# ENVIROMENTAL SITE ASSESSMENT WORKPLAN

# INITIAL SITE CHARACTERIZATION REPORT

# BYRD PUMP SITE MONUMENT, NEW MEXICO

*Prepared for*
ARCO PIPE LINE COMPANY
15600 JFK BLVD SUITE 300
HOUSTON, TEXAS

JANUARY, 2000

**URS Greiner Woodward Clyde**
*A Division of URS Corporation*

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Suite 210
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Project No. 93-99000162.00

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## Background

Arco Pipe Line Company (APL) operates a 4-inch crude oil transfer line in Lea County, New Mexico. Line pressure is increased at a booster pump (Byrd Pump) located 3 miles west of the town of Monument on Hwy 322 and 2.5 miles south of the El Paso Natural Gas Monument Station (32.35.01N and 103.18.32W) Figure 1-1. Upon inspection of the pump area, APL personnel noted that soil around the pump has been stained by crude oil due to historical operations at the pump.

In April 1999, APL contracted CJR Contractors to remove stained soil from around the pump and line. Upon removal of the soil from around the pump and line, APL personnel noted that stained soil extends to at least two feet below grade. Soil samples collected from the stockpile of the excavated soil indicated total petroleum hydrocarbons (TPH) by EPA Method 418.1 at 15,200 mg/kg. The benzene, toluene, ethyl benzene, and xylenes (BTEX) analysis by EPA Method 8260 indicated less than detection limits for each constituent. The composite soil sample was also analyzed by TCLP for metals, semivolatiles, volatiles, reactivity (sulfide and cyanide), corrosivity, and ignitability. Appendix A contains the laboratory analytical report for the composite soil sample from the excavated stockpile. All excavated soils were placed in an onsite landfarm area next to the pump.

On October 1, 1999, URS Greiner Woodward Clyde (URSWC), on behalf of ARCO Pipe Line Company (APL), submitted an *Initial Site Characterization Work Plan, ARCO Pipe Line Byrd Pump Site, Monument, New Mexico* to the New Mexico Oil Conservation Division (NMOCD). The work plan was approved by the NMOCD on October 15,1999. URSGWC performed the field investigation in November 1999. This report presents the findings of the investigation and presents the conclusions and recommendations based on evaluation of the data.

## Water Well Search and Local Hydrogeology

A water well search was conducted by Environmental Data Resources on December 15,1999 (Appendix B). Two wells (A-1, A-2) were identified within 1/4 mile of the site. One well (3) was located ¼ to ½ mile of the site and five domestic supply wells are located ½ to 1 mile from the site. According to the United States Geological Survey publication "Geology and Groundwater Conditions in Southern Lea County, New Mexico," the depths of groundwater wells in the vicinity of the site range from 53 to 283 feet below ground surface (bgs). Groundwater elevations range from 18 to 34 feet (bgs). The water wells are screened in either the Quaternary-age alluvium or the Tertiary-age Ogallala Formation.

In November 1999, URSGWC initiated a soil and groundwater investigation at the Byrd pump site by drilling and sampling one soil boring and installing a permanent monitoring well next to the pump (Figure 2-1). Soil samples were collected from the soil boring and groundwater samples were collected from the monitoring well installed into the soil boring. The soil boring log is presented in Appendix C.

**Monitoring Well Installation, Soil and Groundwater Sampling**

The soil boring was drilled by hollow-stem auger while soil sampling was performed with a 5-foot long CME continuous sampler. A 12.25-inch borehole was initially drilled and sampled for the purposes of installing a surface casing. A 10-inch I.D. PVC casing was cemented into place in the upper ten feet of soil. After the cement cured for approximately 48 hours, an 8.25-inch borehole was then drilled and sampled to 40 feet. Moist soils were encountered at approximately 27 feet below grade and a saturated gravelly sand was encountered at approximately 37 feet below grade. The monitoring well was constructed of four-inch diameter schedule 40 PVC with 20 feet of well screen (0.010" slots) extending from 20 to 40 feet below grade. The monitoring well was filter packed with pre-washed silica sand from 17 to 40 feet and sealed with 3 feet of hydrated bentonite chips from 14 to 17 feet below grade. Above the well seal to ground surface, the borehole annulus was filled with a cement\bentonite slurry. A six-inch upright locking well cover was placed over the 3-foot PVC well stickup and cemented into place.

Soil samples were logged and described for material type, properties, and moisture content during sample collection. Six soil samples were collected from the following depth intervals; 4-5', 9-10', 14-15', 19-20', 29-30', and 39-40' and submitted for laboratory analysis. Soil samples were analyzed BTEX by EPA Method 8021, TPH by EPA Method 8015 modified (GRO-DRO), and polynuclear aromatic hydrocarbons (PAH's) by EPA Method 8310. Additionally, soil samples MW-1 (9-10') and MW-1 (14-15') were analyzed by the Synthetic Precipitation Leaching Procedure (SPLP) for PAH's for the purposes of determining leachability of these constituents from the soil. Soil cuttings from the boring were placed with the excavated soil from the initial excavation of the area.

Groundwater samples were collected from the monitoring well after development and purging. Development consisted of surging and bailing followed by over-pumping until the water was clear and the pH, temperature, and conductivity had stabilized. After well development was complete, a minimum of 24 hours was allowed to pass prior to purging and sampling. Purging was performed by pumping with a submersible pump at a rate of approximately 1 gallon per minute or until no drawdown was observed. Upon removal of at least three well volumes and stabilization of the pH, temperature, and conductivity, the groundwater was sampled from the dedicated discharge tubing of the pump. The groundwater sample was placed into the appropriate

pre-labeled containers and stored on ice for shipment to the analytical laboratory. Chain-of-custody procedures were followed during sample handling. Purge and development water was placed into 55-gallon drums, labeled with contents, sealed, and left at the site pending waste characterization.

Groundwater samples were analyzed for BTEX by EPA Method 8021, PAH's by EPA Method 8310, TPH by EPA Method 8015 modified (GRO-DRO), major cations and anions, and heavy metals by various EPA 7000 series methods. Additionally, a groundwater sample was collected for analysis of total dissolved solids.

### Soil Analytical Results

A total of six subsurface soil samples were collected from the soil boring drilled and the pump site. The soil analytical results were compared to the New Mexico Oil Conservation Division (NMOCD) target criteria. A summary of soil analytical results are presented in Tables 2-1 and 2-2. The laboratory analytical reports are attached as Appendix D.

TPH-DRO and GRO were detected in all six of the soil samples above the NMOCD recommended remediation level for soils of 100 mg/kg. Toluene, ethyl benzene, and xylenes were detected in all six of the soil samples, however, none of these constituents exceeded the NMOCD recommended remediation levels. Benzene was not detected in any of the subsurface soil samples. PAH constituents were also detected in soil samples, however, NMOCD has not established soil remediation standards for the PAH compounds in soil.

SPLP analyses for PAH's were performed on the two highest TPH soil samples for the purposes of determining the leachability of these constituents from soil to groundwater. Soil samples MW-1 (9-10') and MW-1 (14-15') were analyzed by the SPLP method for PAH compounds. Both sample results slightly exceeded the New Mexico Water Quality Control Commission (NMWQCC) groundwater standards for total naphthalene and mono-methylnaphthalenes. Figure 2-2 presents the soil concentrations that exceed NMOCD standards based on a ranking criteria where the depth to groundwater is less than 50 feet, the distance to a public water supply is greater than 1000 feet, the distance to a private domestic water source is greater than 200 feet, and the distance to a surface water body is greater than 1000 feet. Figure 2-2 also presents the PAH-SPLP concentrations that exceed NMWQCC standards.

### Groundwater Analytical Results

The groundwater analytical results from the groundwater sample were compared to the NMWQCC groundwater standards. The groundwater analytical results and the NMWQCC standards are presented on Tables 2-3, 2-4, and 2-5. The laboratory analytical reports are attached as Appendix D.

A trace of crude oil was found on the water table after well development. The oil was visually inspected by the use of a product bailer and found to be in globules only. An interface probe measurement for thickness of the oil indicated <0.005 feet thickness. Prior to sampling an absorbent sock was used to remove any free phase product prior to purging and sampling.

The analytical results for the PAH compounds slightly exceeded the NMWQCC groundwater standards for total naphthalene and mono-methylnaphthalenes. The analytical results for TPH and BTEX were reported in concentrations above the laboratory reporting limits, however, only

the benzene concentration exceeded the NMWQCC groundwater standards. Figure 2-2 presents the groundwater concentrations that exceed NMWQCC standards.

The analytical results for metals were reported in concentrations above the laboratory reporting limits. Arsenic, aluminum, barium, boron, calcium, iron, magnesium, manganese, potassium, and sodium were detected in concentrations above the laboratory reporting limits, however, below any of the NMWQCC standards for domestic water supply or irrigation use. Boron and iron were detected in concentrations that exceeded the NMWQCC standards for domestic water supply or irrigation use. Chloride, fluoride, nitrogen, nitrate, and sulfate concentrations were also measured in the groundwater samples. Chloride and fluoride concentrations exceeded both the NMWQCC standards for domestic water supply and human health. Sulfate was detected in the four samples; however, a water quality standard has not been established for sulfate. The total dissolved solids concentrations measured from the monitoring well is 840 mg/L The metal and ion concentrations are most likely attributable to the poor natural water quality of the aquifer and are not a result of the pipe line leak.

Based on the results of the investigation, historical operations at the booster pump have impacted the soil and groundwater at the Byrd pump site. Soil analytical results have indicated TPH to be above the NMOCD remediation standards, however, further analysis of the TPH impacted soils has shown that the PAH compounds, which comprise the TPH, to marginally leach out of the soils above the NMWQCC standards. Additionally, analytical results for PAH's from the groundwater sample only slightly exceed the NMWQCC standards. Analytical results of benzene and total BTEX in soil were below the NMOCD standards, although benzene was detected in groundwater above the NMWQCC standards.

Because the site is an active booster pump location and several pieces of equipment and a 4-inch crude oil line cross the area, it is recommended that the upper five feet of soil be removed and replaced with clean soil. This can be performed without major disruption of the pump operations while protecting the surface exposure pathway at the site.

Due to the relatively low hydrocarbon concentrations in the deeper soils at the site, APL proposes to address the impacted soils by way of active bioventing. A blower fan will be used to inject ambient air (oxygen) into the existing monitoring well for the purposes of stimulating biodegradation of the remaining constituents in the deeper soils. The soils will be monitored for hydrocarbon concentrations over time. Additionally, the groundwater will be monitored for the present of free phase liquids and periodically sampled to assess the groundwater conditions. Upon demonstration that the soil and groundwater meet NMOCD and NMWQCC standards, APL will request site closure from NMOCD.

# TABLE 2-1
## SOIL ANALYTICAL RESULTS
## BYRD PUMP SITE - HOBBS, NEW MEXICO
*(Samples collected 11/11/99)*

| CONSTITUENT | MW-1 (4-5') | MW-1 (9-10') | MW-1 (14-15') | MW-1 (19-20') | MW-1 (29-30') | MW-1 (39-40') |
|---|---|---|---|---|---|---|
| **PAH** (mg/kg) | | | | | | |
| 1-Methylnaphthalene | <.130 | 5.9 | 2 | 3.7 | 3.7 | 0.037 |
| 2-Methylnaphthalene | <.130 | 4.9 | 1.7 | 3.3 | 3.3 | 0.036 |
| Acenaphtene | <.066 | 0.41 | 0.12 | 0.24 | 0.29 | 0.0047 |
| Acenaphthylene | <.066 | 0.1 | <.066 | 0.076 | <.066 | <.0033 |
| Anthracene | <.066 | <.066 | <.066 | <.066 | <.066 | <.0033 |
| Benz(a)anthracene | <.066 | 0.21 | 0.077 | 0.08 | 0.088 | 0.012 |
| Benzo(a)pyrene | <.066 | <.066 | <.066 | <.066 | <.066 | <.0033 |
| Benzo(b)fluoranthene | <.066 | 0.16 | <.066 | <.066 | 0.078 | <.0033 |
| Benzo(g,h,I)perylene | <.066 | 0.13 | <.066 | <.066 | <.066 | 0.0092 |
| Benzo(k)fluoranthene | <.066 | <.066 | <.066 | <.066 | <.066 | <.0033 |
| Chrysene | <.066 | 0.4 | 0.16 | 0.2 | 0.21 | 0.0071 |
| Dibenzo(g,h)anthracene | <.066 | <.066 | <.066 | <.066 | <.066 | <.0033 |
| Fluoranthene | <.066 | <.066 | <.066 | <.066 | 0.076 | <.0033 |
| Fluorene | <.066 | 3.4 | 0.82 | 2.1 | 2.3 | 0.027 |
| Indeno(1,2,3-cd)pyrene | <.066 | 0.088 | <.066 | <.066 | <.066 | <.0033 |
| Naphthalene | <.066 | 1 | 0.33 | 0.68 | 0.7 | 0.0038 |
| Phenanthrene | <.066 | 1.4 | 0.4 | 0.81 | 0.88 | 0.018 |
| Pyrene | <.066 | 0.46 | 0.17 | 0.21 | 0.25 | 0.0063 |
| **TPH** (mg/kg) | | | | | | |
| Diesel Range Organics | 2500 | 3300 | 4100 | 3000 | 3200 | 5.4 |
| Gasoline Range Organics | 23 | 280 | 250 | 240 | 370 | 17 |
| Total TPH [1] | **2523** | **3580** | **4350** | **3240** | **3570** | 22.4 |
| **BTEX** (mg/kg) | | | | | | |
| Benzene [2] | <.005 | <.05 | <.025 | <.025 | <.05 | <.001 |
| Ethylbenzene | <.005 | 1.8 | 1 | 0.87 | 0.47 | <.001 |
| Toluene | 0.047 | 1.9 | 1.1 | 0.99 | 1.2 | 0.23 |
| Xylenes, Total | 0.324 | 3.8 | 3.8 | 4 | 4 | 0.061 |
| Total BTEX [3] | 0.371 | 7.5 | 5.9 | 5.86 | 5.67 | 0.291 |

**Notes:**

1) New Mexico Oil Conservation Division's Recommended Remediation Levels for soils impacted with petroleum hydrocarbons is 100 mg/Kg for Total TPH, based on site specific ranking criteria.
2) New Mexico Oil Conservation Division's Recommended Remediation Levels for soils impacted with petroleum hydrocarbons is 10 mg/Kg for benzene, based on site specific ranking criteria.
3) New Mexico Oil Conservation Division's Recommended Remediation Levels for soils impacted with petroleum hydrocarbons is 50 mg/Kg for Total BTEX, based on site specific ranking criteria.

PAH = polynuclear aromatic hydrocarbons

TPH = total petroleum hydrocarbons

BTEX = benzene, toluene, ethyl benzene, xylenes

mg/kg=milligrams per kilogram

# TABLE 2-2
## SOIL ANALYTICAL RESULTS, SPLP
## BYRD PUMP SITE - HOBBS, NEW MEXICO
***(samples collected 11/11/99)***

| CONSTITUENT | MW-1 (9-10') | MW-1 (14-15') | New Mexico WQCC Groundwater Standards (HHS)[1] |
|---|---|---|---|
| **PAH (mg/L)** | | | |
| 1-Methylnaphthalene | 0.017 | 0.016 | -- |
| 2-Methylnaphthalene | 0.014 | 0.012 | -- |
| Acenaphtene | <.002 | <.002 | -- |
| Acenaphthylene | 0.00071 | 0.00055 | -- |
| Anthracene | <.0001 | <.0001 | -- |
| Benz(a)anthracene | <.0001 | <.0001 | -- |
| Benzo(a)pyrene | <.0001 | <.0001 | .0007 |
| Benzo(b)fluoranthene | <.0001 | <.0001 | -- |
| Benzo(g,h,I)perylene | <.0001 | <.0001 | -- |
| Benzo(k)fluoranthene | <.0001 | <.0001 | -- |
| Chrysene | <.0001 | <.0001 | -- |
| Dibenzo(g,h)anthracene | <.0001 | <.0001 | -- |
| Fluoranthene | <.0001 | <.0001 | -- |
| Fluorene | 0.0043 | 0.004 | -- |
| Indeno(1,2,3-cd)pyrene | <.0001 | <.0001 | -- |
| Naphthalene | 0.01 | 0.0086 | -- |
| Phenanthrene | <.002 | <.002 | -- |
| Pyrene | <.0001 | <.0001 | -- |
| Total, Naphthalene and Monomethylnaphthalenes[2] | **0.041** | **0.0366** | .030 |

**Notes:**

1) New Mexico Water Quality Control Commision Groundwater Standards for Human Health
2) The standard established by the New Mexico Water Quality Control Commision for Naphthalene includes total monomethylnaphthalenes.

SPLP = synthetic precipation leaching procedure
PAH = polynuclear aromatic hydrocarbons
mg/L = milligrams per liter

# TABLE 2-3
## GROUNDWATER ANALYTICAL RESULTS
## BYRD PUMP SITE - HOBBS, NEW MEXICO
***(samples collected 11/17/99)***

| CONSTITUENT | MW-1 | New Mexico WQCC Groundwater Standards (HHS)[1] |
|---|---|---|
| **PAH** (mg/L) | | |
| 1-Methylnaphthalene | 0.029 | -- |
| 2-Methylnaphthalene | 0.014 | -- |
| Acenaphtene | <.002 | -- |
| Acenaphthylene | <.002 | -- |
| Anthracene | <.002 | -- |
| Benz(a)anthracene | <.002 | -- |
| Benzo(a)pyrene | <.002 | .0007 |
| Benzo(b)fluoranthene | <.002 | -- |
| Benzo(g,h,I)perylene | <.002 | -- |
| Benzo(k)fluoranthene | <.002 | -- |
| Chrysene | <.002 | -- |
| Dibenzo(g,h)anthracene | <.002 | -- |
| Fluoranthene | <.002 | -- |
| Fluorene | 0.0081 | -- |
| Indeno(1,2,3-cd)pyrene | <.002 | -- |
| Naphthalene | 0.01 | -- |
| Phenanthrene | 0.0026 | -- |
| Pyrene | <.002 | -- |
| Total, Naphthalene and Monomethylnaphthalenes[2] | **0.053** | .030 |

**Notes:**

1) New Mexico Water Quality Control Commision Groundwater Standards for Human Health
2) The standard set by the New Mexico Water Quality Control Commision for Naphthalene includes total monomethylnaphthalenes.

PAH = polynuclear aromatic hydrocarbons

mg/L= milligrams per liter

**TABLE 2-4**
**GROUNDWATER ANALYTICAL RESULTS**
**BYRD PUMP SITE - HOBBS, NEW MEXICO**

| CONSTITUENT | MW-1 | New Mexico WQCC Groundwater Standards (HHS)[1] | New Mexico WQCC Groundwater Standards (DWSS)[2] |
|---|---|---|---|
| **TPH** (mg/L) | | | |
| Diesel Range Organics | 22 | -- | -- |
| Gasoline Range Organics | 3.9 | -- | -- |
| **BTEX** (mg/L) | | | |
| Benzene | **0.13** | 0.01 | -- |
| Ethylbenzene | 0.11 | 0.75 | -- |
| Toluene | 0.11 | 0.75 | -- |
| Xylenes, Total | 0.3552 | 0.62 | -- |
| **Cation, Anion Water Quality Parameters** (mg/L) | | | |
| Chloride | **300** | -- | 250 |
| Fluoride | **2.9** | 1.6 | -- |
| Nitrogen, Nitrate | <1 | 10 | -- |
| Sulfate | 1.1 | -- | -- |
| **Total Dissolved Solids** (mg/L) | | | |
| Total Dissolved Solids | 840 | -- | 1000 |

**Notes:**

1) New Mexico Water Quality Control Commision Groundwater Standards for Human Health
2) New Mexico Water Quality Control Commision Groundwater Standards for Domestic Water Supply

TPH = total petroleum hydrocarbons

BTEX = benzene, toluene, ethyl benzene, xylenes

mg/L=milligrams per liter

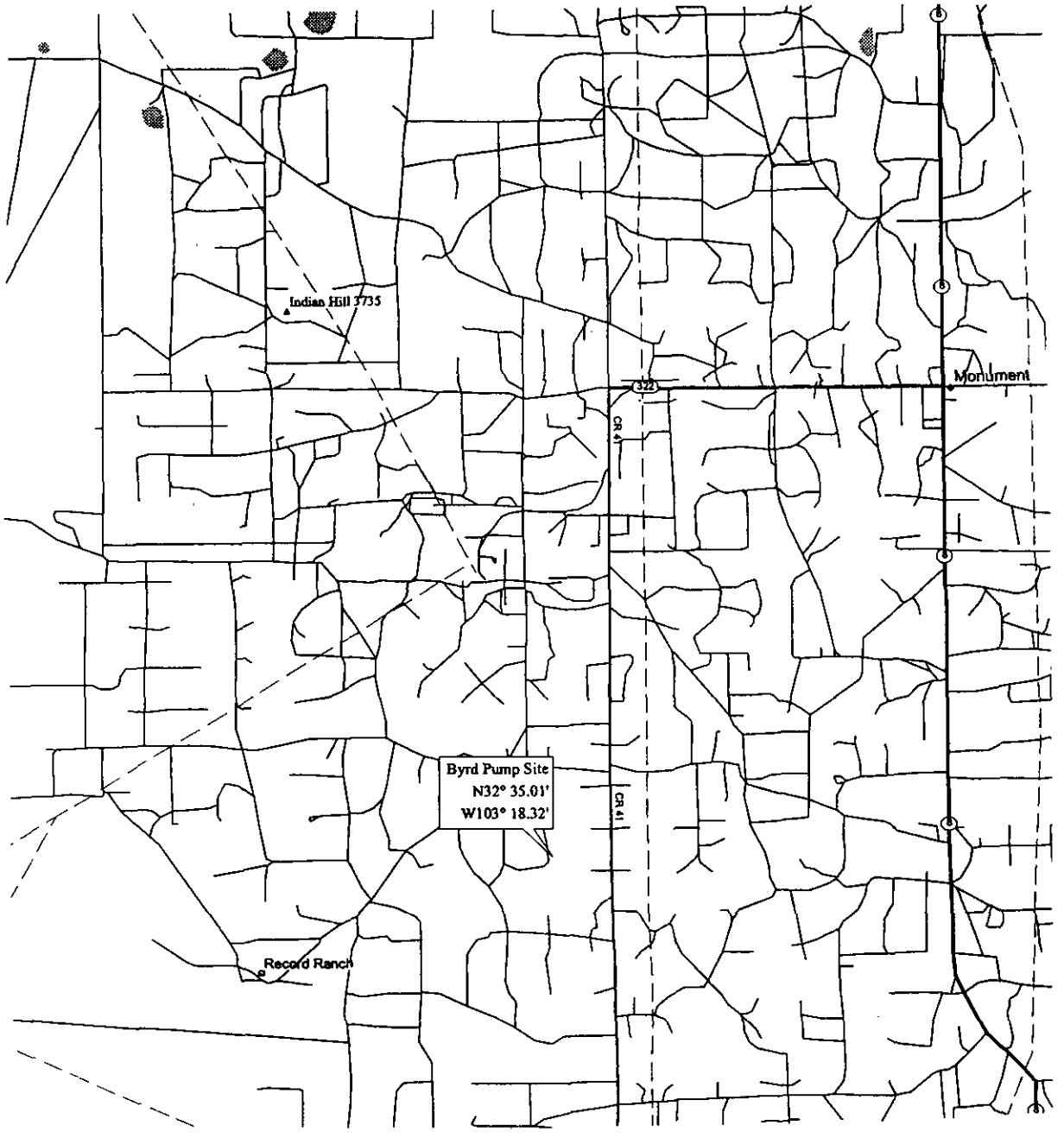
# TABLE 2-5
## GROUNDWATER ANALYTICAL RESULTS
## BYRD PUMP SITE - HOBBS, NEW MEXICO

| CONSTITUENT | MW-1 | New Mexico WQCC Groundwater Standards (HHS)[1] | New Mexico WQCC Groundwater Standards (DWSS)[2] | New Mexico WQCC Groundwater Standards (IU)[3] |
|---|---|---|---|---|
| **Metals** (mg/L) | | | | |
| Arsenic | 0.00674 | 0.10 | -- | -- |
| Lead | <0.005 | 0.05 | -- | -- |
| Selenium | <0.005 | 0.05 | -- | -- |
| Aluminum | 1.92 | -- | -- | 5.0 |
| Barium | 0.88 | 1.0 | -- | -- |
| Boron | **0.882** | -- | -- | 0.75 |
| Cadmium | <0.005 | 0.01 | -- | -- |
| Calcium | 354 | -- | -- | -- |
| Chromium | <1 | 0.05 | -- | -- |
| Cobalt | <0.01 | -- | -- | 0.05 |
| Copper | <0.01 | -- | 1.0 | -- |
| Iron | **2.94** | -- | 1.0 | -- |
| Magnesium | 110 | -- | -- | -- |
| Manganese | 0.0908 | -- | 0.20 | -- |
| Molybdenum | <0.02 | -- | -- | 1.0 |
| Nickel | <0.02 | -- | -- | 0.20 |
| Potassium | 3.22 | -- | -- | -- |
| Silver | <0.01 | 0.05 | -- | -- |
| Sodium | 454 | -- | -- | -- |
| Zinc | <0.02 | -- | 10.0 | -- |

**Notes:**

1) New Mexico Water Quality Control Commision Groundwater Standards for Human Health
2) New Mexico Water Quality Control Commision Groundwater Standards for Domestic Water Supply
3) New Mexico Water Quality Control Commision Groundwater Standards for Irrigation Use

mg/L=milligrams per liter




Mag 13.00
Mon Jun 28 17:19 1999
Scale 1:62,500 (at center)

1 Miles

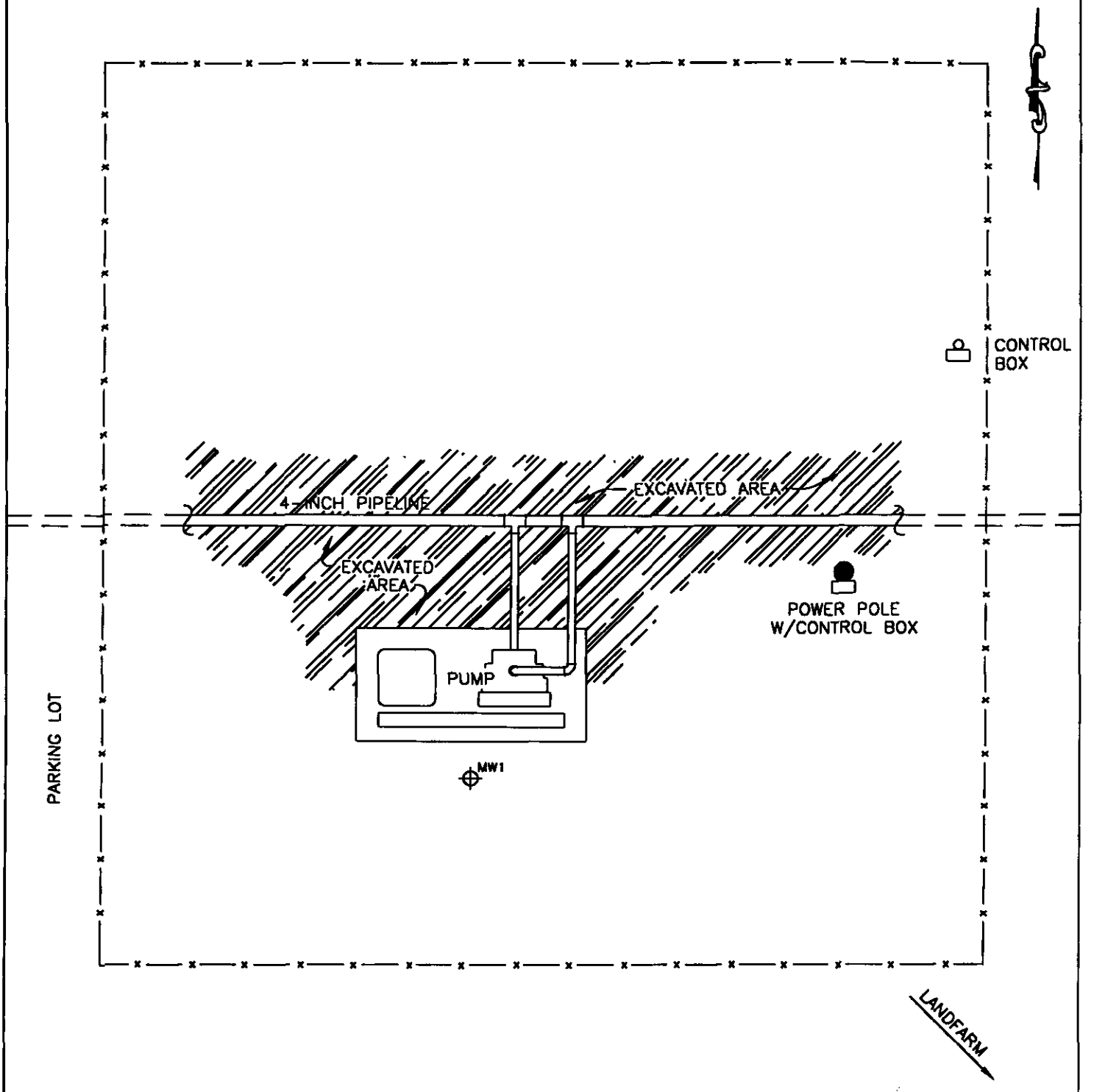
2 KM

Secondary SR/Road/Hwy Ramp
Major Connector
State Route
US Highway
Utility/Pipe
Water
Intermittent River

N

| | | | |
|---|---|---|---|
| ARCO PIPE LINE, CO<br>BYRD PUMP<br>3 MILES WEST OF MONUMENT, NEW MEXICO | URS Greiner Woodward Clyde<br>Austin, Texas | SITE LOCATION MAP | PROJECT NO. 9389000162.00<br>FIG. NO. 1-1 |
| | SCALE: NOTED<br>DRAWN BY: MSM DATE: 6/28/99<br>CHECKED BY: MSM DATE: 6/28/99 | | |

