GW - 190

MONITORING REPORTS

DATE:

2000 - 1995

2 OF 4

FINAL
SOIL AND GROUNDWATER ASSESSMENT REPORT
ARTESIA, NEW MEXICO
BJ SERVICES COMPANY, U.S.A.

MARCH 24, 1998

FINAL
SOIL AND GROUNDWATER ASSESSMENT 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: 2988.09

Timothy Jenkins
Associate Engineer

March 24, 1998

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

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APPENDICES

1.0 EXECUTIVE SUMMARY

Brown and Caldwell conducted a soil and groundwater assessment at the BJ Services Company, U.S.A. (BJ Services) District Facility in Artesia, New Mexico 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. These 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), included as Appendix A.

Three groundwater monitoring wells were installed during the soil and groundwater assessment. One well was installed upgradient of the former fuel island area, and two wells were installed downgradient, as requested in a January 21, 1998 correspondence from the NMOCD, included as Appendix B. Following installation, the three new monitoring wells were developed and sampled. Groundwater samples were submitted to an analytical laboratory to determine the concentration of organics and metals in groundwater at the site, as requested in the January 21, 1998 NMOCD correspondence.

Analytical results for soil samples collected from one downgradient monitoring well boring exceeded NMOCD guidelines for total petroleum hydrocarbons (TPH). Groundwater analytical results for samples collected from the newly installed monitoring wells were reported at concentrations below New Mexico Water Quality Control Commission (NMWQCC) Groundwater Standards.

Based on the groundwater analytical results and the fact that these results, presented herein, indicate compliance with NMWQCC Standards, Brown and Caldwell recommends final closure of the former fuel island area.

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 are attached as Figures 1 and 2, respectively.

From November 18 through 22, 1997, the soil within the curbed area was excavated to a depth of approximately 8 feet. The east end of the former fuel island area was excavated to depth of 15 feet because visible staining and elevated photoionization device (PID) readings were observed. A sample collected at a depth of 15 feet from the east end (East-15) indicated Total Petroleum Hydrocarbons Diesel Range Organics (TPH-DRO) at a concentration of 2,500 milligrams per kilogram (mg/kg). A floor composite sample (FIA-FC8) collected from the main excavation area indicated TPH-DRO at a concentration of 490 mg/kg. These results exceed the action level of 100 ppm for TPH established in the June 30, 1997 Closure Plan. Confirmation sample results for benzene, ethylbenzene, toluene, and xylenes (BTEX) were below the action levels established in the Closure Plan.

Approximately 305 cubic yards of diesel-impacted material were excavated from the former fuel island area and disposed at the Controlled Recovery, Inc. landfarm facility for UST-impacted soils. This landfarm is operated under the authority of the New Mexico Environmental Department. The excavation was then backfilled and compacted following verbal approval by the NMOCD on November 21, 1997. As part of this approval, possible TPH-impacted soil located beneath two 12 ft. by 60 ft. concrete slabs was left in place, as the potential for contaminant migration is significantly reduced by the impervious cover provided by these slabs. The laboratory results for the post-excavation sampling at the former fuel island area are summarized in Table 1. A letter documenting these activities was transmitted to the NMOCD on January 8, 1998, and is included as Appendix A.

3.0 FIELD ACTIVITIES

On January 22, 1998, Brown and Caldwell completed three soil borings at the BJ Services facility in Artesia, New Mexico. Soil borings SB-FIA-1, SB-FIA-2, and SB-FIA-3 were completed as monitoring wells MW-5, MW-7, and MW-6, respectively. Groundwater samples were subsequently collected from the three monitor wells at the site on January 23, 1998.

The following subsections describe in detail the activities conducted during the January 1998 soil and groundwater investigation. These activities were performed in accordance with NMOCD correspondence dated January 21, 1998. This letter is attached as Appendix B.

3.1 Selection of Soil Boring/Monitor Well Locations

The NMOCD requested that one monitoring well be located hydraulically upgradient of the former fuel island and that the remaining two monitoring wells be located hydraulically downgradient of the fuel island. The locations of the three monitoring wells were determined based on the hydraulic gradient observed in monitoring wells located in other areas of the site. Monitoring well MW-5 was positioned at an apparent upgradient location while monitoring wells MW-6 and MW-7 were located at apparent downgradient locations. Monitoring well locations are provided on Figure 2.

3.2 Soil Sample Collection Methodology

Monitoring well borings were drilled using air rotary drilling techniques to depths ranging from 30 to 33 feet below grade. Soil samples were collected on 5-foot centers throughout the boreholes. The boring logs for monitoring well borings MW-5, MW-6, and MW-7 are contained in Appendix C.

Recovered soil samples were field screened by headspace analysis using a photoionization device (PID). Two soil samples from each boring were submitted to the analytical laboratory. The samples submitted to the analytical laboratory were collected from the interval immediately above

the zone where groundwater was observed and from the bottom of the borehole. One additional soil sample was selected for laboratory analysis from soil boring SB-FIA-3 (monitor well boring MW-6) because this boring was the nearest downgradient boring location to the fuel island area and was the most likely to be impacted by a potential release from the fuel island area. The sample was collected from the 20-21 foot interval, the interval indicating the uppermost layer of saturated soil.

Soil samples selected for laboratory analyses 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 reports are included in Appendix D.

3.3 Monitor Well Installation

Upon completion of soil boring and sampling activities, soil borings SB-FIA-1, SB-FIA-2, and SB-FIA-3 were completed as monitoring wells MW-5, MW-7, and MW-6, respectively. Groundwater was first encountered between approximately 19 and 21 feet below grade. The three monitoring wells were constructed according to the following criteria:

- 15 feet of 2-inch diameter 0.010 slot PVC well screen was installed, with approximately 5 feet of screen situated above the observed top of the saturated zone and approximately 10 feet of well screen situated below the top of the saturated zone. Approximately 12.5 to 15 feet of 2-inch diameter riser pipe was added to bring the top of the well casing to approximately 6 inches below grade. The wells were equipped with a 2-inch long bottom cap.
- A silica sand filter pack was installed in the annular area between the PVC well screen and the formation. The sand filter pack extended from the base of the boring to a minimum height of 2 feet above the top of the screened interval;
- A 2- to 3-foot thick bentonite seal was emplaced in the annular area above the filter pack and hydrated; and
- The remaining annular area was filled with a cement-bentonite grout containing 5% bentonite.

The monitoring wells were completed using flush mount man-ways set in concrete pads. The monitoring wells were equipped with locking watertight caps and locks.

All well installation work was performed as prescribed by the NMOCD by a person licensed to conduct monitoring well drilling and installation in the State of New Mexico. Construction diagrams for the monitoring wells are presented in Appendix C.

The position of the well screen in each monitoring well was selected based on water levels observed while drilling the monitoring well boreholes. After the monitoring wells were completed, the water levels in the newly installed monitoring wells rose. The observed increase in groundwater elevation suggests that groundwater at the site may exist under confined conditions. The equilibrium groundwater levels in monitoring wells MW-5 and MW-7 were within the screened intervals. However, the equilibrium groundwater level in monitoring well MW-6 was observed on January 23, 1998 at approximately one foot above the top of the screened interval. Based on the observed low concentrations of constituents in MW-6, it is not likely that free phase product is present in this well. Therefore, the position of the screen relative to the equilibrium groundwater level would appear not to impact the validity of groundwater sample results for this monitoring well.

3.4 Monitoring Well Development

Upon completion of the well installations, the monitoring wells were developed by surging and bailing until the produced groundwater was relatively free of sediment. Development water was placed in 55-gallon steel drums. Based on the results of groundwater analysis, purge and development water will be disposed of at an NMOCD-approved facility. Approximately 45 gallons of water were generated during well development activities.

3.5 Monitor Well Purging and Sampling Procedures

Groundwater samples and groundwater elevation data were collected from the monitoring wells on January 23, 1998. Groundwater elevation data is presented in Table 2. A potentiometric surface

map for January 23, 1998 is presented as Figure 3. Groundwater flow in the fuel island area is approximately east-southeast.

Each of the monitoring wells was purged with a submersible pump. A minimum of three well casing volumes was purged from each monitoring well prior to collection of groundwater samples.

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 reports are included as Appendix D.

3.6 Decontamination Procedures

The downhole drilling and sampling equipment was decontaminated using a pressure washer prior to commencement of sampling activities at a given soil boring/monitor well location. Field sampling equipment was decontaminated prior to use at each boring location and between sample intervals by washing with a laboratory grade detergent, rinsing with potable water, and completing a final rinse with distilled water.

3.7 Sample Analysis

Soil samples selected for laboratory analyses were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020 and diesel-range total petroleum hydrocarbons (TPH-DRO) by Method 8015.

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

Soil and groundwater samples were collected and analyzed to determine the degree to which soil and groundwater in the area of the fuel island area may have been impacted as a result of potential releases from the fuel island. Subsections 4.1 and 4.2 present the analytical results for soil and groundwater samples, respectively.

4.1 Soil Results

TPH-DRO was not detected at concentrations above the laboratory detection limit in soil samples collected from boring SB-FIA-1. Xylenes were detected in the soil sample collected from the 29-foot sample interval of boring SB-FIA-1 at a concentration of 0.0012 mg/kg.

Neither TPH-DRO nor BTEX were reported at concentrations above the laboratory detection limit in soil samples collected from soil boring SB-FIA-2.

TPH-DRO was detected in the 18- to 19-foot and 20- to 21-foot sample intervals of soil boring SB-FIA-3 at concentrations of 3,900 and 2,100 mg/kg, respectively. Ethylbenzene and xylenes were also detected in these two samples. Toluene was observed at a concentration of 0.033 mg/kg in the sample collected from the 18- to 19- foot interval. BTEX concentrations are below the NMOCD action levels established in the Closure Plan.

Analytical results for soil samples are presented in Table 3.

4.2 Groundwater Results

Benzene was reported at a concentration of 0.0015 milligrams per liter (mg/L) and 0.0022 mg/L in groundwater samples collected from MW-6 and MW-7, respectively. Both wells are downgradient from the former fuel island area. Napthalene, phenanthrene, and fluorene (PAHs) were detected in groundwater samples collected from the monitoring wells. Arsenic, barium, chromium, lead, and

selenium were also detected in at least one groundwater sample. Concentrations of constituents detected in groundwater samples were below NMWQCC Standards.

Analytical results for groundwater samples and the applicable NMWQCC Standards are summarized in Table 4.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The site was previously ranked using NMOCD guidelines. This site was classified as having a score greater than 19.

TPH concentrations reported in two soil samples collected from soil boring SB-FIA-3 as shown in Table 3 exceeded NMOCD guidelines. BTEX constituent concentrations reported in soil samples collected from the three borings were below NMOCD guidelines.

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

5.2 Recommendations

Brown and Caldwell recommends final closure of the former fuel island area.

DISTRIBUTION

Final
Soil and Groundwater Assessment Report
Artesia, New Mexico
BJ Services Company, U.S.A.

March 24, 1998

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

Attention: Mr. Mark Ashley

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

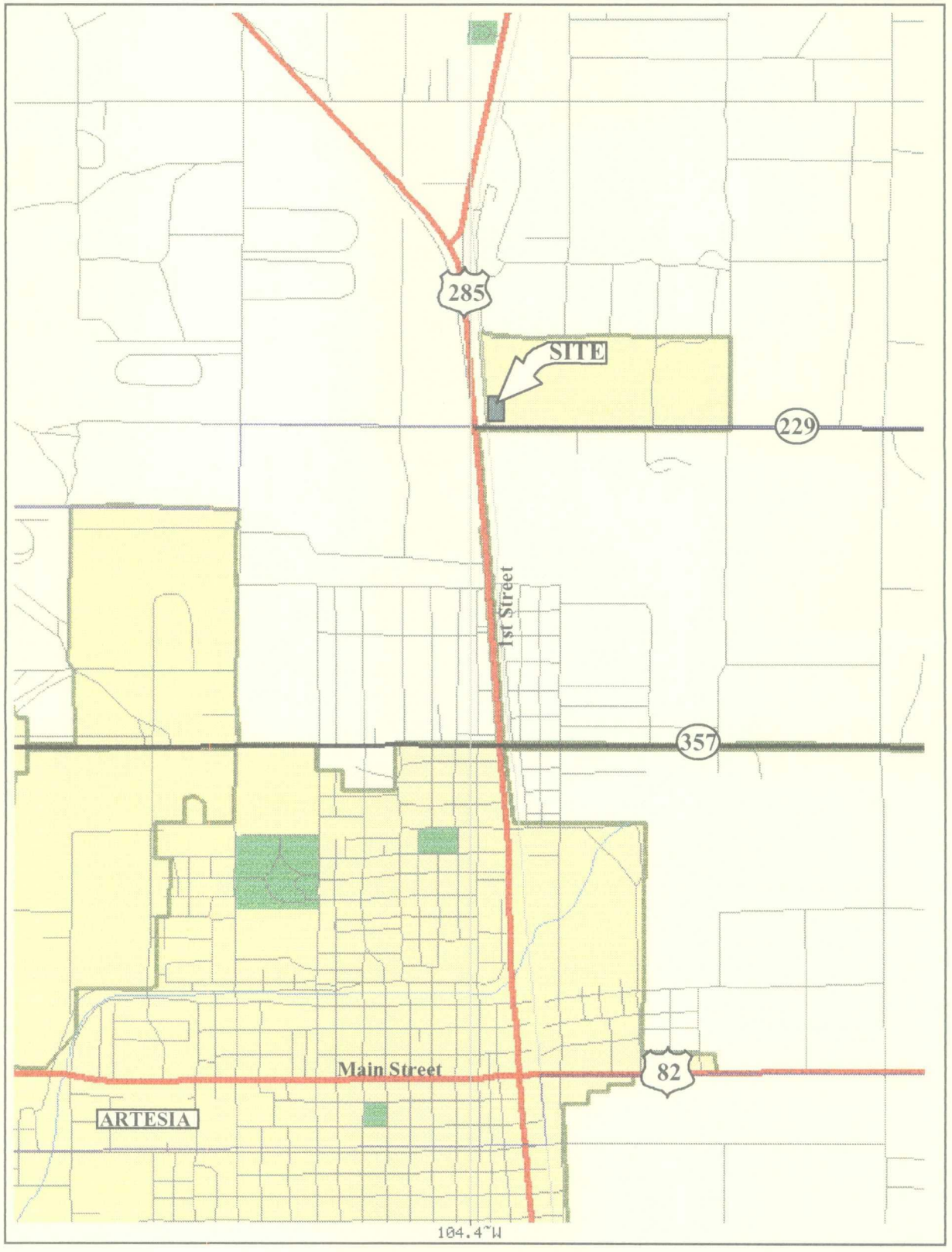
QUALITY CONTROL REVIEWER:

Richard Rexroad

Richard Rexroad
Principal in Charge

DKG/uak

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

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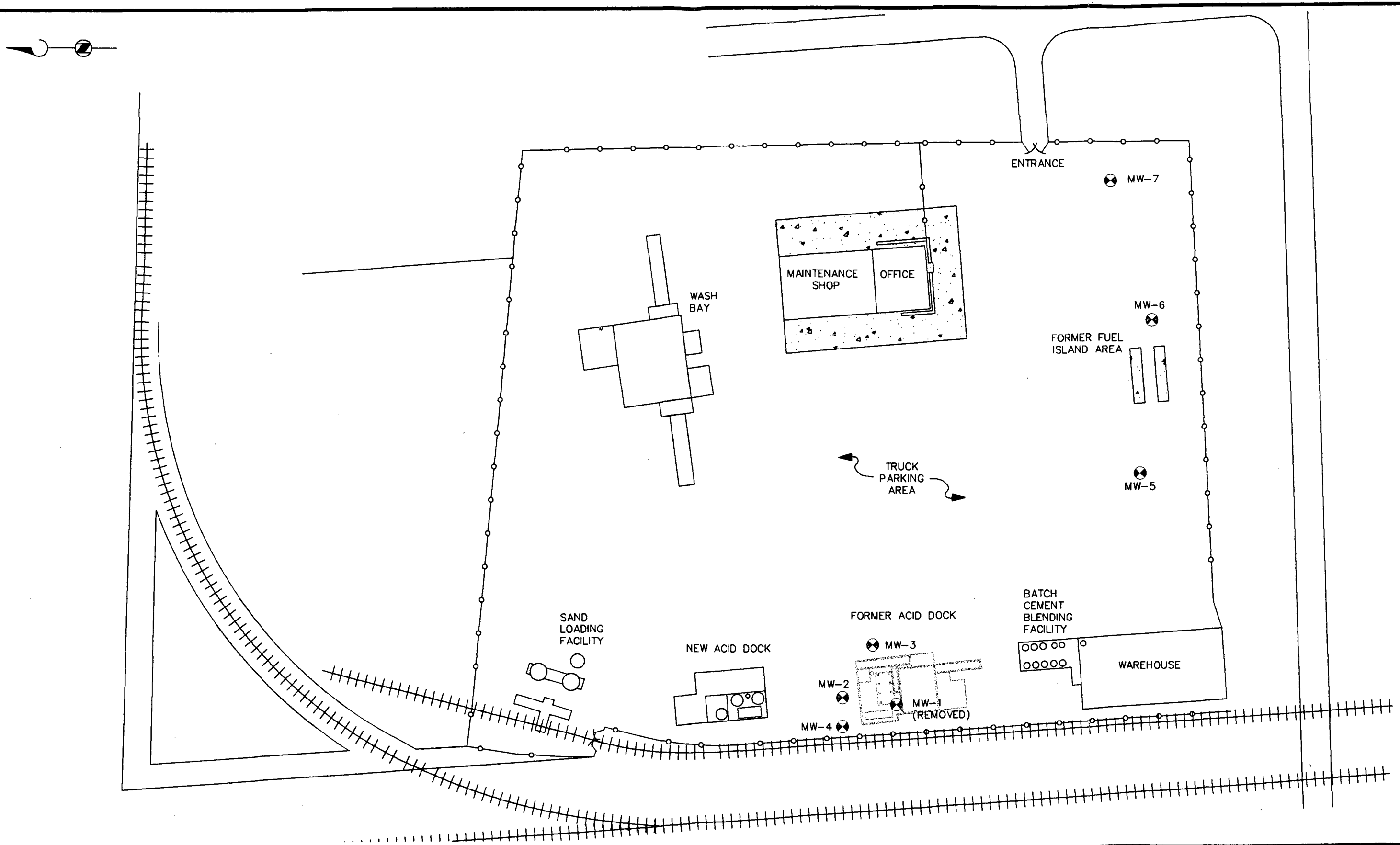


