00	1.82	91	1.60	2.40
Chromium	ND	2.00	1.80	90	1.60	2.40
Copper	ND	2.00	1.84	92	1.60	2.40
Iron	ND	2.00	1.81	91	1.60	2.40
Potassium	ND	20.00	18.00	90	16.00	24.00
Magnesium	ND	20.00	18.49	92	16.00	24.00
Manganese						
Sodium	ND	20.00	18.32	92	16.00	24.00
Nickel	ND	2.00	1.79	89	1.60	2.40
Lead						
Antimony						
Boron	ND	4.00	3.78	95	3.20	4.80
Molybdenum	ND	2.00	1.84	92	1.60	2.40
Vanadium	ND	2.00	1.83	91	1.60	2.40
Zinc	ND	2.00	1.81	91	1.60	2.40

Work Orders in Batch

Work Order	Fractions
99-05-237	01D
99-05-246	01C-07C 11C,12C
99-05-278	01A
99-05-290	02F
99-05-291	01B
99-05-292	01E
99-05-309	20D

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9905237-01D**

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery		Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery		QC Limits % Recovery		Spike RPD %		QC Limits %
Silver	ND	1.0	0.919	91.9		0.9288	92.9		80	120	1.1		20.0
Aluminum													
Arsenic													
Barium	0.0525	1.0	1.014	96.2		0.9914	93.9		80	120	2.4		20.0
Beryllium	ND	1.0	0.966	96.6		0.9789	97.9		80	120	1.3		20.0
Calcium	618	10.0	609.7	0.0	*	621.3	33.0	*	80	120	200.0	**	20.0
Cadmium	ND	1.0	0.9508	95.1		0.9776	97.8		80	120	2.8		20.0
Cobalt	0.0269	1.0	0.9663	93.9		0.9861	95.9		80	120	2.1		20.0
Chromium	ND	1.0	0.9338	93.4		0.9528	95.3		80	120	2.0		20.0
Copper	ND	1.0	1.025	102.5		1.022	102.2		80	120	0.3		20.0
Iron	3.148	1.0	4.019	87.1		4.042	89.4		80	120	2.6		20.0
Potassium	26.72	10.0	36.89	101.7		36.11	93.9		80	120	8.0		20.0
Magnesium	156.6	10.0	162.8	62.0	*	162.5	59.0	*	80	120	5.0		20.0
Manganese													
Sodium	261.1	10.0	265.1	40.0	*	260.2	0.0	*	80	120	200.0	**	20.0
Nickel	0.0599	1.0	0.9804	92.1		1.0111	95.1		80	120	3.3		20.0
Lead													
Antimony													
Boron	0.5962	2.0	2.675	103.9		2.649	102.6		80	120	1.3		20.0
Molybdenum	ND	1.0	0.9838	98.4		1.005	100.5		80	120	2.1		20.0
Vanadium	0.0106	1.0	0.9873	97.7		1.00	98.9		80	120	1.3		20.0
Zinc	ND	1.0	1.00	100.0		1.026	102.6		80	120	2.6		20.0

* Spike Results Outside Method Limits
** Spike RPD Outside Method Limits
Elements Post Spiked:All

Checked: PB 5/12/99

Trace-icp

ICP Spectroscopy Method 6010 Quality Control Report

Analyst: EG

Matrix: Water Units: mg/L

Date:051199 Time:1108 File Name: 0511JM4

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

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver						
Aluminum						
Arsenic	ND	4.00	3.82	96	3.20	4.80
Barium						
Beryllium						
Calcium						
Cadmium						
Cobalt						
Chromium						
Copper						
Iron						
Potassium						
Magnesium						
Manganese						
Sodium						
Nickel						
Lead	ND	2.00	1.90	95	1.60	2.40
Antimony						
Selenium	ND	4.00	3.88	97	3.20	4.80
Thallium	ND	4.00	3.71	93	3.20	4.80
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
99-05-237	01D
99-05-243	01B
99-05-246	01C-07C, 11C,12C
99-05-290	02F
99-05-291	01B
99-05-309	20D