I:\ARCO\BYRD\BYRDPUMP\CADD\BORDER.DWG



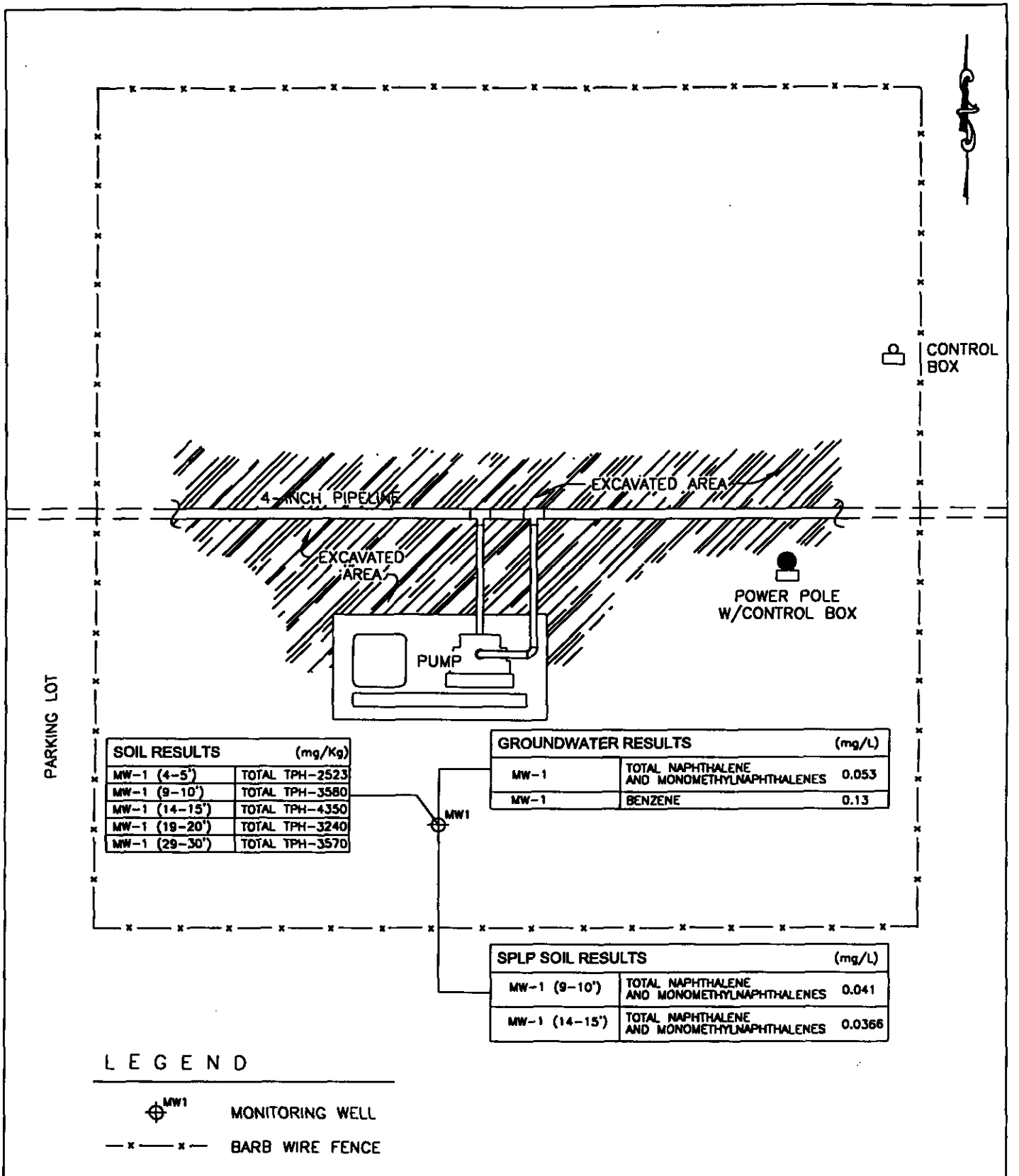

LEGEND

MW1 MONITORING WELL

BARB WIRE FENCE

NOT TO SCALE

| | | | |
|---|---|---|---|
| ARCO PIPELINE BYRD PUMP RELEASE SITE | URS Greiner Woodward Clyde<br>7600 West Tidwell Road, Suite 600<br>Houston, Texas 77040<br>United States of America | SITE PLAN | FILE NO. 9399000162 |
| SCALE: AS NOTED | DRAWN BY: SAF / CHKD. BY: | DATE: 01/03/2000 / DATE: | FIGURE NO. 2-1 |




| SOIL RESULTS | (mg/Kg) |
|---|---|
| MW-1 (4-5') | TOTAL TPH-2523 |
| MW-1 (9-10') | TOTAL TPH-3580 |
| MW-1 (14-15') | TOTAL TPH-4350 |
| MW-1 (19-20') | TOTAL TPH-3240 |
| MW-1 (29-30') | TOTAL TPH-3570 |

| GROUNDWATER RESULTS | | (mg/L) |
|---|---|---|
| MW-1 | TOTAL NAPHTHALENE AND MONOMETHYLNAPHTHALENES | 0.053 |
| MW-1 | BENZENE | 0.13 |

| SPLP SOIL RESULTS | | (mg/L) |
|---|---|---|
| MW-1 (9-10') | TOTAL NAPHTHALENE AND MONOMETHYLNAPHTHALENES | 0.041 |
| MW-1 (14-15') | TOTAL NAPHTHALENE AND MONOMETHYLNAPHTHALENES | 0.0366 |

LEGEND

MW1 MONITORING WELL

BARB WIRE FENCE

NOT TO SCALE

ARCO PIPELINE
BYRD PUMP
RELEASE SITE

**URS Greiner Woodward Clyde**

7600 West Tidwell Road, Suite 600
Houston, Texas 77040
United States of America

| SCALE: | DRAWN BY: SAF/BH | DATE: 01/03/2000 |
|---|---|---|
| AS NOTED | CHKD. BY: | DATE: |

SOIL CONCENTRATIONS, SPLP SOIL CONCENTRATIONS, GROUNDWATER CONCENTRATIONS EXCEEDING NMWQCC/ NMOCD STANDARDS

FILE NO. 9399000162

FIGURE NO. 2-2

# Appendix A
## Laboratory Analytical Reports for Excavated Soil

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS, INC.
ATTN: J.L. HAM
401 W. BROADWAY
DENVER CITY, TX 79323
FAX TO:

Receiving Date: 04/09/99
Reporting Date: 04/12/99
Project Number: NOT GIVEN
Project Name: ARCO PIPELINE
Project Location: BYRD PUMP

Sampling Date: 04/09/99
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

| LAB NO. | SAMPLE ID | TPH (mg/kg) | BENZENE (mg/kg) | TOLUENE (mg/kg) | ETHYL BENZENE (mg/kg) | TOTAL XYLENES (mg/kg) |
|---|---|---|---|---|---|---|
| ANALYSIS DATE: | | 04/09/99 | 04/09/99 | 04/09/99 | 04/09/99 | 04/09/99 |
| H4098-1 | BYRD PUMP | 15200 | <0.002 | <0.002 | <0.002 | <0.006 |
| Quality Control | | 254 | 0.087 | 0.099 | 0.092 | 0.280 |
| True Value QC | | 240 | 0.100 | 0.100 | 0.100 | 0.300 |
| % Recovery | | 106 | 87.4 | 98.8 | 92.4 | 93.4 |
| Relative Percent Difference | | 1.9 | 2.6 | 3.1 | 2.6 | 1.8 |

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW-846 8260

Chemist

4/12/99
Date

H4098.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS, INC.
ATTN: J.L. HAM
401 W. BROADWAY
DENVER CITY, TX 79323
FAX TO:

Receiving Date: 04/09/99
Reporting Date: 04/15/99
Project Number: NOT GIVEN
Project Name: ARCO PIPELINE
Project Location: BYRD PUMP

Sampling Date: 04/09/99
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH/GP

## TCLP METALS

| LAB NO. | SAMPLE ID | As ppm | Ag ppm | Ba ppm | Cd ppm | Cr ppm | Pb ppm | Hg ppm | Se ppm |
|---|---|---|---|---|---|---|---|---|---|
| ANALYSIS DATE: | | 04/13/99 | 04/14/99 | 04/14/99 | 04/14/99 | 04/14/99 | 04/14/99 | 04/15/99 | 04/13/99 |
| EPA LIMITS: | | 5 | 5 | 100 | 1 | 5 | 5 | 0.2 | 1 |
| H4098-1 | BYRD PUMP | <1 | <1 | <5 | <0.1 | <1 | <1 | <0.02 | <0.1 |
| Quality Control | | 0.201 | 1.020 | 19.69 | 0.506 | 3.964 | 2.999 | 0.0095 | 0.051 |
| True Value QC | | 0.200 | 1.000 | 20.00 | 0.500 | 4.000 | 3.000 | 0.0100 | 0.050 |
| % Recovery | | 101 | 102 | 98 | 101 | 99 | 100 | 95 | 102 |
| Relative Standard Deviation | | 2.77 | 0.83 | 0.28 | 1.27 | 1.11 | 1.38 | 2.4 | 3.6 |
| METHODS: EPA 1311, 600/4-91/ | | 206.2 | 272.1 | 208.1 | 213.1 | 218.1 | 239.1 | 245.1 | 270.2 |

Gayle A. Potter, Chemist

04/15/99
Date

H4098M.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS, INC.
ATTN: J.L. HAM
401 W. BROADWAY
DENVER CITY, TX 79323
FAX TO:

Receiving Date: 04/09/99
Reporting Date: 04/13/99
Project Number: NOT GIVEN
Project Name: ARCO PIPELINE
Project Location: BYRD PUMP
Lab Number: H4098-1
Sample ID: BYRD PUMP

Analysis Date: 04/12/99
Sampling Date: 04/09/99
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

| TCLP SEMIVOLATILES (ppm) | EPA LIMIT | Sample Result H4098-1 | Method Blank | QC | % Recov. | True Value QC |
|---|---|---|---|---|---|---|
| Pyridine | 5.00 | <0.020 | <0.005 | 0.016 | 32 | 0.050 |
| 1,4-Dichlorobenzene | 7.50 | <0.020 | <0.005 | 0.034 | 68 | 0.050 |
| o-Cresol | 200 | <0.020 | <0.005 | 0.034 | 68 | 0.050 |
| m, p-Cresol | 200 | <0.020 | <0.005 | 0.034 | 68 | 0.050 |
| Hexachloroethane | 3.00 | <0.020 | <0.005 | 0.033 | 66 | 0.050 |
| Nitrobenzene | 2.00 | <0.020 | <0.005 | 0.034 | 68 | 0.050 |
| Hexachloro-1,3-butadiene | 0.500 | <0.020 | <0.005 | 0.039 | 78 | 0.050 |
| 2,4,6-Trichlorophenol | 2.00 | <0.020 | <0.005 | 0.041 | 82 | 0.050 |
| 2,4,5-Trichlorophenol | 400 | <0.020 | <0.005 | 0.042 | 84 | 0.050 |
| 2,4-Dinitrotoluene | 0.130 | <0.020 | <0.005 | 0.042 | 84 | 0.050 |
| Hexachlorobenzene | 0.130 | <0.020 | <0.005 | 0.044 | 88 | 0.050 |
| Pentachlorophenol | 100 | <0.020 | <0.005 | 0.041 | 82 | 0.050 |

| | % RECOVERY |
|---|---|
| Fluorophenol | 75 |
| Phenol-d5 | 62 |
| Nitrobenzene-d5 | 100 |
| 2-Fluorobiphenyl | 110 |
| 2,4,6-Tribromophenol | 115 |
| Terphenyl-d14 | 104 |

METHODS: EPA SW 846-8270, 1311, 3510

Burgess J. A. Cooke, Ph. D.

4/13/99
Date

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS, INC.
ATTN: J.L. HAM
401 W. BROADWAY
DENVER CITY, TX 79323
FAX TO:

Receiving Date: 04/09/99
Reporting Date: 04/13/99
Project Number: NOT GIVEN
Project Name: ARCO PIPELINE
Project Location: BYRD PUMP
Lab Number: H4098-1
Sample ID: BYRD PUMP

Analysis Date: 04/12/99
Sampling Date: 04/09/99
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

| TCLP VOLATILES (ppm) | EPA LIMIT | Sample Result H4098-1 | Method Blank | QC | %Recov. | True Value QC |
|---|---|---|---|---|---|---|
| Vinyl Chloride | 0.20 | <0.005 | <0.005 | 0.102 | 102 | 0.100 |
| 1,1-Dichloroethylene | 0.7 | <0.005 | <0.005 | 0.104 | 104 | 0.100 |
| Methyl Ethyl Ketone | 200 | <0.050 | <0.050 | 0.116 | 116 | 0.100 |
| Chloroform | 6.0 | <0.005 | <0.005 | 0.106 | 106 | 0.100 |
| 1,2-Dichloroethane | 0.5 | <0.005 | <0.005 | 0.099 | 99 | 0.100 |
| Benzene | 0.5 | <0.005 | <0.005 | 0.111 | 111 | 0.100 |
| Carbon Tetrachloride | 0.5 | <0.005 | <0.005 | 0.094 | 94 | 0.100 |
| Trichloroethylene | 0.5 | <0.005 | <0.005 | 0.097 | 97 | 0.100 |
| Tetrachloroethylene | 0.7 | <0.005 | <0.005 | 0.090 | 90 | 0.100 |
| Chlorobenzene | 100 | <0.005 | <0.005 | 0.099 | 99 | 0.100 |
| 1,4-Dichlorobenzene | 7.5 | <0.005 | <0.005 | 0.093 | 93 | 0.100 |

| | % RECOVERY |
|---|---|
| Dibromofluoromethane | 90 |
| Toluene-d8 | 120 |
| Bromofluorobenzene | 88 |

METHODS: EPA SW 846-8260, 1311

Burgess J. A. Cooke, Ph. D.

4/13/99
Date

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS, INC.
ATTN: J.L. HAM
401 W. BROADWAY
DENVER CITY, TX 79323
FAX TO:

Receiving Date: 04/09/99
Reporting Date: 04/13/99
Project Number: NOT GIVEN
Project Name: ARCO PIPELINE
Project Location: BYRD PUMP

Sampling Date: 04/09/99
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC/AH

| LAB NUMBER | SAMPLE ID | REACTIVITY Sulfide (ppm) | Cyanide (ppm) | CORROSIVITY (pH) | IGNITABILITY (°F) |
|---|---|---|---|---|---|
| ANALYSIS DATE: | | 04/13/99 | 04/13/99 | 04/09/99 | 04/09/99 |
| H4098-1 | BYRD PUMP | Not reactive | Not reactive | 7.45 | Nonflammable |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Quality Control | | NR | NR | 7.02 | NR |
| True Value QC | | NR | NR | 7.00 | NR |
| % Recovery | | NR | NR | 100 | NR |
| Relative Percent Difference | | NR | NR | 0.3 | NR |

METHOD: EPA SW 846-7.3, 7.2, 1030 (proposed), 1311, *40 CFR 261*

Chemist

4/13/99
Date

H4098.XLS

# Appendix B
## EDR Well Search Report

# The EDR-GeoCheck® Report

Arco Pipeline Byrd Pump Site
Byrd Pump
Hobbs, NM 88240

Inquiry Number: 444309.1s

December 15, 1999


## *The* Source For Environmental Risk Management Data

3530 Post Road
Southport, Connecticut 06490

**Nationwide Customer Service**

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

# TABLE OF CONTENTS



***Thank you for your business.***
Please contact EDR at 1-800-352-0050
with any questions or comments.

# THE EDR GEOCHECK™ REPORT

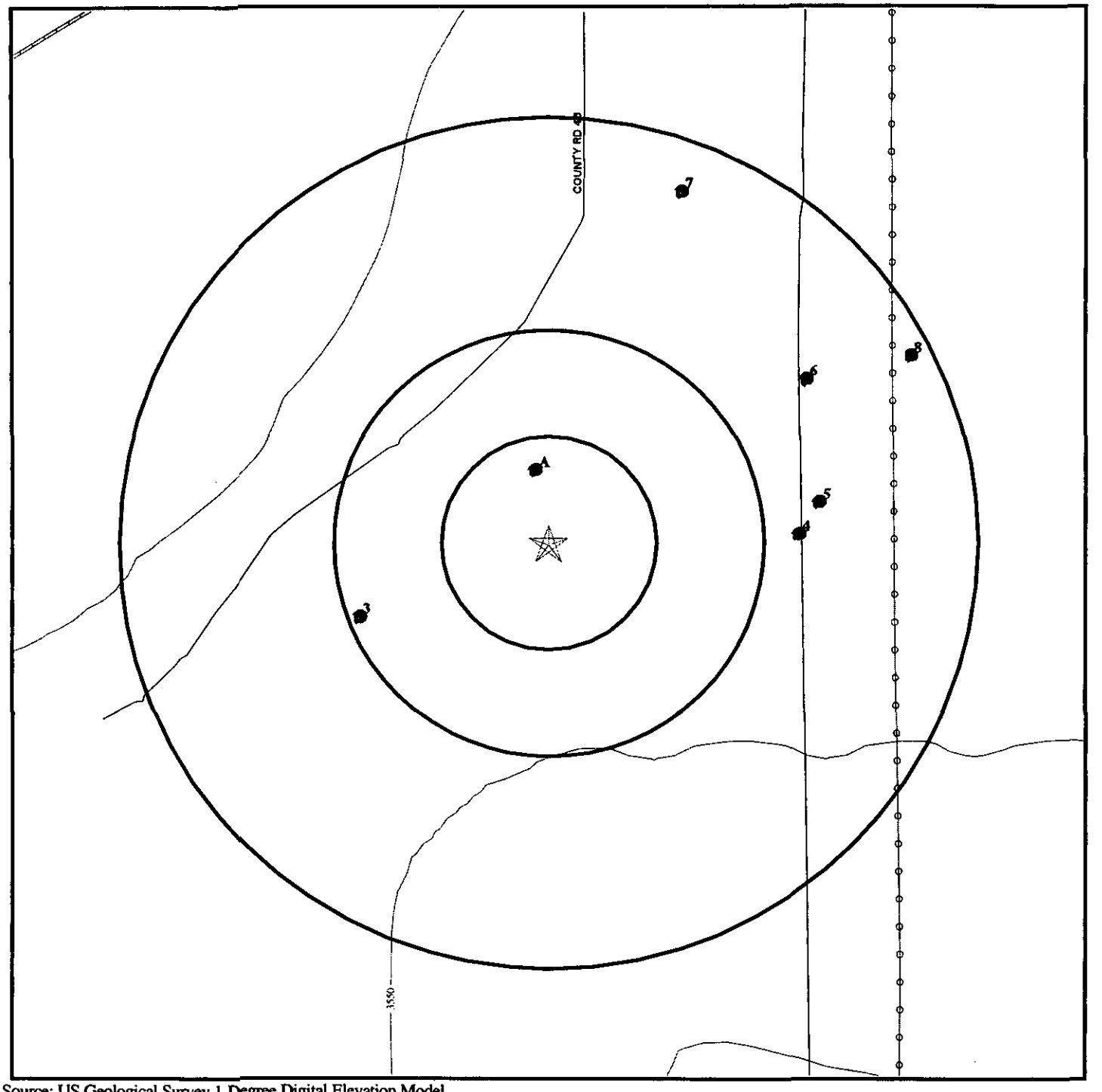
The EDR GeoCheck™ Report is a screening tool designed to assist in the hydrogeological assessment of a particular geographic area based upon publicly available information.

The EDR GeoCheck™ Report consists of the following information within a customer specified radius of the target property.

- topography (25 foot intervals unless otherwise shown)
- major roads
- surface water bodies
- railroad tracks
- flood plains (available in selected counties)
- wetlands (available in selected counties)
- wells including depth to water table and water level variability (in federal and selected state databases)
- public water supply wells (including violations information)
- geologic data
- radon data.

The EDR GeoCheck™ Report is a general area study. It may or may not be accurate at any specific location.

# TOPOGRAPHIC MAP –444309.1s –'URS Greiner/Woodward Clyde'




Source: US Geological Survey 1-Degree Digital Elevation Model
Compiled 09/15/92

0 1/4 1/2 1

scale in miles

–Major Roads
–Contour lines (25 foot interval unless otherwise shown)
–Waterways
–Wells within search distance to Target Property
–Earthquake Epicenters (Richter 5 or greater)
–Power lines
–Pipe lines
–Fault lines
–Water

N

| | | | |
|---|---|---|---|
| TARGET PROPERTY: | Arco Pipeline Byrd Pump Site | CUSTOMER: | URS Greiner/Woodward Clyde |
| ADDRESS: | Byrd Pump | CONTACT: | Dennis Hayes |
| CITY/STATE/ZIP: | Hobbs NM 88240 | INQUIRY #: | 444309.1s |
| LAT/LONG: | 32.5836 / 103.3089 | DATE: | December 15, 1999 |

# WELL SEARCH SUMMARY

## GEOLOGIC AGE IDENTIFICATION†

| | |
|---|---|
| Geologic Code: | Qp |
| Era: | Cenozoic |
| System: | Quaternary |
| Series: | Pleistocene |

## ROCK STRATIGRAPHIC UNIT†

| | |
|---|---|
| Category: | Stratifed Sequence |

## SEARCH DISTANCE RADIUS INFORMATION

| DATABASE | SEARCH DISTANCE (miles) |
|---|---|
| Federal Database | 1.000 |
| State Database | 1.000 |
| PWS Database | 1.000 |

## FEDERAL DATABASE WELL INFORMATION

| MAP ID | WELL ID | LOCATION FROM TP |
|---|---|---|
| A1 | 323510103183401 | 1/8 - 1/4 Mile North |
| A2 | 323510103183402 | 1/8 - 1/4 Mile North |
| 3 | 323452103185901 | 1/4 - 1/2 Mile WSW |
| 4 | 323502103175601 | 1/2 - 1 Mile East |
| 5 | 323506103175301 | 1/2 - 1 Mile East |
| 6 | 323521103175501 | 1/2 - 1 Mile ENE |
| 7 | 323544103181301 | 1/2 - 1 Mile NNE |
| 8 | 323524103174001 | 1/2 - 1 Mile ENE |

## STATE DATABASE WELL INFORMATION

| MAP ID | WELL ID | LOCATION FROM TP |
|---|---|---|
| NO WELLS FOUND | | |

## PUBLIC WATER SUPPLY SYSTEM INFORMATION

NO WELLS FOUND

## AREA RADON INFORMATION

Zip Code: 88240

Number of sites tested: 29

| Area | Average Activity | % <4 pCi/L | % 4-20 pCi/L | % >20 pCi/L |
|---|---|---|---|---|
| Living Area - 1st Floor | 1.655 pCi/L | 93% | 7% | 0% |
| Living Area - 2nd Floor | Not Reported | Not Reported | Not Reported | Not Reported |
| Basement | 1.400 pCi/L | 100% | 0% | 0% |

† Source: P.G. Schruben, R.E. Arndt and W J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

# WELL SEARCH FINDINGS

Map ID
Direction
Distance

**A1**
**North**
**1/8 - 1/4 Mile**

| | | | |
|---|---|---|---|
| Site ID: | 323510103183401 | Info. Source: | USGS |
| Site Type: | Single well, other than collector or Ranney type | | |
| Year Constructed: | Not Reported | County: | Lea |
| Altitude: | 3559.00 ft. | State: | New Mexico |
| Well Depth: | Not Reported | Topographic Setting: | Not Reported |
| Depth to Water Table: | Not Reported | Prim. Use of Site: | Not Reported |
| Date Measured: | Not Reported | Prim. Use of Water: | Not Reported |

**LITHOLOGIC DATA**

Not Reported

**WATER LEVEL VARIABILITY**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Water Level: | 29.45 ft. | Water Level: | 28.18 ft. | Water Level: | 29.76 ft. | Water Level: | 29.65 ft. |
| Date Measured: | 03/25/54 | Date Measured: | 03/01/61 | Date Measured: | 03/03/66 | Date Measured: | 04/11/68 |

---

**A2**
**North**
**1/8 - 1/4 Mile**

| | | | |
|---|---|---|---|
| Site ID: | 323510103183402 | Info. Source: | USGS |
| Site Type: | Single well, other than collector or Ranney type | | |
| Year Constructed: | Not Reported | County: | Lea |
| Altitude: | 3559.00 ft. | State: | New Mexico |
| Well Depth: | Not Reported | Topographic Setting: | Not Reported |
| Depth to Water Table: | Not Reported | Prim. Use of Site: | Not Reported |
| Date Measured: | Not Reported | Prim. Use of Water: | Not Reported |

**LITHOLOGIC DATA**

Not Reported

**WATER LEVEL VARIABILITY**

| | |
|---|---|
| Water Level: | 28.25 ft. |
| Date Measured: | 01/21/71 |

---

**3**
**WSW**
**1/4 - 1/2 Mile**

| | | | |
|---|---|---|---|
| Site ID: | 323452103185901 | Info. Source: | USGS |
| Site Type: | Single well, other than collector or Ranney type | | |
| Year Constructed: | Not Reported | County: | Lea |
| Altitude: | 3566.00 ft. | State: | New Mexico |
| Well Depth: | Not Reported | Topographic Setting: | Not Reported |
| Depth to Water Table: | Not Reported | Prim. Use of Site: | Not Reported |
| Date Measured: | Not Reported | Prim. Use of Water: | Not Reported |

**LITHOLOGIC DATA**

Not Reported

**WATER LEVEL VARIABILITY**

| | | | | | |
|---|---|---|---|---|---|
| Water Level: | 33.51 ft. | Water Level: | 33.13 ft. | Water Level: | 31.74 ft. |
| Date Measured: | 04/11/68 | Date Measured: | 01/27/71 | Date Measured: | 02/13/76 |

# WELL SEARCH FINDINGS

Map ID
Direction
Distance

**4**
**East**
**1/2 - 1 Mile**

| | | | |
|---|---|---|---|
| Site ID: | 323502103175601 | Info. Source: | USGS |
| Site Type: | Single well, other than collector or Ranney type | | |
| Year Constructed: | Not Reported | County: | Lea |
| Altitude: | 3552.00 ft. | State: | New Mexico |
| Well Depth: | Not Reported | Topographic Setting: | Not Reported |
| Depth to Water Table: | Not Reported | Prim. Use of Site: | Not Reported |
| Date Measured: | Not Reported | Prim. Use of Water: | Not Reported |

**LITHOLOGIC DATA**

Not Reported

**WATER LEVEL VARIABILITY**

Water Level: 25.65 ft.
Date Measured: 03/01/61

---

**5**
**East**
**1/2 - 1 Mile**

| | | | |
|---|---|---|---|
| Site ID: | 323506103175301 | Info. Source: | USGS |
| Site Type: | Single well, other than collector or Ranney type | | |
| Year Constructed: | Not Reported | County: | Lea |
| Altitude: | 3553.00 ft. | State: | New Mexico |
| Well Depth: | Not Reported | Topographic Setting: | Not Reported |
| Depth to Water Table: | Not Reported | Prim. Use of Site: | Not Reported |
| Date Measured: | Not Reported | Prim. Use of Water: | Not Reported |

**LITHOLOGIC DATA**

Not Reported

**WATER LEVEL VARIABILITY**

Water Level: 27.14 ft.
Date Measured: 03/29/54

---

**6**
**ENE**
**1/2 - 1 Mile**

| | | | |
|---|---|---|---|
| Site ID: | 323521103175501 | Info. Source: | USGS |
| Site Type: | Single well, other than collector or Ranney type | | |
| Year Constructed: | Not Reported | County: | Lea |
| Altitude: | 3557.00 ft. | State: | New Mexico |
| Well Depth: | Not Reported | Topographic Setting: | Not Reported |
| Depth to Water Table: | Not Reported | Prim. Use of Site: | Not Reported |
| Date Measured: | Not Reported | Prim. Use of Water: | Not Reported |

**LITHOLOGIC DATA**

Not Reported

**WATER LEVEL VARIABILITY**

Water Level: 28.96 ft. Water Level: 27.72 ft.
Date Measured: 03/30/54 Date Measured: 09/08/67

# WELL SEARCH FINDINGS

Map ID
Direction
Distance

**7**
**NNE**
**1/2 - 1 Mile**

| | | | |
|---|---|---|---|
| Site ID: | 323544103181301 | Info. Source: | USGS |
| Site Type: | Single well, other than collector or Ranney type | | |
| Year Constructed: | Not Reported | County: | Lea |
| Altitude: | 3566.00 ft. | State: | New Mexico |
| Well Depth: | Not Reported | Topographic Setting: | Not Reported |
| Depth to Water Table: | Not Reported | Prim. Use of Site: | Not Reported |
| Date Measured: | Not Reported | Prim. Use of Water: | Not Reported |

**LITHOLOGIC DATA**

Not Reported

**WATER LEVEL VARIABILITY**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Water Level: | 33.32 ft. | Water Level: | 26.76 ft. | Water Level: | 27.02 ft. | Water Level: | 26.28 ft. |
| Date Measured: | 03/30/54 | Date Measured: | 03/01/61 | Date Measured: | 03/03/66 | Date Measured: | 04/11/68 |

---

**8**
**ENE**
**1/2 - 1 Mile**

| | | | |
|---|---|---|---|
| Site ID: | 323524103174001 | Info. Source: | USGS |
| Site Type: | Single well, other than collector or Ranney type | | |
| Year Constructed: | Not Reported | County: | Lea |
| Altitude: | 3558.00 ft. | State: | New Mexico |
| Well Depth: | Not Reported | Topographic Setting: | Not Reported |
| Depth to Water Table: | Not Reported | Prim. Use of Site: | Not Reported |
| Date Measured: | Not Reported | Prim. Use of Water: | Not Reported |

**LITHOLOGIC DATA**

Not Reported

**WATER LEVEL VARIABILITY**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Water Level: | 28.71 ft. | Water Level: | 29.09 ft. | Water Level: | 28.23 ft. | Water Level: | 27.37 ft. |
| Date Measured: | 03/01/61 | Date Measured: | 03/03/66 | Date Measured: | 04/10/68 | Date Measured: | 01/14/71 |
| Water Level: | 24.01 ft. | | | | | | |
| Date Measured: | 02/04/76 | | | | | | |

# NEW MEXICO GOVERNMENT WELL RECORDS SEARCHED

**PWS:** Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-260-2805
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

**PWS ENF:** Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-260-2805
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SWDIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

**Area Radon Information:** The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

**EPA Radon Zones:** Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

**USGS Water Wells:** In November 1971 the United States Geological Survey (USGS) implemented a national water resource information tracking system. This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on more than 900,000 wells, springs, and other sources of groundwater.

**Water Dams:** National Inventory of Dams
Source: Federal Emergency Management Agency
Telephone: 202-646-2801
National computer database of more than 74,000 dams maintained by the Federal Emergency Management Agency.

# Appendix C
## Soil Boring/Monitoring Well Construction Log

**Project:** APL BYRD PUMP SITE
**Project Location:** Hobbs, New Mexico
**Project Number:** 93-99000162.00-00001

# Log of Monitoring Well MW1

Sheet 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | 11/9/99 11/11/1999 | Logged By | D. Hayes | Checked By | R.T.Murthy |
| Drilling Method | HSA | Drilling Contractor | GMI | Total Depth of Borehole | 40.0 feet |
| Drill Rig Type | CME | Drill Bit Size/Type | 12.25" OD to 10'/8.25" OD to 40' | Surface Elevation | |
| Groundwater Level and Date | 33.60 (oil)/33.605 (water) on 11/15/99 | Sampler Type | 5 ft. CME Sampler | Top of PVC Elevation | - |
| Diameter of Hole (inches) | 12.25/8.25 | Diameter of Well (inches) 4 | Type of Well Casing | 4 in. Schedule 40 PVC | Screen Perforation | 0.010 inch machine slotted |
| Type of Sand Pack | 20/40 Silica Sand | Type and Depth of Seal(s) | Hydrated Bentonite Pellets, from 14' to 17' | | |
| Comments | | | | | |

| Elevation, feet / Depth, feet | SAMPLES: Type | Number | Percent Recovery | Graphic Log | MATERIAL DESCRIPTION | Well Completion Log | OVA Reading, ppm | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 90 | | SILTY SAND, moderate brown, loose, slightly moist, fine to medium grained, moderate to poorly graded, subangular to subrounded, heavy brown oil staining, strong petroleum odor. | | 4<br>52<br>60<br>71 | - |
| 5 | | | 95 | | CLAYEY SAND, moderate yellow brown, loose, slightly moist, fine to medium grained, moderate to poorly graded, subangular to subrounded, lighter staining.<br>change in color to pale yellow brown<br>SANDY CLAY, gray stains, gray, firm to hard, slightly moist, low plasticity. | | 21<br>503<br>631<br>571<br>435 | MW1-4-5 Soil Jar Sample |
| 10 | | | 50 | | SILTY SAND, moderate yellow brown, loose, moist, fine grained, moderate to poorly graded, subangular.<br>GRAVELLY SAND, moderate yellow brown, loose, moist, coarse to fine, subangular chert pebbles, maximum size of 0.5 inch, strong odor. | | 326<br>252<br>241<br>301<br>321 | MW1-9-10 Soil Jar Sample |
| 15 | | | 60 | | | | 301<br>704<br>569<br>507 | MW1-14-15 Soil Jar Sample |
| 20 | | | 70 | | SILTY SAND, moderate yellow brown, loose, moist, fine grained, moderate to poorly graded, subangular. | | 554<br>834<br>318<br>710 | MW1-19-20 Soil Jar Sample |
| 25 | | | 80 | | CALICHE | | 953<br>510<br>503<br>505 | |
| 30 | | | 80 | | SILTY SAND, moderate yellow brown, loosem moist, fine grained, moderate to poorly graded, subangular<br>change in color to light brown | | 212<br>238<br>138<br>596<br>472<br>187 | MW1-29-30 Soil Jar Sample |
| 35 | | | 80 | | | | 563<br>749<br>820<br>321<br>336 | |
| 40 | | | | | GRAVELLY SAND, light brown, loose, saturated, fine to medium grained, well graded, subangular.<br>Boring terminated at a depth of 40 feet below existing ground.<br>Groundwater encountered after completion of well. | | 196<br>54<br>35 | MW1-39-40 Soil Jar Sample |
| 45 | | | | | | | | |

Report: ENV_23DW; File: BYRD-MON.GPJ, 1/10/00

# Appendix D
## Laboratory Analytical Reports for Subsurface Soil and Groundwater

## Laboratory Analytical Reports
## Subsurface Soils – Soil Boring

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

## Case Narrative for:

# URS Greiner Woodward Clyde

## Certificate of Analysis Number:

## 99110356

| Report To: | | Project Name: | ARCO/ HOBBS, NM |
|---|---|---|---|
| URS Greiner Woodward Clyde | | Site: | HOBBS, NM |
| Rick Nelson | | Site Address: | |
| 6200 La Calma | | | |
| Suite 210 | | PO Number: | |
| Austin | | State: | |
| Texas | | State Cert. No.: | |
| 78752- | | Date Reported: | 12/28/1999 |
| ph (512) 458-1174 | fax: (512) 458-9823 | | |

According to the latest promulgated version of Method 8310 for PAH's, confirmation of target compounds can be performed using either a second analytical column with different retention times for the analytes of interest or by use of the Diode Array Detector (DAD). SPL confirms all PAH compounds detected at concentrations exceeding the Practical Quantitation Limit (PQL) by examining the DAD spectra for these compounds. The spectra are compared to the reference spectra from the instrument that is used for these compounds, and a probability match is generated for the peak requiring confirmation. The effectiveness of this method of confirmation is dependent on the relative concentrations of non-target compounds that are co-extracted from the sample.