T:\2988\298800902 03-04-98 JR

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

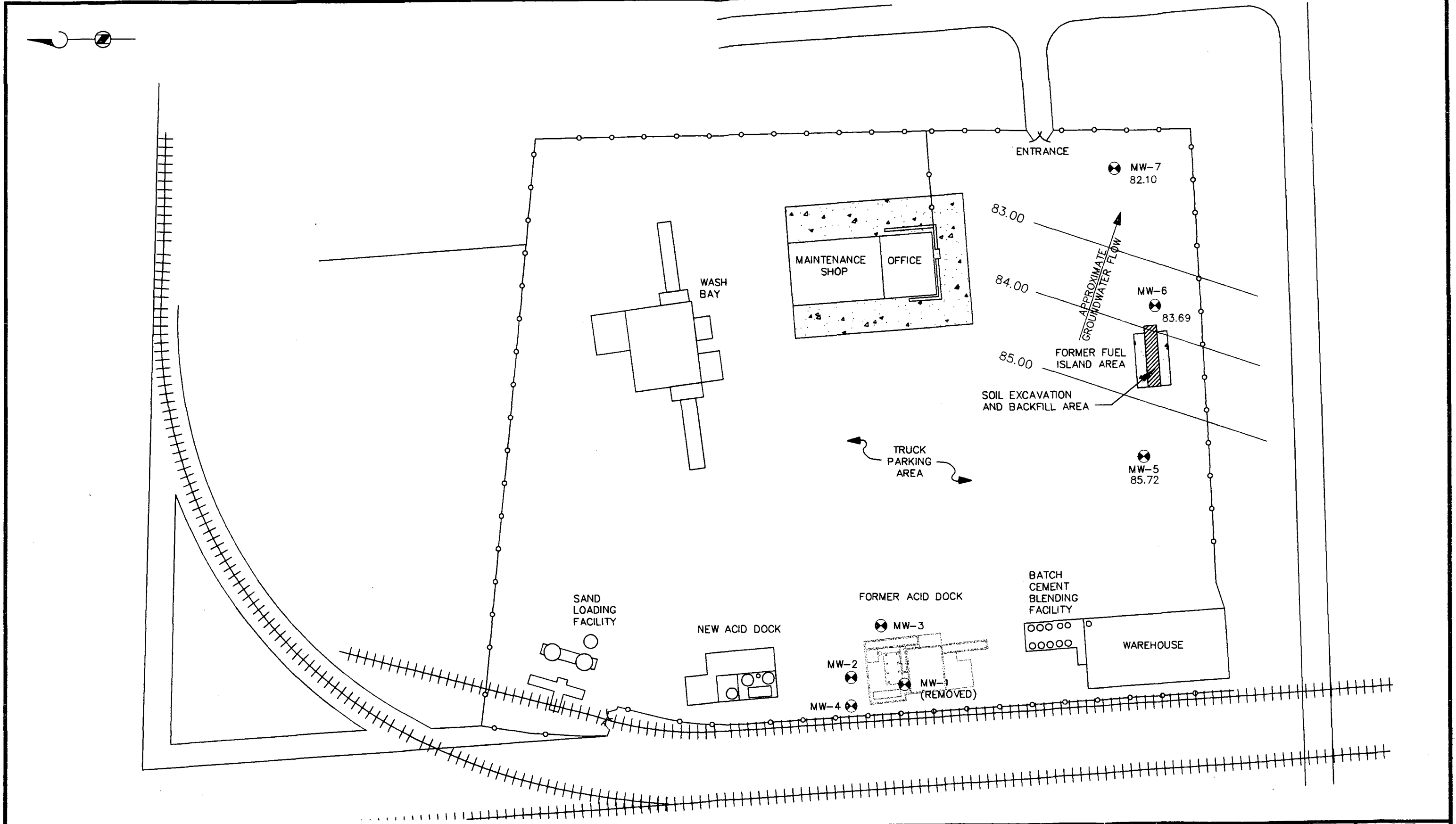
0 50 100
SCALE: 1" = 100'
DRAWN BY: JR DATE 3/98
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-1 MONITOR WELL LOCATIONS

CONCRETE DRIVES, APRON

TITLE: SITE PLAN	DATE: 03/04/98
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 2988.09
SITE: ARTESIA, NEW MEXICO	FIGURE NUMBER: 2



T:\2988\298800902 03-04-98 JR

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 50 100
SCALE: 1" = 100'
DRAWN BY: JR DATE 3/98
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

MW-1 MONITOR WELL LOCATIONS

CONCRETE DRIVES, APRON

TITLE: POTENTIOMETRIC SURFACE MAP FOR 01/23/98	DATE: 03/04/98
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 2988.09
SITE: ARTESIA, NEW MEXICO	FIGURE NUMBER: 3

TABLES

Table 1

Analytical Results for Post Excavation Soil Samples (mg/kg)
BJ Services Company, U.S.A.
Artesia, New Mexico

Sample I.D.	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-DRO
East-12 (sidewall at East End)	0.200	0.390	2.10	1.90	11000
East-15 (toe of sidewall, East End)	0.019	0.0082	0.360	0.190	2500
FIA-FC8 (composite of remaining floor)	<0.001	<0.001	0.013	0.019	490
STKPL-FIA (stockpile sample for disposal)	0.017	0.038	1.10	1.10	7400

Table 2

Groundwater Elevations for January 23, 1998
BJ Services Company, U.S.A.
Artesia, New Mexico

Monitor Well	Top of Casing (Relative Elevation)	Depth to Water (feet)	Groundwater Elevation [1]
MW-5	99.10	13.38	85.72
MW-6	97.69	14.00	83.69
MW-7	97.61	15.51	82.10

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

Table 3

Analytical Results for Soil Boring Samples
BJ Services Company, U.S.A.
Artesia, New Mexico

Soil Boring Identification	Monitoring Well Identification	Sample Depth (feet)	TPH-DRO mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylenes mg/kg
Soil Boring FIA-1 Sample Results:							
SB-FIA-1	MW-5	15	< 10.0	< 0.0010	< 0.0010	< 0.0010	< 0.0010
SB-FIA-1	MW-5	29	< 10.0	< 0.0010	< 0.0010	< 0.0010	0.0012
SB-FIA-1D	MW-5	29	< 10.0	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Soil Boring FIA-2 Sample Results							
SB-FIA-2	MW-7	18-20	< 10.0	< 0.0010	< 0.0010	< 0.0010	< 0.0010
SB-FIA-2	MW-7	31-33	< 10.0	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Soil Boring FIA-3 Sample Results							
SB-FIA-3	MW-6	18-19	3,900	< 0.010	0.033	0.760	0.140
SB-FIA-3	MW-6	20-21	2,100	< 0.010	< 0.010	0.260	0.052
SB-FIA-3	MW-6	31-33	< 10.0	< 0.0010	< 0.0010	< 0.0010	< 0.0010
Trip Blank	-	-	NA	< 0.0010	< 0.0010	< 0.0010	< 0.0010
NMOCD Guidelines [1]			100	10[2]	50 [2]	50 [2]	50 [2]

mg/kg - Milligrams per kilogram
NA - Not analyzed
(1) - Unlined Surface Impoundment Closure Guidelines Ranking Criteria (site rated >19)
(2) - Total BTEX not to exceed 50 mg/kg including a maximum of 10 mg/kg Benzene.

Table 4

Analytical Results for Janury 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
SEMIVOLATILES by Method 8270 (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 3010/30200/610/7000 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

APPENDICES

APPENDIX A

January 8, 1998 Correspondence to the NMOCD

BROWN AND CALDWELL

January 8, 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

2988-14

Subject: BJ Services Artesia District Facility
Fuel Island Area Field Activities Report

Dear Mr. Ashley:

This letter is to confirm the actions agreed upon orally between Brown and Caldwell, a consultant to BJ Services Company, U.S.A. (BJ Services), and the New Mexico Oil Conservation Division (NMOCD). The field activities performed to date and the proposed future actions to be taken by BJ Services are summarized below.

Field Activities Performed to Date

On October 7, 1997, Brown and Caldwell, under contract with BJ Services, advanced several test trenches within the curbed area of a former Fuel Island Area (FIA) at BJ Services Artesia District Facility, as prescribed in the Closure Plan dated June 30, 1997. Soil samples from these test trenches were submitted to a laboratory and analyzed for BTEX and TPH, the results of which indicated the presence of TPH-impacted soil to a depth of 4 feet below ground surface.

From November 18, 1997 through 22, 1997, the soil within the curbed area was excavated to a depth of approximately 8 feet. The east end of the FIA was excavated to depth of 15 feet because visible staining and elevated photoionization device (PID) readings were observed. A sample was collected at a depth of 15 feet from the east end, and submitted to a laboratory for analysis (East-15). A floor composite sample (FIA-FC8) was collected for comparison to the NMOCD action levels established in the June 30, 1997 Closure Plan. The laboratory results for the FIA have been summarized in Table 1 below.

1415 Louisiana, Suite 2500, Houston, TX 77002
(713) 759-0999 Fax (713) 759-0952

TABLE 1
Analytical Results (mg/kg)

Sample I.D.	Benzene	Toluene	Ethylbenzene	Xylene	TPH-DRO
East-12 (sidewall at East End)	0.200	0.390	2.10	1.90	11000
East-15 (toe of sidewall, East End)	0.019	0.0082	0.360	0.190	2500
FIA-FC8 (composite of remaining floor)	<0.001	<0.001	0.013	0.019	490
STKPL-FIA (stockpile sample for disposal)	0.017	0.038	1.10	1.10	7400

From December 11 through 12, 1997, Brown and Caldwell coordinated the removal and disposal of approximately 305 cubic yards of diesel-impacted material from the FIA. The soil was disposed at the Controlled Recovery, Inc. landfarm facility for UST-impacted soils, and is operated under the New Mexico Environmental Department. The excavation was then backfilled and compacted. Approval to backfill was verbally by the NMOCD on November 21, 1997. As part of this approval, possible TPH-impacted soil located beneath two 12 ft. by 60 ft. concrete slabs was left in place. This action was taken because the potential for contaminant migration is significantly reduced by the impervious cover provided by these slabs.

Proposed Future Actions

Groundwater beneath the facility has been identified at depths ranging from 13 to 30 feet below ground surface. Observations made during the deep excavation in the east end of the FIA indicated that groundwater is present at approximately 15 feet below grade. Based on the soil analytical results from this depth, we propose a groundwater evaluation as a condition for FIA closure.

The proposed groundwater evaluation will include installation of 3 monitor wells screened from 5 feet above the water table to 10 feet below the water table (see Figure 1). These wells will be located such that one well is upgradient and two are downgradient based on observed groundwater flow patterns to date. Groundwater samples will be analyzed for BTEX (Method 8020), PAH's (Method 8310), and 8 RCRA metals (Method 3050/6010/7000 Series).

The monitor wells will be sampled after installation, and approximately 6 and 12 months from the first sampling event. Based on the results, a site assessment and groundwater sampling report will be submitted to the NMOCD. If warranted, the report will request final closure of the FIA.

We understand that no further excavation is required for the FIA at this time, and will notify the Oil Conservation Division regarding future activities as they may relate to the FIA. 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.
Mike Wiggins, BJ Services Company, U.S.A.

APPENDIX B

January 21, 1998 Correspondence from the NMOCD

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

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

January 21, 1998

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-259-008

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

RE: Fuel Island Area Report/Work Plan
Artesia Facility
Eddy County, New Mexico

Dear Ms. Cobb:

The New Mexico Oil Conservation Division (OCD) has completed a review of BJ Services' (BJ) "Fuel Island Area Field Activities Report" dated January 8, 1998. This document, received via fax on January 16, 1998, was submitted by Brown and Caldwell on behalf of BJ. It contains activities performed to date and proposed future actions for ground water investigation at the BJ Services Artesia facility.

The above referenced report/work plan is approved with the following conditions:

1. A minimum of one monitor well installed upgradient and a minimum of two monitor wells installed downgradient from the fuel island area.

2. Monitor wells will be constructed with:

   a. A minimum of fifteen feet of well screen, with at least five feet of well screen above the water table and ten feet of well screen below the water table.

   b. An appropriately sized gravel pack will be set around the well screen from the bottom of the hole to 2-3 feet above the top of the well screen.

   c. A 2-3 foot bentonite plug will be placed above the gravel pack.

d. The remainder of the hole will be grouted to the surface with cement containing 5% bentonite.

3. All wastes generated will be disposed of at an OCD approved site.

4. Ground water from the monitor wells will be sampled and analyzed for concentrations of BTEX, polynuclear aromatic hydrocarbons, and 8 RCRA metals using EPA approved methods.

5. BJ will submit a report on the investigation to the OCD by March 23, 1998. The report will include a description of the actions performed and the results of all sampling activities. The report will also include recommendations for future actions based on the results of ground water sampling.

6. BJ will notify the OCD Artesia District Office at least 72 hours in advance of all activities.

7. All original documents will be submitted to the OCD Santa Fe Office with copies provided to the OCD Artesia District Office.

Please be advised that OCD approval does not relieve BJ of liability if contamination exists which is beyond the scope of the report/work plan or if the activities fail 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

APPENDIX C

Soil Boring Logs and Monitoring Well Construction Diagrams

BROWN AND CALDWELL

Monitoring Well: MW-5

Project Name: **BJ Services Company U.S.A. - Artesia, New Mexico** Project Number: **2988-09** Sheet **1** of **1**

Project Location: **30' East of FIA**		Logged By: **T. Jenkins**	Approved: **T. Jenkins**
Drilling Contractor: **West Texas Water Well**		Date Started: **1/22/98**	Date Finished: **1/22/98**
Drilling Equipment: **Badger 1250**	Driller: **B. Brockman**	Total Boring Depth: (feet) **30.0**	Depth to Static Water: (feet) **13.4**
Drilling Method: **Air Rotary**	Borehole Diameter: **6.0"**	TOC Elevation: **99.1**	Ground Elevation: **99.6**
Sampling Method: **Core/Split Spoon**		Diameter and Type of Well Casing: **2" PVC**	
Comments: **MW-5 was installed in soil boring SB-FIA-1.**		Slot Size: **0.010**	Filter Material: **8/16 Silica Sand**
		Development Method: **Bail and Pump**	

Depth (feet)	USC Soil Type	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID
0		ROAD BASE				
2	SP	SAND (SP), brown, with gravel				
4						
6		SAND (SP), brown, with gravel	2		1	
8	CL	SILTY CLAY (CL), with sand, white to tan (small gravel)				
10			2		1	
12						
14		SILTY CLAY (CL), with sand, white to tan	2		1	SB-FIA-1 -15 feet
16						
18						
20	SP	SAND (SP), saturated	2		1	
22						
24						
26						
28		SAND (SP), reddish brown, saturated	2		1	SB-FIA-1 -29 feet
30		Total depth of boring = 30 feet.				

Monitoring Well Remarks

- 0.0: Flush mount completion with top of casing 6" below grade.
- 0.0 – 9.0: Cement grout with 5% bentonite
- 9.0 – 11.0: Hydrated bentonite seal
- 11.0 – 28.0: Silica sand filter pack
- 28.0 – 28.5: 2" PVC cap

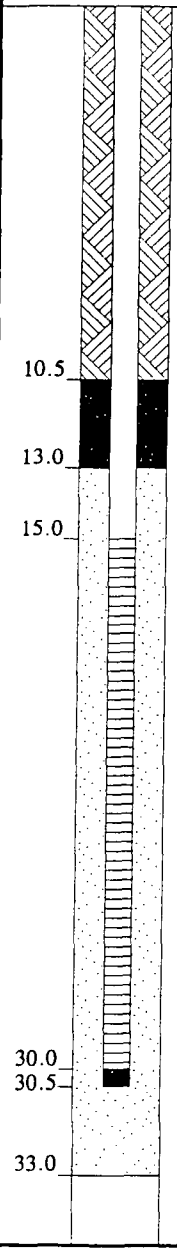
BROWN AND CALDWELL

Monitoring Well: MW-6

Project Name: **BJ Services Company U.S.A. - Artesia, New Mexico** Project Number: **2988-09** Sheet **1** of **1**

Project Location: **30' East of FIA**		Logged By: **T. Jenkins**	Approved: **T. Jenkins**
Drilling Contractor: **West Texas Water Well**		Date Started: **1/22/98**	Date Finished: **1/22/98**
Drilling Equipment: **Badger 1250**	Driller: **B. Brockman**	Total Boring Depth: (feet) **33.0**	Depth to Static Water: (feet) **14.0**
Drilling Method: **Air Rotary**	Borehole Diameter: **6.0"**	TOC Elevation: **97.7**	Ground Elevation: **98.2**
Sampling Method: **Core/Split Spoon**		Diameter and Type of Well Casing: **2" PVC**	
Comments: **MW-6 was installed in soil boring SB-FIA-3.**		Slot Size: **0.010**	Filter Material: **8/16 Silica Sand**
		Development Method: **Bail and Pump**	

Depth (feet)	USC Soil Type	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID
		ROAD BASE				
2	CL	SILTY CLAY (CL), reddish brown				
4		SILTY CLAY (CL), white to tan				
6			0		1	
8						
10			0		1	
12		SILTY CLAY (CL), gray, hydrocarbon odor				
14						
16		SILTY CLAY (CL), mottled gray, red; hydrocarbon odor	63		1.5	
18			91		1	
20		SILTY CLAY (CL), reddish brown, saturated	86		1	SB-FIA-3 -18-20 SB-FIA-3 -20-21
22						
24						
26						
28						
30						
32		SILTY CLAY (CL), saturated				SB-FIA-3 -31-33
		Total depth of boring = 33 feet.				



BROWN AND CALDWELL

Monitoring Well: MW-7

Project Name: **BJ Services Company U.S.A. - Artesia, New Mexico** Project Number: **2988-09** Sheet **1** of **1**

Project Location: **30' East of FIA**		Logged By: **T. Jenkins**	Approved: **T. Jenkins**
Drilling Contractor: **West Texas Water Well**		Date Started: **1/22/98**	Date Finished: **1/22/98**
Drilling Equipment: **Badger 1250**	Driller: **B. Brockman**	Total Boring Depth: (feet) **33.0**	Depth to Static Water: (feet) **15.5**
Drilling Method: **Air Rotary**	Borehole Diameter: **6.0"**	TOC Elevation: **97.6**	Ground Elevation: **98.1**
Sampling Method: **Core/Split Spoon**		Diameter and Type of Well Casing: **2" PVC**	
Comments: **MW-7 was installed in soil boring SB-FIA-2.**		Slot Size: **0.010**	Filter Material: **8/16 Silica Sand**
		Development Method: **Bail and Pump**	

Depth (feet)	USC Soil Type	Description	PID Readings	Sampled Interval	Recovery (feet)	Sample ID
		ROAD BASE				
2	CL	SILTY CLAY (CL), with sand, white to tan				
4						
6			1	1	1	
8		SILTY CLAY (CL), with sand and gravel, white to tan				
		SILTY CLAY (CL), with sand, white to tan				
10			2	1	1	
12		CLAY (CL), reddish brown, with sand				
14						
16						
18		CLAY (CL), reddish brown	3	2		SB-FIA-2 -18-20
20		CLAY (CL), reddish brown, with gravel	2	1	1	
22						
24						
26		CLAY (CL), reddish, with gravel	3	1		
28						
30						
32	SC	SANDY CLAY (SC) reddish, saturated				SB-FIA-2 -31-33
		Total depth of boring = 33 feet.				

