

**GW - 1**

# **WORK PLANS**

2003



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ENVIRONMENTAL BUREAU  
OIL CONSERVATION DIVISION

May 29, 2003

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Hazardous Waste Bureau  
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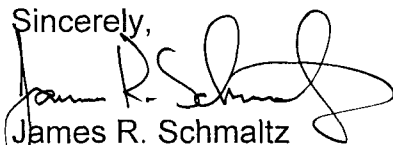
Re: Long-Term Ground Water Monitoring Work Plan  
Giant Refining Company – Bloomfield Refinery

Gentelman:

I have enclosed Giant Refining Company's Long-Term Ground Water Monitoring Work Plan for NMED, OCD and EPA approval as requested to fulfill the requirements specified in Attachment A of the conditional approval letters for the Corrective Measure Study and Corrective Measure Implementation (Site Investigation and Abatement Plan).

If you have any questions please feel free to contact me at (505) 632-4171.

Sincerely,

  
James R. Schmaltz  
Environmental Supervisor

Enc.

cc. Chad King  
Ed Riege

PHONE  
505-632-8013  
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50 ROAD 4990  
P.O. BOX 159  
BLOOMFIELD  
NEW MEXICO  
87413

**Long-Term Ground Water Monitoring  
Work Plan**

## **BACKGROUND INFORMATION**

### **Site Location and Access**

The Bloomfield Refinery (the Refinery) is located south of Bloomfield, New Mexico, in San Juan County, latitude N36° 41' 87", longitude W107° 58' 70". The Refinery is owned by the San Juan Refining Company(SJRC). The Refinery Site (the site) consists of the Refinery processing areas, storage tanks, and waste management areas, as well as adjacent areas that exhibit subsurface petroleum hydrocarbons. Previously installed monitor wells define an area south of the Refinery where petroleum hydrocarbons are present in the subsurface, and the San Juan River defines the northern boundary of the site.

The Refinery is located on a bluff 120 feet above the south side of the San Juan River. The top of the bluff is relatively flat and is at an elevation of 5,540 feet above sea level. The geologic units that comprise the site include, in order of increasing depth, San Juan River Alluvium, Quaternary apron deposits, Aeolian sand and silt, Jackson Lake Terrace, and the Tertiary Nacimiento Formation. An unnamed arroyo flows toward the San Juan River on the southern and western edges of the site. East of the site, a well-defined arroyo cuts a small canyon from the bluff to the San Juan River. Hammond Ditch, a newly concrete-lined irrigation ditch underlain by French Drain with a liquid recovery system, lies on the bluff between the limit of the Jackson Lake Terrace (also called the Nacimiento Cliff in this document) and the Refinery.

### **Site Description and History**

Refinery offices are on the western end of the facility, along with warehouse space, maintenance areas, raw water ponds for temporary storage of fresh water from the San Juan River, and one storage yard containing used material (e.g., pipe, valves). Petroleum processing units, located in the northwest portion of the Refinery, include the crude unit, fluidized catalytic cracking unit, catalytic polymerization unit, and hydrosulfurization unit. Several product storage tanks are present east of the petroleum processing area. The API separator is located in the northwestern portion of the site. The aeration lagoons, formerly known as the north oily water pond (NOWP), the south oily water pond (SOWP), and a part of the API system, were identified by the U.S. Environmental Protection Agency (EPA) as potential Resource Conservation and Recovery Act (RCRA) hazardous waste management units.

In the central portion of the site, aboveground storage tanks (ASTs) occupy a large percentage of Refinery property. South of the Refinery and across Sullivan Road are terminals for loading product and off-loading crude, as well as gas storage and hazardous waste storage.

The eastern portion of the site contains closed and operational wastewater treatment facilities. Until the end of 1994, two clay-lined evaporation ponds and a spray irrigation area were used to treat and dispose of process wastewater. Since that time, two double-lined 5-acre evaporation ponds and a Class I underground injection well have been used to manage all Refinery process wastewater. In late 1998, the former evaporation ponds were converted into new raw water ponds. The spray irrigation area was decommissioned in 1994 with the start up of the Class 1 injection well. It has been overlaid by a parking lot and office complex. The fire training area and the landfill are also located at the eastern end of the facility.

Wells south of the Refinery fence line and west of the crude unloading and product loading area define an area where petroleum hydrocarbons are present in the groundwater. The U.S. Bureau of Land Management (BLM) controls this part of the area. Subsurface hydrocarbons, including both dissolved-phase and separate-phase hydrocarbons, also are present north and west of the processing area, between the San Juan River and the cliff that defines the limit of the Jackson Lake Terrace deposits. This area is owned by SJRC.

The historical and current activities conducted at the Refinery include:

- Petroleum processing
- Crude and product storage
- Crude unloading and product loading
- Waste management (closed units and existing facilities)
- Offices and non-petroleum material storage

Local entrepreneur Kimball Campbell originally constructed the facility as a crude topping unit in the late 1950s. O.L. Garretson bought the facility in the early 1960s, renamed it Plateau, Inc., and sold it in 1964 to Suburban Propane of New Jersey. As a protective filing, Plateau applied for a RCRA Part A Permit as a generator of hazardous waste and as a treatment, storage, and disposal (TSD) facility in November 1980. In 1982, Plateau petitioned for reclassification under a generator-only status. Bloomfield Refining Company (BRC) acquired the facility from Suburban Propane (Plateau) on October 31, 1984. Facility ownership was transferred to SJRC on October 4, 1995.

## **SAMPLING PLAN**

The objective of the Work Plan is to determine the status of the hydrocarbon plume, contain the plume, and ultimately reduce the plume.

Containment has been implemented by installing a hydraulic barrier at the San Juan River. Hydrocarbon recovery will be accomplished by utilizing numerous recovery wells, and the Hammond Ditch French Drain Recovery System. Reduction of the plume can be attained through proper operation of Giant's recovery well system as well as applying source control measures such as below grade line testing, practicing good housekeeping and updating plant employees' environmental awareness training.

## **RECOVERY AND MONITORING WELLS**

Several changes will occur in the recovery well system in 2003. Fluid recovery will be concentrated in the central portion of the site, which could potentially adjust the ground water flow and pull the plume back into the center of the site. This will be accomplished with the following changes:

- Recovery Wells #23 and #22 will utilize total fluids pumps.
- Recovery Wells #19 and #17 will utilize total fluids pumps.
- Monitoring Wells #28 and #9 will be converted into recovery wells.
- MW #28 will become RW #28 (name change) and will be equipped with a skimmer pump.

- MW #9 will become RW #9 (name change) and will be equipped with a total fluids pump.
- RW #2 will use a skimmer pump.

## **New Monitoring Wells and Modifications**

Giant installed three new monitoring wells in January 2003, MW #45, and MW #46 (see attached map). Both wells are located down gradient of the Hammond Ditch.

Seep #5 was drilled west of Hammond Ditch but east of its original location. The gravel company will be mining the original location of Seep #5, so we moved it out of the arroyo and next to the dirt road along Hammond Ditch. Seep #5 was completed as a monitoring well, and will become MW#47 (name change). Giant has enclosed Installation diagrams for MW #45, MW #46, and MW #47.