Your sample ID " MW 1-4-5 " (SPL ID: 99110356-01) was randomly selected for the use in SPL's quality control program for the Polynuclear Aromatic Hydrocarbons analysis by SW846 method 8310. The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) recoveries were outside of the advisable quality control limits for various spiked compounds (Batch ID: 1659), due to matrix interference. A Laboratory Control Sample (LCS) was analyzed as a quality control check for the analytical batch and all recoveries were within acceptable limits.

Please note the results reported in the Quality Assurance section for your sample ID "MW 1-4-5" are below the elevated Practical Quantitaion Limits reported on the analytical pages, but are present for calculation purposes only. Such values should not be interpreted as valid analyte concentrations, and thus are reported as non-detected in the analytical section of the report. Their purpose is to allow for validation of spiked analyte recovery values.

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

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

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



Lynch, Pat
Project Manager

12/29/1999
Date

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

# URS Greiner Woodward Clyde

## Certificate of Analysis Number:

## 99110356

**Report To:** URS Greiner Woodward Clyde
Rick Nelson
6200 La Calma
Suite 210
Austin
Texas
78752-
ph: (512) 458-1174 fax: (512) 458-9823

*Fax To:* *URS Greiner Woodward Clyde*
*Rick Nelson* *fax: (512) 458-9823*

**Project Name:** ARCO/ HOBBS, NM
**Site:** HOBBS, NM
**Site Address:**
**PO Number:**
**State:**
**State Cert. No.:**
**Date Reported:**

| Client Sample ID | Lab Sample ID | Matrix | Date Collected | Date Received | COC ID | HOLD |
|---|---|---|---|---|---|---|
| MW1-4-5 | 99110356-01 | Soil | 11/9/99 10:30:00 AM | 11/13/99 10:00:00 AM | 086306 | ☐ |
| MW1-4-5 | 99110356-01 | Soil | 11/9/99 10:30:00 AM | 11/13/99 10:00:00 AM | 086306 | ☑ |
| MW1-9-10 | 99110356-02 | Soil | 11/9/99 11:00:00 AM | 11/13/99 10:00:00 AM | 086306 | ☐ |
| MW1-14-15 | 99110356-03 | Soil | 11/11/99 10:30:00 AM | 11/13/99 10:00:00 AM | 086306 | ☐ |
| MW1-19-20 | 99110356-04 | Soil | 11/11/99 10:40:00 AM | 11/13/99 10:00:00 AM | 086306 | ☑ |
| MW1-19-20 | 99110356-04 | Soil | 11/11/99 10:40:00 AM | 11/13/99 10:00:00 AM | 086306 | ☐ |
| MW1-29-30 | 99110356-05 | Soil | 11/11/99 11:15:00 AM | 11/13/99 10:00:00 AM | 086306 | ☑ |
| MW1-29-30 | 99110356-05 | Soil | 11/11/99 11:15:00 AM | 11/13/99 10:00:00 AM | 086306 | ☐ |
| MW1-39-40 | 99110356-06 | Soil | 11/11/99 11:30:00 AM | 11/13/99 10:00:00 AM | 086306 | ☑ |
| MW1-39-40 | 99110356-06 | Soil | 11/11/99 11:30:00 AM | 11/13/99 10:00:00 AM | 086306 | ☐ |
| Trip Blank 11/8/99 | 99110356-07 | Trip Blank | 11/11/99 | 11/13/99 10:00:00 AM | 086306 | ☐ |

Lynch, Pat
Project Manager

12/28/99
Date

Joel Grice
Laboratory Director

Ted Yen
Quality Assurance Officer

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

**Client Sample ID** MW1-4-5 **Collected:** 11/9/99 10:30:00 **SPL Sample ID:** 99110356-01

**Site:** HOBBS, NM

| Analyses/Method | Result | | Rep.Limit | | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|---|
| **DIESEL RANGE ORGANICS** | | | | **MCL** | **SW8015B** | | **Units: mg/Kg** | | |
| Diesel Range Organics | 2500 | | 120 | | 25 | | 11/22/99 23:49 | RR | 113050 |
| Surr: Pentacosane | D | % | 20-154 | | 25 | * | 11/22/99 23:49 | RR | 113050 |

**Run ID/Seq #: HP_V_991121C-113050**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/16/1999 9:05 | EE |

| GASOLINE RANGE ORGANICS | | | | MCL | SW8015B | | Units: mg/Kg | | |
|---|---|---|---|---|---|---|---|---|---|
| Gasoline Range Organics | 23 | | 0.5 | | 5 | | 11/19/99 8:05 | FB | 112847 |
| Surr: 1,4-Difluorobenzene | 98 | % | 72-153 | | 5 | | 11/19/99 8:05 | FB | 112847 |
| Surr: 4-Bromofluorobenzene | 480 | % | 51-149 | | 5 | * | 11/19/99 8:05 | FB | 112847 |

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | | MCL | SW8310 | | Units: ug/Kg | | |
|---|---|---|---|---|---|---|---|---|---|
| 1-Methylnaphthalene | ND | | 130 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| 2-Methylnaphthalene | ND | | 130 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Acenaphthene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Acenaphthylene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Anthracene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Benz(a)anthracene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Benzo(a)pyrene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Benzo(b)fluoranthene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Benzo(g,h,i)perylene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Benzo(k)fluoranthene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Chrysene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Dibenzo(a,h)anthracene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Fluoranthene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Fluorene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Indeno(1,2,3-cd)pyrene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Naphthalene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Phenanthrene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Pyrene | ND | | 66 | | 20 | | 11/21/99 21:21 | KA | 111943 |
| Surr: 1-Fluoronaphthalene | D | % | 34-167 | | 20 | * | 11/21/99 21:21 | KA | 111943 |
| Surr: Phenanthrene-d10 | 18 | % | 37-167 | | 20 | * | 11/21/99 21:21 | KA | 111943 |

**Run ID/Seq #: 2_991122A-111943**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/13/1999 18:42 | DB |

**Qualifiers:**

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

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8880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
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**Client Sample ID** MW1-4-5 **Collected:** 11/9/99 10:30:00 **SPL Sample ID:** 99110356-01

**Site:** HOBBS, NM

| Analyses/Method | Result | | Rep.Limit | MCL | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|---|
| **PURGEABLE AROMATICS** | | | | | SW8021B | | Units: ug/Kg | | |
| Benzene | ND | | 5 | | 5 | | 11/19/99 8:52 | FB | 112091 |
| Ethylbenzene | ND | | 5 | | 5 | | 11/19/99 8:52 | FB | 112091 |
| Toluene | 47 | | 5 | | 5 | | 11/19/99 8:52 | FB | 112091 |
| Xylenes,Total | 324 | | 5 | | 5 | | 11/19/99 8:52 | FB | 112091 |
| Surr: 1,4-Difluorobenzene | 110 | % | 59-127 | | 5 | | 11/19/99 8:52 | FB | 112091 |
| Surr: 4-Bromofluorobenzene | 140 | % | 48-156 | | 5 | | 11/19/99 8:52 | FB | 112091 |

**Qualifiers:**

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

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**Client Sample ID** MW1-9-10 **Collected:** 11/9/99 11:00:00 **SPL Sample ID:** 99110356-02

**Site:** HOBBS, NM

| Analyses/Method | Result | | Rep.Limit | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|
| **DIESEL RANGE ORGANICS** | | | **MCL** | **SW8015B** | | **Units: mg/Kg** | | |
| Diesel Range Organics | 3300 | | 250 | 50 | | 11/23/99 0:27 | RR | 113051 |
| Surr: Pentacosane | 6600 | % | 20-154 | 50 | * | 11/23/99 0:27 | RR | 113051 |

**Run ID/Seq #: HP_V_991121C-113051**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/16/1999 9:05 | EE |

| GASOLINE RANGE ORGANICS | | | | MCL | SW8015B | | Units: mg/Kg | | |
|---|---|---|---|---|---|---|---|---|---|
| Gasoline Range Organics | 280 | | 5 | | 50 | | 11/19/99 9:04 | FB | 112848 |
| Surr: 1,4-Difluorobenzene | 73 | % | 72-153 | | 50 | | 11/19/99 9:04 | FB | 112848 |
| Surr: 4-Bromofluorobenzene | 540 | % | 51-149 | | 50 | * | 11/19/99 9:04 | FB | 112848 |
| **POLYNUCLEAR AROMATIC HYDROCARBONS** | | | | **MCL** | **SW8310** | | **Units: ug/Kg** | | |
| 1-Methylnaphthalene | 5900 | | 1300 | | 200 | | 11/23/99 1:46 | KA | 113108 |
| 2-Methylnaphthalene | 4900 | | 1300 | | 200 | | 11/23/99 1:46 | KA | 113108 |
| Acenaphthene | 410 | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Acenaphthylene | 100 | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Anthracene | ND | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Benz(a)anthracene | 210 | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Benzo(a)pyrene | ND | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Benzo(b)fluoranthene | 160 | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Benzo(g,h,i)perylene | 130 | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Benzo(k)fluoranthene | ND | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Chrysene | 400 | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Dibenzo(a,h)anthracene | ND | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Fluoranthene | ND | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Fluorene | 3400 | | 660 | | 200 | | 11/23/99 1:46 | KA | 113108 |
| Indeno(1,2,3-cd)pyrene | 88 | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Naphthalene | 1000 | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Phenanthrene | 1400 | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Pyrene | 460 | | 66 | | 20 | | 11/22/99 1:20 | KA | 111949 |
| Surr: 1-Fluoronaphthalene | 200 | % | 34-167 | | 20 | * | 11/22/99 1:20 | KA | 111949 |
| Surr: 1-Fluoronaphthalene | D | % | 34-167 | | 200 | * | 11/23/99 1:46 | KA | 113108 |
| Surr: Phenanthrene-d10 | 2400 | % | 37-167 | | 200 | * | 11/23/99 1:46 | KA | 113108 |
| Surr: Phenanthrene-d10 | 2200 | % | 37-167 | | 20 | * | 11/22/99 1:20 | KA | 111949 |

**Run ID/Seq #: 2_991122A-111949**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/13/1999 18:42 | DB |

**Run ID/Seq #: 2_991122A-113108**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/13/1999 18:42 | DB |

**Qualifiers:**

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

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**Client Sample ID** MW1-9-10 **Collected:** 11/9/99 11:00:00 **SPL Sample ID:** 99110356-02

**Site:** HOBBS, NM

| Analyses/Method | Result | | Rep.Limit | | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|---|
| **POLYNUCLEAR AROMATIC HYDROCARBONS, SPLP** | | | | **MCL** | **SW8310** | | **Units: ug/L** | | |
| 1-Methylnaphthalene | 17 | | 4 | | 20 | | 12/02/99 13:57 | KA | 120796 |
| 2-Methylnaphthalene | 14 | | 4 | | 20 | | 12/02/99 13:57 | KA | 120796 |
| Acenaphthene | ND | | 2 | | 20 | | 12/02/99 13:57 | KA | 120796 |
| Acenaphthylene | 0.71 | | 0.1 | | 1 | | 12/02/99 7:21 | KA | 120781 |
| Anthracene | ND | | 0.1 | | 1 | | 12/02/99 7:21 | KA | 120781 |
| Benz(a)anthracene | ND | | 0.1 | | 1 | | 12/02/99 7:21 | KA | 120781 |
| Benzo(a)pyrene | ND | | 0.1 | | 1 | | 12/02/99 7:21 | KA | 120781 |
| Benzo(b)fluoranthene | ND | | 0.1 | | 1 | | 12/02/99 7:21 | KA | 120781 |
| Benzo(g,h,i)perylene | ND | | 0.1 | | 1 | | 12/02/99 7:21 | KA | 120781 |
| Benzo(k)fluoranthene | ND | | 0.1 | | 1 | | 12/02/99 7:21 | KA | 120781 |
| Chrysene | ND | | 0.1 | | 1 | | 12/02/99 7:21 | KA | 120781 |
| Dibenzo(a,h)anthracene | ND | | 0.1 | | 1 | | 12/02/99 7:21 | KA | 120781 |
| Fluoranthene | ND | | 0.1 | | 1 | | 12/02/99 7:21 | KA | 120781 |
| Fluorene | 4.3 | | 2 | | 20 | | 12/02/99 13:57 | KA | 120796 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.1 | | 1 | | 12/02/99 7:21 | KA | 120781 |
| Naphthalene | 10 | | 2 | | 20 | | 12/02/99 13:57 | KA | 120796 |
| Phenanthrene | ND | | 2 | | 20 | | 12/02/99 13:57 | KA | 120796 |
| Pyrene | ND | | 0.1 | | 1 | | 12/02/99 7:21 | KA | 120781 |
| Surr: 1-Fluoronaphthalene | 150 | % | 30-140 | | 1 | * | 12/02/99 7:21 | KA | 120781 |
| Surr: 1-Fluoronaphthalene | 130 | % | 30-140 | | 20 | | 12/02/99 13:57 | KA | 120796 |
| Surr: Phenanthrene-d10 | 230 | % | 35-140 | | 20 | * | 12/02/99 13:57 | KA | 120796 |
| Surr: Phenanthrene-d10 | 110 | % | 35-140 | | 1 | | 12/02/99 7:21 | KA | 120781 |

**Run ID/Seq #: 2_991202A-120781**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3510B | 11/23/1999 16:02 | KL |

**Run ID/Seq #: 2_991202A-120796**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3510B | 11/23/1999 16:02 | KL |

| PURGEABLE AROMATICS | | | | MCL | SW8021B | | Units: ug/Kg | | |
|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | | 50 | | 50 | | 11/19/99 9:48 | FB | 112093 |
| Ethylbenzene | 1800 | | 50 | | 50 | | 11/19/99 9:48 | FB | 112093 |
| Toluene | 1900 | | 50 | | 50 | | 11/19/99 9:48 | FB | 112093 |
| Xylenes,Total | 3800 | | 50 | | 50 | | 11/19/99 9:48 | FB | 112093 |
| Surr: 1,4-Difluorobenzene | 80 | % | 59-127 | | 50 | | 11/19/99 9:48 | FB | 112093 |
| Surr: 4-Bromofluorobenzene | 170 | % | 48-156 | | 50 | * | 11/19/99 9:48 | FB | 112093 |

**Qualifiers:**

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

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**Client Sample ID** MW1-14-15 **Collected:** 11/11/99 10:30:0 **SPL Sample ID:** 99110356-03

**Site:** HOBBS, NM

| Analyses/Method | Result | | Rep.Limit | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|
| **DIESEL RANGE ORGANICS** | | | MCL | SW8015B | | Units: mg/Kg | | |
| Diesel Range Organics | 4100 | | 500 | 100 | | 11/23/99 1:05 | RR | 113052 |
| Surr: Pentacosane | 5400 | % | 20-154 | 100 | * | 11/23/99 1:05 | RR | 113052 |

**Run ID/Seq #: HP_V_991121C-113052**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/16/1999 9:05 | EE |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **GASOLINE RANGE ORGANICS** | | | MCL | SW8015B | | Units: mg/Kg | | |
| Gasoline Range Organics | 250 | | 5 | 50 | | 11/19/99 10:01 | FB | 112849 |
| Surr: 1,4-Difluorobenzene | 75 | % | 72-153 | 50 | | 11/19/99 10:01 | FB | 112849 |
| Surr: 4-Bromofluorobenzene | 580 | % | 51-149 | 50 | * | 11/19/99 10:01 | FB | 112849 |
| **POLYNUCLEAR AROMATIC HYDROCARBONS** | | | MCL | SW8310 | | Units: ug/Kg | | |
| 1-Methylnaphthalene | 2000 | | 1300 | 200 | | 11/23/99 2:25 | KA | 113109 |
| 2-Methylnaphthalene | 1700 | | 1300 | 200 | | 11/23/99 2:25 | KA | 113109 |
| Acenaphthene | 120 | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Acenaphthylene | ND | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Anthracene | ND | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Benz(a)anthracene | 77 | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Benzo(a)pyrene | ND | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Benzo(b)fluoranthene | ND | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Benzo(g,h,i)perylene | ND | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Benzo(k)fluoranthene | ND | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Chrysene | 160 | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Dibenzo(a,h)anthracene | ND | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Fluoranthene | ND | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Fluorene | 820 | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Indeno(1,2,3-cd)pyrene | ND | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Naphthalene | 330 | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Phenanthrene | 400 | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Pyrene | 170 | | 66 | 20 | | 11/22/99 10:35 | KA | 111951 |
| Surr: 1-Fluoronaphthalene | D | % | 34-167 | 20 | * | 11/22/99 10:35 | KA | 111951 |
| Surr: 1-Fluoronaphthalene | D | % | 34-167 | 200 | * | 11/23/99 2:25 | KA | 113109 |
| Surr: Phenanthrene-d10 | 800 | % | 37-167 | 200 | * | 11/23/99 2:25 | KA | 113109 |
| Surr: Phenanthrene-d10 | 650 | % | 37-167 | 20 | * | 11/22/99 10:35 | KA | 111951 |

**Run ID/Seq #: 2_991122A-111951**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/13/1999 18:42 | DB |

**Run ID/Seq #: 2_991122A-113109**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/13/1999 18:42 | DB |

**Qualifiers:**

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

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HOUSTON, TEXAS 77054
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**Client Sample ID** MW1-14-15 **Collected:** 11/11/99 10:30:0 **SPL Sample ID:** 99110356-03

**Site:** HOBBS, NM

| Analyses/Method | Result | | Rep.Limit | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|
| **POLYNUCLEAR AROMATIC HYDROCARBONS, SPLP** | | | **MCL** | **SW8310** | | **Units: ug/L** | | |
| 1-Methylnaphthalene | 16 | | 4 | 20 | | 12/02/99 14:37 | KA | 120797 |
| 2-Methylnaphthalene | 12 | | 4 | 20 | | 12/02/99 14:37 | KA | 120797 |
| Acenaphthene | ND | | 2 | 20 | | 12/02/99 14:37 | KA | 120797 |
| Acenaphthylene | 0.55 | | 0.1 | 1 | | 12/02/99 8:01 | KA | 120786 |
| Anthracene | ND | | 0.1 | 1 | | 12/02/99 8:01 | KA | 120786 |
| Benz(a)anthracene | ND | | 0.1 | 1 | | 12/02/99 8:01 | KA | 120786 |
| Benzo(a)pyrene | ND | | 0.1 | 1 | | 12/02/99 8:01 | KA | 120786 |
| Benzo(b)fluoranthene | ND | | 0.1 | 1 | | 12/02/99 8:01 | KA | 120786 |
| Benzo(g,h,i)perylene | ND | | 0.1 | 1 | | 12/02/99 8:01 | KA | 120786 |
| Benzo(k)fluoranthene | ND | | 0.1 | 1 | | 12/02/99 8:01 | KA | 120786 |
| Chrysene | ND | | 0.1 | 1 | | 12/02/99 8:01 | KA | 120786 |
| Dibenzo(a,h)anthracene | ND | | 0.1 | 1 | | 12/02/99 8:01 | KA | 120786 |
| Fluoranthene | ND | | 0.1 | 1 | | 12/02/99 8:01 | KA | 120786 |
| Fluorene | 4 | | 2 | 20 | | 12/02/99 14:37 | KA | 120797 |
| Indeno(1,2,3-cd)pyrene | ND | | 0.1 | 1 | | 12/02/99 8:01 | KA | 120786 |
| Naphthalene | 8.6 | | 2 | 20 | | 12/02/99 14:37 | KA | 120797 |
| Phenanthrene | ND | | 2 | 20 | | 12/02/99 14:37 | KA | 120797 |
| Pyrene | ND | | 0.1 | 1 | | 12/02/99 8:01 | KA | 120786 |
| Surr: 1-Fluoronaphthalene | 100 | % | 30-140 | 1 | | 12/02/99 8:01 | KA | 120786 |
| Surr: 1-Fluoronaphthalene | 120 | % | 30-140 | 20 | | 12/02/99 14:37 | KA | 120797 |
| Surr: Phenanthrene-d10 | 250 | % | 35-140 | 20 | * | 12/02/99 14:37 | KA | 120797 |
| Surr: Phenanthrene-d10 | 110 | % | 35-140 | 1 | | 12/02/99 8:01 | KA | 120786 |

**Run ID/Seq #: 2_991202A-120786**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3510B | 11/23/1999 16:02 | KL |

**Run ID/Seq #: 2_991202A-120797**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3510B | 11/23/1999 16:02 | KL |

| PURGEABLE AROMATICS | | | MCL | SW8021B | Units: ug/Kg | | |
|---|---|---|---|---|---|---|---|
| Benzene | ND | 25 | | 25 | 11/19/99 11:55 | FB | 110703 |
| Ethylbenzene | 1000 | 25 | | 25 | 11/19/99 11:55 | FB | 110703 |
| Toluene | 1100 | 25 | | 25 | 11/19/99 11:55 | FB | 110703 |
| Xylenes,Total | 3800 | 25 | | 25 | 11/19/99 11:55 | FB | 110703 |
| Surr: 1,4-Difluorobenzene | 74 % | 59-127 | | 25 | 11/19/99 11:55 | FB | 110703 |
| Surr: 4-Bromofluorobenzene | 230 % | 48-156 | | 25 * | 11/19/99 11:55 | FB | 110703 |

**Qualifiers:**

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

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**Client Sample ID** MW1-19-20 **Collected:** 11/11/99 10:40:0 **SPL Sample ID:** 99110356-04

**Site:** HOBBS, NM

| Analyses/Method | Result | | Rep.Limit | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|
| **DIESEL RANGE ORGANICS** | | | **MCL** | **SW8015B** | | **Units: mg/Kg** | | |
| Diesel Range Organics | 3000 | | 500 | 100 | | 11/23/99 1:43 | RR | 113053 |
| Surr: Pentacosane | 2400 | % | 20-154 | 100 | * | 11/23/99 1:43 | RR | 113053 |

**Run ID/Seq #: HP_V_991121C-113053**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/16/1999 9:05 | EE |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **GASOLINE RANGE ORGANICS** | | | **MCL** | **SW8015B** | | **Units: mg/Kg** | | |
| Gasoline Range Organics | 240 | | 5 | 50 | | 11/19/99 22:04 | FB | 112850 |
| Surr: 1,4-Difluorobenzene | 75 | % | 72-153 | 50 | | 11/19/99 22:04 | FB | 112850 |
| Surr: 4-Bromofluorobenzene | 620 | % | 51-149 | 50 | * | 11/19/99 22:04 | FB | 112850 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **POLYNUCLEAR AROMATIC HYDROCARBONS** | | | **MCL** | **SW8310** | | **Units: ug/Kg** | | |
| 1-Methylnaphthalene | 3700 | | 1300 | 200 | | 11/23/99 3:05 | KA | 113110 |
| 2-Methylnaphthalene | 3300 | | 1300 | 200 | | 11/23/99 3:05 | KA | 113110 |
| Acenaphthene | 240 | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Acenaphthylene | 76 | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Anthracene | ND | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Benz(a)anthracene | 80 | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Benzo(a)pyrene | ND | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Benzo(b)fluoranthene | ND | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Benzo(g,h,i)perylene | ND | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Benzo(k)fluoranthene | ND | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Chrysene | 200 | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Dibenzo(a,h)anthracene | ND | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Fluoranthene | ND | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Fluorene | 2100 | | 660 | 200 | | 11/23/99 3:05 | KA | 113110 |
| Indeno(1,2,3-cd)pyrene | ND | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Naphthalene | 680 | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Phenanthrene | 810 | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Pyrene | 210 | | 66 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Surr: 1-Fluoronaphthalene | 110 | % | 34-167 | 20 | | 11/22/99 11:15 | KA | 111952 |
| Surr: 1-Fluoronaphthalene | D | % | 34-167 | 200 | * | 11/23/99 3:05 | KA | 113110 |
| Surr: Phenanthrene-d10 | 1600 | % | 37-167 | 200 | * | 11/23/99 3:05 | KA | 113110 |
| Surr: Phenanthrene-d10 | 1300 | % | 37-167 | 20 | * | 11/22/99 11:15 | KA | 111952 |

**Run ID/Seq #: 2_991122A-111952**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/13/1999 18:42 | DB |

**Run ID/Seq #: 2_991122A-113110**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/13/1999 18:42 | DB |

**Qualifiers:**

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

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**Client Sample ID** MW1-19-20 **Collected:** 11/11/99 10:40:0 **SPL Sample ID:** 99110356-04

**Site:** HOBBS, NM

| Analyses/Method | Result | | Rep.Limit | | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|---|
| **PURGEABLE AROMATICS** | | | | **MCL** | **SW8021B** | | **Units: ug/Kg** | | |
| Benzene | ND | | 25 | | 25 | | 11/19/99 12:23 | FB | 110709 |
| Ethylbenzene | 870 | | 25 | | 25 | | 11/19/99 12:23 | FB | 110709 |
| Toluene | 990 | | 25 | | 25 | | 11/19/99 12:23 | FB | 110709 |
| Xylenes,Total | 4000 | | 25 | | 25 | | 11/19/99 12:23 | FB | 110709 |
| Surr: 1,4-Difluorobenzene | 83 | % | 59-127 | | 25 | | 11/19/99 12:23 | FB | 110709 |
| Surr: 4-Bromofluorobenzene | 250 | % | 48-156 | | 25 | * | 11/19/99 12:23 | FB | 110709 |

**Qualifiers:**

ND/U - Not Detected at the Reporting Limit
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J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

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**Client Sample ID** MW1-29-30 **Collected:** 11/11/99 11:15:0 **SPL Sample ID:** 99110356-05

**Site:** HOBBS, NM

| Analyses/Method | Result | | Rep.Limit | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|
| **DIESEL RANGE ORGANICS** | | | **MCL** | **SW8015B** | | **Units: mg/Kg** | | |
| Diesel Range Organics | 3200 | | 500 | 100 | | 11/23/99 2:22 | RR | 113054 |
| Surr: Pentacosane | 2600 | % | 20-154 | 100 | * | 11/23/99 2:22 | RR | 113054 |

**Run ID/Seq #: HP_V_991121C-113054**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/16/1999 9:05 | EE |

| GASOLINE RANGE ORGANICS | | | **MCL** | **SW8015B** | | **Units: mg/Kg** | | |
|---|---|---|---|---|---|---|---|---|
| Gasoline Range Organics | 370 | | 10 | 100 | | 11/22/99 17:00 | FB | 112869 |
| Surr: 1,4-Difluorobenzene | 75 | % | 72-153 | 100 | | 11/22/99 17:00 | FB | 112869 |
| Surr: 4-Bromofluorobenzene | 420 | % | 51-149 | 100 | * | 11/22/99 17:00 | FB | 112869 |

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | **MCL** | **SW8310** | | **Units: ug/Kg** | | |
|---|---|---|---|---|---|---|---|---|
| 1-Methylnaphthalene | 3700 | | 1300 | 200 | | 11/23/99 3:45 | KA | 113111 |
| 2-Methylnaphthalene | 3300 | | 1300 | 200 | | 11/23/99 3:45 | KA | 113111 |
| Acenaphthene | 290 | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Acenaphthylene | ND | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Anthracene | ND | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Benz(a)anthracene | 88 | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Benzo(a)pyrene | ND | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Benzo(b)fluoranthene | 78 | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Benzo(g,h,i)perylene | ND | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Benzo(k)fluoranthene | ND | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Chrysene | 210 | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Dibenzo(a,h)anthracene | ND | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Fluoranthene | 76 | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Fluorene | 2300 | | 660 | 200 | | 11/23/99 3:45 | KA | 113111 |
| Indeno(1,2,3-cd)pyrene | ND | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Naphthalene | 700 | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Phenanthrene | 880 | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Pyrene | 250 | | 66 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Surr: 1-Fluoronaphthalene | 120 | % | 34-167 | 20 | | 11/22/99 11:55 | KA | 111954 |
| Surr: 1-Fluoronaphthalene | D | % | 34-167 | 200 | * | 11/23/99 3:45 | KA | 113111 |
| Surr: Phenanthrene-d10 | 1400 | % | 37-167 | 200 | * | 11/23/99 3:45 | KA | 113111 |
| Surr: Phenanthrene-d10 | 1200 | % | 37-167 | 20 | * | 11/22/99 11:55 | KA | 111954 |

**Run ID/Seq #: 2_991122A-111954**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/13/1999 18:42 | DB |

**Run ID/Seq #: 2_991122A-113111**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/13/1999 18:42 | DB |

**Qualifiers:**

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

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**Client Sample ID** MW1-29-30 **Collected:** 11/11/99 11:15:0 **SPL Sample ID:** 99110356-05

**Site:** HOBBS, NM

| Analyses/Method | Result | | Rep.Limit | | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|---|
| **PURGEABLE AROMATICS** | | | | **MCL** | **SW8021B** | | **Units: ug/Kg** | | |
| Benzene | ND | | 50 | | 50 | | 11/19/99 12:51 | FB | 110711 |
| Ethylbenzene | 470 | | 50 | | 50 | | 11/19/99 12:51 | FB | 110711 |
| Toluene | 1200 | | 50 | | 50 | | 11/19/99 12:51 | FB | 110711 |
| Xylenes,Total | 4000 | | 50 | | 50 | | 11/19/99 12:51 | FB | 110711 |
| Surr: 1,4-Difluorobenzene | 79 | % | 59-127 | | 50 | | 11/19/99 12:51 | FB | 110711 |
| Surr: 4-Bromofluorobenzene | 160 | % | 48-156 | | 50 | * | 11/19/99 12:51 | FB | 110711 |

**Qualifiers:**

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

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**Client Sample ID** MW1-39-40 **Collected:** 11/11/99 11:30:0 **SPL Sample ID:** 99110356-06

**Site:** HOBBS, NM

| Analyses/Method | Result | | Rep.Limit | | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|---|
| **DIESEL RANGE ORGANICS** | | | | **MCL** | **SW8015B** | | **Units: mg/Kg** | | |
| Diesel Range Organics | 5.4 | | 5 | | 1 | | 11/23/99 3:00 | RR | 113055 |
| Surr: Pentacosane | 70 | % | 20-154 | | 1 | | 11/23/99 3:00 | RR | 113055 |

**Run ID/Seq #: HP_V_991121C-113055**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/16/1999 9:05 | EE |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **GASOLINE RANGE ORGANICS** | | | | **MCL** | **SW8015B** | | **Units: mg/Kg** | | |
| Gasoline Range Organics | 17 | | 10 | | 100 | | 11/22/99 17:02 | FB | 112870 |
| Surr: 1,4-Difluorobenzene | 83 | % | 72-153 | | 100 | | 11/22/99 17:02 | FB | 112870 |
| Surr: 4-Bromofluorobenzene | 110 | % | 51-149 | | 100 | | 11/22/99 17:02 | FB | 112870 |
| **POLYNUCLEAR AROMATIC HYDROCARBONS** | | | | **MCL** | **SW8310** | | **Units: ug/Kg** | | |
| 1-Methylnaphthalene | 37 | | 6.7 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| 2-Methylnaphthalene | 36 | | 6.7 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Acenaphthene | 4.7 | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Acenaphthylene | ND | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Anthracene | ND | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Benz(a)anthracene | 12 | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Benzo(a)pyrene | ND | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Benzo(b)fluoranthene | ND | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Benzo(g,h,i)perylene | 9.2 | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Benzo(k)fluoranthene | ND | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Chrysene | 7.1 | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Dibenzo(a,h)anthracene | ND | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Fluoranthene | ND | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Fluorene | 27 | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Indeno(1,2,3-cd)pyrene | ND | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Naphthalene | 3.8 | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Phenanthrene | 18 | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Pyrene | 6.3 | | 3.3 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Surr: 1-Fluoronaphthalene | 52 | % | 34-167 | | 1 | | 11/22/99 3:59 | KA | 111950 |
| Surr: Phenanthrene-d10 | 64 | % | 37-167 | | 1 | | 11/22/99 3:59 | KA | 111950 |

**Run ID/Seq #: 2_991122A-111950**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3550A | 11/13/1999 18:42 | DB |

**Qualifiers:**

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

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**Client Sample ID** MW1-39-40 **Collected:** 11/11/99 11:30:0 **SPL Sample ID:** 99110356-06