Monitoring Well Remarks	
Flush mount completion with top of casing 6" below grade.	
Cement grout with 5% bentonite	
9.0	
Hydrated bentonite seal	
11.0	
15.0	
Silica sand filter pack	
30.0	
30.5	
2" PVC cap	
33.0	

APPENDIX D

Laboratory Analytical Reports

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

December 4, 1997

Ms. Lynn Wright
BROWN AND CALDWELL
1415 Louisiana
Houston, TX 77002

The following report contains analytical results for samples received at Southern Petroleum Laboratories (SPL) on November 23, 1997. The samples were assigned to Certificate of Analysis No.(s) 9711A24 and analyzed for all parameters as listed on the chain of custody.

Any data flag or quality control exception associated with this report will be footnoted in the analytical results 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
Project Manager

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

SOUTHERN PETROLEUM LABORATORIES, INC.

Certificate of Analysis Number: 97-11-A24

Approved for Release by:

Bernadette A. Fini, Project Manager

Date: 12-4-97

Greg Grandits
Laboratory Director

Idelis Williams
Quality Assurance Officer

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

Certificate of Analysis No. H9-9711A24-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Lynn Wright

DATE: 12/04/97

PROJECT: BJ-Artesia-FIA
SITE: Artesia, New Mexico
SAMPLED BY: Brown & Caldwell
SAMPLE ID: East-15

PROJECT NO: 2988-14
MATRIX: SOIL
DATE SAMPLED: 11/21/97 16:10:00
DATE RECEIVED: 11/23/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	19	5.0 P	µg/Kg
TOLUENE	8.2	5.0 P	µg/Kg
ETHYLBENZENE	360	5.0 P	µg/Kg
TOTAL XYLENE	190	5.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	577.2		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	107		
4-Bromofluorobenzene	540MI		
Method 8020A ***			
Analyzed by: MF			
Date: 11/26/97			
Total Petroleum Hydrocarbons-Diesel	2500	2000 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	D		
Method Modified 8015A*** for Diesel			
Analyzed by: APR			
Date: 11/26/97 09:49:00			

(P) - Practical Quantitation Limit MI - Matrix interference.
D - Diluted, limits not applicable.

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

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that resemble a diesel pattern.(C10-C24) RR

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. H9-9711A24-01

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Lynn Wright

DATE: 12/04/97

PROJECT: BJ-Artesia-FIA
SITE: Artesia, New Mexico
SAMPLED BY: Brown & Caldwell
SAMPLE ID: East-15

PROJECT NO: 2988-14
MATRIX: SOIL
DATE SAMPLED: 11/21/97 16:10:00
DATE RECEIVED: 11/23/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sonication Extraction Method 3550A *** Analyzed by: DL Date: 11/25/97 08:00:00	11/25/97		

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

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that resemble a diesel pattern.(C10-C24) RR

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. H9-9711A24-02

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Lynn Wright

DATE: 12/04/97

PROJECT: BJ-Artesia-FIA
SITE: Artesia, New Mexico
SAMPLED BY: Brown & Caldwell
SAMPLE ID: East-12

PROJECT NO: 2988-14
MATRIX: SOIL
DATE SAMPLED: 11/21/97 16:40:00
DATE RECEIVED: 11/23/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	200	10 P	µg/Kg
TOLUENE	390	10 P	µg/Kg
ETHYLBENZENE	2100	10 P	µg/Kg
TOTAL XYLENE	1900	10 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	4590		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	117		
4-Bromofluorobenzene	307MI		
Method 8020A ***			
Analyzed by: MF			
Date: 11/26/97			
Total Petroleum Hydrocarbons-Diesel	11000	2000 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	D		
Method Modified 8015A*** for Diesel			
Analyzed by: APR			
Date: 11/26/97 10:35:00			

(P) - Practical Quantitation Limit MI - Matrix interference.
D - Diluted, limits not applicable.

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

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that resemble a diesel pattern.(C10-C24) RR

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. H9-9711A24-02

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Lynn Wright

DATE: 12/04/97

PROJECT: BJ-Artesia-FIA
SITE: Artesia, New Mexico
SAMPLED BY: Brown & Caldwell
SAMPLE ID: East-12

PROJECT NO: 2988-14
MATRIX: SOIL
DATE SAMPLED: 11/21/97 16:40:00
DATE RECEIVED: 11/23/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sonication Extraction Method 3550A *** Analyzed by: DL Date: 11/25/97 08:00:00	11/25/97		

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

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that resemble a diesel pattern.(C10-C24) RR

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. H9-9711A24-03

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Lynn Wright

DATE: 12/04/97

PROJECT: BJ-Artesia-FIA
SITE: Artesia, New Mexico
SAMPLED BY: Brown & Caldwell
SAMPLE ID: FIA-FC8

PROJECT NO: 2988-14
MATRIX: SOIL
DATE SAMPLED: 11/22/97 07:10:00
DATE RECEIVED: 11/23/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/Kg
TOLUENE	ND	1.0 P	µg/Kg
ETHYLBENZENE	13	1.0 P	µg/Kg
TOTAL XYLENE	19	1.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	32		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	120		
4-Bromofluorobenzene	367MI		
Method 8020A ***			
Analyzed by: MF			
Date: 11/26/97			
Total Petroleum Hydrocarbons-Diesel	490	200 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	MI 184		
Method Modified 8015A*** for Diesel			
Analyzed by: APR			
Date: 11/26/97 09:49:00			

ND - Not detected. (P) - Practical Quantitation Limit
MI - Matrix interference.

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

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that resemble a diesel pattern.(C10-C24) RR

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. H9-9711A24-03

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Lynn Wright

DATE: 12/04/97

PROJECT: BJ-Artesia-FIA
SITE: Artesia, New Mexico
SAMPLED BY: Brown & Caldwell
SAMPLE ID: FIA-FC8

PROJECT NO: 2988-14
MATRIX: SOIL
DATE SAMPLED: 11/22/97 07:10:00
DATE RECEIVED: 11/23/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sonication Extraction Method 3550A ***	11/25/97		
Analyzed by: DL			
Date: 11/25/97 08:00:00			

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

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that resemble a diesel pattern.(C10-C24) RR

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. H9-9711A24-04

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Lynn Wright

DATE: 12/04/97

PROJECT: BJ-Artesia-FIA
SITE: Artesia, New Mexico
SAMPLED BY: Brown & Caldwell
SAMPLE ID: STKPL-FIA

PROJECT NO: 2988-14
MATRIX: SOIL
DATE SAMPLED: 11/22/97 07:30:00
DATE RECEIVED: 11/23/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	17	5.0 P	µg/Kg
TOLUENE	38	5.0 P	µg/Kg
ETHYLBENZENE	1100	5.0 P	µg/Kg
TOTAL XYLENE	1100	5.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	2255		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	120		
4-Bromofluorobenzene	287MI		
Method 8020A ***			
Analyzed by: MF			
Date: 11/26/97			
Total Petroleum Hydrocarbons-Diesel	7400	5000 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	D		
Method Modified 8015A*** for Diesel			
Analyzed by: APR			
Date: 11/26/97 11:42:00			

(P) - Practical Quantitation Limit MI - Matrix interference.
D - Diluted, limits not applicable.

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

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that resemble a diesel pattern.(C10-C24) RR

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. H9-9711A24-04

Brown and Caldwell
1415 Louisiana
Houston, TX 77002
ATTN: Lynn Wright

DATE: 12/04/97

PROJECT: BJ-Artesia-FIA
SITE: Artesia, New Mexico
SAMPLED BY: Brown & Caldwell
SAMPLE ID: STKPL-FIA

PROJECT NO: 2988-14
MATRIX: SOIL
DATE SAMPLED: 11/22/97 07:30:00
DATE RECEIVED: 11/23/97

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sonication Extraction Method 3550A ***	11/25/97		
Analyzed by: DL			
Date: 11/25/97 08:00:00			

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

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that resemble a diesel pattern.(C10-C24) RR

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

QUALITY CONTROL

DOCUMENTATION

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

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

Matrix: Soil

Batch Id: MP_J971126035500

Units: µg/Kg

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	49	98.0	60 - 116
Toluene	ND	50	48	96.0	64 - 122
EthylBenzene	ND	50	47	94.0	68 - 127
O Xylene	ND	50	48	96.0	68 - 127
M & P Xylene	ND	100	92	92.0	68 - 129

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
BENZENE	ND	20	19	95.0	17	85.0	11.1	33	35 - 139
TOLUENE	ND	20	19	95.0	17	85.0	11.1	35	31 - 137
ETHYLBENZENE	ND	20	19	95.0	17	85.0	11.1	40	21 - 141
O XYLENE	ND	20	20	100	17	85.0	16.2	24	25 - 139
M & P XYLENE	1.5	40	37	88.8	33	78.8	11.9	38	19 - 144

Analyst: MF
Sequence Date: 11/26/97
SPL ID of sample spiked: 9711959-06A
Sample File ID: J_7K013.TX0
Method Blank File ID:
Blank Spike File ID: J_7K009.TX0
Matrix Spike File ID: J_7K010.TX0
Matrix Spike Duplicate File ID: J_7K011.TX0

* = Values Outside QC Range. « = Data outside Method Specification limits.
NC = Not Calculated (Sample exceeds spike by factor of 4 or more)
ND = Not Detected/Below Detection Limit
% Recovery = [(<1> - <2>) / <3>] x 100
LCS % Recovery = (<1> / <3>) x 100
Relative Percent Difference = |(<4> - <5> | / [(<4> + <5>) x 0.5] x 100
(**) = Source: SPL-Houston Historical Data (1st Q '97)
(***) = Source: SPL-Houston Historical Data (1st Q '97)

SAMPLES IN BATCH(SPL ID):

9711A07-07A 9711A07-08A 9711A24-04A 9711A24-01A
9711A24-02A 9711A07-11A 9711A07-12A 9711A07-13A
9711A07-09A 9711A07-05A 9711A30-01A 9711A07-10A
9711A30-02A 9711A29-01A 9711701-01A 9711959-06A
9711959-03A 9711A24-03A 9711A07-06A

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

** SPL BATCH QUALITY CONTROL REPORT **
Method Modified 8015A***

Matrix: Soil
Units: mg/kg

Batch Id: HP_V971126060100

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Diesel	ND	166	170	102	77 - 145

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
DIESEL	490	166	840	211 *	940	271 *	24.9	50	21 - 175

Analyst: APR
Sequence Date: 11/26/97
SPL ID of sample spiked: 9711A24-03B
Sample File ID: V_K3154.TXO
Method Blank File ID:
Blank Spike File ID: V_K3149.TXO
Matrix Spike File ID: V_K3155.TXO
Matrix Spike Duplicate File ID: V_K3156.TXO

* = Values outside QC range due to matrix interference
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 (4TH Q '97)
(***) = Source: SPL-Houston Historical Data (4th Q '97)

SAMPLES IN BATCH(SPL ID): 9711A05-02A 9711A05-01A 9711A05-03A 9711A05-04A
9711A24-01B 9711A24-02B 9711A24-04B 9711A24-03B

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9711A24

14856

page 1 of 1

Client Name: BROWN AND CALDWELL

Address/Phone: 415 LOUISIANA #2500, HOUSTON 7136461188

Client Contact: TIM JENKINS

Project Name: BJ-ARTESIA FIA

Project Number: 2988-14

Project Location: ARTESIA, NM

Invoice To: BROWN AND CALDWELL

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); TPH-DRO (8015); 8 RCRA METALS

SAMPLE ID	DATE	TIME	comp	grab	matrix	bottle	size	pres.	Number of Containers	BTEX (8020)	TPH-DRO (8015)	8 RCRA METALS
EAST-15	11/21/97	1610		✓	S	G	4	—	2	X	X	
EAST-12	11/21/97	1640		✓	S	G	4	—	2	X	X	
FIA-FC8	11/22/97	0710	✓		S	G	4	—	4	X	X	H
STKPL-FIA	11/22/97	0730	✓		S	G	4	—	2	H	~~BTEX~~ X	

Client/Consultant Remarks: H = HOLD FOR ANALYSIS

Laboratory remarks:

Intact? ☑ Y ☐ N

Temp: 4c

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):

1. Relinquished by Sampler: _____ date 11/23/97 time 1600

2. Received by: _____

3. Relinquished by: _____ date _____ time _____

4. Received by: _____

5. Relinquished by: _____ date _____ time _____

6. Received by Laboratory: _____

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

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

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

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

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
11/24/97	1130

SPL Sample ID:

9711424

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

Name:	Date:
Arleen Ertl	11/24/97

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

February 9, 1998

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 24, 1998. The sample(s) was assigned to Certificate of Analysis No.(s) 9801A69 and analyzed for all parameters as listed on the chain of custody.

Any data flag or quality control exception associated with this report will be footnoted in the analytical results 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
Project Manager

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

Southern Petroleum Laboratories, Inc.

Certificate of Analysis Number: 98-01-A69

Approved for Release by:

Bernadette A. Fini, Project Manager — Date: 2-9-98

Greg Grandits
Laboratory Director

Idelis Williams
Quality Assurance Officer

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

Certificate of Analysis No. H9-9801A69-01

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: SB-FIA-3 18ft-19ft

PROJECT NO: 2988-09
MATRIX: SOIL
DATE SAMPLED: 01/22/98 14:35:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Total Petroleum Hydrocarbons-Diesel	3900	2000 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	D		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 01/28/98 06:12:00			
BENZENE	ND	10 P	µg/Kg
TOLUENE	33	10 P	µg/Kg
ETHYLBENZENE	760	10 P	µg/Kg
TOTAL XYLENE	140	10 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	933		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	107		
4-Bromofluorobenzene	533MI		
Method 8020A ***			
Analyzed by: AA			
Date: 02/01/98			

(P) - Practical Quantitation Limit
ND - Not detected.
D - Diluted, limits not applicable.
MI - Matrix interference.

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

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that do not resemble a diesel pattern.(C10-C24)

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. H9-9801A69-01

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: SB-FIA-3 18ft-19ft

PROJECT NO: 2988-09
MATRIX: SOIL
DATE SAMPLED: 01/22/98 14:35:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sonication Extraction of DRO by 8015A Method 3550B ***	01/26/98		
Analyzed by: DL			
Date: 01/26/98 14:00:00			

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

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that do not resemble a diesel pattern.(C10-C24)

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. H9-9801A69-02

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: SB-FIA-3 20ft-21ft

PROJECT NO: 2988-09
MATRIX: SOIL
DATE SAMPLED: 01/22/98 14:40:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Total Petroleum Hydrocarbons-Diesel	2100	2000 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	D		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 01/28/98 08:27:00			
BENZENE	ND	10 P	µg/Kg
TOLUENE	ND	10 P	µg/Kg
ETHYLBENZENE	260	10 P	µg/Kg
TOTAL XYLENE	52	10 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	312		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	333MI		
Method 8020A ***			
Analyzed by: AA			
Date: 02/02/98			

(P) - Practical Quantitation Limit
ND - Not detected.
D - Diluted, limits not applicable.
MI - Matrix interference.

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

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that do not resemble a diesel pattern.(C10-C24)

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. H9-9801A69-02

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: SB-FIA-3 20ft-21ft

PROJECT NO: 2988-09
MATRIX: SOIL
DATE SAMPLED: 01/22/98 14:40:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Sonication Extraction of DRO by 8015A Method 3550B ***	01/26/98		
Analyzed by: DL			
Date: 01/26/98 14:00:00			

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

COMMENTS: Sample contains petroleum hydrocarbons from C10-C24 that do not resemble a diesel pattern.(C10-C24)

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. H9-9801A69-03

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: SB-FIA-3 31ft-33ft

PROJECT NO: 2988-09
MATRIX: SOIL
DATE SAMPLED: 01/22/98 15:05:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Total Petroleum Hydrocarbons-Diesel	ND	10.0 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	82		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 01/27/98 09:48:00			
BENZENE	ND	1.0 P	µg/Kg
TOLUENE	ND	1.0 P	µg/Kg
ETHYLBENZENE	ND	1.0 P	µg/Kg
TOTAL XYLENE	ND	1.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	57		
Method 8020A ***			
Analyzed by: SB			
Date: 01/31/98			
Sonication Extraction of DRO by 8015A	01/26/98		
Method 3550B ***			
Analyzed by: DL			
Date: 01/26/98 14:00:00			

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. H9-9801A69-04

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: SB-FIA-1 15ft

PROJECT NO: 2988-09
MATRIX: SOIL
DATE SAMPLED: 01/22/98 07:35:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Total Petroleum Hydrocarbons-Diesel	ND	10.0 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	88		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 01/27/98 10:32:00			
BENZENE	ND	1.0 P	µg/Kg
TOLUENE	ND	1.0 P	µg/Kg
ETHYLBENZENE	ND	1.0 P	µg/Kg
TOTAL XYLENE	ND	1.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	87		
4-Bromofluorobenzene	20MI		
Method 8020A ***			
Analyzed by: SB			
Date: 01/31/98			
Sonication Extraction of DRO by 8015A	01/26/98		
Method 3550B ***			
Analyzed by: DL			
Date: 01/26/98 14:00:00			

ND - Not detected. (P) - Practical Quantitation Limit
MI - Matrix interference.