An attempt was made to drill a background well east of the Refinery property but was a dry hole. Giant proposes to use MW #32 as a background well. MW#32 was sampled extensively and should prove to be a representative background well. Giant has enclosed laboratory analysis for MW#32. It is up gradient from all wells on the south side of Sullivan Road except for MW#5(dry) and MW#6(dry) and MW#13(drilled and screened through the Nacimiento). It is cross gradient from the Terminals, but not in the flow path of any possible contaminants from that location.

## **Monitoring and Analysis**

Giant's philosophy for monitoring and analysis is to focus on the hydrocarbon nature of the contamination. The long term sampling program will consist of sampling and analyzing wells located beyond the boundary of the containment zone and focusing on key points of compliance and assessment.

- Giant will measure the water table and product elevations in all facility monitoring wells on a semi-annual basis. The water/product levels will be measured to an accuracy of 0.01 foot. Adding 0.8 times the measured product thickness to the calculated water table elevation will provide a corrected water table elevation in wells containing separate phase hydrocarbons. All recovery wells will have pumps shut off and removed 24 hours prior to elevation measurements.
- Giant will collect groundwater samples on a semi-annual basis from wells MW #1, MW #6, MW #12, MW #13, MW #20, MW #24, MW #32, MW #33, MW #35, MW #37, MW #38, MW #45, MW #46, Seep #5(reconstructed and renamed

MW #47), P-#4, P-#5, and East Outfalls #1, #2, and #3 for 2003. The samples will be analyzed for BTEX and MTBE.

- In September 2003 Giant will collect groundwater samples from the wells listed above as well as MW #3, MW #4, MW #5, MW #8 MW #26, MW #27, MW #34, MW #36 for a period of two years. For 2003, Giant will submit the ground water samples collected to an analytical laboratory for chemical analysis of VOC's by Method 8260, BTEX, MTBE, TDS and major cations and anions, dissolved WQCC metals, total and dissolved chromium and lead, nitrate/ nitrite, sulfate, dissolved oxygen, carbon dioxide and oxidation-reduction potential, pH, electrical conductivity, and temperature.
- Method 8260 should prove that the contaminants are fuel-related constituents only. If that is the case, then Giant will collect and sample from wells MW #1, MW #3, MW #8, MW #4, MW #32, MW #35, MW #36, MW #12, MW #27, MW #47(Seep #5), MW #39, P-4, P-5. These samples will be analyzed for BTEX, MTBE, dissolved oxygen, oxidation-reduction potential, dissolved metals (Pb, Mn, Cr, and Fe only), sulfate, nitrate/nitrite, TDS, pH, electrical conductance, and temperature on a semi-annual basis starting in 2004.
- Hammond Ditch East Outfalls #1, #2, and #3 will be sampled and analyzed for BTEX and MTBE on a semi-annual basis.
- The wells will be purged prior to sample collection. Electrical conductance, pH, and temperature will be monitored during purging. The wells will be considered satisfactorily purged when the pH, E.C., and temperature values do not vary by more than 10 percent for at least three measurements, and at least three well casing volumes of water have been removed from the well. Purge water will be collected and disposed of through the refinery wastewater treatment system.
- Recovery wells will not be sampled since they will give a distorted result. The purpose of the recovery well is negated if the well is shut down for the appropriate length of time needed to get a representative sample. Therefore, RW#15, RW#18, RW#23, RW#28, RW#42, RW #9, RW #1 and RW#43 will be not be sampled.
- Wells that contain free product will not be sampled.

## Annual Report

Giant will compile an annual comprehensive ground water monitoring report on all investigation, remediation, and monitoring activities. The report will be submitted to the NMOCD Santa Fe Office, NMOCD Aztec District Office, NMED Hazardous Waste Bureau, and the EPA by April 15 of each respective year. The annual report will include:

- A description of all soil and ground water remediation and monitoring activities that occurred during the previous calendar year.
- Annual water table potentiometric surface maps showing well locations, corrected water table elevations, pertinent site features, the direction of ground water flow and the hydraulic gradient.
- Semi-annual product thickness maps showing well locations, measured product thickness in each well and pertinent site features.
- Summary tables of all soil and ground water quality sampling results during the past calendar year and copies of the laboratory analytical reports and associated QA/QC data for the reporting period.
- Annual BTEX concentration maps indicating the concentrations detected at the sampled monitoring wells.
- Estimated volume of fluids recovered from each recovery well and the Hammond Ditch French Drain Recovery System.
- Concentration versus time plots of BTEX and MTBE.
- The disposition of all wastes generated.
- The results of any below grade line testing.