**Site:** HOBBS, NM

| Analyses/Method | Result | | Rep.Limit | | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|---|
| **PURGEABLE AROMATICS** | | | | **MCL** | **SW8021B** | | **Units: ug/Kg** | | |
| Benzene | ND | | 1 | | 1 | | 11/19/99 10:31 | FB | 110761 |
| Ethylbenzene | ND | | 1 | | 1 | | 11/19/99 10:31 | FB | 110761 |
| Toluene | 230 | | 1 | | 1 | | 11/19/99 10:31 | FB | 110761 |
| Xylenes,Total | 61 | | 1 | | 1 | | 11/19/99 10:31 | FB | 110761 |
| Surr: 1,4-Difluorobenzene | 110 | % | 59-127 | | 1 | | 11/19/99 10:31 | FB | 110761 |
| Surr: 4-Bromofluorobenzene | 360 | % | 48-156 | | 1 | * | 11/19/99 10:31 | FB | 110761 |

**Qualifiers:**

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

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**Client Sample ID** Trip Blank 11/8/99 **Collected:** 11/11/99 **SPL Sample ID:** 99110356-07

**Site:** HOBBS, NM

| Analyses/Method | Result | | Rep.Limit | | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|---|
| **PURGEABLE AROMATICS** | | | | **MCL** | **SW8021B** | | **Units: ug/L** | | |
| Benzene | ND | | 1 | | 1 | | 11/20/99 3:18 | CJ | 112779 |
| Ethylbenzene | ND | | 1 | | 1 | | 11/20/99 3:18 | CJ | 112779 |
| Toluene | ND | | 1 | | 1 | | 11/20/99 3:18 | CJ | 112779 |
| Xylenes, Total | ND | | 1 | | 1 | | 11/20/99 3:18 | CJ | 112779 |
| Surr: 1,4-Difluorobenzene | 120 | % | 72-137 | | 1 | | 11/20/99 3:18 | CJ | 112779 |
| Surr: 4-Bromofluorobenzene | 98 | % | 48-156 | | 1 | | 11/20/99 3:18 | CJ | 112779 |

**Qualifiers:**

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

*Quality Control Documentation*

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# Quality Control Report

## URS Greiner Woodward Clyde

**ARCO/ HOBBS, NM**

**Analysis:** Diesel Range Organics
**Method:** SW8015B
**WorkOrder:** 99110356
**Lab Batch ID:** 1670

### Method Blank

RunID: HP_V_991121C-111726 Units: mg/Kg
Analysis Date: 11/21/1999 16:42 Analyst: RR
Preparation Date: 11/16/1999 9:05 Prep By: EE Method SW3550A

| Analyte | Result | Rep Limit |
|---|---|---|
| Diesel Range Organics | ND | 10 |
| Surr: Pentacosane | 91.4 | 20-154 |

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110356-01B | MW1-4-5 |
| 99110356-02B | MW1-9-10 |
| 99110356-03B | MW1-14-15 |
| 99110356-04B | MW1-19-20 |
| 99110356-05B | MW1-29-30 |
| 99110356-06B | MW1-39-40 |

### Laboratory Control Sample (LCS)

RunID: HP_V_991121C-111727 Units: mg/Kg
Analysis Date: 11/21/1999 17:21 Analyst: RR
Preparation Date: 11/16/1999 9:05 Prep By: EE Method SW3550A

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Diesel Range Organics | 83.33 | 80 | 96 | 77 | 145 |

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

Sample Spiked: 99110349-04
RunID: HP_V_991121C-113060 Units: mg/Kg-dry
Analysis Date: 11/23/1999 6:49 Analyst: RR
Preparation Date: 11/16/1999 9:05 Prep By: EE Method SW3550A

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Diesel Range Organics | 22 | 171 | 110 | 49.2 | 171 | 120 | 57.6 | 15.7 | 50 | 21 | 175 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**ARCO/ HOBBS, NM**

**Analysis:** Purgeable Aromatics
**Method:** SW8021B

**WorkOrder:** 99110356
**Lab Batch ID:** R5090

### Method Blank

RunID: HP_O_991118B-110013 Units: ug/Kg
Analysis Date: 11/19/1999 2:04 Analyst: FB

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110356-03A | MW1-14-15 |
| 99110356-04A | MW1-19-20 |
| 99110356-05A | MW1-29-30 |
| 99110356-06A | MW1-39-40 |

| Analyte | Result | Rep Limit |
|---|---|---|
| Benzene | ND | 1.0 |
| Ethylbenzene | ND | 1.0 |
| Toluene | ND | 1.0 |
| Xylenes,Total | ND | 1.0 |
| Surr: 1,4-Difluorobenzene | 91.9 | 59-127 |
| Surr: 4-Bromofluorobenzene | 95.2 | 48-156 |

### Laboratory Control Sample (LCS)

RunID: HP_O_991118B-109980 Units: ug/Kg
Analysis Date: 11/18/1999 23:16 Analyst: FB

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Benzene | 50 | 49 | 98 | 60 | 116 |
| Ethylbenzene | 50 | 51 | 101 | 68 | 127 |
| Toluene | 50 | 50 | 100 | 64 | 122 |
| Xylenes,Total | 150 | 149 | 99 | 68 | 127 |

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

Sample Spiked: 9911480-21A
RunID: HP_O_991118B-109990 Units: ug/Kg
Analysis Date: 11/19/1999 0:12 Analyst: FB

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | 20 | 21 | 104 | 20 | 21 | 103 | 1.44 | 34 | 35 | 139 |
| Ethylbenzene | 1.8 | 20 | 21 | 97.9 | 20 | 21 | 97.9 | 0.0255 | 35 | 31 | 137 |
| Toluene | 3.8 | 20 | 23 | 95.0 | 20 | 23 | 98.4 | 3.52 | 28 | 31 | 137 |
| Xylenes,Total | 12 | 60 | 67 | 92.2 | 60 | 66 | 90.5 | 1.82 | 38 | 25 | 139 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**ARCO/ HOBBS, NM**

**Analysis:** Purgeable Aromatics
**Method:** SW8021B

**WorkOrder:** 99110356
**Lab Batch ID:** R5201

### Method Blank

RunID: HP_O_991119A-111997 Units: ug/Kg
Analysis Date: 11/19/1999 18:02 Analyst: FB

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110356-01A | MW1-4-5 |
| 99110356-02A | MW1-9-10 |

| Analyte | Result | Rep Limit |
|---|---|---|
| Benzene | ND | 1.0 |
| Ethylbenzene | ND | 1.0 |
| Toluene | ND | 1.0 |
| Xylenes,Total | ND | 1.0 |
| Surr: 1,4-Difluorobenzene | 90.6 | 59-127 |
| Surr: 4-Bromofluorobenzene | 97.6 | 48-156 |

### Laboratory Control Sample (LCS)

RunID: HP_O_991119A-111991 Units: ug/Kg
Analysis Date: 11/19/1999 15:11 Analyst: FB

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Benzene | 50 | 48 | 95 | 60 | 116 |
| Ethylbenzene | 50 | 50 | 100 | 68 | 127 |
| Toluene | 50 | 48 | 96 | 64 | 122 |
| Xylenes,Total | 150 | 144 | 96 | 68 | 127 |

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

Sample Spiked: 99110429-01
RunID: HP_O_991119A-111992 Units: ug/Kg-dry
Analysis Date: 11/19/1999 16:09 Analyst: FB

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | 23.8 | 25 | 103 | 23.8 | 25 | 105 | 1.07 | 34 | 35 | 139 |
| Ethylbenzene | ND | 23.8 | 26 | 107 | 23.8 | 24 | 103 | 4.14 | 35 | 31 | 137 |
| Toluene | ND | 23.8 | 25 | 104 | 23.8 | 24 | 100 | 3.18 | 28 | 31 | 137 |
| Xylenes,Total | ND | 71.4 | 72 | 101 | 71.4 | 71 | 99.4 | 1.40 | 38 | 25 | 139 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**ARCO/ HOBBS, NM**

**Analysis:** Purgeable Aromatics
**Method:** SW8021B
**WorkOrder:** 99110356
**Lab Batch ID:** R5226

### Method Blank

RunID: VARD_991120B-112778 Units: ug/L
Analysis Date: 11/20/1999 2:45 Analyst: CJ

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110356-07A | Trip Blank 11/8/99 |

| Analyte | Result | Rep Limit |
|---|---|---|
| Benzene | ND | 1.0 |
| Ethylbenzene | ND | 1.0 |
| Toluene | ND | 1.0 |
| Xylenes,Total | ND | 1.0 |
| Surr: 1,4-Difluorobenzene | 92.6 | 72-137 |
| Surr: 4-Bromofluorobenzene | 99.1 | 48-156 |

### Laboratory Control Sample (LCS)

RunID: VARD_991120B-112775 Units: ug/L
Analysis Date: 11/20/1999 1:06 Analyst: CJ

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Benzene | 50 | 49 | 98 | 61 | 119 |
| Ethylbenzene | 50 | 49 | 97 | 70 | 118 |
| Toluene | 50 | 48 | 97 | 65 | 125 |
| Xylenes,Total | 150 | 148 | 99 | 72 | 116 |

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

Sample Spiked: 9911516-02A
RunID: VARD_991120B-112776 Units: ug/L
Analysis Date: 11/20/1999 1:39 Analyst: CJ

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | 20 | 18 | 90.6 | 20 | 19 | 94.0 | 3.69 | 21 | 32 | 164 |
| Ethylbenzene | ND | 20 | 17 | 87.1 | 20 | 17 | 86.8 | 0.384 | 19 | 52 | 142 |
| Toluene | ND | 20 | 18 | 88.1 | 20 | 18 | 89.4 | 1.37 | 20 | 38 | 159 |
| Xylenes,Total | ND | 60 | 54 | 90.0 | 60 | 82 | 137 | 41.2* | 17 | 53 | 143 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**ARCO/ HOBBS, NM**

**Analysis:** Gasoline Range Organics
**Method:** SW8015B

**WorkOrder:** 99110356
**Lab Batch ID:** R5232

### Method Blank

RunID: HP_O_991119D-112845 Units: mg/Kg
Analysis Date: 11/19/1999 6:00 Analyst: FB

| Analyte | Result | Rep Limit |
|---|---|---|
| Gasoline Range Organics | ND | 0.10 |
| Surr: 1,4-Difluorobenzene | 80.5 | 72-153 |
| Surr: 4-Bromofluorobenzene | 92.4 | 51-149 |

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110356-01A | MW1-4-5 |
| 99110356-02A | MW1-9-10 |
| 99110356-03A | MW1-14-15 |
| 99110356-04A | MW1-19-20 |

### Laboratory Control Sample (LCS)

RunID: HP_O_991119D-112842 Units: mg/Kg
Analysis Date: 11/19/1999 3:03 Analyst: FB

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Gasoline Range Organics | 1 | 0.63 | 63 | 53 | 137 |

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

Sample Spiked: 99110429-01
RunID: HP_O_991119D-112843 Units: mg/Kg-dry
Analysis Date: 11/19/1999 5:00 Analyst: FB

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Gasoline Range Organics | ND | 1.07 | 0.94 | 88.0 | 1.07 | 0.97 | 90.3 | 2.55 | 50 | 36 | 163 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**ARCO/ HOBBS, NM**

**Analysis:** Gasoline Range Organics
**Method:** SW8015B
**WorkOrder:** 99110356
**Lab Batch ID:** R5234

### Method Blank

RunID: HP_O_991122A-114342 Units: mg/Kg
Analysis Date: 11/22/1999 10:02 Analyst: FB

**Samples In Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110356-05A | MW1-29-30 |
| 99110356-06A | MW1-39-40 |

| Analyte | Result | Rep Limit |
|---|---|---|
| Gasoline Range Organics | ND | 0.10 |
| Surr: 1,4-Difluorobenzene | 80.6 | 72-153 |
| Surr: 4-Bromofluorobenzene | 133.5 | 51-149 |

### Laboratory Control Sample (LCS)

RunID: HP_O_991122A-112868 Units: mg/Kg
Analysis Date: 11/22/1999 2:00 Analyst: FB

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Gasoline Range Organics | 1 | 0.68 | 68 | 53 | 137 |

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

Sample Spiked: 99110450-01
RunID: HP_O_991122A-114339 Units: mg/Kg
Analysis Date: 11/22/1999 9:03 Analyst: FB

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Gasoline Range Organics | ND | 0.9 | 1.2 | 130 | 0.9 | 0.94 | 104 | 21.6 | 50 | 36 | 163 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**ARCO/ HOBBS, NM**

**Analysis:** Polynuclear Aromatic Hydrocarbons
**Method:** SW8310
**WorkOrder:** 99110356
**Lab Batch ID:** 1659

### Method Blank

RunID: 2_991122A-111937 Units: ug/Kg
Analysis Date: 11/21/1999 20:02 Analyst: KA
Preparation Date: 11/18/1999 15:09 Prep By: EE Method SW3550A

| Analyte | Result | Rep Limit |
|---|---|---|
| 2-Methylnaphthalene | ND | 6.7 |
| Acenaphthene | ND | 3.3 |
| Acenaphthylene | ND | 3.3 |
| Anthracene | ND | 3.3 |
| Benz(a)anthracene | ND | 3.3 |
| Benzo(a)pyrene | ND | 3.3 |
| Benzo(b)fluoranthene | ND | 3.3 |
| Benzo(g,h,i)perylene | ND | 3.3 |
| Benzo(k)fluoranthene | ND | 3.3 |
| Chrysene | ND | 3.3 |
| Dibenzo(a,h)anthracene | ND | 3.3 |
| Fluoranthene | ND | 3.3 |
| Fluorene | ND | 3.3 |
| Indeno(1,2,3-cd)pyrene | ND | 3.3 |
| Naphthalene | ND | 3.3 |
| Phenanthrene | ND | 3.3 |
| Pyrene | ND | 3.3 |
| Surr: 1-Fluoronaphthalene | 53.9 | 34-167 |
| Surr: Phenanthrene-d10 | 49.5 | 37-167 |

**Samples In Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110356-01B | MW1-4-5 |
| 99110356-02B | MW1-9-10 |
| 99110356-03B | MW1-14-15 |
| 99110356-04B | MW1-19-20 |
| 99110356-05B | MW1-29-30 |
| 99110356-06B | MW1-39-40 |

### Laboratory Control Sample (LCS)

RunID: 2_991122A-111940 Units: ug/Kg
Analysis Date: 11/21/1999 20:42 Analyst: KA
Preparation Date: 11/18/1999 15:09 Prep By: EE Method SW3550A

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Acenaphthene | 16.7 | 11 | 66 | 0.01 | 124 |
| Acenaphthylene | 16.7 | 11 | 66 | 0.01 | 139 |
| Anthracene | 16.7 | 12 | 71 | 0.01 | 126 |
| Benz(a)anthracene | 16.7 | 12 | 73 | 12 | 135 |
| Benzo(a)pyrene | 16.7 | 11 | 67 | 0.01 | 128 |
| Benzo(b)fluoranthene | 16.7 | 12 | 73 | 6 | 150 |
| Benzo(g,h,i)perylene | 16.7 | 12 | 75 | 0.01 | 116 |
| Benzo(k)fluoranthene | 16.7 | 12 | 72 | 0.01 | 159 |
| Chrysene | 16.7 | 13 | 80 | 0.01 | 199 |
| Dibenzo(a,h)anthracene | 16.7 | 12 | 74 | 0.01 | 110 |
| Fluoranthene | 16.7 | 12 | 72 | 14 | 123 |
| Fluorene | 16.7 | 11 | 68 | 0.01 | 142 |
| Indeno(1,2,3-cd)pyrene | 16.7 | 13 | 81 | 0.01 | 116 |
| Naphthalene | 16.7 | 11 | 63 | 0.01 | 122 |
| Phenanthrene | 16.7 | 11 | 67 | 0.01 | 155 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**ARCO/ HOBBS, NM**

**Analysis:** Polynuclear Aromatic Hydrocarbons
**Method:** SW8310
**WorkOrder:** 99110356
**Lab Batch ID:** 1659

### Laboratory Control Sample (LCS)

RunID: 2_991122A-111940 Units: ug/Kg
Analysis Date: 11/21/1999 20:42 Analyst: KA
Preparation Date: 11/18/1999 15:09 Prep By: EE Method SW3550A

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Pyrene | 16.7 | 11 | 68 | 0.01 | 140 |

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

Sample Spiked: 99110356-01
RunID: 2_991122A-111946 Units: ug/Kg
Analysis Date: 11/21/1999 22:01 Analyst: KA
Preparation Date: 11/13/1999 18:42 Prep By: DB Method SW3550A

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | ND | 16.7 | 6.3 | 37.5 | 16.7 | 7.3 | 43.9 | 15.8 | 50 | 0.01 | 124 |
| Acenaphthylene | ND | 16.7 | D | 0* | 16.7 | D | 0* | 0 | 50 | 0.01 | 139 |
| Anthracene | ND | 16.7 | 13 | 77.8 | 16.7 | 14 | 82.6 | 5.91 | 50 | 0.01 | 126 |
| Benz(a)anthracene | 37 | 16.7 | 50 | 77.9 | 16.7 | 43 | 38.9 | 66.7* | 50 | 12 | 135 |
| Benzo(a)pyrene | ND | 16.7 | D | 0* | 16.7 | D | 0* | 0 | 50 | 0.01 | 128 |
| Benzo(b)fluoranthene | 26 | 16.7 | D | -157* | 16.7 | 26 | -2.37* | 194* | 50 | 6 | 150 |
| Benzo(g,h,i)perylene | 27 | 16.7 | 29 | 8.91 | 16.7 | D | -164* | 223* | 50 | 0.01 | 116 |
| Benzo(k)fluoranthene | 14 | 16.7 | 22 | 52.0 | 16.7 | 17 | 19.4 | 91.5* | 50 | 0.01 | 159 |
| Chrysene | 7.5 | 16.7 | 3.9 | -21.6* | 16.7 | 3.9 | -21.5* | 0.793 | 50 | 0.01 | 199 |
| Dibenzo(a,h)anthracene | ND | 16.7 | D | 0* | 16.7 | 27 | 160* | 200* | 50 | 0.01 | 110 |
| Fluoranthene | ND | 16.7 | 18 | 111 | 16.7 | 19 | 111 | 0.749 | 50 | 14 | 123 |
| Fluorene | ND | 16.7 | 28 | 169* | 16.7 | 25 | 152* | 10.4 | 50 | 0.01 | 142 |
| Indeno(1,2,3-cd)pyrene | 43 | 16.7 | 43 | -4.14* | 16.7 | 45 | 12.0 | 409* | 50 | 0.01 | 116 |
| Naphthalene | ND | 16.7 | D | 0* | 16.7 | 7.4 | 44.4 | 200* | 50 | 0.01 | 122 |
| Phenanthrene | ND | 16.7 | 18 | 109 | 16.7 | 20 | 119 | 8.61 | 50 | 0.01 | 155 |
| Pyrene | 14 | 16.7 | 25 | 67.4 | 16.7 | 20 | 38.1 | 55.5* | 50 | 0.01 | 140 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**ARCO/ HOBBS, NM**

**Analysis:** Polynuclear Aromatic Hydrocarbons, SPLP
**Method:** SW8310
**WorkOrder:** 99110356
**Lab Batch ID:** 1817

### Method Blank

RunID: 2_991202A-120774 Units: ug/L
Analysis Date: 12/02/1999 6:02 Analyst: KA
Preparation Date: 11/23/1999 16:02 Prep By: KL Method SW3510B

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110356-02C | MW1-9-10 |
| 99110356-03C | MW1-14-15 |

| Analyte | Result | Rep Limit |
|---|---|---|
| 1-Methylnaphthalene | ND | 0.20 |
| 2-Methylnaphthalene | ND | 0.20 |
| Acenaphthene | ND | 0.10 |
| Acenaphthylene | ND | 0.10 |
| Anthracene | ND | 0.10 |
| Benz(a)anthracene | ND | 0.10 |
| Benzo(a)pyrene | ND | 0.10 |
| Benzo(b)fluoranthene | ND | 0.10 |
| Benzo(g,h,i)perylene | ND | 0.10 |
| Benzo(k)fluoranthene | ND | 0.10 |
| Chrysene | ND | 0.10 |
| Dibenzo(a,h)anthracene | ND | 0.10 |
| Fluoranthene | ND | 0.10 |
| Fluorene | ND | 0.10 |
| Indeno(1,2,3-cd)pyrene | ND | 0.10 |
| Naphthalene | ND | 0.10 |
| Phenanthrene | ND | 0.10 |
| Pyrene | ND | 0.10 |
| Surr: 1-Fluoronaphthalene | 56.8 | 30-140 |
| Surr: Phenanthrene-d10 | 46.5 | 35-140 |

### Laboratory Control Sample (LCS)

RunID: 2_991202A-120778 Units: ug/L
Analysis Date: 12/02/1999 6:42 Analyst: KA
Preparation Date: 11/23/1999 16:02 Prep By: KL Method SW3510B

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Acenaphthene | 0.5 | 0.39 | 77 | 0.01 | 124 |
| Acenaphthylene | 0.5 | 0.38 | 76 | 0.01 | 139 |
| Anthracene | 0.5 | 0.39 | 78 | 0.01 | 126 |
| Benz(a)anthracene | 0.5 | 0.41 | 81 | 12 | 135 |
| Benzo(a)pyrene | 0.5 | 0.42 | 84 | 0.01 | 128 |
| Benzo(b)fluoranthene | 0.5 | 0.41 | 83 | 6 | 150 |
| Benzo(g,h,i)perylene | 0.5 | 0.4 | 80 | 0.01 | 116 |
| Benzo(k)fluoranthene | 0.5 | 0.41 | 81 | 0.01 | 159 |
| Chrysene | 0.5 | 0.45 | 90 | 0.01 | 199 |
| Dibenzo(a,h)anthracene | 0.5 | 0.41 | 83 | 0.01 | 110 |
| Fluoranthene | 0.5 | 0.39 | 79 | 14 | 123 |
| Fluorene | 0.5 | 0.39 | 78 | 0.01 | 142 |
| Indeno(1,2,3-cd)pyrene | 0.5 | 0.39 | 79 | 0.01 | 116 |
| Naphthalene | 0.5 | 0.38 | 75 | 0.01 | 122 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**ARCO/ HOBBS, NM**

**Analysis:** Polynuclear Aromatic Hydrocarbons, SPLP
**Method:** SW8310
**WorkOrder:** 99110356
**Lab Batch ID:** 1817

### Laboratory Control Sample (LCS)

RunID: 2_991202A-120778 Units: ug/L
Analysis Date: 12/02/1999 6:42 Analyst: KA
Preparation Date: 11/23/1999 16:02 Prep By: KL Method SW3510B

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Phenanthrene | 0.5 | 0.4 | 80 | 0.01 | 155 |
| Pyrene | 0.5 | 0.38 | 76 | 0.01 | 140 |

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

Sample Spiked: 99110356-04
RunID: 2_991202A-120793 Units: ug/L
Analysis Date: 12/02/1999 9:20 Analyst: KA
Preparation Date: 11/23/1999 16:02 Prep By: Method

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 1.2 | 0.5 | 1.4 | 58.1 | 0.5 | 1.5 | 78.1 | 29.4 | 30 | 0.01 | 124 |
| Acenaphthylene | 0.91 | 0.5 | 0.95 | 7.98 | 0.5 | 1.9 | 208* | 185* | 30 | 0.01 | 139 |
| Anthracene | ND | 0.5 | 0.36 | 67.0 | 0.5 | 0.37 | 68.3 | 1.92 | 30 | 0.01 | 126 |
| Benz(a)anthracene | ND | 0.5 | 0.38 | 66.6 | 0.5 | 0.37 | 62.9 | 5.72 | 30 | 12 | 135 |
| Benzo(a)pyrene | ND | 0.5 | 0.26 | 51.3 | 0.5 | 0.23 | 46.9 | 8.97 | 30 | 0.01 | 128 |
| Benzo(b)fluoranthene | ND | 0.5 | 0.25 | 49.8 | 0.5 | 0.23 | 46.4 | 7.24 | 30 | 6 | 150 |
| Benzo(g,h,i)perylene | ND | 0.5 | 0.17 | 34.5 | 0.5 | 0.15 | 29.6 | 15.1 | 30 | 0.01 | 116 |
| Benzo(k)fluoranthene | ND | 0.5 | 0.25 | 49.1 | 0.5 | 0.22 | 44.0 | 10.9 | 30 | 0.01 | 159 |
| Chrysene | ND | 0.5 | 0.37 | 74.6 | 0.5 | 0.37 | 73.1 | 2.01 | 30 | 0.01 | 199 |
| Dibenzo(a,h)anthracene | ND | 0.5 | 0.17 | 33.1 | 0.5 | 0.15 | 30.4 | 8.47 | 30 | 0.01 | 110 |
| Fluoranthene | ND | 0.5 | 0.4 | 74.0 | 0.5 | 0.38 | 70.5 | 4.78 | 30 | 14 | 123 |
| Fluorene | 7.3 | 0.5 | 6.8 | -91.4* | 0.5 | 7.7 | 83.2 | 4300* | 30 | 0.01 | 142 |
| Indeno(1,2,3-cd)pyrene | ND | 0.5 | 0.15 | 29.8 | 0.5 | 0.14 | 28.9 | 2.96 | 30 | 0.01 | 116 |
| Naphthalene | 11 | 0.5 | 10 | -165* | 0.5 | 12 | 90.5 | 685* | 30 | 0.01 | 122 |
| Phenanthrene | ND | 0.5 | 0 | 0* | 0.5 | 0 | 0* | 0 | 30 | 0.01 | 155 |
| Pyrene | 0.10 | 0.5 | 0.41 | 60.4 | 0.5 | 0.39 | 57.7 | 4.55 | 30 | 0.01 | 140 |

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

*Chain of Custody*

*And*

*Sample Receipt Checklist*

# SPL, Inc.

## Analysis Request & Chain of Custody Record

SPL Workorder No: 99110356

086306

page 1 of 1

Client Name: URSGWC

Address/Phone: 7600 W. TIDWELL #600

Client Contact: DENNIS HAYES 713-744-9055

Project Name: APL BYRD PUMP SITE

Project Number:

Project Location: HOBBS, NEW MEXICO

Invoice To: RICK NELSON (URSGWC

| 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-8021/TPH-GRO/8015 | TPH DRO-8015/PAH | SPLP(BTEX/PAH) | BTEX 8021 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW1-4-5 | 11-9-99 | 1030 | | X | S | G | 4,8,16 | ICE | 3 | | | | | | | | | |
| MW1-9-10 | 11-9-99 | 1100 | | X | S | G | | | | | | | | | | | | |
| MW1-14-15 | 11-11-99 | 1030 | | X | S | G | | | | | | | | | | | | |
| MW1-19-20 | 11-11-99 | 1040 | | X | S | G | | | | | | | | | | | | |
| MW1-29-30 | 11-11-99 | 1115 | | X | S | G | | | | | | | | | | | | |
| MW1-39-40 | 11-11-99 | 1130 | | X | S | G | | | | | | | | | | | | |
| TRIP BLANK | — | — | | | W | V | | HCl | 1 | | | | 1 | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

Client/Consultant Remarks: TRIP BLANK HAS ONLY 1 VIAL

Laboratory remarks: HOLD SPLP BTEX/PAH per Rick Nelson. PL 11/15/99

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): PL

| | date | time | | |
|---|---|---|---|---|
| 1. Relinquished by Sampler: Dennis Hayes | 11-12-99 | 1700 | 2. Received by: | |
| 3. Relinquished by: | date | time | 4. Received by: | |
| 5. Relinquished by: | date | time | 6. Received by Laboratory: | 11/13/99 1200 |

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

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

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

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

# Sample Receipt Checklist

| | | | |
|---|---|---|---|
| Workorder: | 99110356 | Received by: | Estrada, Ruben |
| Date and Time Received: | 11/13/99 10:00:00 AM | Carrier name: | FedEx |
| Temperature: | 4 | | |

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

# Laboratory Analytical Reports
# Groundwater

HOUSTON LABORATORY
9880 INTERCHANGE DRIVE
HOUSTON, TEXAS 77054
(713) 660-0901

## Case Narrative for:

# URS Greiner Woodward Clyde

## Certificate of Analysis Number:

## 99110496

| Report To: | | Project Name: | BYRD PUMP |
|---|---|---|---|
| URS Greiner Woodward Clyde | | Site: | BYRD PUMP |
| Rick Nelson | | Site Address: | |
| 6200 La Calma | | | |
| Suite 210 | | PO Number: | |
| Austin | | State: | New Mexico |
| Texas | | State Cert. No.: | |
| 78752- | | Date Reported: | 12/16/1999 |
| ph (512) 458-1174 | fax: (512) 458-9823 | | |

According to the latest promulgated version of Method 8310 for PAH's, confirmation of target compounds can be performed using either a second analytical column with different retention times for the analytes of interest or by use of the Diode Array Detector (DAD). SPL confirms all PAH compounds detected at concentrations exceeding the Practical Quantitation Limit (PQL) by examining the DAD spectra for these compounds. The spectra are compared to the reference spectra from the instrument that is used for these compounds, and a probability match is generated for the peak requiring confirmation. The effectiveness of this method of confirmation is dependent on the relative concentrations of non-target compounds that are co-extracted from the sample.