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. H9-9801A69-05

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: SB-FIA-1 29ft

PROJECT NO: 2988-09
MATRIX: SOIL
DATE SAMPLED: 01/22/98 08:05:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Total Petroleum Hydrocarbons-Diesel	ND	10.0 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	84		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 01/27/98 11:17:00			
BENZENE	ND	1.0 P	µg/Kg
TOLUENE	ND	1.0 P	µg/Kg
ETHYLBENZENE	ND	1.0 P	µg/Kg
TOTAL XYLENE	1.2	1.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	1.2		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	103		
4-Bromofluorobenzene	70		
Method 8020A ***			
Analyzed by: SB			
Date: 01/31/98			
Sonication Extraction of DRO by 8015A	01/26/98		
Method 3550B ***			
Analyzed by: DL			
Date: 01/26/98 14:00:00			

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. H9-9801A69-06

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: SB-FIA-1 29ft Dup

PROJECT NO: 2988-09
MATRIX: SOIL
DATE SAMPLED: 01/22/98 08:05:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Total Petroleum Hydrocarbons-Diesel	ND	10.0 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	92		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 01/28/98 12:02:00			
BENZENE	ND	1.0 P	µg/Kg
TOLUENE	ND	1.0 P	µg/Kg
ETHYLBENZENE	ND	1.0 P	µg/Kg
TOTAL XYLENE	ND	1.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	57		
Method 8020A ***			
Analyzed by: SB			
Date: 01/31/98			
Sonication Extraction of DRO by 8015A	01/26/98		
Method 3550B ***			
Analyzed by: DL			
Date: 01/26/98 14:00:00			

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. H9-9801A69-07

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: SB-FIA-2 18ft-20ft

PROJECT NO: 2988-09
MATRIX: SOIL
DATE SAMPLED: 01/22/98 10:10:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Total Petroleum Hydrocarbons-Diesel	ND	10.0 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	80		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 01/28/98 12:47:00			
BENZENE	ND	1.0 P	µg/Kg
TOLUENE	ND	1.0 P	µg/Kg
ETHYLBENZENE	ND	1.0 P	µg/Kg
TOTAL XYLENE	ND	1.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	70		
Method 8020A ***			
Analyzed by: SB			
Date: 01/31/98			
Sonication Extraction of DRO by 8015A	01/26/98		
Method 3550B ***			
Analyzed by: DL			
Date: 01/26/98 14:00:00			

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. H9-9801A69-08

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: SB-FIA-2 31ft-33ft

PROJECT NO: 2988-09
MATRIX: SOIL
DATE SAMPLED: 01/22/98 11:10:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Total Petroleum Hydrocarbons-Diesel	ND	10.0 P	mg/kg
Surrogate	**% Recovery**		
n-Pentacosane	82		
Method Modified 8015B *** for Diesel			
Analyzed by: RR			
Date: 01/28/98 01:31:00			
BENZENE	ND	1.0 P	µg/Kg
TOLUENE	ND	1.0 P	µg/Kg
ETHYLBENZENE	ND	1.0 P	µg/Kg
TOTAL XYLENE	ND	1.0 P	µg/Kg
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/Kg
Surrogate	**% Recovery**		
1,4-Difluorobenzene	93		
4-Bromofluorobenzene	73		
Method 8020A ***			
Analyzed by: SB			
Date: 01/31/98			
Sonication Extraction of DRO by 8015A	01/26/98		
Method 3550B ***			
Analyzed by: DL			
Date: 01/26/98 14:00:00			

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. H9-9801A69-09

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/19/98
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

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

Surrogate	% Recovery
1,4-Difluorobenzene	93
4-Bromofluorobenzene	90

Method 8020A ***
Analyzed by: LJ
Date: 02/02/98

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. H9-9801A69-10

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Provided by SPL
SAMPLE ID: Trip Blank

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/19/98
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

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

Surrogate	% Recovery
1,4-Difluorobenzene	97
4-Bromofluorobenzene	100

Method 8020A ***
Analyzed by: LJ
Date: 02/02/98

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. H9-9801A69-11

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

DATE: 02/07/98

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

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 14:40:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	2.1	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	ND	1.0 P	µg/L
TOTAL XYLENE	ND	1.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	2.1		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	93		
4-Bromofluorobenzene	100		
Method 8020A ***			
Analyzed by: LJ			
Date: 02/04/98			
Silver, Total	ND	0.01	mg/L
Method 6010B ***			
Analyzed by: PS			
Date: 01/27/98			
Arsenic, Total	ND	0.005	mg/L
Method 7060A ***			
Analyzed by: JM			
Date: 02/06/98			
Barium, Total	0.012	0.005	mg/L
Method 6010B ***			
Analyzed by: PS			
Date: 01/27/98			

(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. H9-9801A69-11

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

DATE: 02/07/98

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

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 14:40:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total Method 6010B *** Analyzed by: PS Date: 01/27/98	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: PS Date: 01/27/98	ND	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 02/05/98	ND	0.0002	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: SRC Date: 01/26/98	01/26/98		
Acid Digestion-Aqueous, GF Method 3020A *** Analyzed by: SRC Date: 01/27/98	01/27/98		
Lead, Total Method 7421 *** Analyzed by: PB Date: 02/04/98	0.006	0.002	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. H9-9801A69-11

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

DATE: 02/07/98

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

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 14:40:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Selenium, Total Method 7740 *** Analyzed by: JM Date: 02/06/98	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.

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8880 INTERCHANGE DRIVE
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PHONE (713) 660-0901

Certificate of Analysis No. H9-9801A69-11

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

02/07/98

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

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 14:40:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	1	1.0	ug/L
Acenaphthylene	ND	1.0	ug/L
Acenaphthene	ND	3.0	ug/L
Fluorene	ND	3.0	ug/L
Phenanthrene	3	1.0	ug/L
Anthracene	ND	1.0	ug/L
Fluoranthene	ND	1.0	ug/L
Pyrene	ND	1.0	ug/L
Chrysene	ND	1.0	ug/L
Benzo (a) anthracene	ND	1.0	ug/L
Benzo (b) fluoranthene	ND	1.0	ug/L
Benzo (k) fluoranthene	ND	1.0	ug/L
Benzo (a) pyrene	ND	1.0	ug/L
Dibenzo (a,h) anthracene	ND	1.0	ug/L
Benzo (g,h,i) perylene	ND	1.0	ug/L
Indeno (1,2,3-cd) pyrene	ND	1.0	ug/L

SURROGATES	AMOUNT SPIKED	% RECOVERY	LOWER LIMIT	UPPER LIMIT
1-Fluoronaphthalene	0.20 ug/L	91	50	150
Phenanthrene d-10	0.20 ug/L	375 MI	50	150

ANALYZED BY: KA DATE/TIME: 02/02/98 15:56:46
EXTRACTED BY: DL DATE/TIME: 01/28/98 09:00:00
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. H9-9801A69-13

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

DATE: 02/07/98

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

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 13:35:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	8.0	1.0 P	µg/L
TOTAL XYLENE	ND	1.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	8		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	100		
Method 8020A ***			
Analyzed by: LJ			
Date: 02/04/98			
Silver, Total	ND	0.01	mg/L
Method 6010B ***			
Analyzed by: PS			
Date: 01/27/98			
Arsenic, Total	0.005	0.005	mg/L
Method 7060A ***			
Analyzed by: JM			
Date: 02/06/98			
Barium, Total	0.195	0.005	mg/L
Method 6010B ***			
Analyzed by: PS			
Date: 01/27/98			

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
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HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9801A69-13

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

DATE: 02/07/98

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

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 13:35:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total Method 6010B *** Analyzed by: PS Date: 01/27/98	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: PS Date: 01/27/98	0.02	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 02/05/98	ND	0.0002	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: SRC Date: 01/26/98	01/26/98		
Acid Digestion-Aqueous, GF Method 3020A *** Analyzed by: SRC Date: 01/27/98	01/27/98		
Lead, Total Method 7421 *** Analyzed by: PB Date: 02/04/98	0.011	0.002	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.

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PHONE (713) 660-0901

Certificate of Analysis No. H9-9801A69-13

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

DATE: 02/07/98

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

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 13:35:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Selenium, Total Method 7740 *** Analyzed by: JM Date: 02/06/98	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.

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PHONE (713) 660-0901

Certificate of Analysis No. H9-9801A69-13

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

02/07/98

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

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 13:35:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	2	2.0	ug/L
Acenaphthylene	ND	2.0	ug/L
Acenaphthene	ND	6.0	ug/L
Fluorene	8	6.0	ug/L
Phenanthrene	11	2.0	ug/L
Anthracene	ND	2.0	ug/L
Fluoranthene	ND	2.0	ug/L
Pyrene	ND	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	ND	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	0.20 ug/L	D	50	150
Phenanthrene d-10	0.20 ug/L	D	50	150

ANALYZED BY: KA DATE/TIME: 02/02/98 16:32:54
EXTRACTED BY: DL DATE/TIME: 01/28/98 09:00:00
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. H9-9801A69-14

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-6D

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 13:35:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	1.5	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	8.0	1.0 P	µg/L
TOTAL XYLENE	ND	1.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	9.5		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	100		
4-Bromofluorobenzene	100		
Method 8020A ***			
Analyzed by: LJ			
Date: 02/04/98			
Silver, Total	ND	0.01	mg/L
Method 6010B ***			
Analyzed by: PS			
Date: 01/27/98			
Arsenic, Total	ND	0.005	mg/L
Method 7060A ***			
Analyzed by: JM			
Date: 02/06/98			
Barium, Total	0.032	0.005	mg/L
Method 6010B ***			
Analyzed by: PS			
Date: 01/27/98			

(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. H9-9801A69-14

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-6D

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 13:35:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total Method 6010B *** Analyzed by: PS Date: 01/27/98	ND	0.006	mg/L
Chromium, Total Method 6010B *** Analyzed by: PS Date: 01/27/98	ND	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 02/05/98	ND	0.0002	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: SRC Date: 01/26/98	01/26/98		
Acid Digestion-Aqueous, GF Method 3020A *** Analyzed by: SRC Date: 01/27/98	01/27/98		
Lead, Total Method 7421 *** Analyzed by: PB Date: 02/04/98	0.008	0.002	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.

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HOUSTON, TEXAS 77054
PHONE (713) 660-0901

Certificate of Analysis No. H9-9801A69-14

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

DATE: 02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-6D

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 13:35:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Selenium, Total Method 7740 *** Analyzed by: JM Date: 02/06/98	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
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PHONE (713) 660-0901

Certificate of Analysis No. H9-9801A69-14

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

02/07/98

PROJECT: BJ Artesia-FIA
SITE: Artesia, NM
SAMPLED BY: Brown & Caldwell
SAMPLE ID: MW-6D

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 13:35:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	2	2.0	ug/L
Acenaphthylene	ND	2.0	ug/L
Acenaphthene	ND	6.0	ug/L
Fluorene	8	6.0	ug/L
Phenanthrene	10	2.0	ug/L
Anthracene	ND	2.0	ug/L
Fluoranthene	ND	2.0	ug/L
Pyrene	ND	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	ND	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	0.20 ug/L	D	50	150
Phenanthrene d-10	0.20 ug/L	D	50	150

ANALYZED BY: KA DATE/TIME: 02/02/98 18:21:14
EXTRACTED BY: DL DATE/TIME: 01/28/98 09:00:00
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. H9-9801A69-16

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

DATE: 02/07/98

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

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 10:10:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	1.0 P	µg/L
TOLUENE	ND	1.0 P	µg/L
ETHYLBENZENE	ND	1.0 P	µg/L
TOTAL XYLENE	ND	1.0 P	µg/L
TOTAL VOLATILE AROMATIC HYDROCARBONS	ND		µg/L
Surrogate	**% Recovery**		
1,4-Difluorobenzene	97		
4-Bromofluorobenzene	87		
Method 8020A ***			
Analyzed by: LJ			
Date: 02/03/98			
Silver, Total	ND	0.01	mg/L
Method 6010B ***			
Analyzed by: PS			
Date: 01/27/98			
Arsenic, Total	ND	0.005	mg/L
Method 7060A ***			
Analyzed by: JM			
Date: 02/06/98			
Barium, Total	0.027	0.005	mg/L
Method 6010B ***			
Analyzed by: PS			
Date: 01/27/98			

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. H9-9801A69-16

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

DATE: 02/07/98

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

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 10:10:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Cadmium, Total Method 6010B *** Analyzed by: PS Date: 01/27/98	ND	0.005	mg/L
Chromium, Total Method 6010B *** Analyzed by: PS Date: 01/27/98	ND	0.01	mg/L
Mercury, Total Method 7470 A*** Analyzed by: AG Date: 02/05/98	ND	0.0002	mg/L
Acid Digestion-Aqueous, ICP Method 3010A *** Analyzed by: SRC Date: 01/26/98	01/26/98		
Acid Digestion-Aqueous, GF Method 3020A *** Analyzed by: SRC Date: 01/27/98	01/27/98		
Lead, Total Method 7421 *** Analyzed by: PB Date: 02/04/98	0.014	0.002	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.

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PHONE (713) 660-0901

Certificate of Analysis No. H9-9801A69-16

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

DATE: 02/07/98

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

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 10:10:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
Selenium, Total Method 7740 *** Analyzed by: JM Date: 02/06/98	0.006	0.005	mg/L

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

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

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Certificate of Analysis No. H9-9801A69-16

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

02/07/98

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

PROJECT NO: 2988-09
MATRIX: WATER
DATE SAMPLED: 01/23/98 10:10:00
DATE RECEIVED: 01/24/98

ANALYTICAL DATA

PARAMETER	RESULTS	PQL*	UNITS
Naphthalene	0.4	0.1	ug/L
Acenaphthylene	ND	0.1	ug/L
Acenaphthene	ND	0.3	ug/L
Fluorene	ND	0.3	ug/L
Phenanthrene	ND	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	0.20 ug/L	57	50	150
Phenanthrene d-10	0.20 ug/L	103	50	150

ANALYZED BY: KA DATE/TIME: 01/30/98 12:39:48
EXTRACTED BY: DL DATE/TIME: 01/28/98 09:00:00
METHOD: 8310 Polynuclear Aromatic Hydrocarbons
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

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

** SPL BATCH QUALITY CONTROL REPORT **
Method Modified 8015B***

Batch Id: HP_V980127052000

Units: mg/kg

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Diesel	ND	166	160	96.4	77 - 145

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
DIESEL	3900	166	3600	NC	3900	NC	NC	50	21 - 175

Analyst: RR
Sequence Date: 01/27/98
SPL ID of sample spiked: 9801A69-01A
Sample File ID: V_A3041.TX0
Method Blank File ID:
Blank Spike File ID: V_A3010.TX0
Matrix Spike File ID: V_A3042.TX0
Matrix Spike Duplicate File ID: V_A3043.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 (4TH Q '97)
(***) = Source: SPL-Houston Historical Data (4th Q '97)

SAMPLES IN BATCH(SPL ID):

9801A22-01B 9801A69-01A 9801A69-02A 9801A23-03A
9801A23-02A 9801A23-04A 9801A23-01A 9801A23-05A
9801A23-06A 9801A23-07A 9801A23-08A 9801A23-09A
9801A23-10A 9801A69-03A 9801A69-04A 9801A69-05A
9801A69-06A 9801A69-07A 9801A69-08A 9801A64-01B

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

Batch Id: HP_R980201130200

Units: µg/Kg

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	54	108	60 - 116
Toluene	ND	50	56	112	64 - 122
EthylBenzene	ND	50	53	106	68 - 127
O Xylene	ND	50	54	108	68 - 127
M & P Xylene	ND	100	100	100	68 - 129

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
BENZENE	ND	20	16	80.0	15	75.0	6.45	33	35 - 139
TOLUENE	ND	20	15	75.0	14	70.0	6.90	35	31 - 137
ETHYLBENZENE	ND	20	16	80.0	13	65.0	20.7	40	21 - 141
O XYLENE	ND	20	16	80.0	13	65.0	20.7	24	25 - 139
M & P XYLENE	ND	40	31	77.5	24	60.0	25.5	38	19 - 144

Analyst: AA/
Sequence Date: 02/01/98
SPL ID of sample spiked: 9801D93-13A
Sample File ID: R_A4200.TX0
Method Blank File ID:
Blank Spike File ID: R_A4197.TX0
Matrix Spike File ID: R_A4198.TX0
Matrix Spike Duplicate File ID: R_A4199.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):

9801A35-08A 9801A35-09A 9801A69-01A 9801A35-06A
9801A35-02A 9801C66-05A 9801C66-07A 9801C66-09A
9801D93-01A 9801D93-02A 9801D93-03A 9801D93-04A
9801D93-05A 9801D93-06A 9801A69-02A 9801D93-13A
9801A35-04A 9801A35-05A 9801D93-07A

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

Batch Id: HP_R980131051900

Units: µg/Kg

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
Benzene	ND	50	52	104	60 - 116
Toluene	ND	50	51	102	64 - 122
EthylBenzene	ND	50	47	94.0	68 - 127
O Xylene	ND	50	50	100	68 - 127
M & P Xylene	ND	100	91	91.0	68 - 129

MATRIX SPIKES

SPIKE COMPOUNDS	Sample Results <2>	Spike Added <3>	Matrix Spike Result <1>	Matrix Spike Recovery <4>	Matrix Spike Duplicate Result <1>	Matrix Spike Duplicate Recovery <5>	MS/MSD Relative % Difference	QC Limits(***) (Advisory) RPD Max.	QC Limits(***) (Advisory) Recovery Range
BENZENE	ND	20	20	100	18	90.0	10.5	33	35 - 139
TOLUENE	ND	20	18	90.0	16	80.0	11.8	35	31 - 137
ETHYLBENZENE	ND	20	15	75.0	16	80.0	6.45	40	21 - 141
O XYLENE	ND	20	16	80.0	16	80.0	0	24	25 - 139
M & P XYLENE	ND	40	26	65.0	30	75.0	14.3	38	19 - 144

Analyst: SB
Sequence Date: 01/31/98
SPL ID of sample spiked: 9801A69-07A
Sample File ID: R_A4184.TX0
Method Blank File ID:
Blank Spike File ID: R_A4181.TX0
Matrix Spike File ID: R_A4182.TX0
Matrix Spike Duplicate File ID: R_A4183.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): 9801A69-06A 9801A69-08A 9801C66-02A 9801C66-04A
9801A69-07A 9801A69-03A 9801A69-04A 9801A69-05A

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** SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020

Batch Id: HP_W980202030800

Aqueous

Units: µg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
MTBE	ND	50	46	92.0	72 - 128
Benzene	ND	50	49	98.0	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	96	96.0	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	18	90.0	20	100	10.5	20	39 - 150
BENZENE	ND	20	18	90.0	21	105	15.4	21	32 - 164
TOLUENE	ND	20	18	90.0	22	110	20.0	20	38 - 159
ETHYLBENZENE	ND	20	19	95.0	21	105	10.0	19	52 - 142
O XYLENE	ND	20	19	95.0	21	105	10.0	18	53 - 143
M & P XYLENE	ND	40	38	95.0	43	108	12.8	17	53 - 144

Analyst: LJ
Sequence Date: 02/02/98
SPL ID of sample spiked: 9801B34-05A
Sample File ID: W_B1003.TX0
Method Blank File ID:
Blank Spike File ID: W_A4258.TX0
Matrix Spike File ID: W_B1001.TX0
Matrix Spike Duplicate File ID: W_B1002.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): 9801A69-09A 9801A69-10A 9801D44-06A 9801D44-08A
9801D46-03A 9801A79-03A 9801A79-02A 9801A26-02A

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SPL BATCH QUALITY CONTROL REPORT **
METHOD 8020

Batch Id: HP_W980203182510

Units: µg/L

LABORATORY CONTROL SAMPLE

SPIKE COMPOUNDS	Method Blank Result <2>	Spike Added <3>	Blank Spike Result <1>	Blank Spike Recovery %	QC Limits(**) (Mandatory) % Recovery Range
MTBE	ND	50	56	112	72 - 128
Benzene	ND	50	59	118	61 - 119
Toluene	ND	50	59	118	65 - 125
EthylBenzene	ND	50	59	118	70 - 118
O Xylene	ND	50	58	116	72 - 117
M & P Xylene	ND	100	116	116	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	22	110	22	110	0	20	39 - 150
BENZENE	ND	20	22	110	22	110	0	21	32 - 164
TOLUENE	ND	20	21	105	23	115	9.09	20	38 - 159
ETHYLBENZENE	ND	20	22	110	22	110	0	19	52 - 142
O XYLENE	ND	20	22	110	22	110	0	18	53 - 143
M & P XYLENE	ND	40	43	108	44	110	1.83	17	53 - 144