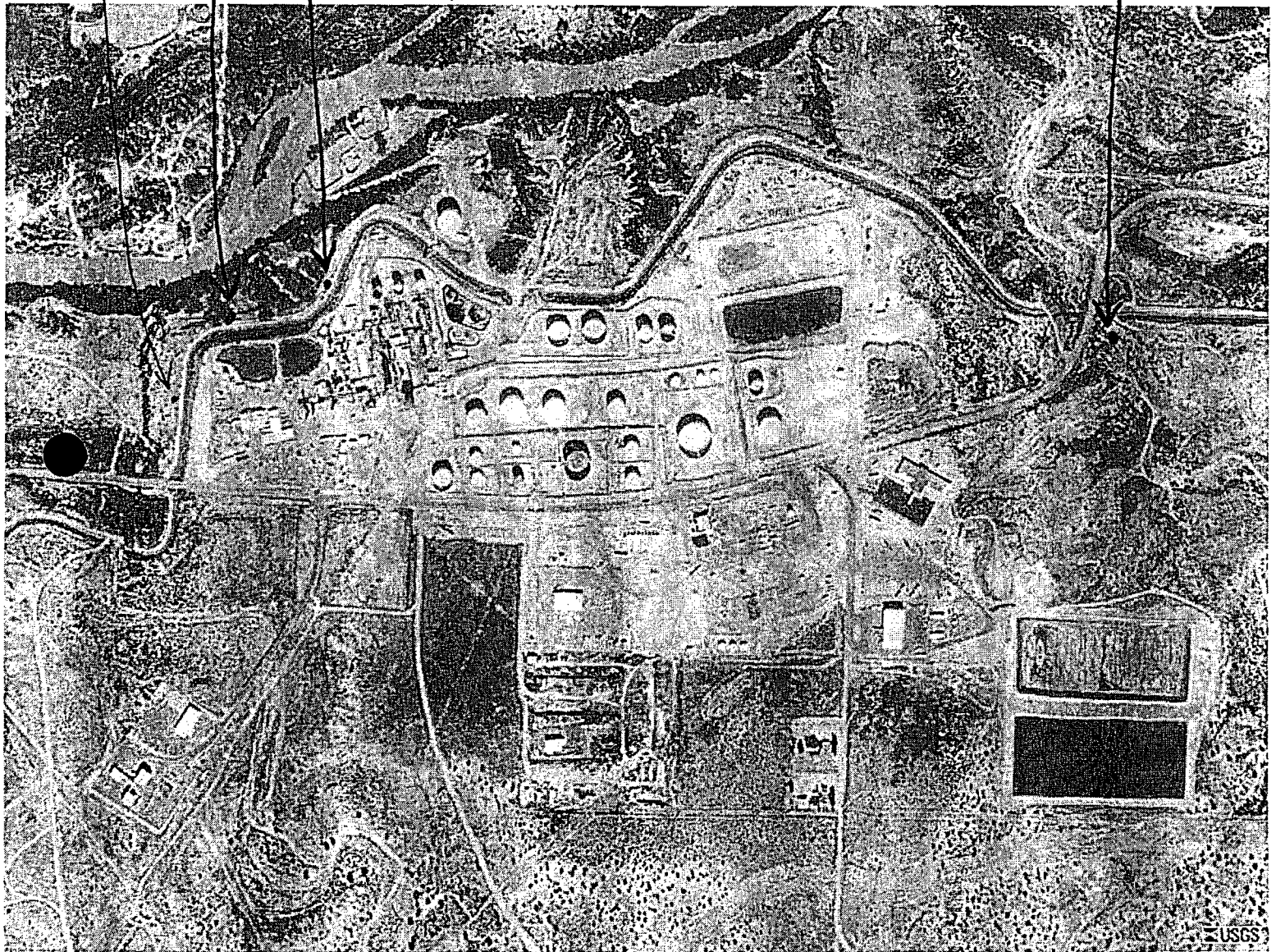
# NEW WELLS

DRY  
BACKGROUND

MW  
#47

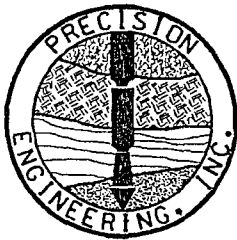
MW  
#45

MW  
#46



SCALE  $\frac{1}{8}$ " = 115'

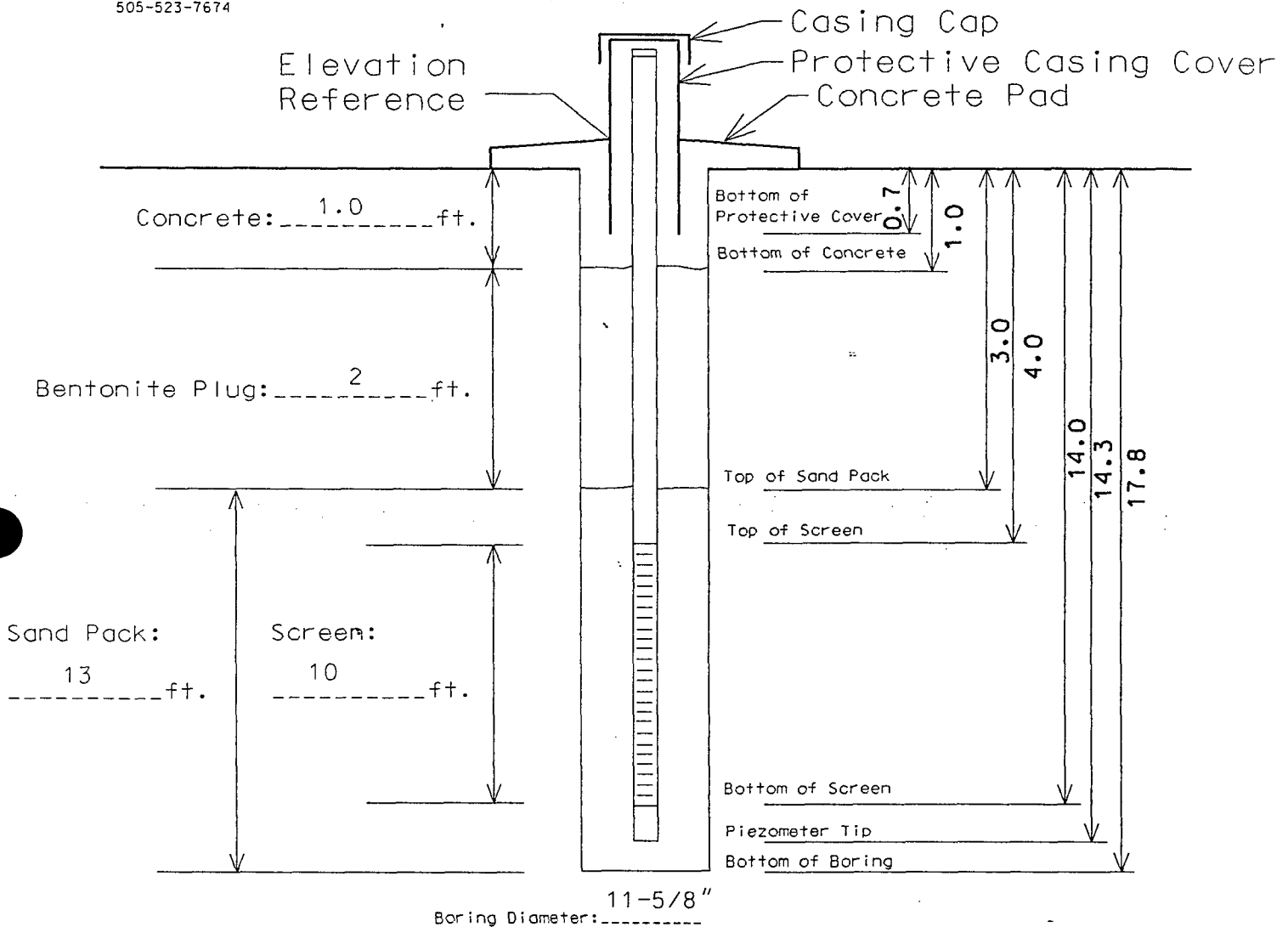
GIANT REFINING COMPANY  
"BLOOMFIELD"



505-523-7674

# Installation Diagram

Monitoring Well No. MW - 45



Sand Type: 10-20 Silica

Bollards, Type/Size: Steel, 3" min.

Bentonite: 3/8" Chip

Screen Type/Size: 4" PVC Sch. 40, 0.010" Slotted

Cement/Grout: -----

Riser Type/Size: 4" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? Yes

Site Northing: 5790.85

Other: N/A

Bottom Cap Used? Yes

Site Easting: 2837.78

Project #: 03-015

Project Name: Bloomfield Wells

Elevation: 5496.33

Sheet: 1 of 1

PRECISION ENGINEERING, INC.