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

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

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



Lynch, Pat
Project Manager

12/16/1999
Date

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

# URS Greiner Woodward Clyde

## Certificate of Analysis Number:

## 99110496

| | | | |
|---|---|---|---|
| **Report To:** | URS Greiner Woodward Clyde<br>Rick Nelson<br>6200 La Calma<br>Suite 210<br>Austin<br>Texas<br>78752-<br>ph: (512) 458-1174 fax: (512) 458-9823 | **Project Name:** | BYRD PUMP |
| | | **Site:** | BYRD PUMP |
| | | **Site Address:** | |
| | | **PO Number:** | |
| | | **State:** | New Mexico |
| | | **State Cert. No.:** | |
| *Fax To:* | *URS Greiner Woodward Clyde*<br>*Rick Nelson* *fax: (512) 458-9823* | **Date Reported:** | |

| Client Sample ID | Lab Sample ID | Matrix | Date Collected | Date Received | COC ID | HOLD |
|---|---|---|---|---|---|---|
| MW1-GW | 99110496-01 | Water | 11/17/99 4:25:00 PM | 11/19/99 10:00:00 AM | 086257 | ☐ |
| Trip Blank 11/11/99 | 99110496-02 | Trip Blank | 11/17/99 | 11/19/99 10:00:00 AM | 086257 | ☐ |

Lynch, Pat
Project Manager

12/16/99
Date

Joel Grice
Laboratory Director

Ted Yen
Quality Assurance Officer

HOUSTON LABORATORY
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(713) 660-0901

**Client Sample ID** MW1-GW **Collected:** 11/17/99 4:25:00 **SPL Sample ID:** 99110496-01

**Site:** BYRD PUMP

| Analyses/Method | Result | | Rep.Limit | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|
| **CHLORIDE-IC** | | | **MCL** | **E300** | | **Units: mg/L** | | |
| Chloride | 300 | | 4 | 20 | | 11/23/99 13:09 | ES | 118573 |
| **DIESEL RANGE ORGANICS** | | | **MCL** | **SW8015B** | | **Units: mg/L** | | |
| Diesel Range Organics | 22 | | 20 | 100 | | 12/07/99 0:15 | RR | 123283 |
| Surr: Pentacosane | 120 | % | 20-131 | 100 | | 12/07/99 0:15 | RR | 123283 |

**Run ID/Seq #: HP_V_991125A-123283**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3510B | 11/22/1999 8:14 | KL |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **FLUORIDE-IC** | | | **MCL** | **E300** | | **Units: mg/L** | | |
| Fluoride | 2.9 | | 0.1 | 1 | | 11/19/99 12:38 | ES | 114570 |
| **GASOLINE RANGE ORGANICS** | | | **MCL** | **SW8015B** | | **Units: mg/L** | | |
| Gasoline Range Organics | 3.9 | | 0.1 | 1 | | 11/23/99 12:04 | DL | 113848 |
| Surr: 1,4-Difluorobenzene | 68 | % | 62-144 | 1 | | 11/23/99 12:04 | DL | 113848 |
| Surr: 4-Bromofluorobenzene | 100 | % | 44-153 | 1 | | 11/23/99 12:04 | DL | 113848 |
| **MERCURY, TOTAL** | | | **MCL** | **SW7470A** | | **Units: mg/L** | | |
| Mercury | ND | | 0.0002 | 1 | | 12/15/99 10:31 | AG | 131562 |

**Run ID/Seq #: HGL_991215A-131562**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW7470A | 12/14/1999 16:30 | AG |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **METALS BY METHOD 6010B, TOTAL** | | | **MCL** | **SW6010B** | | **Units: mg/L** | | |
| Arsenic | 0.00874 | | 0.005 | 1 | | 11/29/99 15:37 | EG | 118315 |
| Lead | ND | | 0.005 | 1 | | 11/29/99 15:37 | EG | 118315 |
| Selenium | ND | | 0.005 | 1 | | 11/29/99 15:37 | EG | 118315 |
| Aluminum | 1.92 | | 0.1 | 1 | | 11/30/99 20:32 | PB | 119318 |
| Barium | 9.88 | | 0.005 | 1 | | 11/30/99 20:32 | PB | 119318 |
| Boron | 0.862 | | 0.2 | 1 | | 11/30/99 20:32 | PB | 119318 |
| Cadmium | ND | | 0.005 | 1 | | 11/30/99 20:32 | PB | 119318 |
| Calcium | 354 | | 10 | 1 | | 12/01/99 18:06 | PB | 120397 |
| Chromium | ND | | 1 | 1 | | 12/01/99 18:06 | PB | 120397 |
| Cobalt | ND | | 0.01 | 1 | | 11/30/99 20:32 | PB | 119318 |
| Copper | ND | | 0.01 | 1 | | 11/30/99 20:32 | PB | 119318 |
| Iron | 2.94 | | 0.02 | 1 | | 11/30/99 20:32 | PB | 119318 |
| Magnesium | 110 | | 0.1 | 1 | | 11/30/99 20:32 | PB | 119318 |
| Manganese | 0.0908 | | 0.005 | 1 | | 11/30/99 20:32 | PB | 119318 |
| Molybdenum | ND | | 0.02 | 1 | | 11/30/99 20:32 | PB | 119318 |
| Nickel | ND | | 0.02 | 1 | | 11/30/99 20:32 | PB | 119318 |
| Potassium | 3.22 | | 2 | 1 | | 11/30/99 20:32 | PB | 119318 |

**Qualifiers:**

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J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

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(713) 660-0901

**Client Sample ID** MW1-GW **Collected:** 11/17/99 4:25:00 **SPL Sample ID:** 99110496-01

**Site:** BYRD PUMP

| Analyses/Method | Result | | Rep.Limit | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|
| Silver | ND | | 0.01 | 1 | | 11/30/99 20:32 | PB | 119318 |
| Sodium | 454 | | 0.5 | 1 | | 11/30/99 20:32 | PB | 119318 |
| Zinc | ND | | 0.02 | 1 | | 11/30/99 20:32 | PB | 119318 |

**Run ID/Seq #: TJAT_991129B-118315**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3010A | 11/22/1999 8:15 | ME |

**Run ID/Seq #: TJA_991130B-119318**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3010A | 11/22/1999 8:15 | ME |

**Run ID/Seq #: TJA_991201B-120397**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3010A | 11/22/1999 8:15 | ME |

| NITROGEN, NITRATE (AS N) | | | MCL | E300 | Units: mg/L | | |
|---|---|---|---|---|---|---|---|
| Nitrogen,Nitrate (As N) | ND | 0.1 | | 1 | 11/19/99 12:38 | ES | 115369 |

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | MCL | SW8310 | | Units: ug/L | | |
|---|---|---|---|---|---|---|---|---|
| 1-Methylnaphthalene | 29 | | 4 | 20 | | 12/05/99 12:31 | KA | 123434 |
| 2-Methylnaphthalene | 14 | | 4 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Acenaphthene | ND | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Acenaphthylene | ND | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Anthracene | ND | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Benz(a)anthracene | ND | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Benzo(a)pyrene | ND | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Benzo(b)fluoranthene | ND | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Benzo(g,h,i)perylene | ND | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Benzo(k)fluoranthene | ND | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Chrysene | ND | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Dibenzo(a,h)anthracene | ND | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Fluoranthene | ND | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Fluorene | 8.1 | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Indeno(1,2,3-cd)pyrene | ND | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Naphthalene | 10 | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Phenanthrene | 2.6 | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Pyrene | ND | | 2 | 20 | | 12/05/99 12:31 | KA | 123434 |
| Surr: 1-Fluoronaphthalene | 190 | % | 30-140 | 20 | * | 12/05/99 12:31 | KA | 123434 |
| Surr: Phenanthrene-d10 | 310 | % | 35-140 | 20 | * | 12/05/99 12:31 | KA | 123434 |

**Run ID/Seq #: 2_991202B-123434**

| Prep Method | Prep Date | Prep Initials |
|---|---|---|
| SW3510B | 11/23/1999 16:02 | KL |

**Qualifiers:**

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J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

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(713) 660-0901

**Client Sample ID** MW1-GW **Collected:** 11/17/99 4:25:00 **SPL Sample ID:** 99110496-01

**Site:** BYRD PUMP

| Analyses/Method | Result | | Rep.Limit | | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|---|
| **PURGEABLE AROMATICS** | | | | **MCL** | **SW8021B** | | **Units: ug/L** | | |
| Benzene | 130 | | 1 | | 1 | | 11/23/99 12:43 | DL | 114435 |
| Ethylbenzene | 110 | | 1 | | 1 | | 11/23/99 12:43 | DL | 114435 |
| Toluene | 110 | | 1 | | 1 | | 11/23/99 12:43 | DL | 114435 |
| Xylenes,Total | 365.2 | | 1 | | 1 | | 11/23/99 12:43 | DL | 114435 |
| Surr: 1,4-Difluorobenzene | 120 | % | 72-137 | | 1 | | 11/23/99 12:43 | DL | 114435 |
| Surr: 4-Bromofluorobenzene | 350 | % | 48-156 | | 1 | * | 11/23/99 12:43 | DL | 114435 |
| **SULFATE** | | | | **MCL** | **E300** | | **Units: mg/L** | | |
| Sulfate | 1.1 | | 0.2 | | 1 | | 11/23/99 13:09 | ES | 118591 |
| **TOTAL DISSOLVED SOLIDS** | | | | **MCL** | **E160.1** | | **Units: mg/L** | | |
| Total Dissolved Solids (Residue,Filterable) | 840 | | 100 | | 10 | | 11/23/99 21:45 | GJ | 116198 |

**Qualifiers:**

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D - Surrogate Recovery Unreportable due to Dilution

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**Client Sample ID** Trip Blank 11/11/99 **Collected:** 11/17/99 **SPL Sample ID:** 99110496-02

**Site:** BYRD PUMP

| Analyses/Method | Result | | Rep.Limit | | Dil. Factor | QUAL | Date Analyzed | Analyst | Seq. # |
|---|---|---|---|---|---|---|---|---|---|
| **GASOLINE RANGE ORGANICS** | | | | **MCL** | **SW8015B** | | **Units: mg/L** | | |
| Gasoline Range Organics | ND | | 0.1 | | 1 | | 11/22/99 22:01 | DL | 113831 |
| Surr: 1,4-Difluorobenzene | 92 | % | 62-144 | | 1 | | 11/22/99 22:01 | DL | 113831 |
| Surr: 4-Bromofluorobenzene | 95 | % | 44-153 | | 1 | | 11/22/99 22:01 | DL | 113831 |
| **PURGEABLE AROMATICS** | | | | **MCL** | **SW8021B** | | **Units: ug/L** | | |
| Benzene | ND | | 1 | | 1 | | 11/22/99 22:17 | DL | 113706 |
| Ethylbenzene | ND | | 1 | | 1 | | 11/22/99 22:17 | DL | 113706 |
| Toluene | ND | | 1 | | 1 | | 11/22/99 22:17 | DL | 113706 |
| Xylenes,Total | ND | | 1 | | 1 | | 11/22/99 22:17 | DL | 113706 |
| Surr: 1,4-Difluorobenzene | 96 | % | 72-137 | | 1 | | 11/22/99 22:17 | DL | 113706 |
| Surr: 4-Bromofluorobenzene | 100 | % | 48-156 | | 1 | | 11/22/99 22:17 | DL | 113706 |

**Qualifiers:**

ND/U - Not Detected at the Reporting Limit
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J - Estimated Value between MDL and PQL
>MCL - Result Over Maximum Contamination Limit(MCL)
D - Surrogate Recovery Unreportable due to Dilution

# *Quality Control Documentation*

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

# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Diesel Range Organics
**Method:** SW8015B

**WorkOrder:** 99110496
**Lab Batch ID:** 1791

**Method Blank**

RunID: HP_V_991125A-117219 Units: mg/L
Analysis Date: 11/25/1999 8:45 Analyst: RR
Preparation Date: 11/22/1999 8:14 Prep By: KL Method SW3510B

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-01E | MW1-GW |

| Analyte | Result | Rep Limit |
|---|---|---|
| Diesel Range Organics | ND | 0.20 |
| Surr: Pentacosane | 26.6 | 20-131 |

**Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)**

RunID: HP_V_991125A-117220 Units: mg/L
Analysis Date: 11/25/1999 9:23 Analyst: RR
Preparation Date: 11/22/1999 8:14 Prep By: KL Method SW3510B

| Analyte | LCS Spike Added | LCS Result | LCS Percent Recovery | LCSD Spike Added | LCSD Result | LCSD Percent Recovery | RPD | RPD Limit | Lower Limit | Upper Limit |
|---|---|---|---|---|---|---|---|---|---|---|
| Diesel Range Organics | 2.5 | 2.1 | 84 | 2.5 | 1.9 | 78 | 7.8 | 39 | 53 | 148 |

**Qualifiers:**

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

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(713) 660-0901

# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Purgeable Aromatics
**Method:** SW8021B
**WorkOrder:** 99110496
**Lab Batch ID:** R5271

### Method Blank

RunID: HP_S_991122A-113704 Units: ug/L
Analysis Date: 11/22/1999 21:18 Analyst: DL

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-02A | Trip Blank 11/11/99 |

| Analyte | Result | Rep Limit |
|---|---|---|
| Benzene | ND | 1.0 |
| Ethylbenzene | ND | 1.0 |
| Toluene | ND | 1.0 |
| Xylenes,Total | ND | 1.0 |
| Surr: 1,4-Difluorobenzene | 98.7 | 72-137 |
| Surr: 4-Bromofluorobenzene | 99.8 | 48-156 |

### Laboratory Control Sample (LCS)

RunID: HP_S_991122A-113703 Units: ug/L
Analysis Date: 11/22/1999 20:48 Analyst: DL

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Benzene | 50 | 49 | 98 | 61 | 119 |
| Ethylbenzene | 50 | 51 | 101 | 70 | 118 |
| Toluene | 50 | 50 | 100 | 65 | 125 |
| Xylenes,Total | 150 | 147 | 98 | 72 | 116 |

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

Sample Spiked: 99110460-02
RunID: HP_S_991122A-113707 Units: ug/L
Analysis Date: 11/22/1999 22:46 Analyst: DL

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | 20 | 16 | 77.7 | 20 | 14 | 70.4 | 9.95 | 21 | 32 | 164 |
| Ethylbenzene | ND | 20 | 14 | 69.2 | 20 | 12 | 59.6 | 14.9 | 19 | 52 | 142 |
| Toluene | ND | 20 | 15 | 74.2 | 20 | 13 | 64.0 | 14.7 | 20 | 38 | 159 |
| Xylenes,Total | ND | 60 | 35 | 58.3 | 60 | 28 | 46.7* | 22.2* | 17 | 53 | 143 |

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

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

# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Gasoline Range Organics
**Method:** SW8015B

**WorkOrder:** 99110496
**Lab Batch ID:** R5277

### Method Blank

RunID: HP_S_991122B-113829 Units: mg/L
Analysis Date: 11/22/1999 21:01 Analyst: DL

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-01A | MW1-GW |
| 99110496-02A | Trip Blank 11/11/99 |

| Analyte | Result | Rep Limit |
|---|---|---|
| Gasoline Range Organics | ND | 0.10 |
| Surr: 1,4-Difluorobenzene | 91.3 | 62-144 |
| Surr: 4-Bromofluorobenzene | 96.8 | 44-153 |

### Laboratory Control Sample (LCS)

RunID: HP_S_991122B-113828 Units: mg/L
Analysis Date: 11/22/1999 20:01 Analyst: DL

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Gasoline Range Organics | 1 | 0.78 | 78 | 64 | 131 |

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

Sample Spiked: 99110449-04
RunID: HP_S_991122B-113832 Units: mg/L
Analysis Date: 11/22/1999 23:04 Analyst: DL

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Gasoline Range Organics | ND | 0.9 | 0.84 | 89.4 | 0.9 | 0.81 | 87.0 | 2.80 | 36 | 36 | 160 |

**Qualifiers:**

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Purgeable Aromatics
**Method:** SW8021B
**WorkOrder:** 99110496
**Lab Batch ID:** R5301

### Method Blank

RunID: HP_S_991123A-115061 Units: ug/L
Analysis Date: 11/23/1999 19:17 Analyst: DL

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-01A | MW1-GW |

| Analyte | Result | Rep Limit |
|---|---|---|
| Benzene | ND | 1.0 |
| Ethylbenzene | ND | 1.0 |
| Toluene | ND | 1.0 |
| Xylenes,Total | ND | 1.0 |
| Surr: 1,4-Difluorobenzene | 98.4 | 72-137 |
| Surr: 4-Bromofluorobenzene | 100.6 | 48-156 |

### Laboratory Control Sample (LCS)

RunID: HP_S_991123A-114434 Units: ug/L
Analysis Date: 11/23/1999 12:13 Analyst: DL

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Benzene | 50 | 50 | 101 | 61 | 119 |
| Ethylbenzene | 50 | 52 | 105 | 70 | 118 |
| Toluene | 50 | 53 | 106 | 65 | 125 |
| Xylenes,Total | 150 | 153 | 102 | 72 | 116 |

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

Sample Spiked: 9911506-02A
RunID: HP_S_991123A-115062 Units: ug/L
Analysis Date: 11/23/1999 20:14 Analyst: DL

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Benzene | ND | 20 | 19 | 94.9 | 20 | 20 | 98.6 | 3.90 | 21 | 32 | 164 |
| Ethylbenzene | 2.7 | 20 | 21 | 90.5 | 20 | 22 | 94.7 | 4.59 | 19 | 52 | 142 |
| Toluene | 3.3 | 20 | 20 | 84.6 | 20 | 21 | 87.9 | 3.87 | 20 | 38 | 159 |
| Xylenes,Total | 8.8 | 60 | 60 | 85.3 | 60 | 62 | 88.7 | 3.83 | 17 | 53 | 143 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Polynuclear Aromatic Hydrocarbons
**Method:** SW8310

**WorkOrder:** 99110496
**Lab Batch ID:** 1817

### Method Blank

RunID: 2_991202B-123423 Units: ug/L
Analysis Date: 12/02/1999 6:02 Analyst: KA
Preparation Date: 11/23/1999 16:02 Prep By: KL Method SW3510B

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-01B | MW1-GW |

| Analyte | Result | Rep Limit |
|---|---|---|
| 1-Methylnaphthalene | ND | 0.20 |
| 2-Methylnaphthalene | ND | 0.20 |
| Acenaphthene | ND | 0.10 |
| Acenaphthylene | ND | 0.10 |
| Anthracene | ND | 0.10 |
| Benz(a)anthracene | ND | 0.10 |
| Benzo(a)pyrene | ND | 0.10 |
| Benzo(b)fluoranthene | ND | 0.10 |
| Benzo(g,h,i)perylene | ND | 0.10 |
| Benzo(k)fluoranthene | ND | 0.10 |
| Chrysene | ND | 0.10 |
| Dibenzo(a,h)anthracene | ND | 0.10 |
| Fluoranthene | ND | 0.10 |
| Fluorene | ND | 0.10 |
| Indeno(1,2,3-cd)pyrene | ND | 0.10 |
| Naphthalene | ND | 0.10 |
| Phenanthrene | ND | 0.10 |
| Pyrene | ND | 0.10 |
| Surr: 1-Fluoronaphthalene | 56.8 | 30-140 |
| Surr: Phenanthrene-d10 | 46.5 | 35-140 |

### Laboratory Control Sample (LCS)

RunID: 2_991202B-123424 Units: ug/L
Analysis Date: 12/02/1999 6:42 Analyst: KA
Preparation Date: 11/23/1999 16:02 Prep By: KL Method SW3510B

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Acenaphthene | 0.5 | 0.39 | 77 | 0.01 | 124 |
| Acenaphthylene | 0.5 | 0.38 | 76 | 0.01 | 139 |
| Anthracene | 0.5 | 0.39 | 78 | 0.01 | 126 |
| Benz(a)anthracene | 0.5 | 0.41 | 81 | 12 | 135 |
| Benzo(a)pyrene | 0.5 | 0.42 | 84 | 0.01 | 128 |
| Benzo(b)fluoranthene | 0.5 | 0.41 | 83 | 6 | 150 |
| Benzo(g,h,i)perylene | 0.5 | 0.4 | 80 | 0.01 | 116 |
| Benzo(k)fluoranthene | 0.5 | 0.41 | 81 | 0.01 | 159 |
| Chrysene | 0.5 | 0.45 | 90 | 0.01 | 199 |
| Dibenzo(a,h)anthracene | 0.5 | 0.41 | 83 | 0.01 | 110 |
| Fluoranthene | 0.5 | 0.39 | 79 | 14 | 123 |
| Fluorene | 0.5 | 0.39 | 78 | 0.01 | 142 |
| Indeno(1,2,3-cd)pyrene | 0.5 | 0.39 | 79 | 0.01 | 116 |
| Naphthalene | 0.5 | 0.38 | 75 | 0.01 | 122 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Polynuclear Aromatic Hydrocarbons **WorkOrder:** 99110496
**Method:** SW8310 **Lab Batch ID:** 1817

### Laboratory Control Sample (LCS)

RunID: 2_991202B-123424 Units: ug/L
Analysis Date: 12/02/1999 6:42 Analyst: KA
Preparation Date: 11/23/1999 16:02 Prep By: KL Method SW3510B

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Phenanthrene | 0.5 | 0.4 | 80 | 0.01 | 155 |
| Pyrene | 0.5 | 0.38 | 76 | 0.01 | 140 |

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

Sample Spiked: 99110356-04
RunID: 2_991202B-123426 Units: ug/L
Analysis Date: 12/02/1999 9:20 Analyst: KA
Preparation Date: 11/23/1999 16:02 Prep By: Method

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | 1.2 | 0.5 | 1.4 | 58.1 | 0.5 | 1.5 | 78.1 | 29.4 | 30 | 0.01 | 124 |
| Acenaphthylene | 0.91 | 0.5 | 0.95 | 7.98 | 0.5 | 1.9 | 208* | 185* | 30 | 0.01 | 139 |
| Anthracene | ND | 0.5 | 0.36 | 67.0 | 0.5 | 0.37 | 68.3 | 1.92 | 30 | 0.01 | 126 |
| Benz(a)anthracene | ND | 0.5 | 0.38 | 66.6 | 0.5 | 0.37 | 62.9 | 5.72 | 30 | 12 | 135 |
| Benzo(a)pyrene | ND | 0.5 | 0.26 | 51.3 | 0.5 | 0.23 | 46.9 | 8.97 | 30 | 0.01 | 128 |
| Benzo(b)fluoranthene | ND | 0.5 | 0.25 | 49.8 | 0.5 | 0.23 | 46.4 | 7.24 | 30 | 6 | 150 |
| Benzo(g,h,i)perylene | ND | 0.5 | 0.17 | 34.5 | 0.5 | 0.15 | 29.6 | 15.1 | 30 | 0.01 | 116 |
| Benzo(k)fluoranthene | ND | 0.5 | 0.25 | 49.1 | 0.5 | 0.22 | 44.0 | 10.9 | 30 | 0.01 | 159 |
| Chrysene | ND | 0.5 | 0.37 | 74.6 | 0.5 | 0.37 | 73.1 | 2.01 | 30 | 0.01 | 199 |
| Dibenzo(a,h)anthracene | ND | 0.5 | 0.17 | 33.1 | 0.5 | 0.15 | 30.4 | 8.47 | 30 | 0.01 | 110 |
| Fluoranthene | ND | 0.5 | 0.4 | 74.0 | 0.5 | 0.38 | 70.5 | 4.78 | 30 | 14 | 123 |
| Fluorene | 7.3 | 0.5 | 6.8 | -91.4* | 0.5 | 7.7 | 83.2 | 4300* | 30 | 0.01 | 142 |
| Indeno(1,2,3-cd)pyrene | ND | 0.5 | 0.15 | 29.8 | 0.5 | 0.14 | 28.9 | 2.96 | 30 | 0.01 | 116 |
| Naphthalene | 11 | 0.5 | 10 | -165* | 0.5 | 12 | 90.5 | 685* | 30 | 0.01 | 122 |
| Phenanthrene | ND | 0.5 | 0 | 0* | 0.5 | 0 | 0* | 0 | 30 | 0.01 | 155 |
| Pyrene | 0.10 | 0.5 | 0.41 | 60.4 | 0.5 | 0.39 | 57.7 | 4.55 | 30 | 0.01 | 140 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Metals by Method 6010B, Total
**Method:** SW6010B
**WorkOrder:** 99110496
**Lab Batch ID:** 1794

### Method Blank

RunID: TJA_991130B-119305 Units: mg/L
Analysis Date: 11/30/1999 19:39 Analyst: PB
Preparation Date: 11/22/1999 8:15 Prep By: ME Method SW3010A

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-01C | MW1-GW |

| Analyte | Result | Rep Limit |
|---|---|---|
| Aluminum | ND | 0.1 |
| Barium | ND | 0.005 |
| Boron | ND | 0.2 |
| Cadmium | ND | 0.005 |
| Cobalt | ND | 0.01 |
| Copper | ND | 0.01 |
| Iron | ND | 0.02 |
| Magnesium | ND | 0.1 |
| Manganese | ND | 0.005 |
| Molybdenum | ND | 0.02 |
| Nickel | ND | 0.02 |
| Potassium | ND | 2 |
| Silver | ND | 0.01 |
| Sodium | ND | 0.5 |
| Zinc | ND | 0.02 |

### Laboratory Control Sample (LCS)

RunID: TJA_991130B-119306 Units: mg/L
Analysis Date: 11/30/1999 19:43 Analyst: PB
Preparation Date: 11/22/1999 8:15 Prep By: ME Method SW3010A

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Aluminum | 2 | 2.03 | 101 | 80 | 120 |
| Barium | 2 | 2.05 | 102 | 80 | 120 |
| Boron | 4 | 3.95 | 99 | 80 | 120 |
| Cadmium | 2 | 2 | 100 | 80 | 120 |
| Cobalt | 2 | 2 | 100 | 80 | 120 |
| Copper | 2 | 2.04 | 102 | 80 | 120 |
| Iron | 2 | 2.04 | 102 | 80 | 120 |
| Magnesium | 20 | 20.5 | 103 | 80 | 120 |
| Manganese | 2 | 2.04 | 102 | 80 | 120 |
| Molybdenum | 2 | 2.04 | 102 | 80 | 120 |
| Nickel | 2 | 2.02 | 101 | 80 | 120 |
| Potassium | 20 | 20.6 | 103 | 80 | 120 |
| Silver | 2 | 2.07 | 104 | 80 | 120 |
| Sodium | 20 | 19.4 | 97 | 80 | 120 |
| Zinc | 2 | 2.02 | 101 | 80 | 120 |

### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Metals by Method 6010B, Total
**Method:** SW6010B
**WorkOrder:** 99110496
**Lab Batch ID:** 1794

Sample Spiked: 99110449-01
RunID: TJA_991130B-119313 Units: mg/L
Analysis Date: 11/30/1999 20:12 Analyst: PB

| Analyte | Sample Result | PDS Spike Added | PDS Result | PDS % Recovery | PDSD Spike Added | PDSD Result | PDSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 7.67 | 1 | 8.5 | 83 | 1 | 8.46 | 79 | 5.0 | 20 | 75 | 125 |
| Iron | 3.46 | 1 | 4.32 | 86 | 1 | 4.28 | 82 | 5.0 | 20 | 75 | 125 |
| Sodium | 471 | 10 | 468 | -34* | 10 | 464 | -69* | 70* | 20 | 75 | 125 |

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

Sample Spiked: 99110449-01
RunID: TJA_991130B-119308 Units: mg/L
Analysis Date: 11/30/1999 19:51 Analyst: PB

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 7.7 | 1 | 9.8 | 213* | 1 | 8.74 | 107 | 66.7* | 20 | 75 | 125 |
| Barium | 0.40 | 1 | 1.35 | 95.8 | 1 | 1.34 | 94.6 | 1.20 | 20 | 75 | 125 |
| Boron | 0.78 | 2 | 2.63 | 92.7 | 2 | 2.64 | 92.8 | 0.130 | 20 | 75 | 125 |
| Cadmium | ND | 1 | 0.958 | 95.8 | 1 | 0.959 | 95.9 | 0.112 | 20 | 75 | 125 |
| Cobalt | ND | 1 | 0.875 | 87.0 | 1 | 0.875 | 87.0 | .0161 | 20 | 75 | 125 |
| Copper | ND | 1 | 0.997 | 98.9 | 1 | 0.991 | 98.3 | 0.630 | 20 | 75 | 125 |
| Iron | 3.5 | 1 | 4.64 | 117 | 1 | 4.07 | 60.4* | 64.0* | 20 | 75 | 125 |
| Magnesium | 110 | 10 | 117 | 106 | 10 | 115 | 90.2 | 16.6 | 20 | 75 | 125 |
| Manganese | 0.46 | 1 | 1.37 | 91.5 | 1 | 1.36 | 90.9 | 0.760 | 20 | 75 | 125 |
| Molybdenum | ND | 1 | 0.919 | 91.3 | 1 | 0.922 | 91.6 | 0.366 | 20 | 75 | 125 |
| Nickel | ND | 1 | 0.878 | 87.8 | 1 | 0.873 | 87.3 | 0.522 | 20 | 75 | 125 |
| Potassium | 20 | 10 | 31.5 | 115 | 10 | 30.8 | 108 | 6.10 | 20 | 75 | 125 |
| Silver | ND | 1 | 0.992 | 99.2 | 1 | 0.995 | 99.5 | 0.235 | 20 | 75 | 125 |
| Sodium | 470 | 10 | 481 | 101 | 10 | 475 | 35.6* | 95.6* | 20 | 75 | 125 |
| Zinc | 0.092 | 1 | 1.08 | 99.1 | 1 | 1.1 | 101 | 2.15 | 20 | 75 | 125 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Metals by Method 6010B, Total
**Method:** SW6010B
**WorkOrder:** 99110496
**Lab Batch ID:** 1794A

### Method Blank

RunID: TJA_991201B-120384 Units: mg/L
Analysis Date: 12/01/1999 17:13 Analyst: PB
Preparation Date: 11/22/1999 8:15 Prep By: ME Method SW3010A

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-01C | MW1-GW |

| Analyte | Result | Rep Limit |
|---|---|---|
| Calcium | ND | 10 |
| Chromium | ND | 1 |

### Laboratory Control Sample (LCS)

RunID: TJA_991201B-120385 Units: mg/L
Analysis Date: 12/01/1999 17:17 Analyst: PB
Preparation Date: 11/22/1999 8:15 Prep By: ME Method SW3010A

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Calcium | 20 | 20.5 | 103 | 80 | 120 |
| Chromium | 2 | 2.04 | 102 | 80 | 120 |

### Post Digestion Spike (PDS) / Post Digestion Spike Duplicate (PDSD)

Sample Spiked: 99110449-01
RunID: TJA_991201B-120389 Units: mg/L
Analysis Date: 12/01/1999 17:34 Analyst: PB

| Analyte | Sample Result | PDS Spike Added | PDS Result | PDS % Recovery | PDSD Spike Added | PDSD Result | PDSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcium | 2060 | 100 | 2170 | 115 | 100 | 2000 | -61 | 650* | 20 | 75 | 125 |
| Chromium | ND | 10 | 9.93 | 99 | 10 | 10 | 100 | 1.0 | 20 | 75 | 125 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Metals by Method 6010B, Total
**Method:** SW6010B
**WorkOrder:** 99110496
**Lab Batch ID:** 1794-T

### Method Blank

RunID: TJAT_991129B-118301 Units: mg/L
Analysis Date: 11/29/1999 14:30 Analyst: EG
Preparation Date: 11/22/1999 8:15 Prep By: ME Method SW3010A

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-01C | MW1-GW |

| Analyte | Result | Rep Limit |
|---|---|---|
| Arsenic | ND | 0.005 |
| Lead | ND | 0.005 |
| Selenium | ND | 0.005 |

### Laboratory Control Sample (LCS)

RunID: TJAT_991129B-118302 Units: mg/L
Analysis Date: 11/29/1999 14:35 Analyst: EG
Preparation Date: 11/22/1999 8:15 Prep By: ME Method SW3010A

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Arsenic | 4 | 4.15 | 104 | 80 | 120 |
| Lead | 2 | 1.97 | 99 | 80 | 120 |
| Selenium | 4 | 4.09 | 102 | 80 | 120 |

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

Sample Spiked: 99110449-01
RunID: TJAT_991129B-118304 Units: mg/L
Analysis Date: 11/29/1999 14:45 Analyst: EG

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.054 | 2 | 2.13 | 104 | 2 | 2.13 | 104 | 0.326 | 20 | 75 | 125 |
| Lead | 0.023 | 1 | 0.91 | 88.7 | 1 | 0.907 | 88.4 | 0.345 | 20 | 75 | 125 |
| Selenium | ND | 2 | 2.02 | 101 | 2 | 2.02 | 101 | 0.305 | 20 | 75 | 125 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Mercury, Total
**Method:** SW7470A

**WorkOrder:** 99110496
**Lab Batch ID:** 2151

### Method Blank

RunID: HGL_991215A-131552 Units: mg/L
Analysis Date: 12/15/1999 10:31 Analyst: AG
Preparation Date: 12/14/1999 16:30 Prep By: AG Method SW7470A

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-01C | MW1-GW |

| Analyte | Result | Rep Limit |
|---|---|---|
| Mercury | ND | 0.0002 |

### Laboratory Control Sample (LCS)

RunID: HGL_991215A-131553 Units: mg/L
Analysis Date: 12/15/1999 10:31 Analyst: AG
Preparation Date: 12/14/1999 16:30 Prep By: AG Method SW7470A

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Mercury | 0.002 | 0.00192 | 96 | 80 | 120 |

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

Sample Spiked: 99110449-01
RunID: HGL_991215A-131555 Units: mg/L
Analysis Date: 12/15/1999 10:31 Analyst: AG
Preparation Date: 12/14/1999 16:30 Prep By: AG Method SW7470A

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mercury | ND | 0.002 | 0.00212 | 106 | 0.002 | 0.002 | 100 | 5.58 | 20 | 75 | 125 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Fluoride-IC
**Method:** E300
**WorkOrder:** 99110496
**Lab Batch ID:** R5306

### Method Blank

RunID: WET_991119O-114562 Units: mg/L
Analysis Date: 11/19/1999 12:38 Analyst: ES

**Samples In Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-01D | MW1-GW |

| Analyte | Result | Rep Limit |
|---|---|---|
| Fluoride | ND | 0.10 |

### Laboratory Control Sample (LCS)

RunID: WET_991119O-114563 Units: mg/L
Analysis Date: 11/19/1999 12:38 Analyst: ES

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Fluoride | 10 | 9.5 | 95 | 90 | 110 |

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

Sample Spiked: 99110449-01
RunID: WET_991119O-114565 Units: mg/L
Analysis Date: 11/19/1999 12:38 Analyst: ES

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fluoride | 3.1 | 10 | 13 | 96.2 | 10 | 13 | 95.6 | 0.709 | 20 | 80 | 120 |

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

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# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Nitrogen, Nitrate (As N) **WorkOrder:** 99110496
**Method:** E300 **Lab Batch ID:** R5352

### Method Blank

RunID: WET_991119P-115361 Units: mg/L
Analysis Date: 11/19/1999 12:38 Analyst: ES

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-01D | MW1-GW |

| Analyte | Result | Rep Limit |
|---|---|---|
| Nitrogen,Nitrate (As N) | ND | 0.10 |

### Laboratory Control Sample (LCS)

RunID: WET_991119P-115362 Units: mg/L
Analysis Date: 11/19/1999 12:38 Analyst: ES

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Nitrogen,Nitrate (As N) | 10 | 9.4 | 94 | 90 | 110 |

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

Sample Spiked: 99110449-01
RunID: WET_991119P-115364 Units: mg/L
Analysis Date: 11/19/1999 12:38 Analyst: ES

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen,Nitrate (As N) | ND | 10 | 11 | 111 | 10 | 9.5 | 95.1 | 15.3 | 20 | 86 | 115 |

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

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

# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Total Dissolved Solids
**Method:** E160.1
**WorkOrder:** 99110496
**Lab Batch ID:** R5394

### Method Blank

RunID: WET_991123J-116185 Units: mg/L
Analysis Date: 11/23/1999 21:45 Analyst: GJ