Analyst: LJ
Sequence Date: 02/03/98
SPL ID of sample spiked: 9801A69-16A
Sample File ID: W_B1062.TX0
Method Blank File ID:
Blank Spike File ID: W_B1058.TX0
Matrix Spike File ID: W_B1059.TX0
Matrix Spike Duplicate File ID: W_B1060.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): 9801A69-13A 9801A69-11A 9801A69-14A 9801B47-01A 9801B47-03A 9801B56-01A 9801B56-02A 9801B56-03A 9801A69-16A 9801D46-03A 9801D49-02A

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

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Matrix: Aqueous
Units: ug/L

Batch Id: 2980129235700

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	0.35	70.0	32 - 148
Acenaphthylene	ND	0.50	0.35	70.0	42 - 138
Acenaphthene	ND	0.50	0.37	74.0	22 - 133
Fluorene	ND	0.50	0.36	72.0	11 - 148
Phenanthrene	ND	0.50	0.38	76.0	40 - 121
Anthracene	ND	0.50	0.37	74.0	32 - 121
Fluoranthene	ND	0.50	0.40	80.0	45 - 133
Pyrene	ND	0.50	0.40	80.0	39 - 136
Chrysene	ND	0.50	0.42	84.0	44 - 122
Benzo (a) anthracene	ND	0.50	0.41	82.0	53 - 137
Benzo (b) fluoranthene	ND	0.50	0.44	88.0	62 - 121
Benzo (k) fluoranthene	ND	0.50	0.43	86.0	66 - 128
Benzo (a) pyrene	ND	0.50	0.46	92.0	42 - 120
Dibenzo (a,h) anthracene	ND	0.50	0.41	82.0	59 - 129
Benzo (g,h,i) perylene	ND	0.50	0.44	88.0	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	21	0.50	17	NC	17	NC	NC	30	1 - 122
ACENAPHTHYLENE	ND	0.50	1.13	226 *	1.17	234 *	3.48	30	1 - 124
ACENAPHTHENE	ND	0.50	0.832	166 *	0.929	186 *	11.4	30	1 - 124
FLUORENE	ND	0.50	3.97	794 *	4.20	840 *	5.63	30	1 - 142
PHENANTHRENE	ND	0.50	1.19	238 *	0.771	154	42.9 *	30	1 - 155
ANTHRACENE	ND	0.50	0.630	126	0.327	65.4	63.3 *	30	1 - 126
FLUORANTHENE	ND	0.50	0.839	168 *	0.521	104	47.1 *	30	14 - 123
PYRENE	ND	0.50	0.501	100	0.467	93.4	6.83	30	1 - 140
CHRYSENE	ND	0.50	0.478	95.6	0.492	98.4	2.89	30	1 - 199
BENZO (A) ANTHRACENE	ND	0.50	0.492	98.4	0.484	96.8	1.64	30	12 - 135
BENZO (B) FLUORANTHENE	ND	0.50	0.469	93.8	0.498	99.6	6.00	30	6 - 150
BENZO (K) FLUORANTHENE	ND	0.50	0.463	92.6	0.486	97.2	4.85	30	1 - 159
BENZO (A) PYRENE	ND	0.50	0.486	97.2	0.512	102	4.82	30	1 - 128
DIBENZO (A,H) ANTHRACENE	ND	0.50	0.422	84.4	0.448	89.6	5.98	30	1 - 110
BENZO (G,H,I) PERYLENE	ND	0.50	0.459	91.8	0.430	86.0	6.52	30	1 - 116
INDENO (1,2,3-CD) PYRENE	ND	0.50	0.484	96.8	0.514	103	6.21	30	1 - 116

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

Matrix: Aqueous
Units: ug/L

Batch Id: 2980129235700

Analyst: KA
Sequence Date: 01/30/98
SPL ID of sample spiked: 9801A86-01B
Sample File ID: 980129A\034-0501
Method Blank File ID:
Blank Spike File ID: 980129A\016-1601
Matrix Spike File ID: 980129A\032-0301
Matrix Spike Duplicate File ID: 980129A\033-0401

* = 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): 9801A86-03B 9801A69-16B 9801A69-11B 9801A69-13B 9801A69-14B 9801A17-05C 9801A86-01B 9801A86-04B 9801A86-05B 9801A86-02B

ICP Spectroscopy Method 6010 Quality Control Report

Matrix: Water Units: mg/L Analyst: PS

Date:012798 Time:1107 File Name: 012798C8 Checked:

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1/28/98

Laboratory Control Sample

Element	Mth. Blank	True Value	Result	% Recovery	Lower Limit	Upper Limit
Silver	ND	2.00	1.99	99	1.60	2.40
Aluminum						
Arsenic	ND	4.00	3.97	99	3.20	4.80
Barium	ND	2.00	1.94	97	1.60	2.40
Beryllium						
Calcium						
Cadmium	ND	2.00	1.92	96	1.60	2.40
Cobalt						
Chromium	ND	2.00	1.99	100	1.60	2.40
Copper	ND	2.00	1.95	98	1.60	2.40
Iron						
Potassium						
Magnesium						
Manganese						
Sodium						
Nickel						
Lead	ND	2.00	1.98	99	1.60	2.40
Antimony						
Selenium	ND	4.00	3.93	98	3.20	4.80
Thallium						
Vanadium						
Zinc						

Work Orders in Batch

Work Order	Fractions
98-01-A33	17C-22C
98-01-A34	23C-30C
98-01-A69	11C
	13C-16C
98-01-A74	01D

Matrix Spike - Spike Duplicate Results **Work Order Spiked: 9801A33-17C**

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	0.9106	91.1	0.937	93.7	80	120	2.9	20.0
Aluminum										
Arsenic	ND	2.0	1.814	90.7	1.867	93.4	80	120	2.9	20.0
Barium	0.1822	1.0	1.026	84.4	1.063	88.1	80	120	4.3	20.0
Beryllium										
Calcium										
Cadmium	ND	1.0	0.8825	88.3	0.9083	90.8	80	120	2.9	20.0
Cobalt										
Chromium	ND	1.0	0.9109	91.1	0.9381	93.8	80	120	2.9	20.0
Copper	ND	1.0	0.8923	89.2	0.928	92.8	80	120	3.9	20.0
Iron										
Potassium										
Magnesium										
Manganese										
Sodium										
Nickel										
Lead	ND	1.0	0.9007	90.1	0.9396	94.0	80	120	4.2	20.0
Antimony										
Selenium	ND	2.0	1.804	90.2	1.851	92.6	80	120	2.6	20.0
Thallium										
Vanadium										
Zinc										

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 02/06/98
Analyzed on: 02/06/98
Analyst: JM

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:

Arsenic, Total
Method 7060A ***

SPL Sample ID Number	Blank Value ug/L	LCS Concentration ug/L	Measured Concentration ug/L	% Recovery	QC Limits Recovery
LCS	ND	40.0	37.5	93.8	80 - 120

-9802289

Samples in batch:

9801A69-11C 9801A69-13C 9801A69-14C 9801A69-16C

COMMENTS:

LCS=SPL ID#: 97-839-152-2
POST SPIKED

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 02/06/98
Analyzed on: 02/06/98
Analyst: JM

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:

Arsenic, Total
Method 7060A ***

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
9801B68-03D	ND	ND	40.0	43.0	108	42.4	106	1.9	20	75 -125

-9802289

Samples in batch:

9801A69-11C 9801A69-13C 9801A69-14C 9801A69-16C

COMMENTS:

LCS=SPL ID#: 97-839-152-2
POST SPIKED

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 02/05/98
Analyzed on: 02/05/98
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	2.31	116	80 - 120

-9802226

Samples in batch:

9801970-01C	9801970-02C	9801970-03C	9801970-04C
9801970-05C	9801970-06C	9801970-07C	9801970-08C
9801970-09C	9801970-10C	9801970-11C	9801970-12C
9801A04-01B	9801A04-02B	9801A04-03B	9801A69-11C
9801A69-13C	9801A69-14C	9801A69-16C	

COMMENTS:
LCS = SPL ID# 94-452-39-6

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 02/05/98
Analyzed on: 02/05/98
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
9801970-01C	ND	ND	2.00	2.00	100	1.88	94.0	6.2	20	75 -125

-9802226

Samples in batch:

9801970-01C	9801970-02C	9801970-03C	9801970-04C
9801970-05C	9801970-06C	9801970-07C	9801970-08C
9801970-09C	9801970-10C	9801970-11C	9801970-12C
9801A04-01B	9801A04-02B	9801A04-03B	9801A69-11C
9801A69-13C	9801A69-14C	9801A69-16C	

COMMENTS:
LCS = SPL ID# 94-452-39-6

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 02/04/98
Analyzed on: 02/04/98
Analyst: PB

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:

Lead, Total
Method 7421 ***

SPL Sample ID Number	Blank Value ug/L	LCS Concentration ug/L	Measured Concentration ug/L	% Recovery	QC Limits Recovery
LCS	ND	40.0	37.5	93.8	80 - 120

-9802214

Samples in batch:

9801A69-11C 9801A69-13C 9801A69-14C 9801A69-16C

COMMENTS:
LCS= SPL ID# 97-839-152-2
POST SPIKED.

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** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 02/04/98
Analyzed on: 02/04/98
Analyst: PB

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:

Lead, Total
Method 7421 ***

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
9801B28-03D	ND	30.3	40.0	68.2	94.8	68.2	94.8	0	20	75 -125

-9802214

Samples in batch:

9801A69-11C 9801A69-13C 9801A69-14C 9801A69-16C

COMMENTS:
LCS= SPL ID# 97-839-152-2
POST SPIKED.

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 02/06/98
Analyzed on: 02/06/98
Analyst: JM

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:

Selenium, Total
Method 7740 ***

SPL Sample ID Number	Blank Value ug/L	LCS Concentration ug/L	Measured Concentration ug/L	% Recovery	QC Limits Recovery
LCS	ND	40.00	38.82	97.0	80 - 120

-9802277

Samples in batch:

9801A69-11C 9801A69-13C 9801A69-14C 9801A69-16C

COMMENTS:

LCS=SPL ID#: 97-839-152-2
POST SPIKED

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

** SPL QUALITY CONTROL REPORT **

Matrix: Aqueous

Reported on: 02/06/98
Analyzed on: 02/06/98
Analyst: JM

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:

Selenium, Total
Method 7740 ***

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
9801B28-03D	ND	ND	40.00	37.56	93.9	37.94	94.8	1.0	20	75 -125

-9802277

Samples in batch:

9801A69-11C 9801A69-13C 9801A69-14C 9801A69-16C

COMMENTS:

LCS=SPL ID#: 97-839-152-2
POST SPIKED

CHAIN OF CUSTODY

AND

SAMPLE RECEIPT CHECKLIST

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9801A69 — 19715 — page 1 of 2

Client Name: Brown + Caldwell
Address/Phone: 1415 Louisiana #2500
Client Contact: Tim Jenkins
Project Name: BJ Artesia - FIA
Project Number: 2988-04
Project Location: Artesia, NM
Invoice To: Brown + Caldwell

SAMPLE ID	DATE	TIME	comp	grab	matrix (W=water S=soil SL=sludge O=other:)	bottle (P=plastic A=amber glass G=glass V=vial)	size (1=1 liter 4=4oz 40=vial 8=8oz 16=16oz)	pres. (1=HCl 2=HNO3 3=H2SO4 O=other:)	Number of Containers	Requested Analysis: BTEX (8020)	Requested Analysis: TPH D (8015)
SB-FIA-3 18'-19'	1/22/98	1435		X	S	G	4	NONE	1	X	X
SB-FIA-3 20'-21'		1440		X	S	G	4		1	X	X
SB-FIA-3 31'-33'		1505		X	S	G	4		1	X	X
SB-FIA-1 15'		0735		X	S	G	4		1	X	X
SB-FIA-1 29'		0805		X	S	G	4		1	X	X
SB-FIA-1 29' Dup		0805		X	S	G	4		1	X	X
SB FIA-2 18'-20'		1010		X	S	G	4		1	X	X
SB FIA-2 31'-33'		1110		X	S	G	4		1	X	X
TRIP BLANK	1/19/98				W	V	40	NONE	2	X	
TRIP BLANK	1/19/98				W	V	40		2	X	

Client/Consultant Remarks:

Laboratory remarks:

Intact? ☑ Y ☐ N
Temp: 2°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):

	date	time	
1. Relinquished by Sampler: Brandi M Chavarria	1/22/98	1500	2. Received by: Fed EX
3. Relinquished by:	date	time	4. Received by:
5. Relinquished by:	date	time	6. Received by Laboratory: 1/24/98 1000

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

SPL, Inc.

Analysis Request & Chain of Custody Record

SPL Workorder No: 9801A69

19717

page 2 of 2

Client Name: BROWN + CALDWELL

Address/Phone: 1415 LOUISIANA #2500

Client Contact: TIM JENKINS

Project Name: BJ ARTESIA - FIA

Project Number: 2938-09

Project Location: ARTESIA, NM

Invoice To: BROWN + CALDWELL

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:

Requested Analysis

SAMPLE ID	DATE	TIME	comp	grab	matrix	bottle	size	pres.	Number of Containers	BTEX (8020)	PAHs (8310)	METALS (6020A)						
MW-7	1/23/98	1440		X	W	P,A,V	1,40	1,2	5	X	X	X		Pit				
MW-7D		1445		X	W	A	1	None	1		X			"				
MW-6		1335		X	W	P,A,V	1,40	1,2	5	X	X	X		1-24	98			
MW-6D		1335		X	W	P,A,V	1,40	1,2	5	X	X	X						
MW-6T		1335		X	W	P,A,V	1,40	1,2	5	X	X	X						
MW-5		1010		X	W	P,A,V	1,40	1,2	5	X	X	X						

Client/Consultant Remarks:

Laboratory remarks:

Intact? Y N

Temp: 2° 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):

	date	time
1. Relinquished by Sampler: Benedetta M Clarkson	1/23/98	1500
2. Received by: Fed EX		
3. Relinquished by:		
4. Received by:		
5. Relinquished by:		
6. Received by Laboratory:	1/24/98	1000

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

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

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

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

SPL Houston Environmental Laboratory

Sample Login Checklist

Date:	Time:
1-24-98	1000

SPL Sample ID:
9801A69

			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:		2° C	
10	Method of sample delivery to SPL:	**SPL Delivery**		
		Client Delivery		
		FedEx Delivery (airbill #)	8008167062	
		Other:		
11	Method of sample disposal:	SPL Disposal	✓	
		HOLD		
		Return to Client		

Name:	Date:
[signature]	1-24-98

CLOSURE PLAN
FORMER ACID DOCK AREA AND
FORMER FUEL ISLAND
ARTESIA, NEW MEXICO

BJ SERVICES COMPANY, U.S.A.

JUNE 30, 1997

CLOSURE PLAN
FORMER ACID DOCK AREA AND
FORMER FUEL ISLAND
ARTESIA, NEW MEXICO

Prepared for

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

Project Number: 2988-09

Timothy L. Jenkins

June 30, 1997

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

W:\BJSERV\2988\039R.DOC

CONTENTS

1.0 INTRODUCTION

This closure plan serves as notification to the New Mexico Oil Conservation Division (NMOCD) for closure and sampling activities to be performed at the former acid dock area and the former fuel island area. BJ Services Company, U.S.A. (BJ Services) owns and operates the Artesia District Facility 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, 88210. A site location map and site plan are attached as Figures 1 and 2, respectively.

The former acid dock area was constructed in the early 1980's, and includes the following units/facilities:

- an elevated slab area used for storing miscellaneous chemical additives;
- drum storage area slab;
- a ramp leading to the elevated slab;
- a truck staging/loading pad, with curbing and a field drain;
- an elevated 25,000 gallon 32%-solution hydrochloric acid storage tank;
- tank supports and footings;
- a sump to collect drainage from the truck staging/loading pad; and
- miscellaneous curbing and slab areas.

This closure plan was developed to describe, in general, the removal of the above units/facilities, and the sampling activities to be performed following the removal. This closure plan also describes the sampling activities prescribed for the former fuel island area. A letter from the NMOCD dated November 18, 1996 outlines the general sampling requirements to achieve closure at the former acid dock area. According to the letter, "soil samples will be collected from each of the sidewalls, and a composite from the floor of each excavation" following the removal of the former acid dock. This closure plan is prepared in accordance with the NMOCD guidance document entitled "Unlined Surface Impoundment Closure Guidelines" (February 1993) in order to define the treatment levels for BTEX and TPH. In accordance with the guidance document and the NMOCD letter mentioned above, this closure plan contains the following elements:

- The procedures that will be used to conduct a soil assessment and the circumstances under which a groundwater assessment will be conducted.

- The procedures that will be used to manage, remediate, or dispose of contaminated soil and groundwater, if any.

- Reporting procedures that will be used to document the closure activities and obtain approval for final closure from the NMOCD.

The fuel island, having undergone previous remedial activities, will be sampled for confirmation that the soils in the former fuel island area meet NMOCD requirements.

2.0 SITE ASSESSMENT

BJ Services will perform a site assessment to determine the extent to which site soils/groundwater may have been impacted by the past operation of the acid dock and fuel island. The results of the site assessment will be used for evaluating the need for remediation and the type of closure best suited for the site.

2.1 General Site Characteristics

BJ Services has determined that the depth to groundwater, defined as the vertical distance from the lowermost contaminants to the seasonal high water elevation of the groundwater, is less than 50 feet based on previous monitor well observations in the area. Therefore, according to the following table, a site ranking score of 20 is assigned for the site groundwater criteria.

Depth to Groundwater:	Ranking Score:
< 50 feet	20
50 - 99 feet	10
> 100 feet	0

If necessary, BJ Services will determine the proximity of drinking water sources by performing a search of water wells within a one mile radius of the facility. The search would provide information (as available) such as the distance from the site to each well, well depth, water quality data and the purpose of the well.

Wellhead Protection Area:	Ranking Score:
< 1000 feet from a water source, or;	
< 200 feet from a private domestic water source:	
Yes	20
No	0

The distance to nearby downgradient surface water bodies will be determined by review of a USGS topographic map for the area. Surface water bodies include rivers, creeks, ponds, lakes, irrigation canals and ditches. Site drainage patterns and off-site receptors of surface drainage will be determined by field observations and discussions with site personnel.

Distance to Surface Water Body:	Ranking Score:
< 200 horizontal feet	20
200 - 1000 feet	10
> 1000 feet	0

2.2 Preliminary Site Scoring

According to the OCD guidance documents, a total ranking score of >19 yields action levels as outlined in Table 1. Based on the groundwater ranking score of 20, the site will be remediated according to Table 1.