Matrix Spike - Spike Duplicate Results

Work Order Spiked: 9905237-01D

Element	Sample Result	Spike Added	Matrix Spike Result	Matrix Spike Recovery	Matrix Spike Duplicate Result	Matrix Spike Duplicate Recovery	QC Limits % Recovery		Spike RPD %	QC Limits %
Silver										
Aluminum										
Arsenic	0.014	2.0	1.699	84.3	1.782	88.4	80	120	4.8	20.0
Barium										
Beryllium										
Calcium										
Cadmium										
Cobalt										
Chromium										
Copper										
Iron										
Potassium										
Magnesium										
Manganese										
Sodium										
Nickel										
Lead	ND	1.0	0.9445	94.5	0.9488	94.9	80	120	0.5	20.0
Antimony										
Selenium	ND	2.0	1.666	83.3	1.767	88.4	80	120	5.9	20.0
Thallium	ND	2.0	1.822	91.1	1.811	90.6	80	120	0.6	20.0
Vanadium										
Zinc										

Checked: jm 5/12/99

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PHONE (713) 660-0901

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/10/99
Analyzed on: 05/10/99
Analyst: AG

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Mercury, Total
Method 7470 A***

SPL Sample ID Number	Blank Value ug/L	LCS Concentration ug/L	Measured Concentration ug/L	% Recovery	QC Limits Recovery
LCS	ND	2.00	2.08	104	80 - 120

-9905261

Samples in batch:

9904C08-03E 9905237-01D 9905246-01C 9905246-02C
9905246-03C 9905246-04C 9905246-05C 9905246-06C
9905246-07C 9905246-11C 9905246-12C 9905290-02F
9905291-01B

COMMENTS:
LCS = SPL ID# 94-452-49-12

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/10/99
Analyzed on: 05/10/99
Analyst: AG

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Mercury, Total
Method 7470 A***

SPL Sample ID Number	Method Blank ug/L	Sample Result ug/L	Spike Added ug/L	Matrix Spike Result ug/L	Matrix Spike Recovery %	Matrix Spike Duplicate Result ug/L	Matrix Spike Duplicate Recovery %	RPD (%)	QC LIMITS (Advisory) RPD Max	QC LIMITS (Advisory) % REC
9905237-01D	ND	ND	2.00	1.90	95.0	2.05	102	7.1	20	75 -125

-9905261

Samples in batch:

9904C08-03E	9905237-01D	9905246-01C	9905246-02C
9905246-03C	9905246-04C	9905246-05C	9905246-06C
9905246-07C	9905246-11C	9905246-12C	9905290-02F
9905291-01B			

COMMENTS:
LCS = SPL ID# 94-452-49-12

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/17/99
Analyzed on: 05/14/99
Analyst: CV

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Chloride
Method 325.3 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	162	159.5	98.5	94 - 106

-9905427

Samples in batch:

9905168-01A	9905168-02A	9905168-03A	9905168-04A
9905168-05A	9905168-06A	9905168-07A	9905168-08A
9905168-09A	9905168-10A	9905168-11A	9905237-01E
9905258-01A	9905371-01C	9905371-02C	9905371-03C
9905371-05C	9905371-06C		

COMMENTS:

LCS-SPL ID#94453228-24

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HOUSTON, TEXAS 77054
PHONE (713) 660-0901

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/17/99
Analyzed on: 05/14/99
Analyst: CV

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Chloride
Method 325.3 *

SPL Sample ID Number	Method Blank mg/L	Sample Result mg/L	Spike Added mg/L	Matrix Spike Result mg/L	Matrix Spike Recovery %	Matrix Spike Duplicate Result mg/L	Matrix Spike Duplicate Recovery %	RPD (%)	QC LIMITS (Advisory) RPD Max	QC LIMITS (Advisory) % REC
9905258-01A	ND	5.3	50.0	54.9	99.2	54.9	99.2	0	5	92 -109