File #:03-015

Bore Point:N5790.85'

E2837.78

Water Elev: 9.54'

Boring No.: MW 45

## LOG OF TEST BORINGS

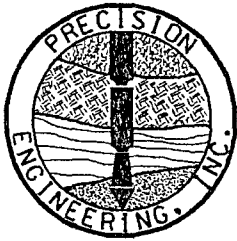
Site:Giant Refinery

Bloomfield, NM

Elevation: 5496.33

Date:1-15-03

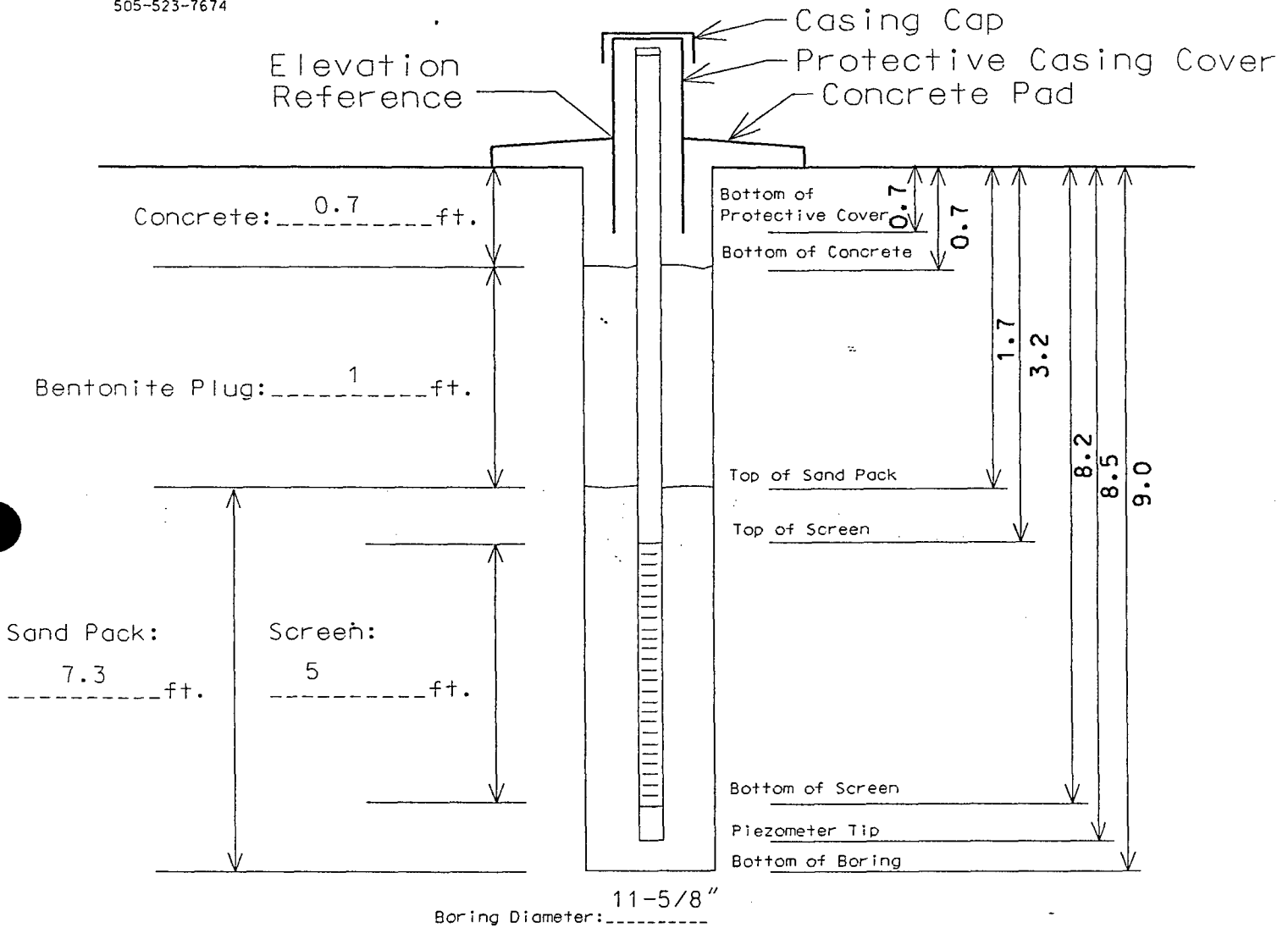
| LAB #                                                 | DEPTH       | BLOW COUNT  | P<br>L<br>O<br>T | S<br>C<br>A<br>L<br>E | S<br>A<br>M<br>P<br>L<br>E | MATERIAL CHARACTERISTICS<br>(MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.) | %M | L | PI | CLASS. |
|-------------------------------------------------------|-------------|-------------|------------------|-----------------------|----------------------------|---------------------------------------------------------------------------|----|---|----|--------|
|                                                       |             |             |                  |                       |                            |                                                                           |    |   |    |        |
|                                                       | 0-1.0       | Grab        | 00*00*           |                       | G                          | GRAVEL, TO 12", SANDY, DENSE, DAMP                                        |    |   |    |        |
|                                                       | 1.0-5.0     |             | 00*00*           |                       | G                          |                                                                           |    |   |    |        |
|                                                       |             |             | 00*00*           |                       | G                          |                                                                           |    |   |    |        |
|                                                       |             |             | 00*00*           |                       | G                          |                                                                           |    |   |    |        |
|                                                       |             |             | 00*00*           | 2.5                   | G                          |                                                                           |    |   |    |        |
|                                                       |             |             | 00*00*           |                       | G                          |                                                                           |    |   |    |        |
|                                                       |             |             | 00*00*           |                       | G                          |                                                                           |    |   |    |        |
|                                                       |             |             | 00*00*           |                       | G                          |                                                                           |    |   |    |        |
|                                                       |             |             | 00*00*           |                       | G                          |                                                                           |    |   |    |        |
|                                                       | 5.0-6.5     | 6-14-32     | 00*00*           | 5.0                   | G                          |                                                                           |    |   |    |        |
|                                                       |             |             | 00*00*           |                       | S                          |                                                                           |    |   |    |        |
|                                                       | 6.5-7.0     | 7-60        | 00*00*           |                       | S                          |                                                                           |    |   |    |        |
|                                                       |             |             | 00*00*           |                       | S                          |                                                                           |    |   |    |        |
|                                                       |             |             | 00*00*           |                       | S                          |                                                                           |    |   |    |        |
|                                                       |             |             | 00*00*           |                       | S                          | NACIMIENTO FORMATION                                                      |    |   |    |        |
|                                                       | 7.0-8.5     | 37-27-31    | ---+---          | 7.5                   | S                          | MUDSTONE, SANDY, DENSE, WET, DARK GREEN                                   |    |   |    |        |
|                                                       |             |             | ---+---          |                       | S                          |                                                                           |    |   |    |        |
|                                                       | 9.0-10.0    | 14-65       | ---+---          |                       | S                          |                                                                           |    |   |    |        |
|                                                       |             |             | ---+---          |                       | S                          | SAME, HYDROCARBON ODOR (GASOLINE)                                         |    |   |    |        |
|                                                       |             |             | ---+---          |                       | S                          |                                                                           |    |   |    |        |
|                                                       | 10.0-11.0   | 16-60-60(4) | ---+---          | 10.0                  | S                          |                                                                           |    |   |    |        |
|                                                       |             |             | ---+---          |                       | S                          |                                                                           |    |   |    |        |
|                                                       |             |             | ---+---          |                       | S                          |                                                                           |    |   |    |        |
|                                                       |             |             | ---+---          |                       | S                          |                                                                           |    |   |    |        |
|                                                       |             |             | ---+---          |                       | S                          |                                                                           |    |   |    |        |
|                                                       | 14.0-14.7   | 54-50(1")   | ---+---          |                       | S                          | SOME LAMINATION, LIGHTER IN COLOR                                         |    |   |    |        |
|                                                       |             |             | ---+---          | 15.0                  | S                          |                                                                           |    |   |    |        |
|                                                       |             |             | ---+---          |                       |                            |                                                                           |    |   |    |        |
|                                                       |             |             | ---+---          |                       |                            |                                                                           |    |   |    |        |
|                                                       |             |             | ---+---          |                       |                            |                                                                           |    |   |    |        |
|                                                       | 17.0-17.8   | 36-50(3")   | ---+---          |                       | S                          | SANDSTONE, WEAK, SILTY, MUDDY, WHITE/LIGHT                                |    |   |    |        |
|                                                       | 17.8        |             | ---+---          |                       | S                          | BROWN, VERY DENSE, WET-MOIST                                              |    |   |    |        |
|                                                       | TOTAL DEPTH |             |                  |                       |                            |                                                                           |    |   |    |        |
|                                                       |             |             |                  | 20.0                  |                            |                                                                           |    |   |    |        |
| Size & Type of Boring: 4 1/4" ID HOLLOW STEMMED AUGER |             |             |                  |                       |                            | Logged By: WHK                                                            |    |   |    |        |



505-523-7674

# Installation Diagram

Monitoring Well No. MW - 46



Sand Type: 10-20 Silica

Bollards, Type/Size: Steel, 3" min.