2.3 Soil Characterization

BJ Services will collect confirmation samples of the soil exposed following excavation activities by collecting discrete sidewall samples and floor composites for each distinct excavation area. These samples will be analyzed for BTEX, TPH, and total RCRA metals.

If contamination is present, vertical extent of contamination will be determined by field observations (staining) and headspace analysis for organic vapors by a photoionization or flame ionization device (PID or FID, respectively). Headspace analysis will be performed in accordance with the procedures outlined in the NMOCD guidance document.

If contamination is observed, soil samples will be visually classified as highly contaminated/saturated soils or unsaturated contaminated soils, according to the NMOCD guidance document. Highly contaminated/saturated soils contain observable free petroleum hydrocarbons or immiscible phases and gross staining. The immiscible phase may range from a free hydrocarbon to a sheen on any associated aqueous phase. Unsaturated contaminated soils are those that are not highly contaminated as described above, but contain measurable concentrations of contaminants.

A floor composite will also be collected for the former fuel island area. This sample will be analyzed for BTEX and TPH for comparison to the NMOCD action levels (Table 1).

All samples will be collected with decontaminated sampling equipment, placed in labeled jars, and shipped on ice overnight using chain of custody procedures to the off-site laboratory. Decontamination fluids (non-toxic degreasers and water) will be collected and deposited in the truck wash separator system.

All soil samples will use EPA's SW-846 methodology for each analyte specified by the NMOCD. Soil samples will be analyzed for Purgeable Aromatic Hydrocarbons (including BTEX) by Method 8020, Purgeable Halogenated Hydrocarbons by Method 8010, and Total Petroleum Hydrocarbons (TPH) by EPA's SW-846 Method 8015 modified for soil samples. Also, a floor composite sample from each area – one from the former acid dock area, and one from the former fuel island area – will be analyzed for total RCRA metals (TCLP analysis is not required, as the OCD will accept an approximation of 5% of total metals as the estimated TCLP level). The analytical results will be compared against the action levels in Table 1. Within the acid dock area, there are four distinct facilities that may require excavation (i.e., the drum storage area slab, the elevated concrete pad and ramp, the truck loading pad, and the elevated acid tank area). Composite floor samples will be collected from each of the areas excavated. One composite sample will be selected for RCRA metals analysis based on visual staining, if present, and the field measurement indicating the highest organic vapor reading.

2.4 Groundwater Quality

It is not anticipated that contamination will extend to a depth at which groundwater would be encountered. However, if groundwater is encountered, BJ Services will notify the NMOCD within 24 hours of such an occurrence. At that time, a plan of action will be developed and implemented.

2.5 Schedule of Activities

Closure activities are planned to commence in early July, 1997. As requested in the letter to BJ Services from Mr. Mark Ashley of the NMOCD (11/18/96), at least 72 hours notice shall be

provided to Mr. Ashley and to the local NMOCD office, prior to commencement of sampling operations.

3.0 SITE ASSESSMENT REPORT

The field procedures and analytical results for both the former acid dock area and the former fuel island area will be presented in a single site assessment report to the NMOCD within 30 days of receiving analytical results for samples collected during the removal of the former acid dock area and from the former fuel island area. The analytical results will be used in conjunction with the ranking score to verify final closure status according to the NMOCD closure guidance document. BJ Services will present the ranking score in the site assessment report and either request NMOCD confirmation of closure or, if necessary, propose further activities, such as additional investigation of groundwater or soil remediation.

Benzene concentrations in soil exceeding 10 mg/kg or total BTEX concentrations in soil exceeding 50 mg/kg or TPH concentration in soil exceeding 100 mg/kg may require additional investigation or remediation. In this case, BJ Services may propose alternate cleanup levels for OCD approval or propose no further action by conducting a risk-based evaluation of the site assessment data.

3.1 Cleanup Alternatives

If remediation is necessary, feasible cleanup alternatives will be presented in the site assessment report. Alternatives include excavation and off-site disposal, landfarming, or in-situ treatment such as vapor sparging or bioremediation. BJ Services will not commence remediation until the OCD has reviewed and approved the recommended cleanup alternative. A final closure report documenting closure activities and remediated soil contaminant concentrations will be prepared for OCD approval following any required site remediation.

DISTRIBUTION

Closure Plan
Former Acid Dock Area and
Former Fuel Island
Artesia, New Mexico
BJ Services Company, U.S.A.

June 30, 1997

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

Attention: Mr. Mark Ashley

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

Attention: Mr. Mike Wiggins

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

Attention: Ms. Jo Ann Cobb

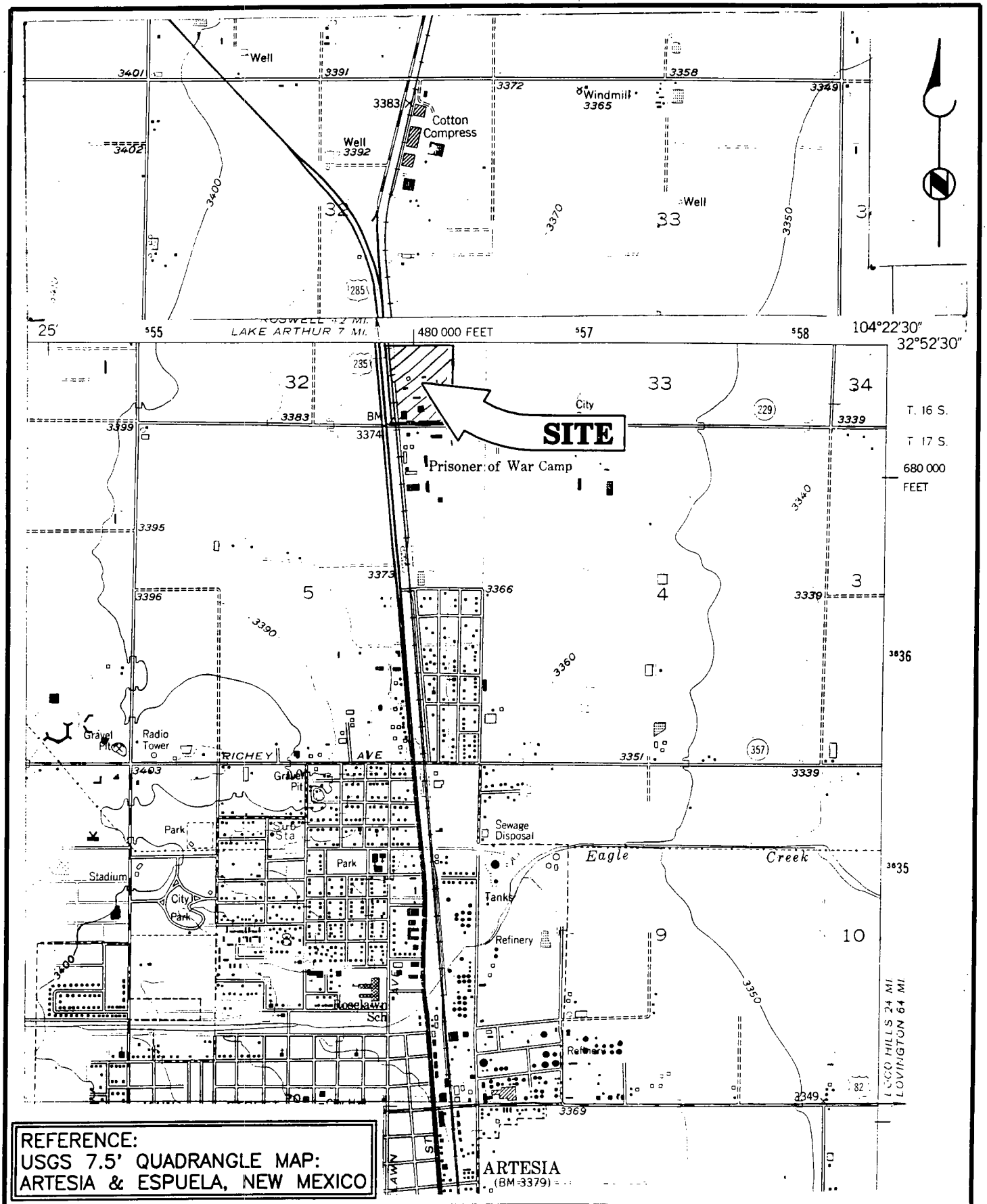
1 copy to: Brown and Caldwell
Project File

QUALITY CONTROL REVIEWER

Robert N. Jennings, P.E.
Vice President

TLJ:uak

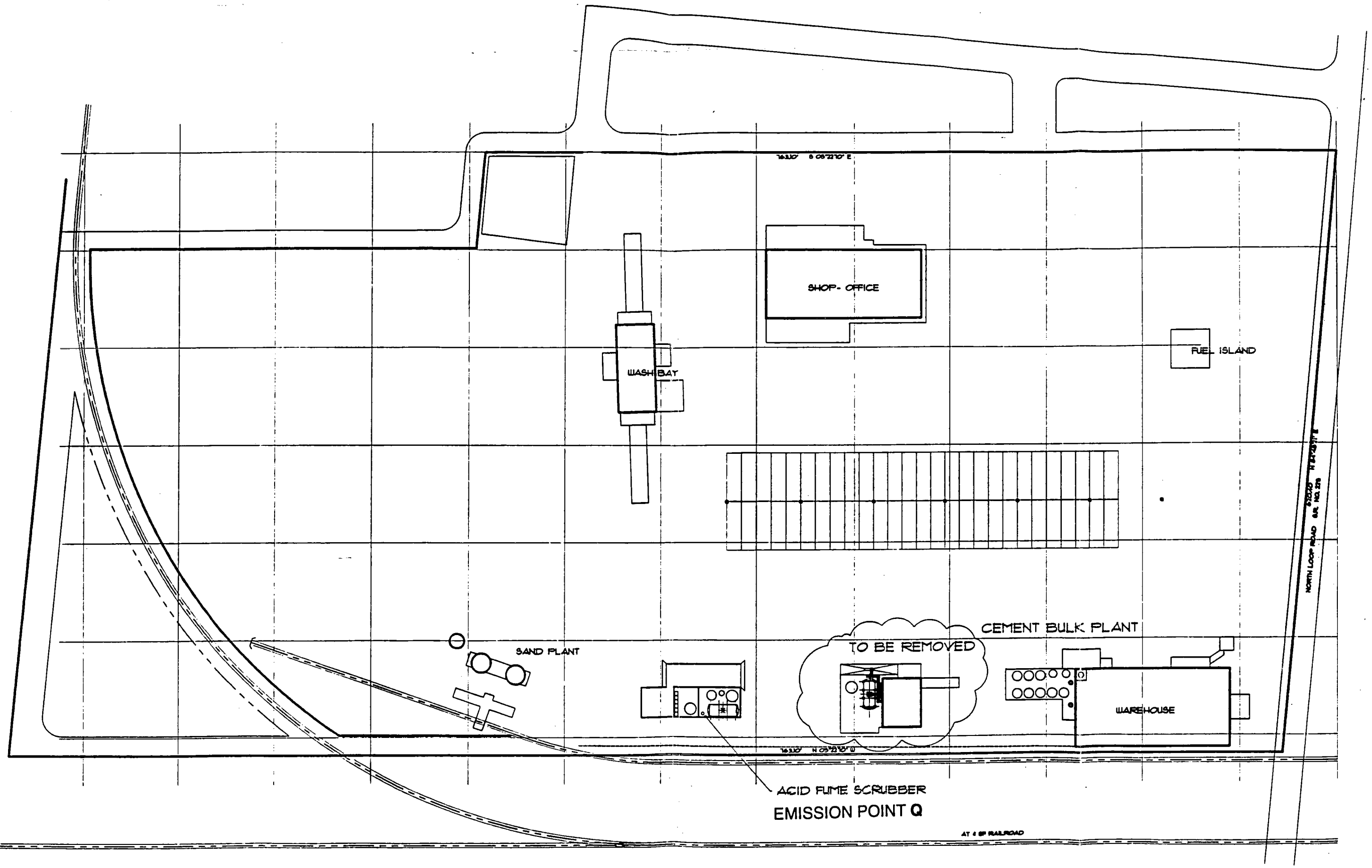
FIGURES



REFERENCE:
USGS 7.5' QUADRANGLE MAP:
ARTESIA & ESPUELA, NEW MEXICO

T:\2830\5VIGN 1/25/96 DHD

BROWN AND CALDWELL HOUSTON, TEXAS SUBMITTED: _____ DATE: _____ PROJECT MANAGER APPROVED: _____ DATE: _____ BROWN AND CALDWELL	0 1000 2000 SCALE: 1" = 2000' DRAWN BY: DHD DATE 1/25 CHK'D BY: _____ DATE _____ APPROVED: _____ DATE _____	TITLE SITE LOCATION MAP CLIENT BJ SERVICES COMPANY, U.S.A. SITE LOCATION ARTESIA, NEW MEXICO	DATE 1/26/96 PROJECT NUMBER 2830-20 FIGURE NUMBER 1



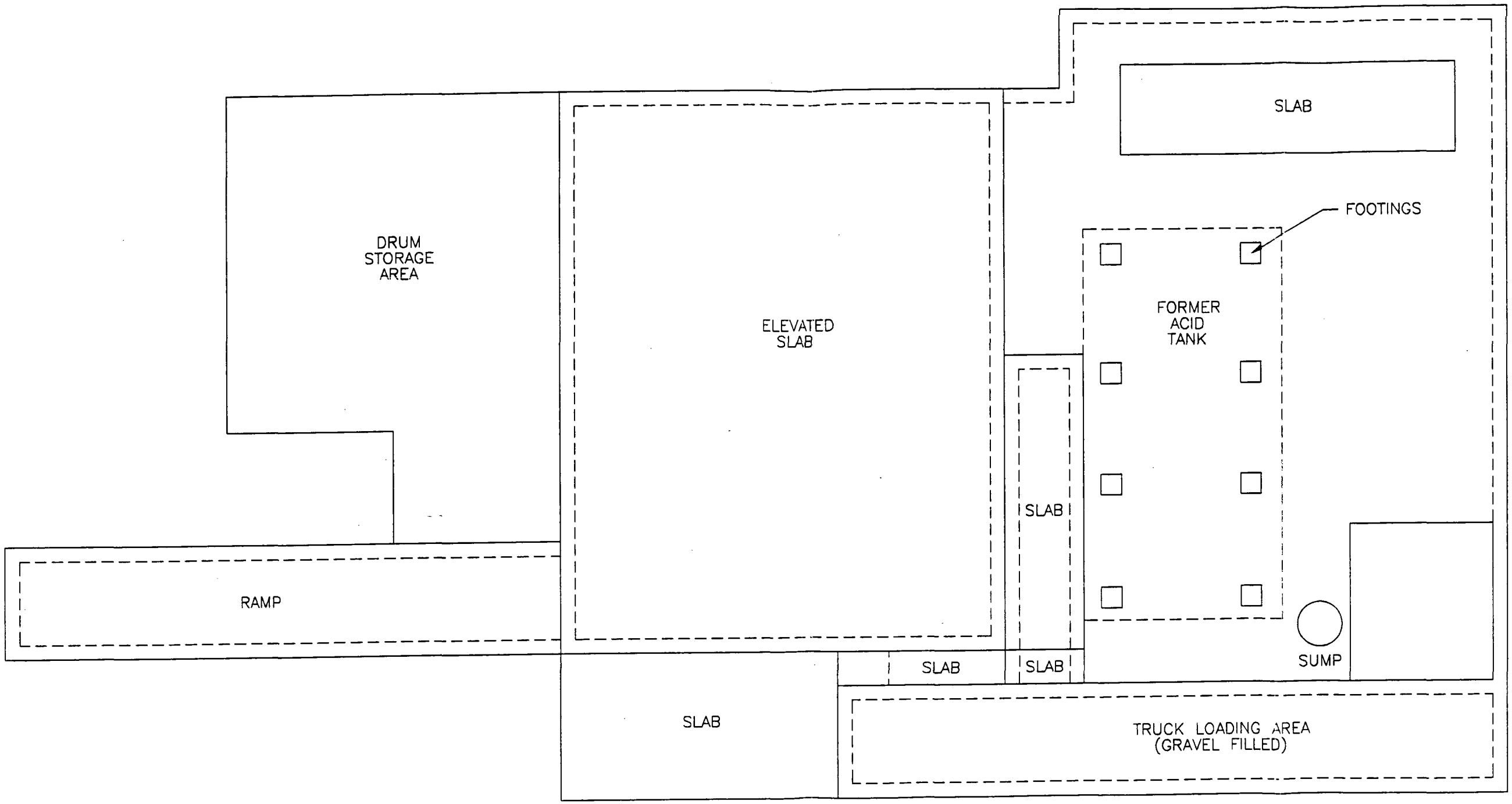
TRUE NORTH ROTATION
PLAN NORTH

INFORMATION SHOWN ON THIS DRAWING IS A COMPILATION OF INFORMATION TAKEN FROM SITE PLANS PREPARED BY DORLAND CAROL SHELTON, ARCHITECTS SHEET NO 1, DATED 22 JAN 1982, PROJECT NO. 82060 AND SHEET NO. 1, DATED 14 MAY 1982, PROJECT NO. 82030 AND UNMARKED SKETCH IDENTIFIED ONLY AS DWG. A3998. NO SURVEY HAS BEEN MADE TO AUTHENTICATE THE ACCURACY OF THIS DRAWING.

BROWN AND CALDWELL

FIGURE 2
SITE PLAN
ARTESIA, NEW MEXICO
BJ SERVICES

28305F2 01-29-96 BLH



T:\2988\ACIDOCK 05-30-97 JEB

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 5 10
SCALE: 1" = 10'
DRAWN BY: JEB DATE 5/97
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

TITLE: FORMER ACID DOCK AREA PLAN	DATE: 05/30/97
CLIENT: BJ SERVICES U.S.A., INC.	PROJECT NUMBER: 2988.09
SITE: ARTESIA, NM	FIGURE NUMBER: 3

TABLES

Table 1
Soil Cleanup Goals
Artesia, New Mexico
BJ Services Company, U.S.A.

Contaminant	Regulatory Remediation Action Levels (mg/kg)
Benzene	*10
BTEX, Total	*50
TPH	*100
RCRA Metals :	
Arsenic	<5.0 (mg/L TCLP)
Barium	<100.0 (mg/L TCLP)
Cadmium	<1.0 (mg/L TCLP)
Chromium	<5.0 (mg/L TCLP)
Lead	<5.0 (mg/L TCLP)
Mercury	<0.2 (mg/L TCLP)
Selenium	<1.0 (mg/L TCLP)
Silver	<5.0 (mg/L TCLP)

* These limits based on a ranking score >19, and are outlined in the NMOCD guidance documents.