-9905428

Samples in batch:

9905168-06A	9905168-07A	9905168-08A	9905168-09A
9905168-10A	9905168-11A	9905237-01E	9905258-01A

COMMENTS:

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PHONE (713) 660-0901

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/07/99
Analyzed on: 05/07/99
Analyst: AB

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Carbonate, as CaCO3
Method SM 4500-CO2D **

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration mg/L	Duplicate Sample mg/L	RPD	RPD Max.
9904B57-01B	ND	ND	0	5

-9905217

Samples in batch:

9904B57-01B 9904B57-02B 9905160-02A 9905236-01A
9905236-02A 9905236-03A 9905237-01E

COMMENTS:

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/07/99
Analyzed on: 05/07/99
Analyst: AB

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Specific Conductance @ 25°C
Method 120.1 *

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration Umhos/cm	Duplicate Sample Umhos/cm	RPD	RPD Max.
LCS	4800	4800	0	1.0

-9905220

Samples in batch:

9905237-01E

COMMENTS:

SPL=LCS# 94453217-27

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/07/99
Analyzed on: 05/07/99
Analyst: AB

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Specific Conductance @ 25°C
Method 120.1 *

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration Umhos/cm	Duplicate Sample Umhos/cm	RPD	RPD Max.
9905237-01E	4800	4800	0	1.0

-9905219

Samples in batch:

9905237-01E

COMMENTS:

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/07/99
Analyzed on: 05/07/99
Analyst: AB

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Bicarbonate, as CaCO3
Method SM 4500-CO2D **

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration mg/L	Duplicate Sample mg/L	RPD	RPD Max.
9904B57-01B	142	144	1.4	5

-9905218

Samples in batch:

9904B57-01B 9904B57-02B 9905160-02A 9905236-01A
9905236-02A 9905236-03A 9905237-01E

COMMENTS:

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PHONE (713) 660-0901

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/10/99
Analyzed on: 05/07/99
Analyst: CV

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Nitrate nitrogen(as N)
Method 353.3 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	5.0	4.83	96.6	92 - 113

-9905280

Samples in batch:

9905237-01E

COMMENTS:

LCS-SPL ID#94453220-10

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/10/99
Analyzed on: 05/07/99
Analyst: CV

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Nitrate nitrogen(as N)
Method 353.3 *

SPL Sample ID Number	Method Blank mg/L	Sample Result mg/L	Spike Added mg/L	Matrix Spike Result mg/L	Matrix Spike Recovery %	Matrix Spike Duplicate Result mg/L	Matrix Spike Duplicate Recovery %	RPD (%)	QC LIMITS (Advisory) RPD Max	QC LIMITS (Advisory) % REC
9905237-01E	ND	ND	5.0	5.21	104	5.21	104	0	12	84 -125

-9905280

Samples in batch:

9905237-01E

COMMENTS:

LCS-SPL ID#94453220-10

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/07/99
Analyzed on: 05/07/99
Analyst: AB

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

pH
Method 150.1 *

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration pH units	Duplicate Sample pH units	RPD	RPD Max.
9904B57-01B	6.20	6.20	0	1.0

-9905214

Samples in batch:

9904B57-01B 9904B57-02B 9905160-02A 9905236-01A
9905236-02A 9905236-03A 9905237-01E

COMMENTS:

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/12/99
Analyzed on: 05/12/99
Analyst: ELS

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Sulfate
Method 375.4 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	26.8	25.0	93.3	82 - 111

-9905326

Samples in batch:

9905237-01E 9905336-01B 9905336-02B 9905336-03B
9905336-04B 9905336-05B 9905336-06B 9905336-07B

COMMENTS:

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/12/99
Analyzed on: 05/12/99
Analyst: ELS