Bentonite: 3/8" Chip

Screen Type/Size: 4" PVC Sch. 40, 0.010" Slotted

Cement/Grout:                     

Riser Type/Size: 4" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? Yes

Site Northing: 5560.48

Other: N/A

Bottom Cap Used? Yes

Site Easting: 2576.06

Project #: 03-015

Project Name: Bloomfield Wells

Elevation: 5496.43

Sheet: 1 of 1

PRECISION ENGINEERING, INC.

File #:03-015

Bore Point:N5560.48'  
E2576.06

LOG OF TEST BORINGS

Site:Giant Refinery  
Bloomfield, NM  
Elevation: 5496.43

Water Elev:

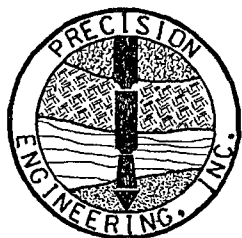
Boring No.: MW 46

Date:1-16-03

| LAB # | DEPTH       | BLOW COUNT | P<br>L<br>O<br>T | S<br>C<br>A<br>L<br>E | S<br>A<br>M<br>P<br>L<br>E | MATERIAL CHARACTERISTICS<br>(MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.) | %M | L | PI | CLASS. |
|-------|-------------|------------|------------------|-----------------------|----------------------------|---------------------------------------------------------------------------|----|---|----|--------|
|       |             |            |                  |                       |                            |                                                                           |    |   |    |        |
|       | 0-1.0       | Grab       | **0**0           |                       | G                          | <u>SAND</u> , VERY GRAVELLY, COBBLY, LIGHT BROWN,<br>LOOSE                |    |   |    |        |
|       |             |            | **0**0           |                       | G                          |                                                                           |    |   |    |        |
|       |             |            | **0**0           |                       |                            |                                                                           |    |   |    |        |
|       |             |            | **0**0           | 2.5                   |                            |                                                                           |    |   |    |        |
|       |             |            | **0**0           |                       |                            |                                                                           |    |   |    |        |
|       |             |            | **0**0           |                       |                            |                                                                           |    |   |    |        |
|       |             |            | **0**0           |                       |                            |                                                                           |    |   |    |        |
|       |             |            | **0**0           |                       |                            |                                                                           |    |   |    |        |
|       |             |            | **0**0           |                       |                            |                                                                           |    |   |    |        |
|       | 5.0-6.5     | 3-4-4      | **0**0           | 5.0                   | S                          | SAME                                                                      |    |   |    |        |
|       |             |            | **0**0           |                       | S                          |                                                                           |    |   |    |        |
|       |             |            | **0**0           |                       | S                          | NACIMIENTO FORMATION                                                      |    |   |    |        |
|       | 6.5-8.0     | 13-18-18   | --- --           | 7.5                   | S                          | <u>MUDSTONE</u> , SILTY, HARD, DRY, LIGHT GREEN                           |    |   |    |        |
|       |             |            | --- --           |                       | S                          |                                                                           |    |   |    |        |
|       |             |            | --- --           |                       | S                          |                                                                           |    |   |    |        |
|       | 9.0         |            | --- --           |                       |                            |                                                                           |    |   |    |        |
|       | TOTAL DEPTH |            |                  | 10.0                  |                            |                                                                           |    |   |    |        |
|       |             |            |                  |                       |                            |                                                                           |    |   |    |        |
|       |             |            |                  | 15.0                  |                            |                                                                           |    |   |    |        |
|       |             |            |                  |                       |                            |                                                                           |    |   |    |        |
|       |             |            |                  | 20.0                  |                            |                                                                           |    |   |    |        |
|       |             |            |                  |                       |                            |                                                                           |    |   |    |        |