APPENDIX A

November 18, 1996 Letter from Mark Ashley of the NMOCD

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

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

November 18, 1996

CERTIFIED MAIL
RETURN RECEIPT NO. P-288-258-873

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

RE: Discharge Plan GW-190
Artesia Facility
Eddy County, New Mexico

Dear Ms. Cobb:

The New Mexico Oil Conservation Division (OCD) has completed a review of BJ Services' (BJ) September 13, 1996 discharge plan summary (GW-190) for the BJ facility in Artesia, New Mexico. This document contains BJ's work plan to remove the old truck wash bay facility, and the old acid loading facility. It also contains BJ's work plan to construct a new truck wash bay facility, a new acid loading facility, and upgrading the cement blending facility.

The above referenced work plans are approved with the following conditions:

1. BJ will sample the soils beneath the existing facilities for hazardous constituents. After removal of the existing facilities, soil samples will be collected from each of the sidewalls, and a composites from the floor of each excavation. If contamination exists, verticle extent will be determined, and the contaminated soils will be removed and disposed of at an OCD approved site.

2. The OCD will be notified 72 hours prior to all activities.

3. BJ will submit a report on each investigation to the OCD within 30 days of removal. The report will contain:

A. A description of all activities which occurred during removal.

B. A summary of all laboratory analytical results of soil samples.

Please be advised that OCD approval does not relieve BJ of liability if contamination exists which is beyond the scope of the work plan or if the activities fail 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 you have any questions, please call me at (505) 827-7155.

Sincerely,

Mark Ashley
Geologist

xc: OCD Artesia Office

FINAL
SITE ASSESSMENT REPORT
FORMER ACID DOCK AREA

ARTESIA, NEW MEXICO

BJ SERVICES COMPANY, U.S.A.

OCTOBER 23, 1997

FINAL
SITE ASSESSMENT REPORT
FORMER ACID DOCK AREA
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: 2988-09

Timothy Jenkins
Associate Engineer

October 23, 1997

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

CONTENTS

1.0 INTRODUCTION

Brown and Caldwell, under contract to BJ Services Company, U.S.A. (BJ Services), conducted a site assessment for the closure of the former Acid Dock from August 25, 1997 through September 2, 1997. The site assessment was conducted in accordance with the "Closure Plan: Former Acid Dock Area and Former Fuel Island" (Closure Plan), submitted to the New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division (OCD) on June 30, 1997. The Closure Plan is found in Appendix A. The site assessment for the Fuel Island Area closure will be documented in a separate report.

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, 88210. A site location map and site plan are attached as Figures 1 and 2, respectively.

Between August 25, 1997 through September 2, 1997, Brown and Caldwell supervised the removal of the former Acid Dock. The former Acid Dock, which is located north of the batch cement blending facility (see Figure 2), was constructed in the early 1980's, and included the following units/facilities:

- an elevated slab area used for storing miscellaneous chemical additives;
- drum storage area slab;
- a ramp leading to the elevated slab;
- a truck staging/loading pad, with curbing and a field drain;
- an elevated 25,000 gallon 32%-solution hydrochloric acid storage tank;
- tank supports and footings;
- a sump to collect drainage from the truck staging/loading pad; and
- miscellaneous curbing and slab areas.

Brown and Caldwell also provided field oversight during excavation backfilling and removal/disposal of the impacted soil stockpile. These activities occurred from September 30, 1997 through October 5, 1997. Closure activities were conducted in accordance with Brown and Caldwell's Closure Plan. The Closure Plan defined the following objectives:

- Conduct a site assessment to define extent of hydrocarbon impact to soils from former Acid Dock operations;
- Remove all structures related to the former Acid Dock, including concrete, steel and fiberglass structures;
- Remove potential sources in the former Acid Dock area which could impact underlying groundwater;
- Manage, remediate, or dispose of excavated soils impacted by former Acid Dock operations; and,
- Document the closure activities and obtain approval for final closure from the NMOCD.

The following sections summarize the site activities, site assessment and scoring, closure confirmation methods utilized, and the results of both field and laboratory analyses. Section 3 summarizes our conclusions and recommendations, and requests approval for final closure based on the results of the site assessment.

2.0 SITE ASSESSMENT

Brown and Caldwell, with Remedial Construction Services, Inc. as subcontractor, performed the site assessment to determine the potential for site soils/groundwater to have been impacted by the operation of the former Acid Dock. The results of the site assessment were used for evaluating the need for further remediation and the type of closure best suited for the site.

2.1 General Site Characteristics

BJ Services determined the depth to groundwater to be approximately 20 to 25 feet below the ground surface based on previous groundwater investigations conducted at the site.

Depth to Groundwater	Ranking Score
< 50 feet	Yes - 20

Brown and Caldwell personnel conducted a water well search at the State Engineer's office in Roswell, New Mexico on February 21, 1993. This search determined that no water wells were identified within a one-half mile radius of the facility.

Wellhead Protection Area	Ranking Score
< 1000 feet from a water source, or	No - 0
< 200 feet from a private domestic water source:	No - 0

The distance from the site to the Pecos River (nearest downgradient surface water body), was determined to be more than 1,000 feet by reviewing a USGS topographic map for the area.

Distance to Surface Water Body	Ranking Score
> 1,000 feet	Yes - 0

2.2 Site Scoring

Groundwater is present at a depth of less than 50 feet below grade. Flow direction is east-southeast, as determined from wells previously installed at the facility. Therefore, the site scoring procedure outlined above calls for a depth to groundwater Ranking Score of 20. No water wells were identified within a 2,000 ft. radius of the site. Therefore, the wellhead protection Ranking Score is 0. A review of a USGS map indicates the nearest water body (Eagle Creek) is approximately 7,000 ft. south of the site. The Pecos River is several miles from the facility. Therefore, the distance to surface water body Ranking Score is 0.

The site ranking score of 20 is greater than 19. This determination was made based on physical site characteristics as described above. According to the OCD guidance document attached as Appendix B, 'Unlined Surface Impoundment Closure Guidelines, 2/93", a total ranking score of greater than 19 yields action levels as outlined in Table 1 (in the Tables section).

2.3 Groundwater Assessment

A groundwater assessment was conducted concurrently with the soil assessment and excavation activities. Existing monitor wells MW-1, MW-2, MW-3, and MW-4 were purged on September 1, 1997, and sampled on September 2, 1997. Samples collected from the monitor wells were analyzed for BTEX and semivolatiles by EPA Methods 8020 and 8270, respectively. Groundwater analytical results are summarized in Table 2. There were no detectable concentrations for any of the chemicals analyzed in the downgradient well (MW-3). In the area where impacted soils were removed (MW-1 area), the groundwater analytical results indicate that benzene, toluene, ethylbenzene, and xylenes were present at concentrations below the New Mexico Water Quality Control Commission (NMWQCC) groundwater standards. Of the semivolatiles analyzed, only naphthalene was present at a level above the NMWQCC groundwater standards (0.032 mg/L versus the NMWQCC standard of 0.030 mg/L). MW-1 and the surrounding impacted soils have been removed, and will no longer serve as a potential source for groundwater impact.

2.4 Demolition and Excavation Activities

The former Acid Dock was in operation from the early 1980's and was removed from service in mid-1997. Operations included loading hydrochloric acid solution into an 25,000 gallon above-grade storage tank, acid batch blending with bulk additives and loading for delivery to job sites, and pumping and storage of returned waste fluid for reuse or disposal. Figure 3 depicts the plan layout of the former acid dock area.

2.4.1 Acid Dock Demolition and Preliminary Delineation

The former Acid Dock, including an elevated slab area, curbing, truck loading ramp, sump, tank footings, and miscellaneous slabs, was removed based on the Closure Plan (Appendix A). Prior to commencing demolition activities, several soil samples were collected on each side and from within the former acid dock area. These samples were split and tested using a photoionization device (PID), and submitted to a laboratory for analysis to confirm the suitability of the field screening method for total petroleum hydrocarbon (TPH) concentration in site soils. Following the removal of concrete and other structural equipment, test trenches were advanced in the northeastern and southeastern areas of the former Acid Dock. Test trenches were advanced based on both visual and PID field screening.

2.4.2 Overexcavation and Stockpiling of Acid Dock Soils

Once the limits of the impacted soil were established, overexcavation and stockpiling of impacted soil was performed. The approximate limits of the final excavation are depicted in Figure 3.

2.4.3 Confirmation Sampling

Upon completion of excavation activities, confirmation samples were collected at the locations shown in Figure 4. The excavation was divided into six distinct zones. These zones were generally based on floor depth. For each zone, a single floor composite sample and a discrete sample from each sidewall was collected and submitted to a laboratory for analysis. Each sample was analyzed for benzene,

toluene, ethylbenzene, and xylenes (BTEX by EPA SW-846 Method 8020), and TPH for diesel range organics (EPA SW-846, Method 8015 modified). A summary of confirmation sample results is included as Table 3. Analytical reports are in Appendix C.

Only one of the 21 samples collected indicated levels exceeding the NMOCD action levels established in Section 2.1 of this report and listed in Table 1. The sidewall sample, D-SDWL-W-9 was collected from a depth of 9 feet below the top of the west sidewall of zone D (total depth of 13 feet below grade). The TPH level measured in this sample was 950 mg/kg, which is above the NMOCD remediation action level of 100 mg/kg. BTEX concentrations for all samples were below the NMOCD remediation action levels.

2.4.4 Stockpile Sampling, Profiling, and Disposal

Approximately 1,400 cubic yards of impacted soil were excavated and stockpiled for disposal. The stockpile was sampled for TPH, reactivity, corrosivity and ignitability, plus TCLP volatiles, semi-volatiles, and metals. The stockpile TPH concentration was measured as 357 mg/kg for the composite sample collected on 9/2/97. Results for the stockpile composite sample are included in Table 4. The stockpiled soil profile was submitted to the NMOCD for approval in accordance with the permit held by Controlled Recovery, Inc. landfill facility in Hobbs, New Mexico. The soil was disposed upon approval by the NMOCD Hobbs and Artesia District Offices, and the NMOCD Santa Fe Headquarters. Analytical reports are located in Appendix C. Waste disposal permits and manifests are included in Appendix D of this report.

2.4.5 Excavation Backfilling

From October 2, 1997 to October 5, 1997, the excavated area was backfilled with fill material from two on-site stockpiles and imported fill similar to existing site soils. The on-site sources were soil stockpiles created during the former acid dock demolition (soil from the elevated slab removal) and from the truck wash area (soil removed during sump and containment system installation).

One composite sample was collected from each stockpile and field screened using a PID. The sample from the elevated slab removal stockpile was analyzed for TPH-DRO and BTEX. The sample from the truck wash stockpile was analyzed for TPH-DRO and TCLP VOCs, SVOCs and metals. The sample results for the elevated slab removal stockpile were 9.9 mg/kg TPH-DRO and less than 0.02 mg/kg total BTEX. The sample from the truck wash stockpile was initially submitted to Cardinal Laboratories in Hobbs, New Mexico to verify field screening results from the PID (field screening results with the PID were 2 ppm). Analytical results from Cardinal were 281 mg/kg TPH-DRO. Based on the variation between the PID readings and the Cardinal results, the sample was submitted to Southern Petroleum Laboratories (SPL) in Houston, Texas for confirmation analysis. Analytical results from SPL were 54 mg/kg TPH-DRO. The TCLP results, run for complete characterization of the soil stockpile, are included in Table 4. Based on these analytical results, the stockpiled soils were placed back into the excavation. Backfilling was accomplished in lifts, with each lift compacted using a sheepsfoot compactor/roller.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

Based on the information contained herein, we conclude the following:

- Field and laboratory analyses of the soil samples obtained during the site investigation indicate that, with the exception of one sidewall sample area, soils potentially impacted by TPH constituents and associated with the former Acid Dock have been removed.
- Field screening and confirmation sampling of the floor sample in this area indicate soils at the base of the excavation are below NMOCD action levels. Further excavation of the west sidewall soils (area of TPH impact) is not feasible due to the proximity of a water main located 3 feet west of the current excavation limits.
- Groundwater flow is east-northeast, which indicates flow onto the property from an adjacent railroad easement.
- Groundwater sampling indicated non-detectable concentrations of volatiles and semivolatiles downgradient of the former Acid Dock.
- Stockpiled soil impacted by TPH has been profiled, and received NMOCD approval prior to disposal. Disposal of soils was accomplished at the NMOCD approved facility operated by Controlled Recovery, Inc. in Hobbs, New Mexico.
- The excavation was backfilled and compacted in lifts. A gravel covering was applied to restore the site to standard operating condition.

3.2 Recommendations

Based on the findings of the Site Assessment, the following activities are recommended to complete closure of the acid dock area:

- Sample the monitor well downgradient of the former Acid Dock area, MW-2, in approximately one year (September, 1998); the sample should be analyzed for BTEX (Method 8020) and semivolatiles (Method 8270). If groundwater samples indicate no impact to groundwater (concentrations below NMWQCC groundwater standards), then the existing monitor wells (MW-2, MW-3, and MW-4) may be plugged and abandoned according to NMOCD requirements.

Upon completion of this recommendation, no further remedial action at the former acid dock area will be required to meet NMOCD action levels.

DISTRIBUTION

Final
Site Assessment Report
Former Acid Dock Area
Artesia, New Mexico Facility

October 23, 1997

1 copy to: New Mexico Energy, Minerals and Natural Resources Department
Oil Conservation Division
2040 S. Pacheco
Santa Fe, New Mexico 87505

Attention: Mr. Mark Ashley

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

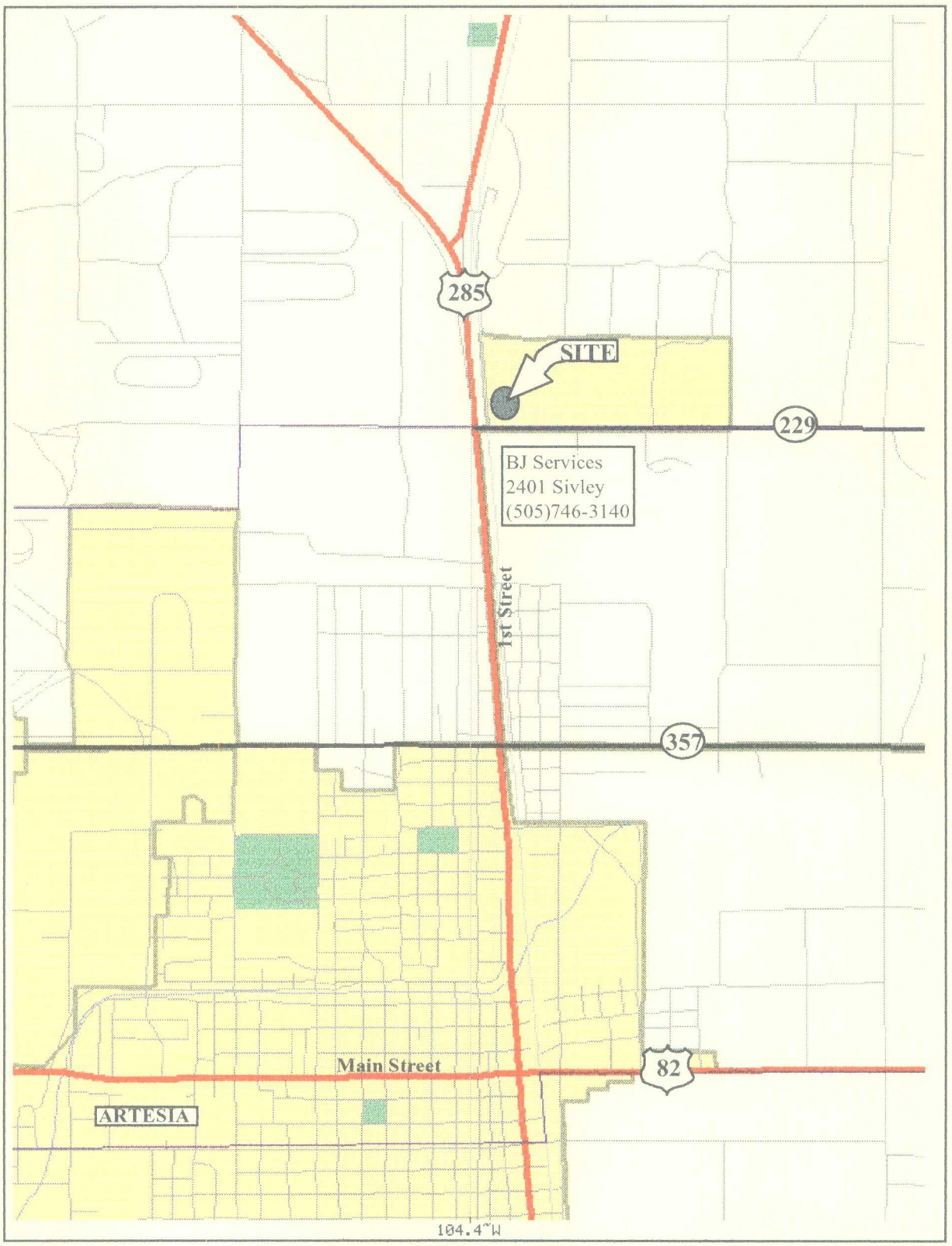
1 copy to: Brown and Caldwell
File

QUALITY CONTROL REVIEWER

Robert N. Jennings, P.E.
Vice President

TLJ:uak

FIGURES



BROWN AND CALDWELL HOUSTON, TEXAS	0 0.5 1 miles	TITLE: SITE LOCATION MAP	DATE: 09/22/97
		CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NO.: 2988-09
		SITE LOCATION: ARTESIA, NEW MEXICO	FIGURE NO.: 1