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Sulfate
Method 375.4 *

SPL Sample ID Number	Method Blank mg/L	Sample Result mg/L	Spike Added mg/L	Matrix Spike Result mg/L	Matrix Spike Recovery %	Matrix Spike Duplicate Result mg/L	Matrix Spike Duplicate Recovery %	RPD (%)	QC LIMITS (Advisory) RPD Max	QC LIMITS (Advisory) % REC
9905336-02B	ND	ND	10.0	9.5	95.0	9.7	97.0	2.1	9.5	84 -120

-9905326

Samples in batch:

9905237-01E	9905336-01B	9905336-02B	9905336-03B
9905336-04B	9905336-05B	9905336-06B	9905336-07B

COMMENTS:

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PHONE (713) 660-0901

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/12/99
Analyzed on: 05/11/99
Analyst: BEN

This sample was randomly selected for use in the SPL quality control program. Samples chosen are fortified with a known concentration in duplicate. The results are as follows:

Total Dissolved Solids
Method 160.1 *

SPL Sample ID Number	Blank Value mg/L	LCS Concentration mg/L	Measured Concentration mg/L	% Recovery	QC Limits Recovery
LCS	ND	384.4	384.0	99.9	93 - 107

-9905330

Samples in batch:

9905226-04D 9905237-01E 9905291-01F 9905292-01D
9905331-01A

COMMENTS:
LCS# 95535272-11

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 05/12/99
Analyzed on: 05/11/99
Analyst: BEN

This sample was randomly selected for use in the SPL quality control program. The results are as follows:

Total Dissolved Solids
Method 160.1 *

-- DUPLICATE ANALYSIS --

SPL Sample ID	Original Sample Concentration mg/L	Duplicate Sample mg/L	RPD	RPD Max.
9905291-01F	3830	4000	4.3	5

-9905330

Samples in batch:

9905226-04D 9905237-01E 9905291-01F 9905292-01D
9905331-01A

COMMENTS:
LCS# 95535272-11

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9905237 | 087673 | page 1 of 1

Client Name: Brown & Caldwell
Address/Phone: 1415 Louisiana #2500 759-0999
Client Contact: Tim Jenkins
Project Name: BJ - Artesia
Project Number: 12988
Project Location:
Invoice To: Tim Jenkins

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: Volat-les-8260	semi-volatiles-8270	PAH-8310	RCRA metals * see Below	General Chemistry **	Alk: CO3, HCO3, pH TDS, cond
MW-3R	5-6-99	15:00			W				11	X	X	X	X	X	X

RUSH

Client/Consultant Remarks: * As, Ba, Cd, Cr, Pb, Hg, Se, Ag, Cu, Zn, Na, K, Mg, Ca

Laboratory remarks:

Intact? Y N
Temp: 3

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): BAF

1. Relinquished by Sampler:	date	time	2. Received by:
3. Relinquished by:	date	time	4. Received by:
5. Relinquished by:	date	time	6. Received by Laboratory: Diane Kelly 5/7/99 1000

☒ 8880 Interchange Drive, Houston, TX 77054 (713) 660-0901
☐ 500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775
☐ 459-Hughes Drive, Traverse City, MI 49684 (616) 947-5777

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
5/7/99	1000

SPL Sample ID:
9905237

			Yes	No
1	Chain-of-Custody (COC) form is present.		✓	
2	COC is properly completed.		✓	
3	If no, Non-Conformance Worksheet has been completed.			
4	Custody seals are present on the shipping container.		✓	
5	If yes, custody seals are intact.		✓	
6	All samples are tagged or labeled.		✓	
7	If no, Non-Conformance Worksheet has been completed.			
8	Sample containers arrived intact		✓	
9	Temperature of samples upon arrival:		3° C	
10	Method of sample delivery to SPL:	SPL Delivery		
		Client Delivery		
		FedEx Delivery (airbill #)	811305332492	
		Other:		
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name:	Date:
Donna McCall	5/7/99