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-01D | MW1-GW |

| Analyte | Result | Rep Limit |
|---|---|---|
| Total Dissolved Solids (Residue,Filterable) | ND | 10 |

### Laboratory Control Sample (LCS)

RunID: WET_991123J-116187 Units: mg/L
Analysis Date: 11/23/1999 21:45 Analyst: GJ

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Total Dissolved Solids (Residue,Filtera | 450 | 452 | 100 | 80 | 120 |

### Sample Duplicate

Original Sample: 99110496-01
RunID: WET_991123J-116198 Units: mg/L
Analysis Date: 11/23/1999 21:45 Analyst: GJ

| Analyte | Sample Result | DUP Result | RPD | RPD Limit |
|---|---|---|---|---|
| Total Dissolved Solids (Residue,Filtera | 840 | 760 | 10 | 20 |

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

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

# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Chloride-IC
**Method:** E300

**WorkOrder:** 99110496
**Lab Batch ID:** R5511

### Method Blank

RunID: WET_991123O-118565 Units: mg/L
Analysis Date: 11/23/1999 13:09 Analyst: ES

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-01D | MW1-GW |

| Analyte | Result | Rep Limit |
|---|---|---|
| Chloride | ND | 0.20 |

### Laboratory Control Sample (LCS)

RunID: WET_991123O-118566 Units: mg/L
Analysis Date: 11/23/1999 13:09 Analyst: ES

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Chloride | 10 | 9.5 | 95 | 90 | 110 |

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

Sample Spiked: 99110449-01
RunID: WET_991123O-118568 Units: mg/L
Analysis Date: 11/23/1999 13:09 Analyst: ES

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | 830 | 1000 | 1900 | 104 | 1000 | 1900 | 104 | .0760 | 20 | 80 | 120 |

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

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

# Quality Control Report

## URS Greiner Woodward Clyde

**BYRD PUMP**

**Analysis:** Sulfate
**Method:** E300
**WorkOrder:** 99110496
**Lab Batch ID:** R5513

### Method Blank

RunID: WET_991123P-118585 Units: mg/L
Analysis Date: 11/23/1999 13:09 Analyst: ES

**Samples in Analytical Batch:**

| Lab Sample ID | Client Sample ID |
|---|---|
| 99110496-01D | MW1-GW |

| Analyte | Result | Rep Limit |
|---|---|---|
| Sulfate | ND | 0.20 |

### Laboratory Control Sample (LCS)

RunID: WET_991123P-118586 Units: mg/L
Analysis Date: 11/23/1999 13:09 Analyst: ES

| Analyte | Spike Added | Result | Percent Recovery | Lower Limit | Upper Limit |
|---|---|---|---|---|---|
| Sulfate | 10 | 9.7 | 97 | 90 | 110 |

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

Sample Spiked: 99110496-01
RunID: WET_991123P-118592 Units: mg/L
Analysis Date: 11/23/1999 13:09 Analyst: ES

| Analyte | Sample Result | MS Spike Added | MS Result | MS % Recovery | MSD Spike Added | MSD Result | MSD % Recovery | RPD | RPD Limit | Low Limit | High Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sulfate | 1.1 | 10 | 12 | 106 | 10 | 12 | 107 | 0.357 | 20 | 80 | 120 |

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

*Chain of Custody*

*And*

*Sample Receipt Checklist*

# SPL, Inc.

## Analysis Request & Chain of Custody Record

SPL Workorder No: 9911049 6 — 086257 — page 1 of 1

| | |
|---|---|
| Client Name: | URS Greiner Woodward Clyde |
| Address/Phone: | 6200 La Calma Ste. 210 Austin, TX |
| Client Contact: | DENNIS HAYES |
| Project Name: | APL BYRD PUMP |
| Project Number: | 93990001620000001 |
| Project Location: | HOBBS NEW MEXICO |
| Invoice To: | URSGLEX |

| 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 (8021) 1680 | PAH (8310) | Metals | TDS, Cl, SO4, F, NO3 | DRO (8015) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW1-GW | 11/17/99 | 1625 | | X | W | P,A,V | 1,40 | 1,2 | 8 | X | X | X | X | X | | | | |
| TRIP BLANK | 11/11 199 | | | | W | | | | 2 | X | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | |

Client/Consultant Remarks:

Laboratory remarks: PH 12 11-20-99

Intact? Y N

Temp: 2

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): NMWQS

PM review (initial): PLL

| | | | |
|---|---|---|---|
| 1. Relinquished by Sampler: Dennis Hayes | date 11-17-99 | time 2200 | 2. Received by: |
| 3. Relinquished by: | date | time | 4. Received by: |
| 5. Relinquished by: | date | time | 6. Received by Laboratory: 11/19/99 1000 |

☒ 8880 Interchange Drive, Houston, TX 77054 (713) 660-0901 ☐ 500 Ambassador Caffery Parkway, Scott, LA 70583 (318) 237-4775

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

# Sample Receipt Checklist

| | | | |
|---|---|---|---|
| Workorder: | 99110496 | Received by: | Estrada, Ruben |
| Date and Time Received: | 11/19/99 10:00:00 AM | Carrier name: | FedEx |
| Temperature: | 2 | | |

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

**WORK PLAN**

# INITIAL SITE CHARACTERIZATION

# BYRD PUMP SITE MONUMENT, NEW MEXICO



*Prepared for*
ARCO PIPE LINE COMPANY
15600 JFK BLVD. SUITE 300
HOUSTON, TEXAS

October 1, 1999

**URS Greiner Woodward Clyde**
*A Division of URS Corporation*

6200 La Calma
Suite 210
Austin, TX 78752

Project No. 93-99000162.00

# TABLE OF CONTENTS



## Figures



## Appendices

## 1.0 INTRODUCTION

Arco Pipe Line Company (APL) operates a 4-inch crude oil transfer line in Lea County, New Mexico. Line pressure is increased at a booster pump (Byrd Pump) located 3 miles west of the town of Monument on Hwy 322 and 2.5 miles south of the EL Paso Natural Gas Monument Station (32.35.01N and 103.18.32W) Figure 1-1. Upon inspection of the pump area, APL personnel noted that soil around the pump has been stained by crude oil due to historical operations at the pump.

In April 1999, APL contracted CJR Contractors to remove stained soil from around the pump and line. Upon removal of the soil from around the pump and line, APL personnel noted that stained soil extends to at least two feet below grade (Photo #1 and #2). Soil samples collected from the stockpile of the excavated soil indicated total petroleum hydrocarbons (TPH) by EPA Method 418.1 at 15,200 mg/kg. The benzene, toluene, ethyl benzene, and xylenes (BTEX) analysis by EPA Method 8260 indicated less than detection limits for each constituent. The composite soil sample was also analyzed by TCLP for metals, semivolatiles, volatiles, reactivity (sulfide and cyanide), corrosivity, and ignitability. Appendix A contains the laboratory analytical report for the composite soil sample from the excavated stockpile.

This work plan supercedes the "*Arco Pipeline Remediation Workplan Byrd Pump*" prepared by CJR Contractors dated April 12, 1999.

## 2.0 SITE CHARACTERIZATION ACTIVITIES

Based on site observations and results of the laboratory analysis of the surface soils, APL proposes to characterize the pump area soils and collect a groundwater sample (estimated groundwater depth is 35 to 40 feet below grade) to determine if groundwater has been impacted by historical operations. In order to perform this task APL proposes to drill and sample one soil boring next to the pump and convert this soil boring to a monitoring well. Soil samples will be collected continuously for lithologic logging purposes and select soil samples (5, 10, 15, 20, 30, and 40 feet below grade) will be collected for laboratory analysis. A groundwater sample will also be collected from the monitoring well.

Soil samples will be analyzed for TPH by EPA Method 8015 (GRO-DRO) and BTEX by EPA Method 8021. Additionally, soil samples will be analyzed by the Synthetic Precipitation Leaching Procedure (SPLP) for BTEX and TPH for the purposes of

determining if these constituents may potentially leach out of the soil. Groundwater samples will be analyzed for BTEX by EPA Method 8021, polynuclear aromatic hydrocarbons (PAH) by EPA Method 8310, TPH by EPA Method 8015 (GRO-DRO), major cations and anions, and heavy metals by various EPA 7000 series methods. Additionally, a groundwater sample will be collected for analysis of total dissolved solids.

## 3.0 DATA EVALUATION

Based on the results of the soil analysis and depth of impact to soil, the soil results will be compared to the New Mexico Oil Conservation Division (NMOCD) target criteria. In addition, the soil SPLP results will be evaluated as to whether petroleum constituents can potentially leach out of soil above NMOCD target criteria into the underlying groundwater. The soil data will also provide APL with options as to whether insitu or exsitu remediation is feasible, if it should be required.

The groundwater analytical results will be evaluated so as to determine if groundwater has been impacted above the New Mexico Water Quality Control Commission regulations. Options for potentially remediating groundwater will also be evaluated, if necessary.

## 4.0 REPORTING

A report describing the findings of the initial site characterization will be prepared for submittal to the NMOCD. The report will include the results of the findings, the well/soil boring log, the analytical data collected from the site, and a recommendation for the next step.

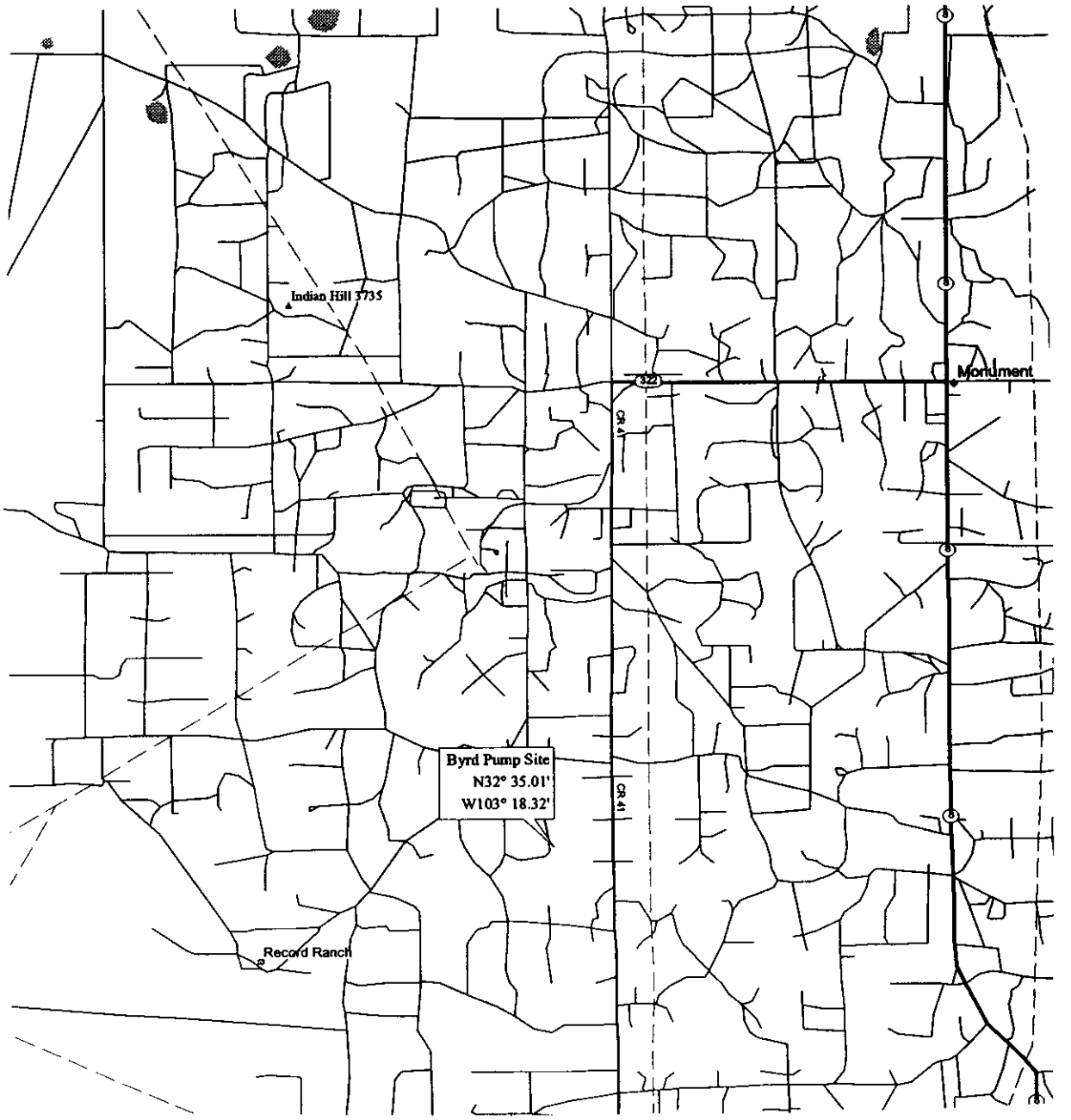
## 5.0 SOIL BORING AND MONITORING WELL CONSTRUCTION AND SAMPLING

The soil boring will be drilled by using air rotary and sampling methods or hollow-stem auger sampling methods. The boring will be soil sampled continuously for lithologic sampling purposes while soil samples for laboratory analytical analysis will be collected at depths of 5, 10, 15, 20, 30, and 40 feet or just above the encountered water table and the total depth of the boring. The soil samples will be analyzed for the constituents listed in section 2.0.

The monitoring well will be constructed in the borehole used for soil sampling. A four-inch diameter schedule 40 PVC well casing and screen (0.010" slots) will used for the

well. The well will be filter packed with a pre-washed silica sand and sealed with 2 feet of hydrated bentonite chips. Above the bentonite chips to ground surface, the borehole annulus will be filled with a cement\bentonite slurry. The surface completion will be constructed with a 4ft x 4ft x 6in concrete pad and a six inch upright locking well cover.

A groundwater sample will be collected from the monitoring well after development and purging. Development will consist of surging and bailing followed by over-pumping until the water is clear and the pH, temperature, and conductivity have stabilized. After the development is complete, the well will be purged prior to sample collection. Purging will be accomplished by pumping at a slow rate (~1 gallon per minute) or until no drawdown is observed. Upon stabilization of the development parameters and the removal of at least three well volumes, the well water will be sampled from the dedicated discharge tubing of the pump. The samples will be placed into the appropriate pre-labeled containers and stored for shipment to the analytical laboratory. Chain-of-custody procedures will be followed during sample handling. The groundwater samples will be analyzed for the constituents listed in section 2.0.




Mag 13.00
Mon Jun 28 17:19 1999
Scale 1:62,500 (at center)

1 Miles

2 KM

Secondary SR/Road/Hwy Ramp
Major Connector
State Route
US Highway
Utility/Pipe
Water
Intermittent River

N

I:\ARCO\BYRD\BYRDPUMP\CADD\BORDER.DWG

| | | | |
|---|---|---|---|
| ARCO PIPE LINE, CO | URS Greiner Woodward Clyde<br>Austin, Texas | SITE LOCATION MAP | PROJECT NO. 9399000182.00 |
| BYRD PUMP<br>3 MILES WEST OF MONUMENT,<br>NEW MEXICO | SCALE: NOTED<br>DRAWN BY: MSM DATE: 6/28/99<br>CHECKED BY: MSM DATE: 6/28/99 | | FIG. NO. 1-1 |

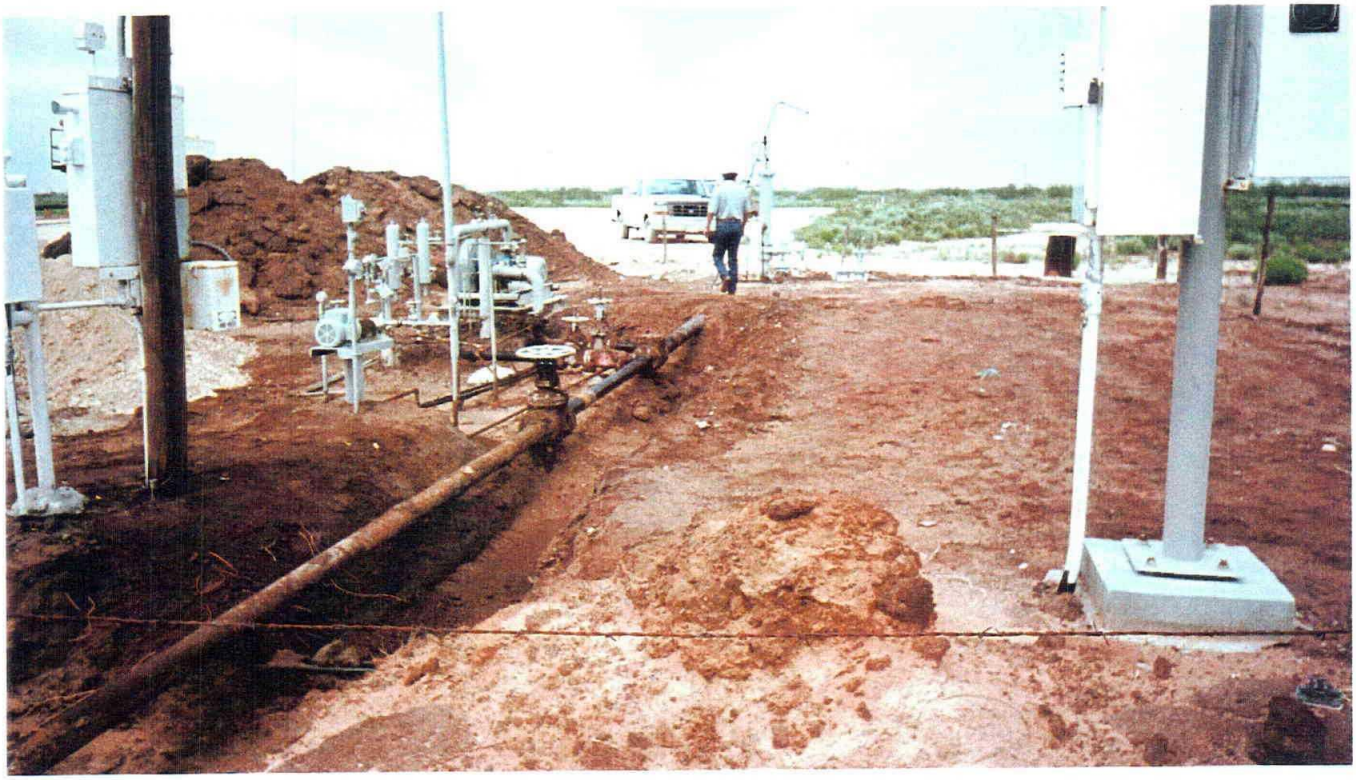


Photo #1: View looking west at pump area. Note excavated soil stock pile in left rear of photo. (photo by RJN 5/28/99)

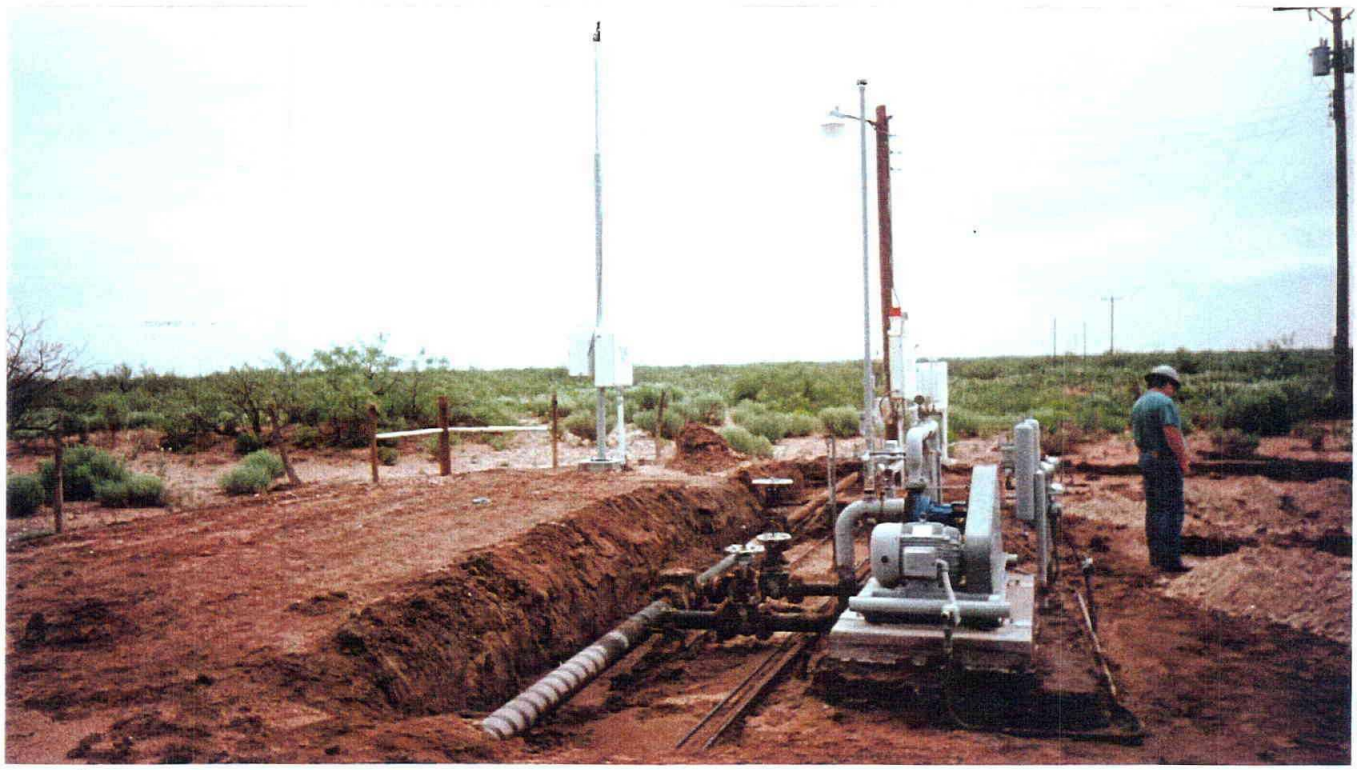


Photo #2: View looking east at pump areas showing limits of initial excavation. (photo by RJN 5/28/99)

| | | | | |
|---|---|---|---|---|
| ARCO PIPE LINE, CO<br>BYRD PUMP<br>3 MILES WEST OF MONUMENT,<br>NEW MEXICO | **URS Greiner Woodward Clyde**<br>Austin, Texas | | SITE PHOTOS | PROJECT NO.<br>9399000152.00 |
| | SCALE: NOTED | DRAWN BY: MSM DATE: 6/28/99<br>CHECKED BY: MSM DATE: 6/28/99 | | PHOTOS<br>1 and 2 |

i:\ARCO\BYRD\BYRDPUMP\CADD\BORDER.DWG

# APPENDIX A
## Laboratory Analytical Data

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS, INC.
ATTN: J.L. HAM
401 W. BROADWAY
DENVER CITY, TX 79323
FAX TO:

Receiving Date: 04/09/99
Reporting Date: 04/12/99
Project Number: NOT GIVEN
Project Name: ARCO PIPELINE
Project Location: BYRD PUMP

Sampling Date: 04/09/99
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

| LAB NO. | SAMPLE ID | TPH (mg/kg) | BENZENE (mg/kg) | TOLUENE (mg/kg) | ETHYL BENZENE (mg/kg) | TOTAL XYLENES (mg/kg) |
|---|---|---|---|---|---|---|
| ANALYSIS DATE: | | 04/09/99 | 04/09/99 | 04/09/99 | 04/09/99 | 04/09/99 |
| H4098-1 | BYRD PUMP | 15200 | <0.002 | <0.002 | <0.002 | <0.006 |
| Quality Control | | 254 | 0.087 | 0.099 | 0.092 | 0.280 |
| True Value QC | | 240 | 0.100 | 0.100 | 0.100 | 0.300 |
| % Recovery | | 106 | 87.4 | 98.8 | 92.4 | 93.4 |
| Relative Percent Difference | | 1.9 | 2.6 | 3.1 | 2.6 | 1.8 |

METHODS: TRPHC - EPA 600/7-79-020, 418.1; BTEX - EPA SW-846 8260

Chemist

4/12/99
Date

H4098.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS, INC.
ATTN: J.L. HAM
401 W. BROADWAY
DENVER CITY, TX 79323
FAX TO:

Receiving Date: 04/09/99
Reporting Date: 04/15/99
Project Number: NOT GIVEN
Project Name: ARCO PIPELINE
Project Location: BYRD PUMP

Sampling Date: 04/09/99
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: AH/GP

TCLP METALS

| LAB NO. | SAMPLE ID | As ppm | Ag ppm | Ba ppm | Cd ppm | Cr ppm | Pb ppm | Hg ppm | Se ppm |
|---|---|---|---|---|---|---|---|---|---|
| ANALYSIS DATE: | | 04/13/99 | 04/14/99 | 04/14/99 | 04/14/99 | 04/14/99 | 04/14/99 | 04/15/99 | 04/13/99 |
| EPA LIMITS: | | 5 | 5 | 100 | 1 | 5 | 5 | 0.2 | 1 |
| H4098-1 | BYRD PUMP | <1 | <1 | <5 | <0.1 | <1 | <1 | <0.02 | <0.1 |
| Quality Control | | 0.201 | 1.020 | 19.69 | 0.506 | 3.964 | 2.999 | 0.0095 | 0.051 |
| True Value QC | | 0.200 | 1.000 | 20.00 | 0.500 | 4.000 | 3.000 | 0.0100 | 0.050 |
| % Recovery | | 101 | 102 | 98 | 101 | 99 | 100 | 95 | 102 |
| Relative Standard Deviation | | 2.77 | 0.83 | 0.28 | 1.27 | 1.11 | 1.38 | 2.4 | 3.6 |
| METHODS: EPA 1311, 600/4-91/ | | 206.2 | 272.1 | 208.1 | 213.1 | 218.1 | 239.1 | 245.1 | 270.2 |

Gayle A. Potter, Chemist

04/15/99
Date

H4098M.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS, INC.
ATTN: J.L. HAM
401 W. BROADWAY
DENVER CITY, TX 79323
FAX TO:

Receiving Date: 04/09/99
Reporting Date: 04/13/99
Project Number: NOT GIVEN
Project Name: ARCO PIPELINE
Project Location: BYRD PUMP
Lab Number: H4098-1
Sample ID: BYRD PUMP

Analysis Date: 04/12/99
Sampling Date: 04/09/99
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

| TCLP SEMIVOLATILES (ppm) | EPA LIMIT | Sample Result H4098-1 | Method Blank | QC | % Recov. | True Value QC |
|---|---|---|---|---|---|---|
| Pyridine | 5.00 | <0.020 | <0.005 | 0.016 | 32 | 0.050 |
| 1,4-Dichlorobenzene | 7.50 | <0.020 | <0.005 | 0.034 | 68 | 0.050 |
| o-Cresol | 200 | <0.020 | <0.005 | 0.034 | 68 | 0.050 |
| m, p-Cresol | 200 | <0.020 | <0.005 | 0.034 | 68 | 0.050 |
| Hexachloroethane | 3.00 | <0.020 | <0.005 | 0.033 | 66 | 0.050 |
| Nitrobenzene | 2.00 | <0.020 | <0.005 | 0.034 | 68 | 0.050 |
| Hexachloro-1,3-butadiene | 0.500 | <0.020 | <0.005 | 0.039 | 78 | 0.050 |
| 2,4,6-Trichlorophenol | 2.00 | <0.020 | <0.005 | 0.041 | 82 | 0.050 |
| 2,4,5-Trichlorophenol | 400 | <0.020 | <0.005 | 0.042 | 84 | 0.050 |
| 2,4-Dinitrotoluene | 0.130 | <0.020 | <0.005 | 0.042 | 84 | 0.050 |
| Hexachlorobenzene | 0.130 | <0.020 | <0.005 | 0.044 | 88 | 0.050 |
| Pentachlorophenol | 100 | <0.020 | <0.005 | 0.041 | 82 | 0.050 |

| | % RECOVERY |
|---|---|
| Fluorophenol | 75 |
| Phenol-d5 | 62 |
| Nitrobenzene-d5 | 100 |
| 2-Fluorobiphenyl | 110 |
| 2,4,6-Tribromophenol | 115 |
| Terphenyl-d14 | 104 |

METHODS EPA SW 846-8270, 1311, 3510

Burgess J A Cooke, Ph. D.

4/13/99
Date

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS, INC.
ATTN: J.L. HAM
401 W. BROADWAY
DENVER CITY, TX 79323
FAX TO:

Receiving Date: 04/09/99
Reporting Date: 04/13/99
Project Number: NOT GIVEN
Project Name: ARCO PIPELINE
Project Location: BYRD PUMP
Lab Number: H4098-1
Sample ID: BYRD PUMP

Analysis Date: 04/12/99
Sampling Date: 04/09/99
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

| TCLP VOLATILES (ppm) | EPA LIMIT | Sample Result H4098-1 | Method Blank | QC | %Recov. | True Value QC |
|---|---|---|---|---|---|---|
| Vinyl Chloride | 0.20 | <0.005 | <0.005 | 0.102 | 102 | 0.100 |
| 1,1-Dichloroethylene | 0.7 | <0.005 | <0.005 | 0.104 | 104 | 0.100 |
| Methyl Ethyl Ketone | 200 | <0.050 | <0.050 | 0.116 | 116 | 0.100 |
| Chloroform | 6.0 | <0.005 | <0.005 | 0.106 | 106 | 0.100 |
| 1,2-Dichloroethane | 0.5 | <0.005 | <0.005 | 0.099 | 99 | 0.100 |
| Benzene | 0.5 | <0.005 | <0.005 | 0.111 | 111 | 0.100 |
| Carbon Tetrachloride | 0.5 | <0.005 | <0.005 | 0.094 | 94 | 0.100 |
| Trichloroethylene | 0.5 | <0.005 | <0.005 | 0.097 | 97 | 0.100 |
| Tetrachloroethylene | 0.7 | <0.005 | <0.005 | 0.090 | 90 | 0.100 |
| Chlorobenzene | 100 | <0.005 | <0.005 | 0.099 | 99 | 0.100 |
| 1,4-Dichlorobenzene | 7.5 | <0.005 | <0.005 | 0.093 | 93 | 0.100 |

| | % RECOVERY |
|---|---|
| Dibromofluoromethane | 90 |
| Toluene-d8 | 120 |
| Bromofluorobenzene | 88 |

METHODS: EPA SW 846-8260, 1311

Burgess J. A. Cooke, Ph. D.

4/13/99
Date

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS, INC.
ATTN: J.L. HAM
401 W. BROADWAY
DENVER CITY, TX 79323
FAX TO:

Receiving Date: 04/09/99
Reporting Date: 04/13/99
Project Number: NOT GIVEN
Project Name: ARCO PIPELINE
Project Location: BYRD PUMP

Sampling Date: 04/09/99
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC/AH

| LAB NUMBER | SAMPLE ID | REACTIVITY Sulfide (ppm) | REACTIVITY Cyanide (ppm) | CORROSIVITY (pH) | IGNITABILITY (°F) |
|---|---|---|---|---|---|
| ANALYSIS DATE: | | 04/13/99 | 04/13/99 | 04/09/99 | 04/09/99 |
| H4098-1 | BYRD PUMP | Not reactive | Not reactive | 7.45 | Nonflammable |
| Quality Control | | NR | NR | 7.02 | NR |
| True Value QC | | NR | NR | 7.00 | NR |
| % Recovery | | NR | NR | 100 | NR |
| Relative Percent Difference | | NR | NR | 0.3 | NR |

METHOD: EPA SW 846-7.3, 7.2, 1030 (proposed), 1311, *40 CFR 261*

Chemist

4/13/99
Date

# WORKPLAN FOR EXCAVATION BACKFILLING AND QUARTERLY GROUNDWATER MONITORING

# BYRD PUMP SITE MONUMENT, NEW MEXICO

*Prepared for*
BP PIPELINES (NORTH AMERICA), INC.
LISLE, ILLINOIS

March, 2002

URS

9400 Amberglen Blvd.
Austin, TX 78729

Project No. 806035.01

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## Figures



## Appendices

# 1.0 INTRODUCTION

## Background

Arco Pipe Line Company (APL) now BP Pipelines (North America), Inc. formerly operated a 4-inch crude oil transfer line in Lea County, New Mexico. The line runs east-west in the area near the town of Monument, New Mexico. Line pressure is increased at a booster pump (Byrd Pump) located 3 miles west of the town of Monument on Hwy 322 and 2.5 miles south of the El Paso Natural Gas Monument Station (32.35.01N and 103.18.32W) Figure 1-1. Upon inspection of the pump area, APL personnel noted that soil around the pump has been stained by crude oil due to historical operations at the pump.