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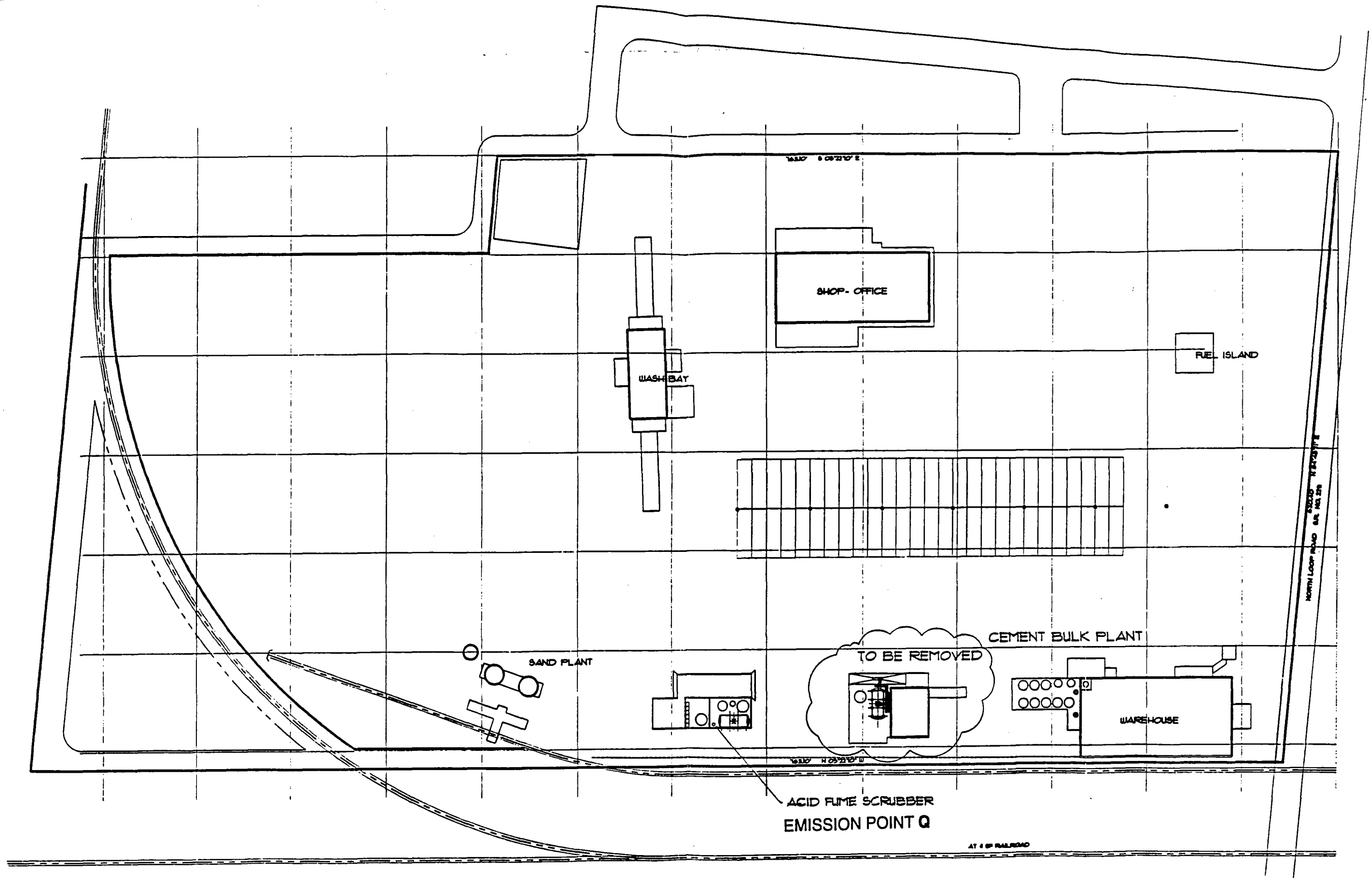


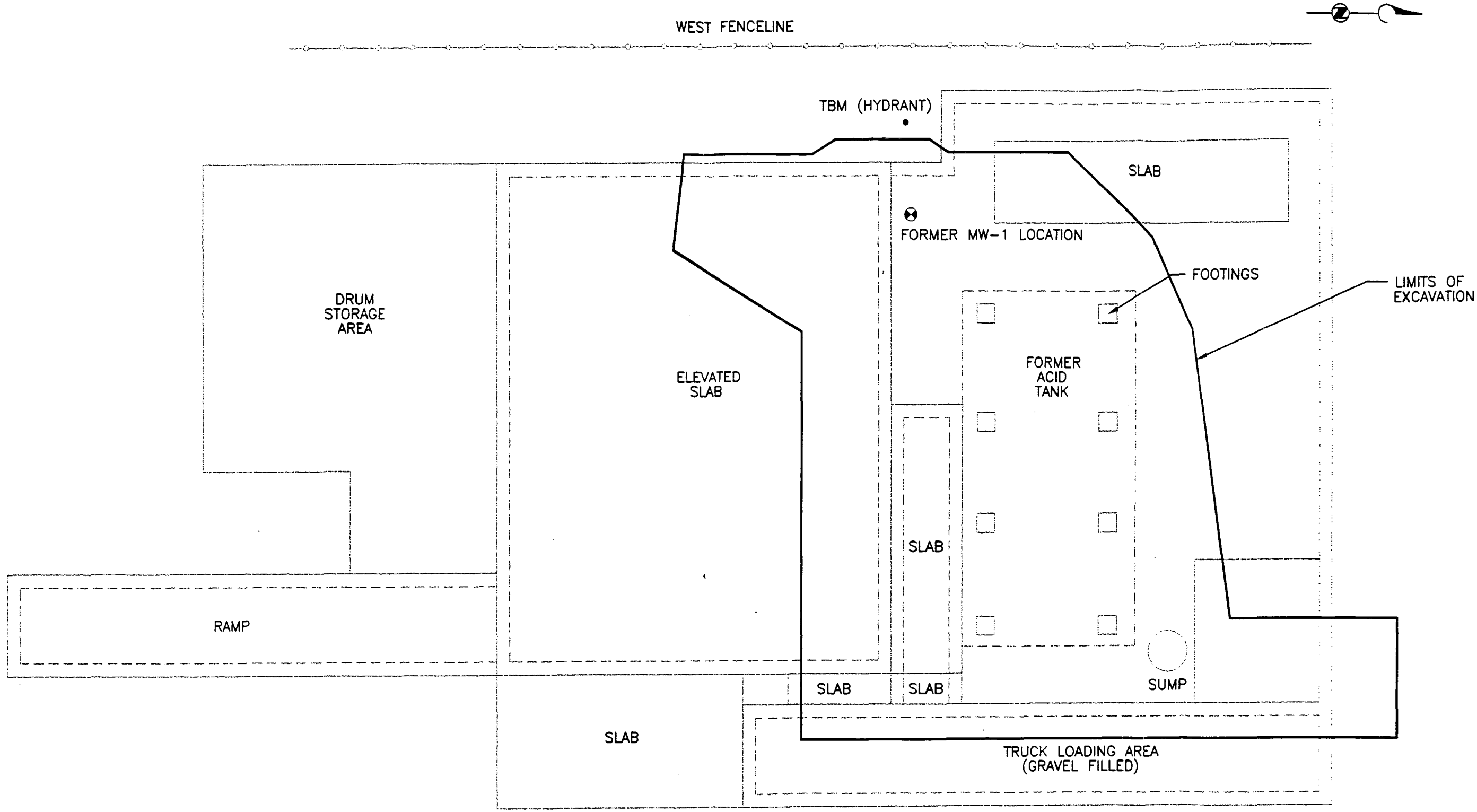
TRUE NORTH
ROTATION
PLAN NORTH

INFORMATION SHOWN ON THIS DRAWING IS A COMPILATION OF INFORMATION TAKEN FROM SITE PLANS PREPARED BY DORLAND CARROL SHELTON, ARCHITECTS SHEET NO 1, DATED 23 JAN 1995 , PROJECT NO. 93260 AND SHEET NO. 1, DATED 14 MAY 1992, PROJECT NO. 92260 AND UNSURVEYED SKETCH IDENTIFIED ONLY AS DRG. A2993A. NO SURVEY HAS BEEN MADE TO AUTHENTICATE THE ACCURACY OF THIS DRAWING.

BROWN AND CALDWELL

FIGURE 2
SITE PLAN
ARTESIA, NEW MEXICO
BJ SERVICES

28305F2 01-29-96 BLH



T:\2988\EXCAVATE 09-16-97 JEB

BROWN AND CALDWELL
HOUSTON, TEXAS

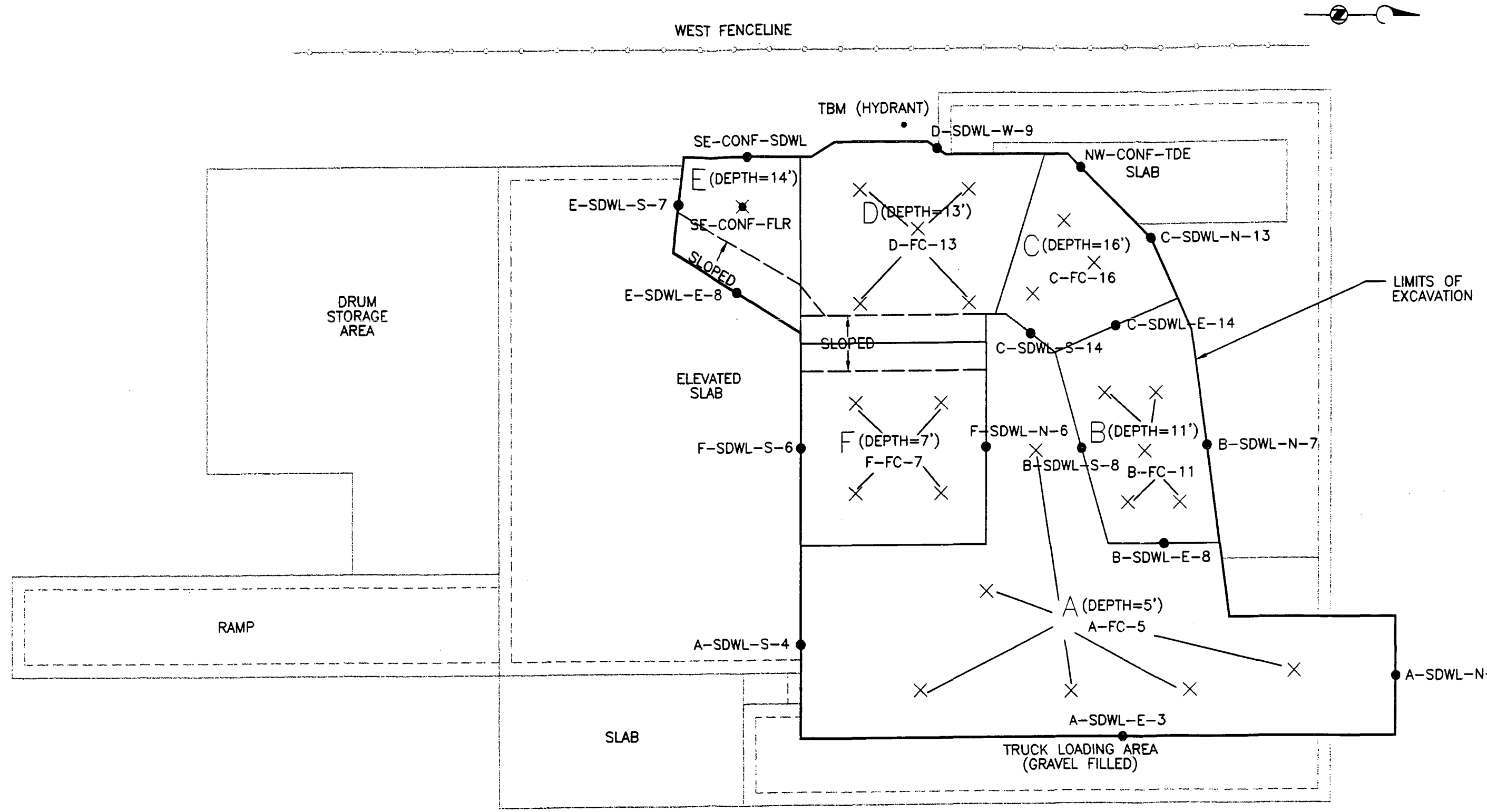
SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 5 10
SCALE: 1" = 10'
DRAWN BY: JEB DATE 9/97
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

TITLE: EXCAVATION LIMITS		DATE: 09/16/97
CLIENT: BJ SERVICES COMPANY, U.S.A.		PROJECT NUMBER: 2988.09
SITE: ARTESIA, NEW MEXICO		FIGURE NUMBER: 3



T:\2988\SAMPLOC 10-03-97 JEB

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: _____ DATE: _____
PROJECT MANAGER

APPROVED: _____ DATE: _____
BROWN AND CALDWELL

0 5 10
SCALE: 1" = 10'
DRAWN BY: JEB DATE 10/03
CHK'D BY: ____ DATE ____
APPROVED: ____ DATE ____

LEGEND

BGS – BELOW GROUND SURFACE
● SIDEWALL SAMPLE LOCATION
× FLOOR COMPOSITE LOCATION
⊗ DISCRETE FLOOR SAMPLE

TITLE: CONFIRMATION SAMPLE LOCATIONS	DATE: 10/03/97
CLIENT: BJ SERVICES COMPANY, U.S.A.	PROJECT NUMBER: 2988.09
SITE: ARTESIA, NEW MEXICO	FIGURE NUMBER: 4

TABLES

Table 1
NMOCD Remediation Action Levels
Artesia, New Mexico
BJ Services Company, U.S.A.

Contaminant	NMOCD Remediation Action Levels (mg/kg)
Benzene	*10
BTEX, Total	*50
TPH	*100
RCRA Metals:	
Arsenic	<5.0 (mg/L TCLP)
Barium	<100.0 (mg/L TCLP)
Cadmium	<1.0 (mg/L TCLP)
Chromium	<5.0 (mg/L TCLP)
Lead	<5.0 (mg/L TCLP)
Mercury	<0.2 (mg/L TCLP)
Selenium	<1.0 (mg/L TCLP)
Silver	<5.0 (mg/L TCLP)

* These limits based on a ranking score >19, and are outlined in the NMOCD guidance documents.

Table 2
Groundwater Analytical Results
September 2, 1997 Sampling Event
Analytical Results

BJ Services Company, U.S.A.
Artesia, New Mexico

MONITOR WELL	MW-1	MW-2	MW-3	MW-4	Field Blank	NMWQCC Groundwater Standards
VOLATILES by Method 8020 (mg/L)						
Benzene	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	0.01
Toluene	0.470	<0.0010	<0.0010	<0.0010	<0.0010	0.75
Ethylbenzene	0.059	<0.0010	<0.0010	<0.0010	<0.0010	0.75
Total Xylenes	0.190	<0.0010	<0.0010	<0.0010	<0.0010	0.62
SEMIVOLATILES by Method 8270 (mg/L) [a]						
Dibenzofuran	0.012	<0.005	<0.005	<0.005	<0.005	NL
2-Methylnapthalene	0.024	<0.005	<0.005	<0.005	<0.005	NL
4-Methyphenol	0.059	<0.005	<0.005	<0.005	<0.005	NL
Napthalene	0.032	<0.005	<0.005	<0.005	<0.005	0.03 [b]

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

[b] Value is for PAHs: total napthalene plus monomethylnaphthalenes.

Table 3
Confirmation Soil Sample
Analytical Results

BJ Services Company, U.S.A.
Artesia, New Mexico

SAMPLE ID	TPH	Benzene	Toluene	Ethylbenzene	Xylenes	BTEX
A-FC-5	<4.0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040
A-SDWL-N-2	10	<0.0050	<0.0050	<0.0050	<0.0050	<0.020
A-SDWL-E-3	<4.0	<0.0010	<0.0010	<0.0010	0.0012	0.0012
A-SDWL-S-4	<4.0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040
B-FC-11	49	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040
B-SDWL-N-7	<4.0	0.0011	<0.0010	<0.0010	0.0024	0.0035
B-SDWL-E-8	8	<0.0050	<0.0050	<0.0050	0.11	0.11
B-SDWL-S-8	<4.0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040
C-FC-16	6	<0.0010	<0.0010	<0.0010	0.0035	0.0035
C-SDWL-N-13	<4.0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040
C-SDWL-E-14	<4.0	<0.0010	0.0015	<0.0010	0.013	0.0145
C-SDWL-S-9	<4.0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040
D-FC-13	13	<0.0010	<0.0010	0.0015	0.015	0.0165
D-SDWL-W-9	950	0.27	<0.010	0.036	0.056	0.362
D-SDWL-S-8	<4.0	<0.0010	0.0021	<0.0010	0.0052	0.0073
E-SDWL-E-8	5.4	<0.010	<0.010	<0.010	<0.010	<0.040
E-SDWL-S-7	5.2	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040
F-SDWL-N-6	5.3	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040
F-SDWL-S-6	5.6	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040
F-FC-7	6.8	<0.010	<0.010	<0.010	<0.010	<0.040
NW-CONF-TOE	<8.0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040
SE-CONF-SDWL	<8.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.020
SE-CONF-FLR	<8.0	<0.0010	<0.0010	<0.0010	<0.0010	<0.0040
NMOCD Cleanup Goal	100	10		TOTAL BTEX:	50	0.362

Sample results are reported in mg/kg.

Table 3 - Cont'd
Confirmation Soil Sample Analytical Results

BJ Services Company, U.S.A.
Artesia, New Mexico

Metal Analyzed	B-FC-11 Total Concentration (mg/kg)	Estimated TCLP Concentration (5% of Total) (mg/L)	NMOCD Regulatory Action Levels (mg/L)
Arsenic	<2	<0.1	< 5
Barium	246	12.3	< 100
Cadmium	<0.5	<0.025	< 1
Chromium	9	0.45	< 5
Lead	4.2	0.21	< 5
Mercury	<0.1	<0.005	< 0.2
Selenium	<0.5	<0.025	< 1
Silver	<1	<0.05	< 5

Table 4
Stockpile Analytical Results

BJ Services Company, U.S.A.
Artesia, New Mexico

Analysis (units)	STKPL-N-1 North Stockpile (Impacted Acid Dock Excavated Material)	TW-STK-E (Resampled as "N. Fenceline") North Fenceline Stockpile (Generated from Truck Wash Construction)
Total Petroleum Hydrocarbons (mg/kg)	370	54
TCLP METALS (mg/L)		
Arsenic	<0.2	<0.03
Barium	<1	0.28
Cadmium	<0.02	<0.01
Chromium	<0.02	<0.01
Lead	<0.1	<0.03
Mercury	<0.0002	<0.02
Selenium	<0.2	<0.01
RCI (Reactivity, Corrosivity, Ignitability)		
Reactivity - Cyanide (mg/kg)	<10	<0.25
Reactivity - Sulfide (mg/kg)	<100	<12.5
Corrosivity (pH in water - standard units)	7.94	8.16
Flash Point (°F)	>210	Does Not Burn
TCLP Semi-Volatiles (µg/L)		
o-Cresol	<50	<66
m,p-Cresol	<100	<66
1,4-Dichlorobenzene	<50	<66
2,4-Dinitrotoluene	<50	<66
Hexachlorobenzene	<50	<66
Hexachlorobutadiene	<50	<66
Hexachloroethane	<50	<66
Nitrobenzene	<50	<66
Pentachlorophenol	<250	<33
Pyridine	<50	<66
2,4,5-Trichlorophenol	<100	<66
2,4,6-Trichlorophenol	<50	<66
TCLP Volatiles (µg/L)		
Benzene	<50	<25
2-Butanone	<200	<50
Carbon Tetrachloride	<50	<25
Clorobenzene	<50	<25
Chloroform	<50	<25
1,2-Dichloroethane	<50	<25
1,1-Dichloroethene	<50	<25
Tetrachloroethene	<50	<25
Trichloroethene	<50	<25
Vinyl Chloride	<100	<50

APPENDICES

APPENDIX A

Closure Plan:
Former Acid Dock Area and
Former Fuel Island
(June 30, 1997)