Size & Type of Boring:4 1/4" ID HOLLOW STEMMED AUGER

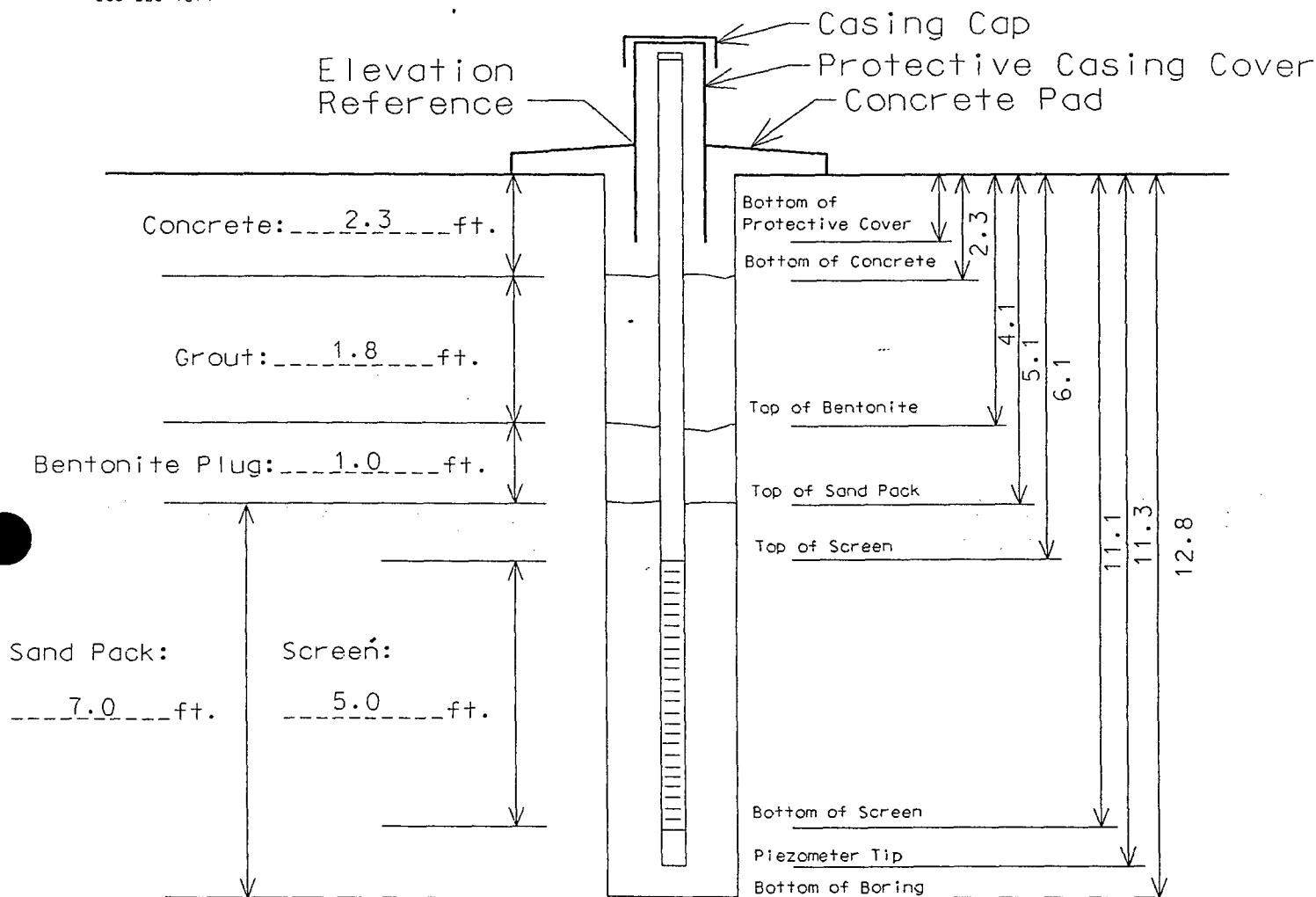
Logged By: WHK



505-523-7674

# Installation Diagram

Monitoring Well No. Seep 5  
RENAMED ( MW-47 )



Boring Diameter: 8 5/8"

Sand Type: 10-20 Silica

Bollards, Type/Size: Steel, 3"

Bentonite: 3/8" Chips

Screen Type/Size: 2" PVC Sch. 40, 0.010" Slotted

Cement/Grout: 6% Bentonite

Riser Type/Size: 2" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? Yes

Site Northing: 5413.57

Other: N/A

Bottom Cap Used? Yes

Site Easting: 2220.90

Project #: 03-015

Project Name: Giant Refining Co. Bloomfield Wells

Elevation: TBD

Bore Point: PLANT COORDINATES  
N5413.7 E2220.90  
Water Elev: 7.49'

## LOG OF TEST BORINGS

Site: Bloomfield  
Refinery  
Elevation: TO BE DETERMINED

Boring No.: Seep 5

Date: 3-6-03

| LAB # | DEPTH       | BLOW COUNT | P<br>L<br>O<br>T | S<br>C<br>A<br>L<br>E | S<br>A<br>M<br>P<br>L<br>E | MATERIAL CHARACTERISTICS<br>(MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.) | %M | LL | PI | CLASS. |
|-------|-------------|------------|------------------|-----------------------|----------------------------|----------------------------------------------------------------------------|----|----|----|--------|
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       | 0.0-5.0     | GRAB       | 00**00           |                       | G                          | GRAVEL, MEDIUM SANDY, LIGHT BROWN, SOME<br>COBBLES TO BOULDER SIZE, DENSE  |    |    |    |        |
|       |             |            | 00**00           |                       | G                          |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       | G                          |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       | G                          |                                                                            |    |    |    |        |
|       |             |            | 00**00           | 2.5                   | G                          |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       | G                          |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       | G                          |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       | G                          |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       | G                          |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       | G                          |                                                                            |    |    |    |        |
|       | 5.0-6.5     | 8-18-18    | 00**00           | 5.0                   | G                          | GRAVEL, MEDIUM SANDY, LIGHT BROWN, SOME<br>COBBLES TO BOULDER SIZE, DENSE  |    |    |    |        |
|       |             |            | 00**00           |                       | S                          |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       | S                          |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       | S                          |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       |             |            | 00**00           | 7.5                   |                            |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       | 9.0-9.7     | 9-100(1)   | 00**00           |                       |                            | MACIMIENTO FORMATION<br>MUDSTONE, SILTSTONE, FISSILE, BLACK, HARD, WET     |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       |             |            | 00**00           |                       |                            |                                                                            |    |    |    |        |
|       | 10.2-11.3   |            | -----            |                       | S                          | MACIMIENTO FORMATION<br>MUDSTONE, SILTSTONE, FISSILE, BLACK, HARD, WET     |    |    |    |        |
|       |             |            | -----            |                       | S                          |                                                                            |    |    |    |        |
|       |             |            | -----            |                       | S                          |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       | 11.3-12.8   | 13-37-60   | -----            |                       |                            | MACIMIENTO FORMATION<br>MUDSTONE, SILTSTONE, FISSILE, BLACK, HARD, WET     |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       | 12.8        |            | -----            |                       |                            | MACIMIENTO FORMATION<br>MUDSTONE, SILTSTONE, FISSILE, BLACK, HARD, WET     |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       |             |            | -----            |                       |                            |                                                                            |    |    |    |        |
|       | TOTAL DEPTH |            |                  |                       |                            | MACIMIENTO FORMATION<br>MUDSTONE, SILTSTONE, FISSILE, BLACK, HARD, WET     |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  | 15                    |                            | MACIMIENTO FORMATION<br>MUDSTONE, SILTSTONE, FISSILE, BLACK, HARD, WET     |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  | 20                    |                            | MACIMIENTO FORMATION<br>MUDSTONE, SILTSTONE, FISSILE, BLACK, HARD, WET     |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |
|       |             |            |                  |                       |                            |                                                                            |    |    |    |        |