In April 1999, APL contracted CJR Contractors to remove stained soil from around the pump and line. Prior to excavation the pump and line were re-routed around the impacted area to facilitate excavation. Upon removal of the surface soil from around the pump and line, APL personnel noted that stained soil extended deeper than anticipated. Soil samples collected from the stockpile of the excavated soil indicated a release of petroleum hydrocarbons to native soils. Excavated soils were placed in an onsite land farm area next to the pump. Soil Remediation activities consisted of excavation and land farming of approximately 32,000 yards of impacted soil. Excavation and land farming activities were performed from April 2000 through December 2000.

In a letter dated December 10$^{th}$, 2001, the New Mexico Oil Conservation Division (OCD) has concurred with the soil remediation activities and has required that BP backfill the excavation. After this requirement is met, the OCD has directed BP, to install groundwater monitoring wells and perform quarterly monitoring to demonstrate that ground water at the site is below New Mexico Water Quality Control Commission (WQCC) standards for 4 consecutive quarters. (*See the attached letter from NMOCD, Appendix A*).

## Local Hydrogeology

According to the United States Geological Survey publication "Geology and Groundwater Conditions in Southern Lea County, New Mexico," the depths of groundwater wells in the vicinity of the site range from 53 to 283 feet below ground surface (bgs). Groundwater depths range from 18 to 34 feet below ground surface. The

water wells are screened in either the Quaternary-age alluvium or the Tertiary-age Ogallala Formation.

Depth to groundwater at the pump site is approximately 33 feet below grade. The water table exists in a silty and gravelly sand unit. Based on groundwater flow data from nearby sites, the groundwater flow direction has been to the south-southeast.

## 2.0 SCOPE OF WORK

### Backfill Soil Sampling

OCD has required that the excavation be backfilled and that previously landfarmed soils may be used to backfill the excavation. Prior to using the landfarmed soils, OCD has required that soil confirmation samples be collected and analyzed for BTEX and TPH. To date a total of 96 grab samples have been collected and composited to 24 representative samples that were analyzed for TPH. These results indicated an average TPH concentration of 95mg/kg ranging from a high of 326mg/kg to non-detect at <50mg/kg. Only 6 of the 24 soil samples were above the 100mg/kg guidance criteria. Additionally, the TPH results were all in the C10 to C28 carbon range.

Based on this preliminary assessment of the landfarmed soils, BP requests that OCD concur with the sampling and analysis of the landfarmed soils as outlined below:

- 40 additional representative samples be collected to bring the total number of samples collected to 64. This will represent one sample per 500 yards of soil. Each of the 40 samples will be composited from 5 locations on the stockpile.

- The samples will be analyzed for TPH by EPA method 8015 (GRO and DRO) since previous sampling and analysis has not indicated the presence of any light fraction hydrocarbons (ie, BTEX)

BP proposes to sample and analyze the landfarmed soils prior to backfilling and obtain NMOCD concurrence for use of the soils prior to backfilling.

### Excavation Backfilling

Upon concurrence of the OCD regarding the use of the landfarmed soils as backfill, BP will initiate refilling of the excavation. The landfarmed soils will be placed on top of the soils previously removed from the excavation that were not impacted by the release.

Soils of this nature were removed in order to gain access to the impacted soils and are currently located in an adjacent stockpile. Backfilling will be performed in lifts in order to allow for adequate compaction. Once the excavation is filled to existing grade, the area will be planted with similar vegetation existing in the area.

## Monitoring Well Construction and Sampling

In order to characterize groundwater, as directed by OCD, BP proposes to install four monitoring wells at the previous location of the pump and sample the wells on a quarterly basis for one year. The locations of the proposed monitoring wells are shown on Figure 1-2. Soil samples will be collected continuously for lithologic logging purposes and groundwater samples will be collected from the monitoring wells.

The wells will be installed under the following OCD approved conditions:

1. BP shall install four groundwater monitoring wells at the locations shown in figure 1-2.
2. BP shall wait a minimum of 24 hours after the monitor wells have been developed to purge and sample ground water from the monitor wells.
3. Ground water samples taken for metals analyses shall be analyzed for metals listed in the New Mexico Water Quality Control Commission regulations.
4. BP shall submit a report on the results of the quarterly monitoring to the OCD. The report shall be submitted to the OCD Santa Fe Office with a copy provided to the OCD Hobbs District Office.
5. All wastes containing petroleum hydrocarbons above OCD standards shall be disposed of at an OCD approved facility.
6. BP shall notify the OCD at least 24 hours in advance of all scheduled activities such that the OCD has the opportunity to witness the events and split samples.

The monitor well boreholes will be drilled by using hollow-stem auger method. The boreholes will be soil sampled continuously for lithologic description purposes. Since the wells will be drilled outside the excavated area, soil cuttings will be placed with the landfarmed soils and used as backfill material.

The monitoring wells will be constructed with two-inch diameter schedule 40 PVC well casing and screen (0.010" slots). Twenty feet of screen will be used from 30 to 50 feet below grade. The wells will be filter packed with pre-washed silica sand and sealed with 2 feet of hydrated bentonite chips. Above the bentonite chips to ground surface, the borehole annulus will be filled with a cement\bentonite grout. The surface completions will be constructed with a 4ft x 4ft x 4in concrete pad and a three foot upright locking well cover. Four 3-inch diameter bollards will be placed around each well for protection.

Groundwater samples will be collected from the monitoring wells after development and purging. Development will consist of surging and bailing followed by over-pumping until the water is clear and the pH, temperature, and conductivity have stabilized. After the development is complete, and a minimum of 24 hours has passed, the wells will be purged prior to sample collection. Purging will be accomplished by pumping at a slow rate (~1 gallon per minute) or until no drawdown is observed. Upon stabilization of the purging parameters and the removal of at least three well volumes, the well water will be sampled from the dedicated discharge tubing of the pump. The samples will be placed into the appropriate pre-labeled containers and stored for shipment to the analytical laboratory. Chain-of-custody procedures will be followed during sample handling. Groundwater samples will be analyzed for BTEX by EPA Method 8021, polynuclear aromatic hydrocarbons (PAH) by EPA Method 8310, TPH by EPA Method 8015 (GRO-DRO), major cations and anions, and heavy metals by various EPA 7000 series methods. Additionally, a groundwater sample will be collected for analysis of total dissolved solids.

### Quarterly Well Sampling and Analysis

After the monitoring wells are constructed and sampled initially, three additional quarters of sampling and analysis of the groundwater will be performed. Samples will collected and analyzed from the four proposed monitoring wells as described above. Well purging and sample handling will be performed as described above.

## 3.0 DATA EVALUATION AND REPORTING

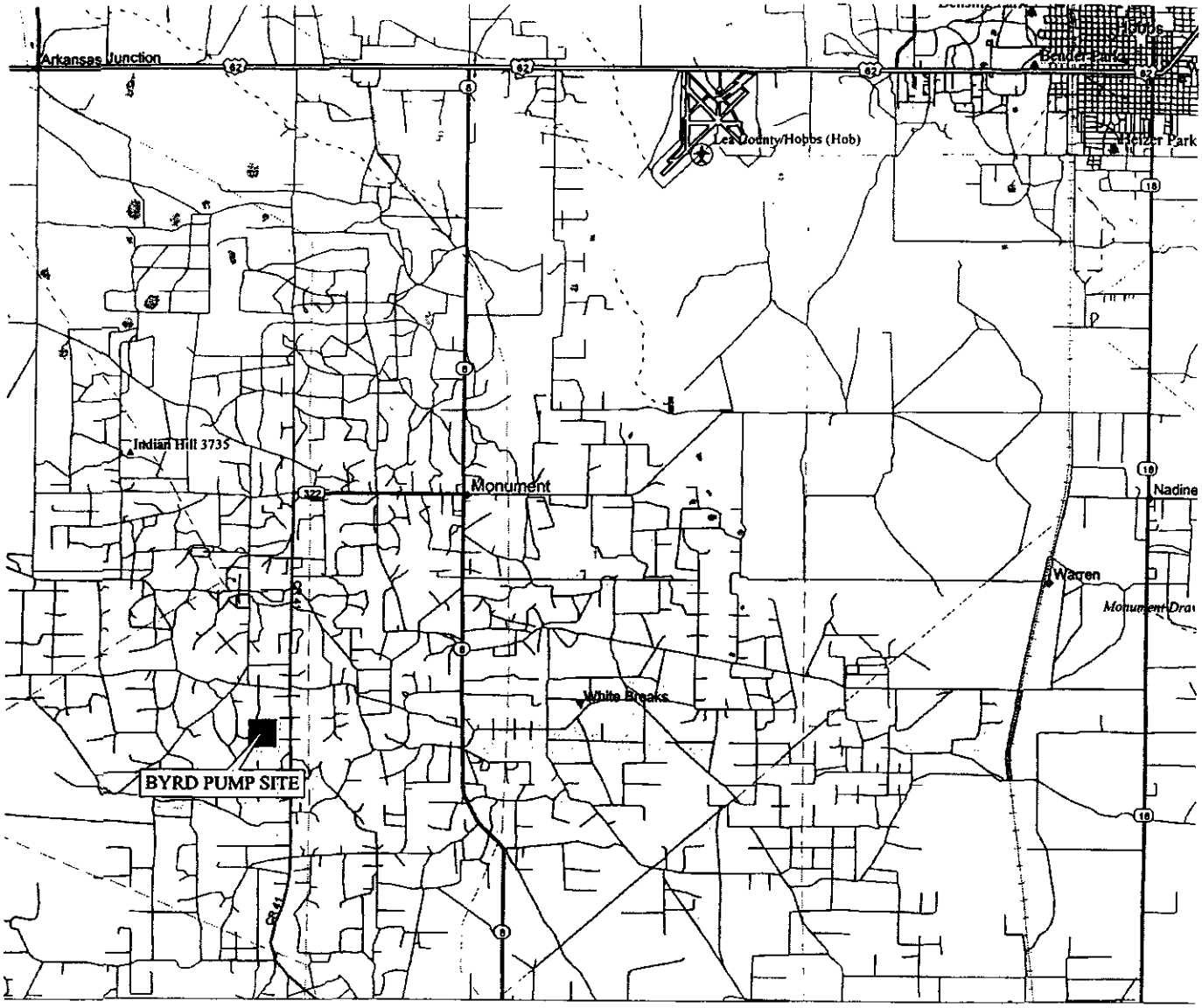
After the landfarmed soils that will be used for backfilling are sampled and analyzed, BP will report the results of the backfill sampling and analysis to the OCD prior to using the soil for backfill. BP will request concurrence from the OCD for use of the landfarmed soils as backfill prior to backfilling the excavation.

After the monitoring wells are installed and four quarters of groundwater monitoring have been completed, a report presenting the results of the quarterly sampling and analysis will be issued to the OCD. The groundwater analytical results will be compared to the New Mexico Water Quality Control Commission (WQCC) regulations and based on the comparison BP will request closure if the WQCC standards are met.

The report describing the results of the quarterly sampling will include:

1. A description of all monitor well construction and sampling.
2. A map showing historical spill areas, excavated areas, monitor well and soil boring locations as well as the direction and magnitude of the hydraulic gradient.
3. Geologic logs and well completion diagrams for each monitor well.
4. Analytical data tabulated with OCD/WQCC standards shown.
5. The laboratory analytical results of all soil and water quality sampling including the quality assurance/control data.

# FIGURES




Mag 12.00
Tue Jan 29 11:14 2002
Scale 1:125,000 (at center)
2 Miles
2 KM

- Local Road
- Major Connector
- State Route
- Trail
- US Highway
- Utility/Pipe
- Railroad
- Small Town
- Airfield
- Summit
- Geographic Feature
- Park/Reservation
- Locale
- City

BP PIPELINES
(NORTH AMERICA), INC.
BYRD PUMP SITE
MONUMENT NEW MEXICO

**URS Corporation**
Austin, Texas

SITE LOCATION MAP

FILE NO. 806035.01

FIG. NO. 1-1

| SCALE: | DRAWN BY: rjn | DATE: 1/9/99 |
|---|---|---|
| NOTED | MODIFIED BY: MSM | DATE: 1/29/2002 |

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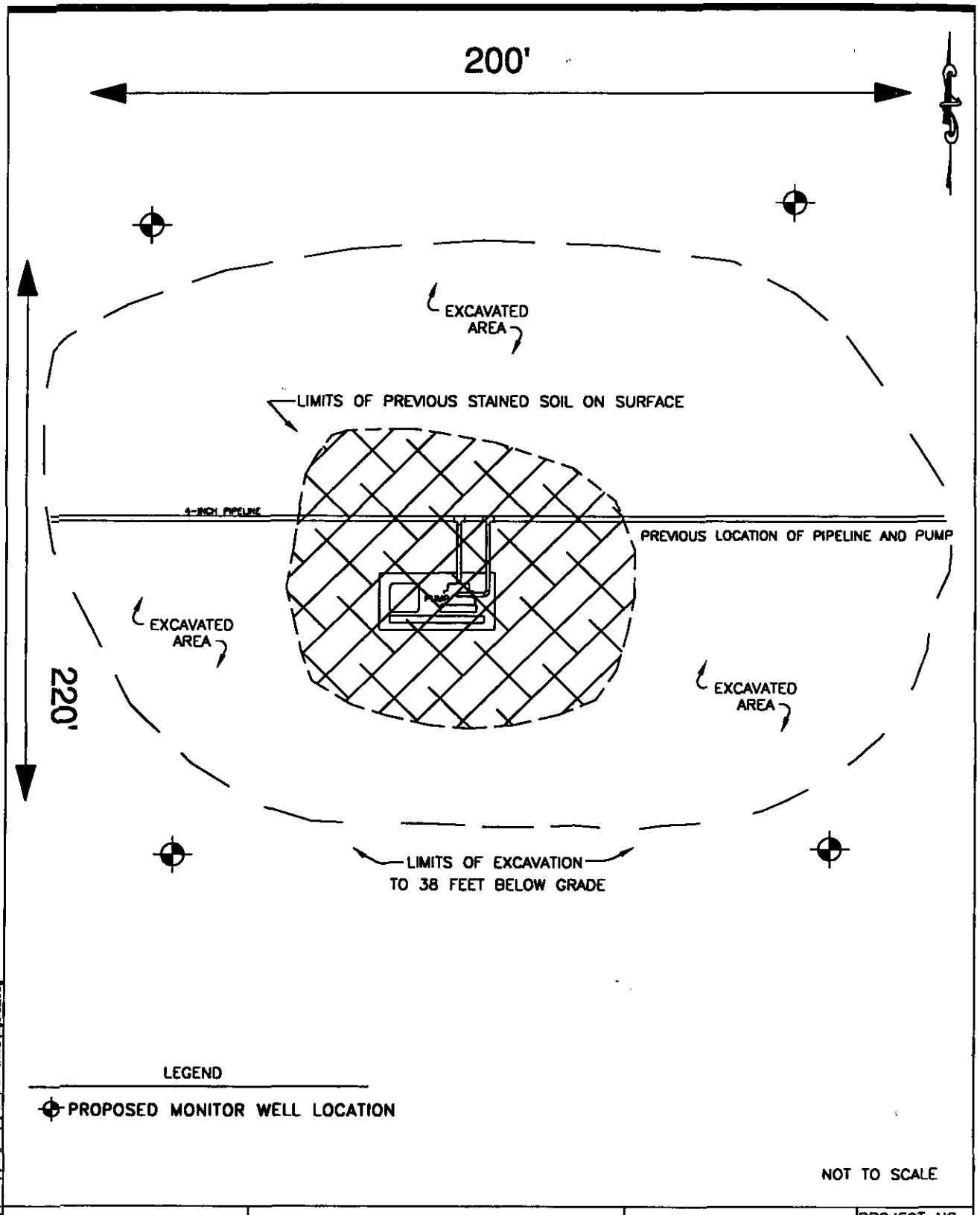


LEGEND

⊕ PROPOSED MONITOR WELL LOCATION

NOT TO SCALE

| | | | |
|---|---|---|---|
| BP PIPELINES (NORTH AMERICA), INC. BYRD PUMP SITE MONUMENT, NEW MEXICO | **URS Corporation** Austin, Texas | PROPOSED MONITORING WELL LOCATIONS | PROJECT NO. 806035.01 |
| | SCALE: SCALE; DRAWN BY: SAF; DATE: 1/3/2000; CHKD. BY: MSM; DATE: 1/29/2002 | | FIGURE NO. 1-2 |

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# APPENDIX A

# NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

GARY E. JOHNSON
*Governor*
Jennifer A. Salisbury
Cabinet Secretary

Lori Wrotenbery
*Director*
Oil Conservation Division


December 10, 2001

**CERTIFIED MAIL**
**RETURN RECEIPT NO. 5357-8079**

Mr. Ray Glover
BP Pipeline (North America), Inc.
Mail Code 7039A
801 Warrenville Rd.
Lisle, Illinois 60532

**RE: CASE #1R0034**
**BYRD PUMP SITE**
**MONUMENT, NEW MEXICO**

Dear Mr. Glover:

The New Mexico Oil Conservation Division (OCD) has reviewed BP Pipeline (North America), Inc.'s (BP) May 8, 2001 "SOIL REMEDIATION REPORT, BP PIPELINES (NORTH AMERICA), INC., BYRD PUMP RELEASE SITE, MONUMENT, NEW MEXICO" which was submitted on behalf of BP by their consultant URS Corporation. This document contains the results of BP's soil and ground water remediation activities at the Byrd Pump Release Site southwest of Monument, New Mexico. The document also requests closure of the site based upon the results of soil and ground water sampling.

The soil investigation and remediation actions taken to date are satisfactory. The OCD understands that the excavation is still currently open. The OCD requires that BP backfill the excavation. The excavation may be backfilled with landfarmed soils that meet the OCD's guidance criteria of 100 ppm for this area. If landfarmed soils are used for backfill, the OCD requires that a soil confirmation sample be taken for every 100 yards of backfill and analyzed for concentrations of BTEX and TPH using EPA approved methods, and that BP submit a report to the OCD containing the backfill results.

Since ground water at the site was originally contaminated in excess of New Mexico Water Quality Control Commission (WQCC) standards, the OCD cannot issue final closure approval until BP can demonstrate that ground water at the site is below WQCC standards for 4 consecutive quarters. The OCD requires that BP submit a work plan to install ground water monitoring wells to meet this objective. The work plan shall be submitted to the OCD Santa Fe Office by February 10, 2002 with a copy provided to the OCD Hobbs District Office.

If you have any questions, please call me at (505) 476-3491.

Sincerely,

William C. Olson
Hydrologist
Environmental Bureau

xc: Chris Williams, OCD Hobbs District Supervisor
Rick Nelson, URS Greiner Woodward Clyde

**REPORT**

# SOIL REMEDIATION REPORT

# BYRD PUMP SITE
# MONUMENT, NEW MEXICO



*Prepared for*
BP PIPELINE (NORTH AMERICA), Inc.
801 WARRENVILLE RD.
LISLE, IL 60532

MAY, 2001

URS
8501 N Mopac
Austin, TX 78752
512-454-4797

Project No. 806035.01

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## Figures



## Photos



## Tables



## Appendices

## Background

Arco Pipe Line Company (APL) now BP Pipelines (North America), Inc. formerly operated a 4-inch crude oil transfer line in Lea County, New Mexico. The line runs east-west in the area near the town of Monument, New Mexico. Line pressure is increased at a booster pump (Byrd Pump) located 3 miles west of the town of Monument on Hwy 322 and 2.5 miles south of the El Paso Natural Gas Monument Station (32.35.01N and 103.18.32W) Figure 1-1. Upon inspection of the pump area, APL personnel noted that soil around the pump has been stained by crude oil due to historical operations at the pump.

In April 1999, APL contracted CJR Contractors to remove stained soil from around the pump and line. Upon removal of the surface soil from around the pump and line, APL personnel noted that stained soil extended deeper than anticipated. Soil samples collected from the stockpile of the excavated soil indicated a release of petroleum hydrocarbons to native soils. Excavated soils were placed in an onsite land farm area next to the pump.

On October 1, 1999, URS, on behalf of APL, submitted an *Initial Site Characterization Work Plan, ARCO Pipe Line Byrd Pump Site, Monument, New Mexico* to the New Mexico Oil Conservation Division (NMOCD). The work plan was approved by the NMOCD on October 15,1999. The work plan called for the sampling of one soil boring and the installation of one monitor well next to the pump. This field investigation concluded that the soil in the vicinity of the pump had been impacted to a depth of approximately 38 feet below grade. The investigation also concluded that groundwater had been impacted by historical leaks and spills from the pump. (see *Initial Site Characterization Report, January 2000).*

Based on the findings from the initial field investigation, APL proposed to remediate soil insitu by way of active bioventing (as reported in the *Initial Site Characterization Report)*, however due to landowner concerns, APL decided to excavate and land farm the impacted soil on an adjacent parcel of land leased to APL. This report documents the results of the excavation and soil land farm activities and presents conclusions based on evaluation of data.

## Water Well Search and Local Hydrogeology

A water well search was conducted by Environmental Data Resources on December 15,1999 (Appendix A). Two wells (A-1, A-2) were identified within 1/4 mile of the site. One well (3) was located ¼ to ½ mile of the site and five domestic supply wells are located ½ to 1 mile from the site. According to the United States Geological Survey publication "Geology and Groundwater Conditions in Southern Lea County, New Mexico," the depths of groundwater wells in the

vicinity of the site range from 53 to 283 feet below ground surface (bgs). Groundwater depths range from 18 to 34 feet below ground surface. The water wells are screened in either the Quaternary-age alluvium or the Tertiary-age Ogallala Formation.

Soil Remediation activities consisted of excavation and land farming of approximately 32,000 yards of impacted soil. Excavation and land farming activites were performed from April 2000 through December 2000.

**Excavation and Land Farming**

In April 2000, excavation began around the Byrd pump. Stained soil had been observed on the ground surface around the pump for approximately 25 feet in all directions away from the pump (Figure 2-2, photos 1 and 2). Additionally, based on the results of soil samples collected from the monitoring well soil boring located next to the pump, soil had been impacted vertically to a depth of 38 feet below grade (see soil boring log, Appendix A).

Excavation began after the pump and pipeline were re-routed around the proposed excavation area. Soil excavation was initially performed within a 25 foot radius of the pump to a depth of approximately 30 feet below grade. At 30 feet depth the oil impacted soil appeared to "pancake out" in a radial fashion on the water table. Based on observations during the excavation activities the radius of impacted soil at 30 to 38 feet below grade was now approximately 100 feet away from the pump. It appears that the water table in the area had historically fluctuated causing an eight foot thick section of soil 200 feet in diameter to be impacted at 30 to 38 feet below grade. Soil above the 30 foot demarcation, between 25 and 100 feet away from the pump, had not been affected by the release.

In order to excavate to 30 feet during the excavation activities, unimpacted soil had to be removed to construct access ramps. This soil along with unimpacted soil located above the impacted soil at depth was also removed and stockpiled in a separate pile (Figure 2-2). Impacted soil from the ground surface to 38 feet below grade was excavated and moved to the land farm area. Since some of the impacted soil was observed below the current water table level, groundwater had to be pumped from the excavation in order to excavate below the water table. Groundwater pumped from the excavation was transported for disposal at a local injection well. Approximately 26,500 barrels of water with small amounts of residual oil was pumped from the excavation.

Soil excavation in the area of the Byrd pump removed approximately 72,000 yds of soil of which approximately 32,000 was impacted by the release. The impacted soil was land farmed by spreading, drying, and mixing on a parcel of land next to the release site. As the wet soil dried, it was mixed with previously dried soil until a consistent mixture was attained. The process of spreading and drying was continued until sample results indicated a reduction in total petroleum hydrocarbon (TPH) concentrations.

**Confirmation Soil Sampling**

Upon completion of the excavation and removal of all visually stained soils, confirmation soil samples were collected from the walls and floor of the excavation. Figure 2-1 shows the locations of the samples from the excavation. A total of seven soil samples from the walls and one composite bottom sample were collected and analyzed. A water sample was also taken from the excavation area after the excavation and water pumping was complete (photo #3). In the land farm area, soil samples were collected from 24 cells (Figure 2-2, photo #4). Composite soil samples were taken in a 4 spot pattern in each cell.

Soil samples from the land farm area were analyzed for TPH by EPA Method 8015 modified (GRO-DRO). Soil samples from the excavation pit were analyzed for TPH by EPA Method 8015 modified (GRO-DRO), BTEX by EPA Method 8021B, and chloride. The water sample from the excavation pit was analyzed for BTEX by EPA Method 8260, TPH by EPA Method 418.1, and chloride. All soil and water samples were placed in the appropriate pre-labled containers and stored on ice prior shipment the analytical laboratory.

**Analytical Results**

A total of 8 soil samples from the excavation pit were collected (Figure 2-1). The average TPH concentration from the 8 soil samples collected from the excavation walls and floor was 67.5 mg/kg. Table 2-1 presents the results of the laboratory analysis for soil samples collected from the walls and floor of the excavation.

A total of 24 soil samples from the land farm area were collected (Figure 2-2). The average TPH concentration from the 24 soil samples collected from the land farm area was 95 mg/kg. Table 2-2 presents the results of the laboratory analysis for soil samples collected from the land farm area.

One water sample was also collected from the excavation pit after groundwater had recharged the area from the pumping. Table 2-3 presents the results of the water sample collected from the excavation pit. Laboratory analytical reports for the soil and groundwater samples discussed above are attached as Appendix B.

Based on the analytical results from the wall and floor samples collected from the excavation area, impacted soil above the NMOCD recommended remediation level of 100 mg/kg for TPH has been removed. Removal of residual free phase TPH from the groundwater occurred during pumping of the pit water. Analytical results from a water sample collected from the pit indicated constituents below the New Mexico Water Quality Control Commission groundwater standards for human health. Additionally, all visual signs of petroleum hydrocarbons have been removed from the pit. Results obtained from the sampling and analysis of the land farmed soil indicate an overall reduction of TPH to below the NMOCD recommended remediation level.

Based on the results obtained from the soil and groundwater remediation efforts at the Byrd Pump Site, BP Pipelines (North America), Inc. requests a "No Further Action" finding from the NMOCD for the Byrd Pump Release Site.

# TABLES

**TABLE 2-1**
**SOIL ANALYTICAL RESULTS**
**EXCAVATION PIT**
**BYRD PUMP SITE - MONUMENT, NEW MEXICO**
**(samples collected 8/28/00 and 10/09/00**

| Sample ID | Wall Sample # 1 30'-32' | Wall Sample # 2 30'-32' | Wall Sample # 3 30'-32' | Wall Sample # 4 30'-32' | Wall Sample # 5 30'-32' | Wall Sample # 6 30'-32' | Wall Sample #7 30'-32' Composite | Bottom Sample * |
|---|---|---|---|---|---|---|---|---|
| **CONSTITUENT** | | | | | | | | |
| **TPH (mg/kg)** | | | | | | | | |
| TPH (Method 418.1) | -- | -- | -- | -- | -- | -- | -- | 80.4 |
| GRO (C6-C10) (Method SW-846 8015M) | <50 | <50 | <50 | <50 | <50 | <50 | -- | -- |
| DRO (>C10-C28) (Method SW-846 8015M) | 67.1 | <50 | <50 | <50 | <50 | 125 | -- | -- |
| **BTEX (mg/kg)** | | | | | | | | |
| Benzene | -- | -- | -- | -- | -- | -- | <0.005 | <0.005 |
| Ethylbenzene | -- | -- | -- | -- | -- | -- | <0.005 | <0.005 |
| Toluene | -- | -- | -- | -- | -- | -- | <0.005 | <0.005 |
| Xylenes, Total | -- | -- | -- | -- | -- | -- | <0.005 | <0.015 |
| Chloride | -- | -- | -- | -- | -- | -- | -- | 259 |

**Notes:**

mg/kg - milligrams per kilogram

TPH = Total Petroleum Hydrocarbons

BTEX = benzene, toluene, ethyl benzene, xylenes

-- = Not analyzed

# TABLE 2-2
# SOIL ANALYTICAL RESULTS
# LAND FARMED SOIL
# BYRD PUMP SITE - MONUMENT, NEW MEXICO
# (samples collected 1/10/01)

| CONSTITUENT (mg/kg) | TPH (Method SW-846 8015M) GRO (C6-C10) | TPH (Method SW-846 8015M) DRO (>C10-C28) |
|---|---|---|
| SAMPLE ID | NMOCD REMEDIATION LEVEL 100 mg/kg | NMOCD REMEDIATION LEVEL 100 mg/kg |
| RSA-1 | <50 | <50 |
| RSA-2 | <50 | <50 |
| RSA-3 | <50 | 64.1 |
| RSA-4 | <50 | <50 |
| RSA-5 | <50 | 88.3 |
| RSA-6 | <50 | 86.3 |
| RSA-7 | <50 | 161 |
| RSA-8 | <50 | 223 |
| RSA-9 | <50 | 104 |
| RSA-10 | <50 | 200 |
| RSA-11 | <50 | <50 |
| RSA-12 | <50 | 177 |
| RSA-13 | <50 | 326 |
| RSA-14 | <50 | 92.1 |
| RSA-15 | <50 | <50 |
| RSA-16 | <50 | <50 |
| RSA-17 | <50 | 79.1 |
| RSA-18 | <50 | <50 |
| RSA-19 | <50 | <50 |
| RSA-20 | <50 | 66.3 |
| RSA-21 | <50 | <50 |
| RSA-22 | <50 | <50 |
| RSA-23 | <50 | <50 |
| RSA-24 | <50 | <50 |

**Notes:**

RSA = Reclaimed Soil Area

mg/kg = milligrams per kilogram

NMOCD = New Mexico Oil Conservation Division

TPH = Total Petroleum Hydrocarbons

# TABLE 2-3
# GROUNDWATER ANALYTICAL RESULTS
# EXCAVATION PIT WATER
# BYRD PUMP SITE - MONUMENT, NEW MEXICO
# (samples collected 9/21/00)

| CONSTITUENT | Excavation Pit Lab ID# - H5197-1 | New Mexico WQCC Groundwater Standards (HHS)[1] |
|---|---|---|
| **TPH (mg/L)** | | |
| TPH (Method 418.1) | 8.51 | -- |
| **BTEX (mg/L) (Method EPA SW-846 8260)** | | |
| Benzene | <0.002 | 0.01 |
| Ethylbenzene | 0.006 | 0.75 |
| Toluene | <0.002 | 0.75 |
| Xylenes, Total | 0.025 | 0.62 |
| **Chloride (mg/L)** | 3300 | -- |

**Notes:**

1) New Mexico Water Quality Control Commision groundwater standards for human health

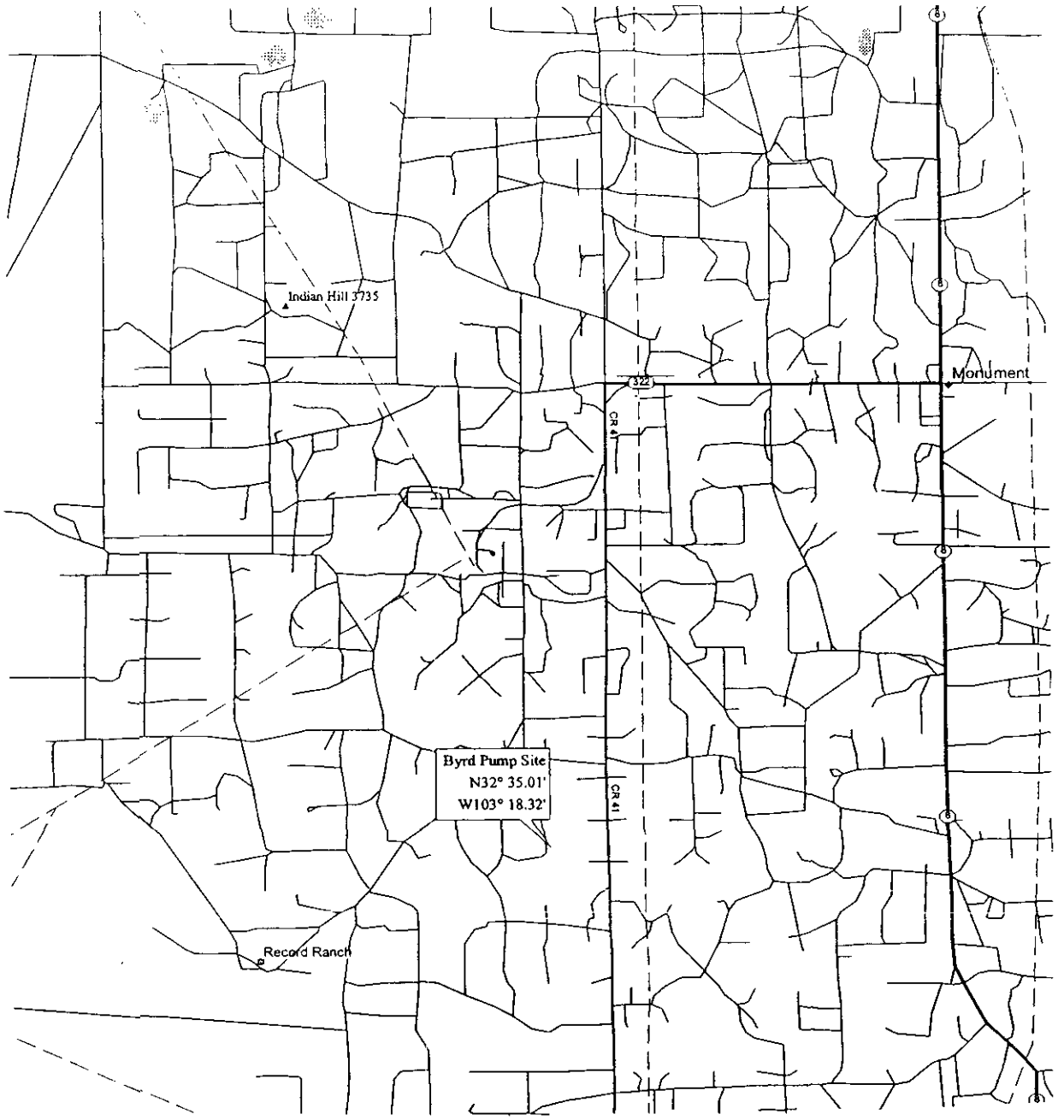
2) New Mexico Water Quality Control Commision groundwater standards for domestic water supply

TPH = total petroleum hydrocarbons

BTEX = benzene, toluene, ethyl benzene, xylenes

mg/L=milligrams per liter

# FIGURES




Mag 13.00
Mon Jun 28 17:19 1999
Scale 1:62,500 (at center)

1 Miles

2 KM

Secondary SR/Road/Hwy Ramp
Major Connector
State Route
US Highway
Utility/Pipe
Water
Intermittent River

N

BP PIPELINES
(NORTH AMERICA), INC.
BYRD PUMP SITE
MONUMENT NEW MEXICO

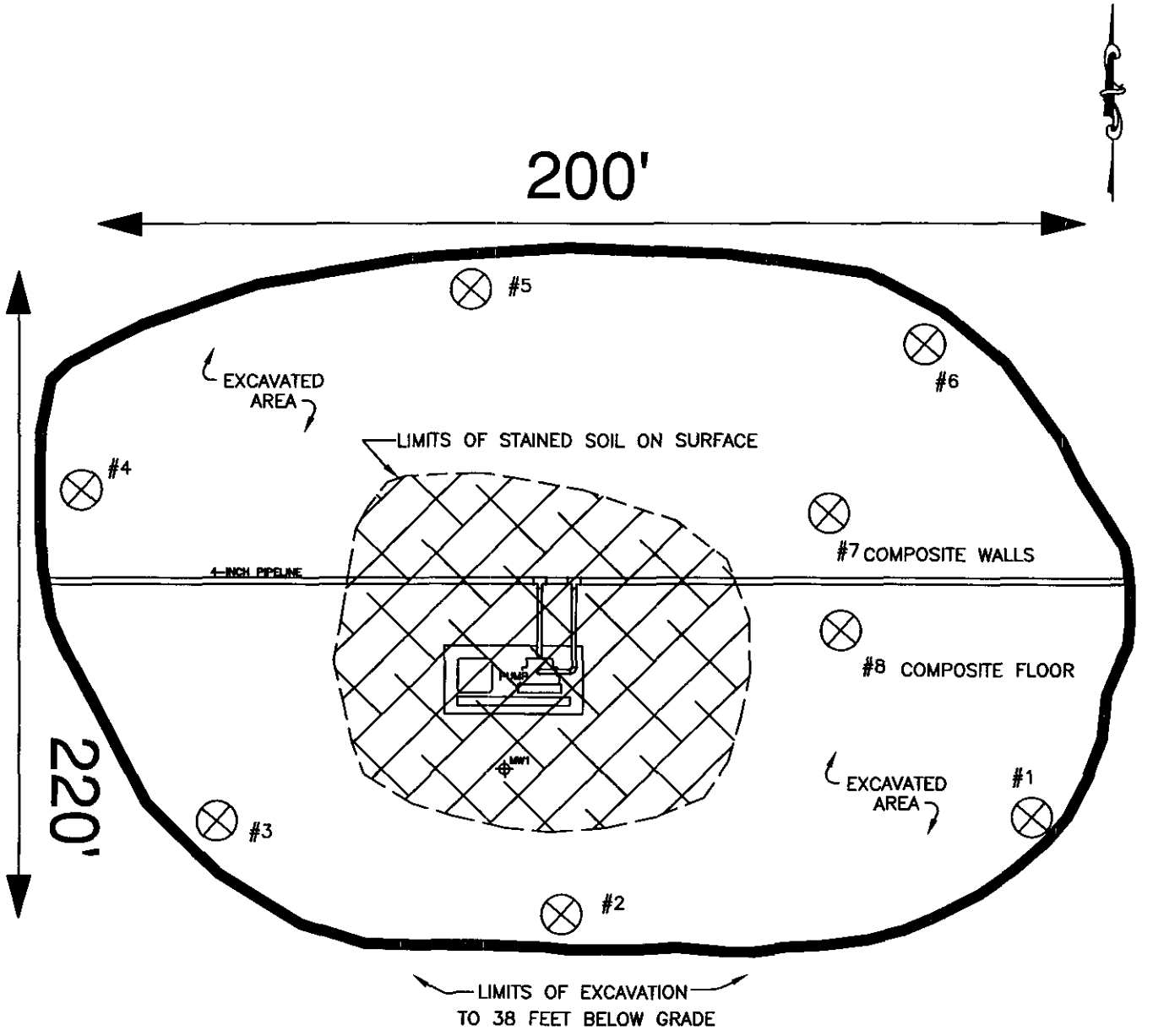
**URS Corporation**
Austin, Texas

SCALE: NOTED
DRAWN BY: rjn DATE: 1/9/99
MODIFIED BY: MSM DATE: 4/20/01

SITE LOCATION MAP

FILE NO. 806035.01
FIG. NO. 1-1

H:\wc-users\activepro\arco\byrdpump\rlp2001\figures\sitelocmap.dwg



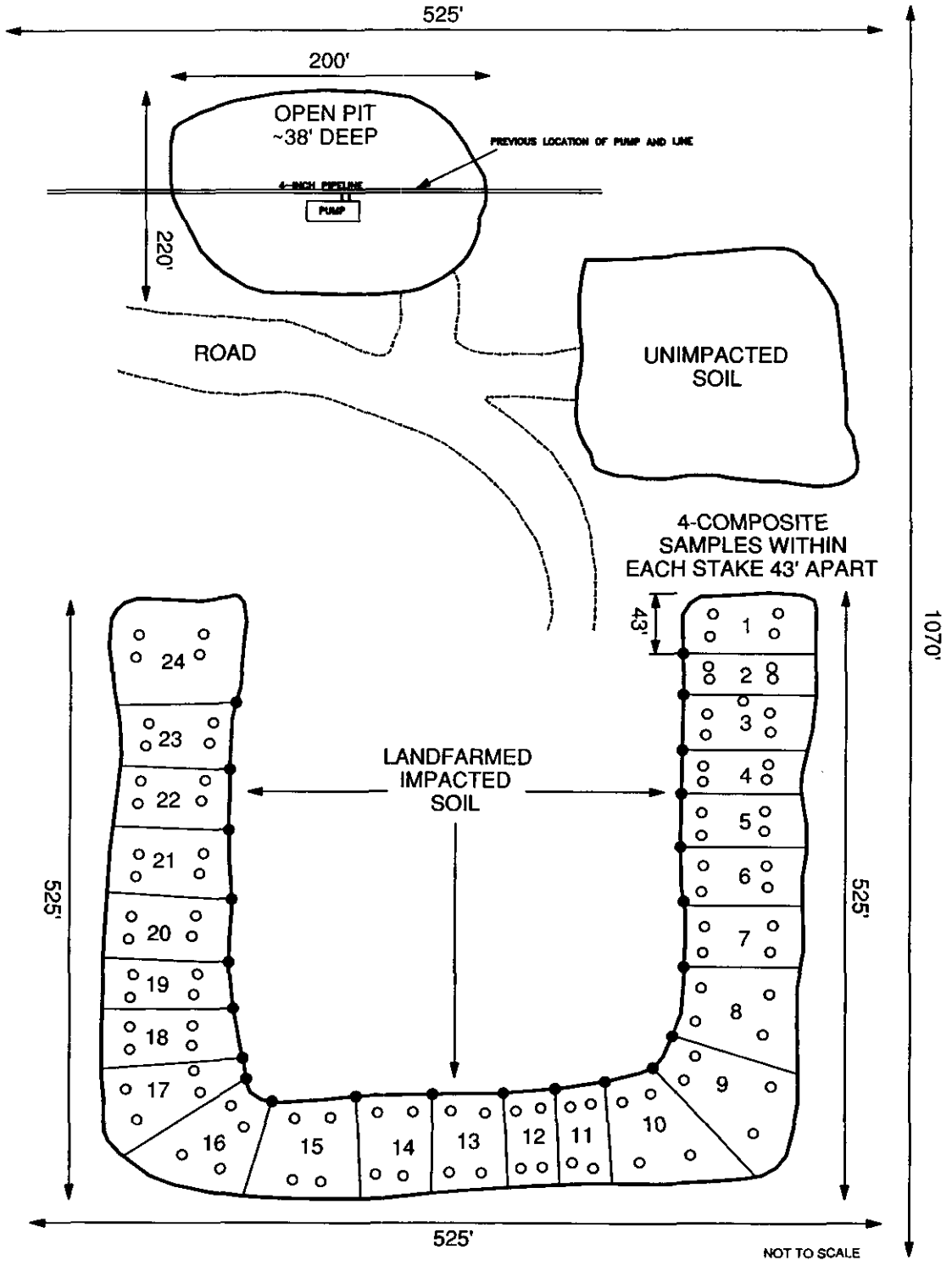

LEGEND

#2 SOIL SAMPLE LOCATION AND NUMBER

NOT TO SCALE

| | | | |
|---|---|---|---|
| BP PIPELINES (NORTH AMERICA), INC. BYRD PUMP SITE MONUMENT NEW MEXICO | URS Corporation Austin, Texas | SITE PLAN EXCAVATION AREA | PROJECT NO. 806035.01 |
| | SCALE: SCALE; DRAWN BY: SAF; DATE: 1/3/2000; CHKD. BY: MSM; DATE: 4/18/2001 | | FIGURE NO. 2-1 |

H:\wc-users\actheppo\area\byrd_pump\my2001\figure1.dwg




| | | | |
|---|---|---|---|
| BP PIPELINES (NORTH AMERICA), INC.<br>BYRD PUMP SITE<br>MONUMENT NEW MEXICO | **URS Corporation**<br>Austin, Texas | SITE PLAN<br>LAND FARM AREA | FILE NO.<br>806035.01 |
| | SCALE: NOTED<br>DRAWN BY: rjn DATE: 1/9/99<br>MODIFIED BY: MSM DATE: 4/20/01 | | FIG. NO.<br>2-2 |

H:\wc-users\activeproj\arco\byrdpump\rpt2001\figures\fig2-3.dwg

## PHOTOS

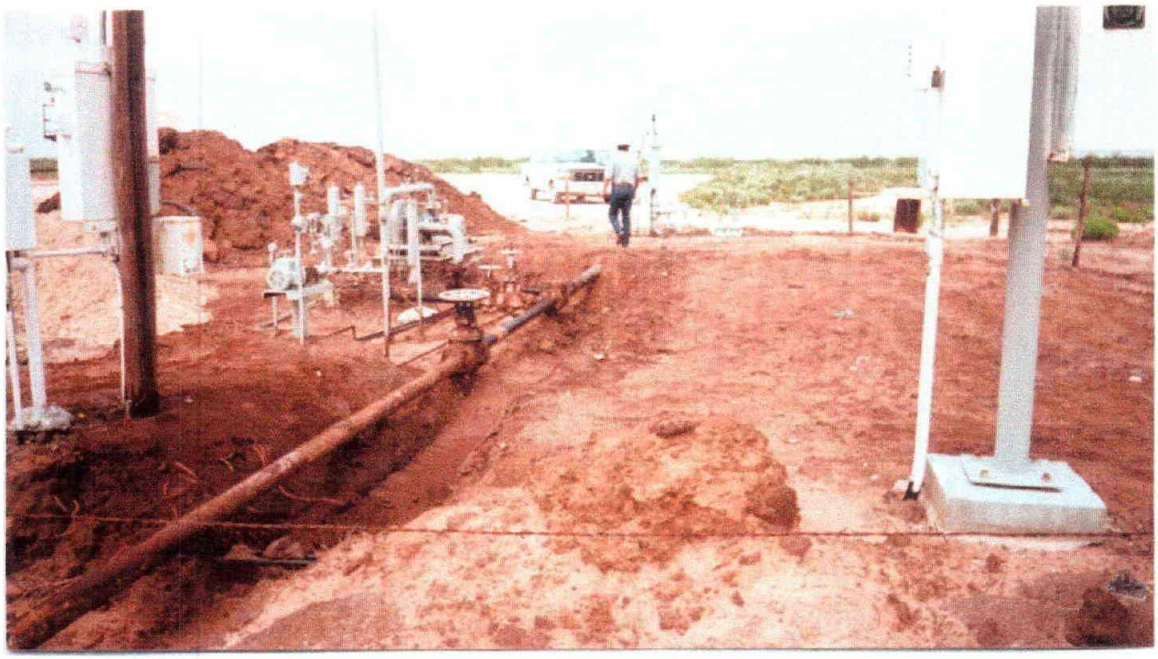


Photo #1 View looking at Pump area prior to remediation (5/28/99, photo by RJN)

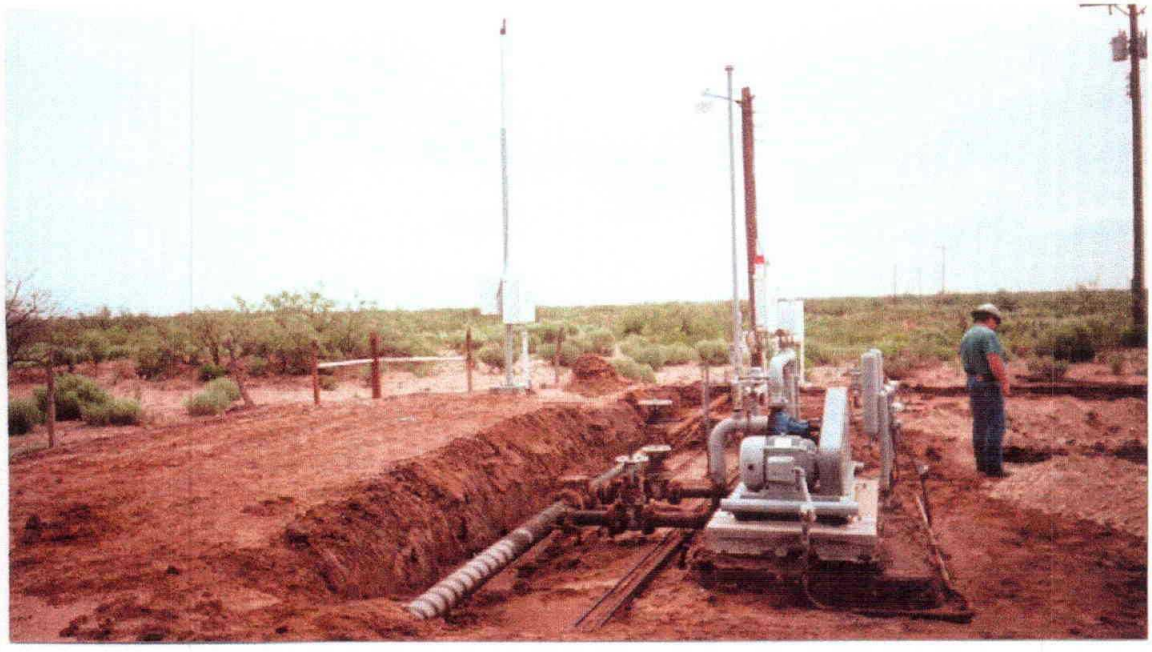


Photo #2 View looking at Pump area prior to remediation (5/28/99, photo by RJN)

URS

Photo #3 View looking at Excavation Area (2/28/01, photo by RJN)

Photo #4 View looking at Land Farm Area (2/28/01, photo by RJN)

URS

# APPENDIX A
## WELL LOG AND SOIL SAMPLE RESULTS – MW-1

| Project: APL BYRD PUMP SITE<br>Project Location: Hobbs, New Mexico<br>Project Number: 93-99000162.00-00001 | **Log of Monitoring Well MW1**<br>Sheet 1 of 1 |
|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Date(s) Drilled | 11/9/99 11/11/1999 | Logged By | D. Hayes | Checked By | R.T.Murthy |
| Drilling Method | HSA | Drilling Contractor | GMI | Total Depth of Borehole | 40.0 feet |
| Drill Rig Type | CME | Drill Bit Size/Type | 12.25" OD to 10'/8.25" OD to 40' | Surface Elevation | |
| Groundwater Level and Date | 33.60 (oil)/33.605 (water) on 11/15/99 | Sampler Type | 5 ft. CME Sampler | Top of PVC Elevation | - |
| Diameter of Hole (inches) | 12.25/8.25 Diameter of Well (inches) 4 | Type of Well Casing | 4 in. Schedule 40 PVC | Screen Perforation | 0.010 inch machine slotted |
| Type of Sand Pack | 20/40 Silica Sand | Type and Depth of Seal(s) | Hydrated Bentonite Pellets, from 14' to 17' | | |
| Comments | | | | | |

| Elevation, feet | Depth, feet | SAMPLES Type | SAMPLES Number | Percent Recovery | Graphic Log | MATERIAL DESCRIPTION | Well Completion Log | OVA Reading, ppm | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | 90 | | SILTY SAND, moderate brown, loose, slightly moist, fine to medium grained, moderate to poorly graded, subangular to subrounded, heavy brown oil staining, strong petroleum odor. | | 4<br>52<br>60<br>71 | |
| | 5 | | | 95 | | CLAYEY SAND, moderate yellow brown, loose, slightly moist, fine to medium grained, moderate to poorly graded, subangular to subrounded, lighter staining. | | 21<br>503 | MW1-4-5 Soil Jar Sample |
| | | | | | | change in color to pale yellow brown | | 631 | |
| | | | | | | SANDY CLAY, gray stains, gray, firm to hard, slightly moist, low plasticity. | | 571<br>435 | |
| | 10 | | | 50 | | SILTY SAND, moderate yellow brown, loose, moist, fine grained, moderate to poorly graded, subangular. | | 326<br>252 | MW1-9-10 Soil Jar Sample |
| | | | | | | GRAVELLY SAND, moderate yellow brown, loose, moist, coarse to fine, subangular chert pebbles, maximum size of 0.5 inch, strong odor. | | 241<br>301<br>321 | |
| | 15 | | | 60 | | | | 301 | MW1-14-15 Soil Jar Sample |
| | | | | | | | | 704<br>569<br>507 | |
| | 20 | | | 70 | | SILTY SAND, moderate yellow brown, loose, moist, fine grained, moderate to poorly graded, subangular. | | 554<br>834<br>318<br>710 | MW1-19-20 Soil Jar Sample |
| | 25 | | | 80 | | CALICHE | | 953<br>510<br>503<br>505 | |
| | | | | | | SILTY SAND, moderate yellow brown, loosem moist, fine grained, moderate to poorly graded, subangular | | 212<br>238<br>138 | |
| | 30 | | | 80 | | | | 596<br>472 | MW1-29-30 Soil Jar Sample |
| | | | | | | change in color to light brown | ▽ | 187<br>563<br>749 | |
| | 35 | | | 80 | | | | 820<br>321<br>336 | |
| | | | | | | GRAVELLY SAND, light brown, loose, saturated, fine to medium grained, well graded, subangular. | | 196<br>54<br>35 | MW1-39-40 Soil Jar Sample |
| | 40 | | | | | Boring terminated at a depth of 40 feet below existing ground. Groundwater encountered after completion of well. | | | |
| | 45 | | | | | | | | |

Report: ENV_23DW; File: BYRD-MON.GPJ, 1/10/00

**URS Greiner Woodward Clyde**

## SOIL ANALYTICAL RESULTS
## BYRD PUMP SITE - HOBBS, NEW MEXICO

*(Samples collected 11/11/99)*

| CONSTITUENT | MW-1 (4-5') | MW-1 (9-10') | MW-1 (14-15') | MW-1 (19-20') | MW-1 (29-30') | MW-1 (39-40') |
|---|---|---|---|---|---|---|
| **PAH** (mg/kg) | | | | | | |
| 1-Methylnaphthalene | <.130 | 5.9 | 2 | 3.7 | 3.7 | 0.037 |
| 2-Methylnaphthalene | <.130 | 4.9 | 1.7 | 3.3 | 3.3 | 0.036 |
| Acenaphtene | <.066 | 0.41 | 0.12 | 0.24 | 0.29 | 0.0047 |
| Acenaphthylene | <.066 | 0.1 | <.066 | 0.076 | <.066 | <.0033 |
| Anthracene | <.066 | <.066 | <.066 | <.066 | <.066 | <.0033 |
| Benz(a)anthracene | <.066 | 0.21 | 0.077 | 0.08 | 0.088 | 0.012 |
| Benzo(a)pyrene | <.066 | <.066 | <.066 | <.066 | <.066 | <.0033 |
| Benzo(b)fluoranthene | <.066 | 0.16 | <.066 | <.066 | 0.078 | <.0033 |
| Benzo(g,h,I)perylene | <.066 | 0.13 | <.066 | <.066 | <.066 | 0.0092 |
| Benzo(k)fluoranthene | <.066 | <.066 | <.066 | <.066 | <.066 | <.0033 |
| Chrysene | <.066 | 0.4 | 0.16 | 0.2 | 0.21 | 0.0071 |
| Dibenzo(g,h)anthracene | <.066 | <.066 | <.066 | <.066 | <.066 | <.0033 |
| Fluoranthene | <.066 | <.066 | <.066 | <.066 | 0.076 | <.0033 |
| Fluorene | <.066 | 3.4 | 0.82 | 2.1 | 2.3 | 0.027 |
| Indeno(1,2,3-cd)pyrene | <.066 | 0.088 | <.066 | <.066 | <.066 | <.0033 |
| Naphthalene | <.066 | 1 | 0.33 | 0.68 | 0.7 | 0.0038 |
| Phenanthrene | <.066 | 1.4 | 0.4 | 0.81 | 0.88 | 0.018 |
| Pyrene | <.066 | 0.46 | 0.17 | 0.21 | 0.25 | 0.0063 |
| **TPH** (mg/kg) | | | | | | |
| Diesel Range Organics | 2500 | 3300 | 4100 | 3000 | 3200 | 5.4 |
| Gasoline Range Organics | 23 | 280 | 250 | 240 | 370 | 17 |
| Total TPH [1] | **2523** | **3580** | **4350** | **3240** | **3570** | 22.4 |
| **BTEX** (mg/kg) | | | | | | |
| Benzene [2] | <.005 | <.05 | <.025 | <.025 | <.05 | <.001 |
| Ethylbenzene | <.005 | 1.8 | 1 | 0.87 | 0.47 | <.001 |
| Toluene | 0.047 | 1.9 | 1.1 | 0.99 | 1.2 | 0.23 |
| Xylenes, Total | 0.324 | 3.8 | 3.8 | 4 | 4 | 0.061 |
| Total BTEX [3] | 0.371 | 7.5 | 5.9 | 5.86 | 5.67 | 0.291 |

**Notes:**

1) New Mexico Oil Conservation Division's Recommended Remediation Levels for soils impacted with petroleum hydrocarbons is 100 mg/Kg for Total TPH, based on site specific ranking criteria.
2) New Mexico Oil Conservation Division's Recommended Remediation Levels for soils impacted with petroleum hydrocarbons is 10 mg/Kg for benzene, based on site specific ranking criteria.
3) New Mexico Oil Conservation Division's Recommended Remediation Levels for soils impacted with petroleum hydrocarbons is 50 mg/Kg for Total BTEX, based on site specific ranking criteria.

PAH = polynuclear aromatic hydrocarbons

TPH = total petroleum hydrocarbons

BTEX = benzene, toluene, ethyl benzene, xylenes

mg/kg=milligrams per kilogram

# APPENDIX B
## LABORATORY ANALYTICAL DATA

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS
ATTN: J.L. HAM
401 WEST BROADWAY
DENVER CITY, TX 79323
FAX TO:

Receiving Date: 08/28/00
Reporting Date: 08/29/00
Project Number: NOT GIVEN
Project Name: BYRD PUMP
Project Location: MONUMENT, NM

Sampling Date: 08/28/00
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

| LAB NUMBER | SAMPLE ID | GRO ($C_6$-$C_{10}$) (mg/Kg) | DRO (>$C_{10}$-$C_{28}$) (mg/Kg) |
|---|---|---|---|
| ANALYSIS DATE: | | 08/28/00 | 08/28/00 |
| H5126-1 | SAMPLE #1 30-32' | <50 | 67.1 |
| H5126-2 | SAMPLE #2 30-32' | <50 | <50 |
| H5126-3 | SAMPLE #3 30-32' | <50 | <50 |
| H5126-4 | SAMPLE #4 30-32' | <50 | <50 |
| H5126-5 | SAMPLE #5 30-32' | <50 | <50 |
| H5126-6 | SAMPLE #6 30-32' | <50 | 125 |
| | Wall Samples - Pit | | |
| Quality Control | | 822 | 956 |
| True Value QC | | 1000 | 1000 |
| % Recovery | | 82.2 | 95.6 |
| Relative Percent Difference | | 4.5 | 9.5 |

METHOD: SW-846 8015 M

Chemist

8/29/00
Date

H5126A.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS
ATTN: JEFF HAM
P.O. BOX 1080
DENVER CITY, TX 79323
FAX TO:

Receiving Date: 10/09/00
Reporting Date: 10/10/00
Project Number: NOT GIVEN
Project Name: BYRD PUMP
Project Location: BYRD RANCH

Sampling Date: 10/09/00
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC/AH

| LAB NO. | SAMPLE ID | TPH (mg/Kg) | Cl* (mg/Kg) | BENZENE (mg/Kg) | TOLUENE (mg/Kg) | ETHYL BENZENE (mg/Kg) | TOTAL XYLENES (mg/Kg) |
|---|---|---|---|---|---|---|---|
| ANALYSIS DATE: | | 10/09/00 | 10/09/00 | 10/09/00 | 10/09/00 | 10/09/00 | 10/09/00 |
| H5240-1 | COMPOSITE SAMPLE, 38' Bottom - Pit | 80.4 | 259 | <0.005 | <0.005 | <0.005 | <0.015 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Quality Control | | 218 | 906 | 0.089 | 0.092 | 0.096 | 0.290 |
| True Value QC | | 240 | 1000 | 0.100 | 0.100 | 0.100 | 0.300 |
| % Recovery | | 90.9 | 90.6 | 89.2 | 92.3 | 96.3 | 96.7 |
| Relative Percent Difference | | 7.0 | 5.3 | 4.4 | 12.3 | 6.5 | 6.9 |

METHODS: TRPHC-EPA 600/4-79-020 418.1; Cl-Std. Methods 4500-ClB; BTEX-EPA SW-846 8260
*Analysis performed on a 1:4 w:v aqueous extract.

Burgess J.A. Cooke, Ph. D.

10/10/00
Date

H5240.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS
ATTN: J.L. HAM
401 WEST BROADWAY
DENVER CITY, TX 79323
FAX TO:

Receiving Date: 08/28/00
Reporting Date: 08/29/00
Project Number: NOT GIVEN
Project Name: BYRD PUMP
Project Location: MONUMENT, NM

Sampling Date: 08/28/00
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

| LAB NO. | SAMPLE ID | BENZENE (mg/Kg) | TOLUENE (mg/Kg) | ETHYL BENZENE (mg/Kg) | TOTAL XYLENES (mg/Kg) |
|---|---|---|---|---|---|
| ANALYSIS DATE | | 08/28/00 | 08/28/00 | 08/28/00 | 08/28/00 |
| H5126-7 | SAMPLE #7 COMPOSITE 30-32' | <0.005 | <0.005 | <0.005 | <0.015 |
| Quality Control | | | | 0.097 | 0.294 |
| True Value QC | | | | 0.100 | 0.300 |
| % Recovery | | | | 96.9 | 97.9 |
| Relative Percent Difference | | | | 5.5 | 4.8 |

Composite
BTEX Sample
Gathered from WALL'S
30-32' deep

METHOD: EPA SW 846-802

Chemist

9/00

H5126B.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS
ATTN: J.L. HAM
P.O. BOX 1080
DENVER CITY, TX 79323
FAX TO: (806) 592-3412

Receiving Date: 09/22/00
Reporting Date: 09/25/00
Project Number: NOT GIVEN
Project Name: BYRD PUMP
Project Location: MONUMENT, NEW MEXICO

Sampling Date: 09/21/00
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC/AH

| LAB NUMBER | SAMPLE ID | TPH (mg/L) | Cl (mg/L) | BENZENE (mg/L) | TOLUENE (mg/L) | ETHYL BENZENE (mg/L) | TOTAL XYLENES (mg/L) |
|---|---|---|---|---|---|---|---|
| ANALYSIS DATE: | | 09/25/00 | 09/22/00 | 09/22/00 | 09/22/00 | 09/22/00 | 09/22/00 |
| H5197-1 | GROUND WTR. | 8.51 | 3300 | <0.002 | <0.002 | 0.006 | 0.025 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Quality Control | | 10.64 | 962 | 0.088 | 0.093 | 0.094 | 0.286 |
| True Value QC | | 12.00 | 1000 | 0.100 | 0.100 | 0.100 | 0.300 |
| % Recovery | | 88.7 | 96.2 | 87.6 | 93.3 | 93.5 | 95.2 |
| Relative Percent Difference | | 9.0 | 0.2 | 8.9 | 8.6 | 8.6 | 6.7 |

METHODS: TRPHC-EPA 600/4-79-020 418.1;Cl-Std. Methods 4500-ClB; BTEX-EPA SW-846 8260

Burgess J.A. Cooke, Ph. D.

9/25/00
Date

H5197.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
CJR CONTRACTORS
ATTN: J.L. HAM
P.O. BOX 1080
DENVER CITY, TX 79323
FAX TO: (806) 592-3412

Receiving Date: 01/10/01
Reporting Date: 01/11/01
Project Number: NOT GIVEN
Project Name: NOT GIVEN
Project Location: BYRD RANCH

Sampling Date: 01/10/01
Sample Type: SOIL
Sample Condition: COOL & INTACT
Sample Received By: GP
Analyzed By: BC

| LAB NUMBER | SAMPLE ID | GRO ($C_6$-$C_{10}$) (mg/Kg) | DRO (>$C_{10}$-$C_{28}$) (mg/Kg) |
|---|---|---|---|
| ANALYSIS DATE: | | 01/10/01 | 01/10/01 |
| H5509-1 | 1 | <50 | <50 |
| H5509-2 | 2 | <50 | <50 |
| H5509-3 | 3 | <50 | 64.1 |
| H5509-4 | 4 | <50 | <50 |
| H5509-5 | 5 | <50 | 88.3 |
| H5509-6 | 6 | <50 | 86.3 |
| H5509-7 | 7 | <50 | 161 |
| H5509-8 | 8 | <50 | 223 |
| H5509-9 | 9 | <50 | 104 |
| H5509-10 | 10 | <50 | 200 |
| H5509-11 | 11 | <50 | <50 |
| H5509-12 | 12 | <50 | 177 |
| H5509-13 | 13 | <50 | 326 |
| H5509-14 | 14 | <50 | 92.1 |
| H5509-15 | 15 | <50 | <50 |
| H5509-16 | 16 | <50 | <50 |
| H5509-17 | 17 | <50 | 79.1 |
| H5509-18 | 18 | <50 | <50 |
| H5509-19 | 19 | <50 | <50 |
| H5509-20 | 20 | <50 | 66.3 |
| H5509-21 | 21 | <50 | <50 |
| H5509-22 | 22 | <50 | <50 |
| H5509-23 | 23 | <50 | <50 |
| H5509-24 | 24 | <50 | <50 |
| Quality Control | | 727 | 701 |
| True Value QC | | 800 | 800 |
| % Recovery | | 90.9 | 87.6 |
| Relative Percent Difference | | 10.8 | 2.0 |

METHOD: SW-846 8015 M

Chemist

1/11/01
Date

H5509.XLS