Size &amp; Type of Boring: 4-1/4" ID Hollow Stemmed Auger

Logged By: WHK

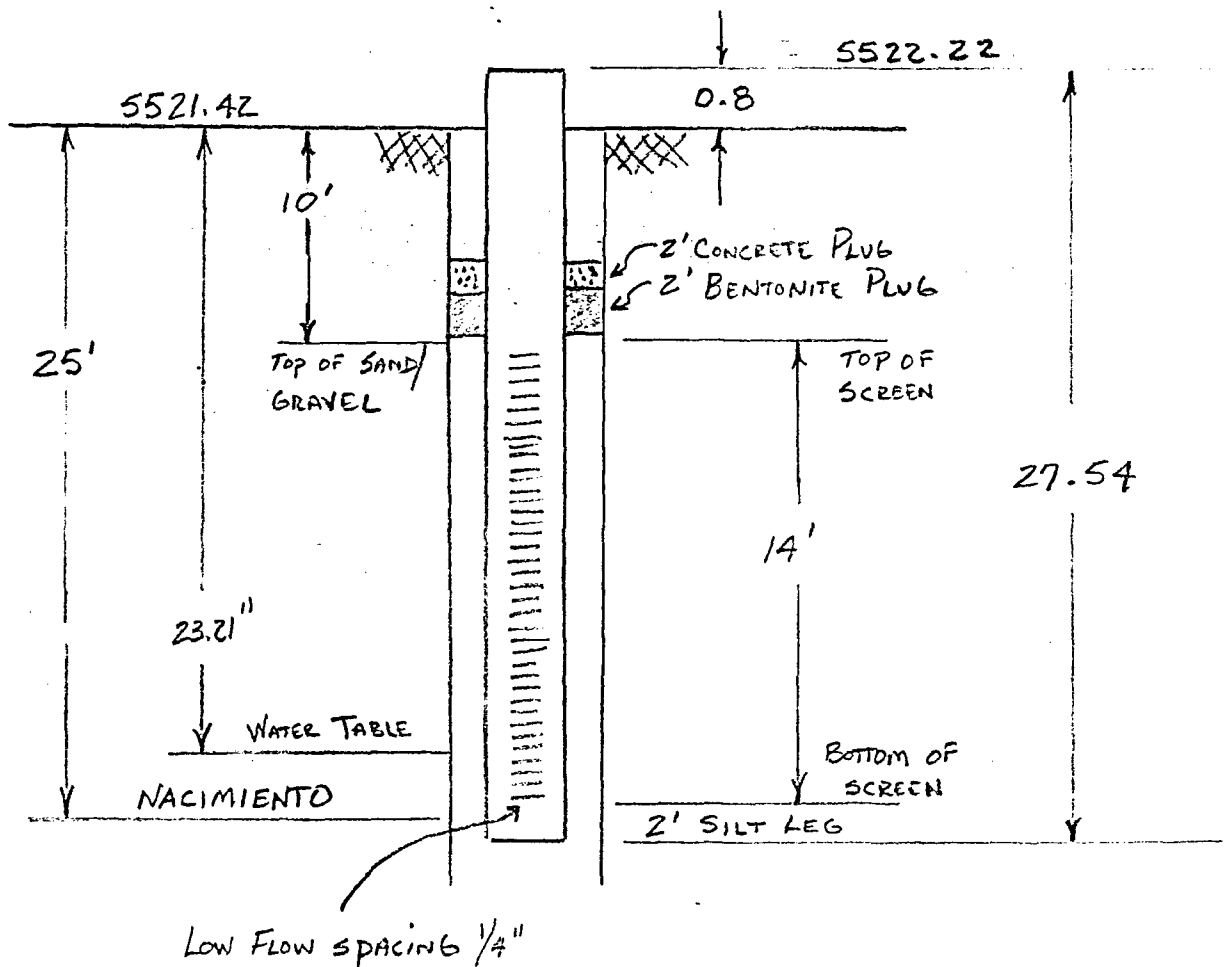


MW-32

CONSTRUCTION COMMENTS:

DRILLED BY CASING DRIVER, 8" BIT, 4.5" O. FIBERGLASS CASING SET TO DEPTH INSIDE DRIVEN CASING; ANNULAR SPACE FILLED WITH 30/40 SAND AS DRIVEN CASING REMOVED 50 LBS OF BENTONITE DRILLING MUD & 100 LBS OF CONCRETE PLACED ON TOP OF SAND PACK; BACKFILLED WITH DIRT TO SURFACE

CONCRETE PAD SURFACE SEAL (NOT SHOWN)



MW-32

DATE OF INSTALLATION 2-23-95

22-141 50 SHEETS  
22-142 100 SHEETS  
22-143 200 SHEETS

CLAMP



# Hall Environmental Analysis Laboratory

## COVER LETTER

March 20, 2003

Cindy Hurtado  
San Juan Refining  
#50 CR 4990  
Bloomfield, NM 87413  
TEL: (505) 632-4161  
FAX (505) 632-3911

RE: MW #32 Background

Order No.: 0303026

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 1 sample on 3/5/2003 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Business Manager  
Nancy McDuffie, Laboratory Manager

**Hall Environmental Analysis Laboratory**

Date: 20-Mar-03

**CLIENT:** San Juan Refining  
**Lab Order:** 0303026  
**Project:** MW #32 Background  
**Lab ID:** 0303026-01

**Client Sample ID:** MW #32  
**Collection Date:** 3/4/2003 8:30:00 AM

**Matrix:** AQUEOUS

| Analyses | Result | Limit | Qual | Units | DF | Date Analyzed |
|----------|--------|-------|------|-------|----|---------------|
|----------|--------|-------|------|-------|----|---------------|

**EPA METHOD 300.0: ANIONS**

Analyst: HVA

|                                   |      |      |  |      |     |          |
|-----------------------------------|------|------|--|------|-----|----------|
| Fluoride                          | 0.15 | 0.10 |  | mg/L | 1   | 3/5/2003 |
| Chloride                          | 870  | 10   |  | mg/L | 100 | 3/6/2003 |
| Nitrogen, Nitrite (As N)          | ND   | 0.50 |  | mg/L | 5   | 3/5/2003 |
| Bromide                           | ND   | 0.10 |  | mg/L | 1   | 3/5/2003 |
| Nitrogen, Nitrate (As N)          | 27   | 0.50 |  | mg/L | 5   | 3/5/2003 |
| Phosphorus, Orthophosphate (As P) | ND   | 0.50 |  | mg/L | 1   | 3/5/2003 |
| Sulfate                           | 1200 | 50   |  | mg/L | 100 | 3/6/2003 |

**EPA METHOD 8260B: VOLATILES**

Analyst: BL

|                                |     |     |  |      |   |          |
|--------------------------------|-----|-----|--|------|---|----------|
| Benzene                        | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| Toluene                        | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| Ethylbenzene                   | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| Methyl tert-butyl ether (MTBE) | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| 1,2,4-Trimethylbenzene         | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| 1,3,5-Trimethylbenzene         | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| 1,2-Dichloroethane (EDC)       | 5.1 | 1.0 |  | µg/L | 1 | 3/6/2003 |
| 1,2-Dibromoethane (EDB)        | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| Naphthalene                    | ND  | 2.0 |  | µg/L | 1 | 3/6/2003 |
| 1-Methylnaphthalene            | ND  | 4.0 |  | µg/L | 1 | 3/6/2003 |
| 2-Methylnaphthalene            | ND  | 4.0 |  | µg/L | 1 | 3/6/2003 |
| Bromobenzene                   | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| Bromochloromethane             | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| Bromodichloromethane           | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| Bromoform                      | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| Bromomethane                   | ND  | 2.0 |  | µg/L | 1 | 3/6/2003 |
| Carbon Tetrachloride           | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| Chlorobenzene                  | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| Chloroethane                   | ND  | 2.0 |  | µg/L | 1 | 3/6/2003 |
| Chloroform                     | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| Chloromethane                  | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| 2-Chlorotoluene                | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| 4-Chlorotoluene                | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| cis-1,2-DCE                    | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| cis-1,3-Dichloropropene        | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| 1,2-Dibromo-3-chloropropane    | ND  | 2.0 |  | µg/L | 1 | 3/6/2003 |
| Dibromochloromethane           | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| Dibromomethane                 | ND  | 2.0 |  | µg/L | 1 | 3/6/2003 |
| 1,2-Dichlorobenzene            | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| 1,3-Dichlorobenzene            | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| 1,4-Dichlorobenzene            | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |
| Dichlorodifluoromethane        | ND  | 1.0 |  | µg/L | 1 | 3/6/2003 |

**Qualifiers:** ND - Not Detected at the Reporting Limit  
J - Analyte detected below quantitation limits  
B - Analyte detected in the associated Method Blank  
\* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
E - Value above quantitation range

# Hall Environmental Analysis Laboratory

Date: 20-Mar-03

CLIENT: San Juan Refining  
Lab Order: 0303026  
Project: MW #32 Background  
Lab ID: 0303026-01

Client Sample ID: MW #32  
Collection Date: 3/4/2003 8:30:00 AM  
Matrix: AQUEOUS

| Analyses                    | Result | Limit    | Qual | Units | DF | Date Analyzed |
|-----------------------------|--------|----------|------|-------|----|---------------|
| 1,1-Dichloroethane          | 1.3    | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| 1,1-Dichloroethene          | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| 1,2-Dichloropropane         | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| 1,3-Dichloropropane         | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| 2,2-Dichloropropane         | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| 1,1-Dichloropropene         | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| Hexachlorobutadiene         | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| Isopropylbenzene            | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| 4-Isopropyltoluene          | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| Methylene Chloride          | ND     | 3.0      |      | µg/L  | 1  | 3/6/2003      |
| n-Butylbenzene              | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| n-Propylbenzene             | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| sec-Butylbenzene            | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| Styrene                     | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| tert-Butylbenzene           | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| Tetrachloroethene (PCE)     | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| 1,1,1,2-Tetrachloroethane   | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| 1,1,2,2-Tetrachloroethane   | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| trans-1,2-DCE               | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| trans-1,3-Dichloropropene   | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| Trichloroethene (TCE)       | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| Trichlorofluoromethane      | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| 1,2,3-Trichlorobenzene      | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| 1,2,4-Trichlorobenzene      | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| 1,1,1-Trichloroethane       | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| 1,1,2-Trichloroethane       | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| Vinyl chloride              | ND     | 2.0      |      | µg/L  | 1  | 3/6/2003      |
| 1,2,3-Trichloropropane      | ND     | 2.0      |      | µg/L  | 1  | 3/6/2003      |
| Xylenes, Total              | ND     | 1.0      |      | µg/L  | 1  | 3/6/2003      |
| Surr: 1,2-Dichloroethane-d4 | 91.2   | 74.6-123 |      | %REC  | 1  | 3/6/2003      |
| Surr: 4-Bromofluorobenzene  | 99.7   | 85.6-117 |      | %REC  | 1  | 3/6/2003      |
| Surr: Dibromofluoromethane  | 91.3   | 78.6-115 |      | %REC  | 1  | 3/6/2003      |
| Surr: Toluene-d8            | 105    | 84.2-115 |      | %REC  | 1  | 3/6/2003      |

## EPA METHOD 8310: PAHS

Analyst: GT

|                     |    |      |  |      |   |                      |
|---------------------|----|------|--|------|---|----------------------|
| Naphthalene         | ND | 2.5  |  | µg/L | 1 | 3/14/2003 6:38:11 PM |
| 1-Methylnaphthalene | ND | 2.5  |  | µg/L | 1 | 3/14/2003 6:38:11 PM |
| 2-Methylnaphthalene | ND | 2.5  |  | µg/L | 1 | 3/14/2003 6:38:11 PM |
| Acenaphthylene      | ND | 2.5  |  | µg/L | 1 | 3/14/2003 6:38:11 PM |
| Acenaphthene        | ND | 2.5  |  | µg/L | 1 | 3/14/2003 6:38:11 PM |
| Fluorene            | ND | 0.80 |  | µg/L | 1 | 3/14/2003 6:38:11 PM |
| Phenanthrene        | ND | 0.60 |  | µg/L | 1 | 3/14/2003 6:38:11 PM |
| Anthracene          | ND | 0.60 |  | µg/L | 1 | 3/14/2003 6:38:11 PM |

Qualifiers: ND - Not Detected at the Reporting Limit  
J - Analyte detected below quantitation limits  
B - Analyte detected in the associated Method Blank  
\* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
E - Value above quantitation range

# Hall Environmental Analysis Laboratory

Date: 20-Mar-03

CLIENT: San Juan Refining  
Lab Order: 0303026  
Project: MW #32 Background  
Lab ID: 0303026-01

Client Sample ID: MW #32  
Collection Date: 3/4/2003 8:30:00 AM  
Matrix: AQUEOUS

| Analyses               | Result | Limit  | Qual | Units | DF | Date Analyzed        |
|------------------------|--------|--------|------|-------|----|----------------------|
| Fluoranthene           | ND     | 0.30   |      | µg/L  | 1  | 3/14/2003 6:38:11 PM |
| Pyrene                 | ND     | 0.30   |      | µg/L  | 1  | 3/14/2003 6:38:11 PM |
| Benz(a)anthracene      | ND     | 0.020  |      | µg/L  | 1  | 3/14/2003 6:38:11 PM |
| Chrysene               | ND     | 0.20   |      | µg/L  | 1  | 3/14/2003 6:38:11 PM |
| Benzo(b)fluoranthene   | ND     | 0.050  |      | µg/L  | 1  | 3/14/2003 6:38:11 PM |
| Benzo(k)fluoranthene   | ND     | 0.020  |      | µg/L  | 1  | 3/14/2003 6:38:11 PM |
| Benzo(a)pyrene         | ND     | 0.020  |      | µg/L  | 1  | 3/14/2003 6:38:11 PM |
| Dibenz(a,h)anthracene  | ND     | 0.040  |      | µg/L  | 1  | 3/14/2003 6:38:11 PM |
| Benzo(g,h,i)perylene   | ND     | 0.030  |      | µg/L  | 1  | 3/14/2003 6:38:11 PM |
| Indeno(1,2,3-cd)pyrene | ND     | 0.080  |      | µg/L  | 1  | 3/14/2003 6:38:11 PM |
| Surr: Benzo(e)pyrene   | 95.0   | 54-102 |      | %REC  | 1  | 3/14/2003 6:38:11 PM |

## EPA METHOD 7470: MERCURY

Analyst: MAP

|         |    |         |  |      |   |          |
|---------|----|---------|--|------|---|----------|
| Mercury | ND | 0.00020 |  | mg/L | 1 | 3/7/2003 |
|---------|----|---------|--|------|---|----------|

## EPA METHOD 6010C: DISSOLVED METALS

Analyst: NMO

|           |        |        |  |      |    |                       |
|-----------|--------|--------|--|------|----|-----------------------|
| Arsenic   | ND     | 0.025  |  | mg/L | 1  | 3/19/2003 1:28:18 PM  |
| Barium    | 0.043  | 0.0020 |  | mg/L | 1  | 3/19/2003 1:28:18 PM  |
| Cadmium   | ND     | 0.0020 |  | mg/L | 1  | 3/19/2003 1:28:18 PM  |
| Calcium   | 440    | 5.0    |  | mg/L | 10 | 3/19/2003 3:38:23 PM  |
| Chromium  | ND     | 0.0060 |  | mg/L | 1  | 3/19/2003 1:28:18 PM  |
| Copper    | ND     | 0.0060 |  | mg/L | 1  | 3/19/2003 1:28:18 PM  |
| Iron      | ND     | 0.020  |  | mg/L | 1  | 3/11/2003 11:57:06 AM |
| Lead      | ND     | 0.0050 |  | mg/L | 1  | 3/11/2003 11:57:06 AM |
| Magnesium | 60     | 0.50   |  | mg/L | 1  | 3/19/2003 3:34:15 PM  |
| Manganese | 0.0059 | 0.0020 |  | mg/L | 1  | 3/11/2003 11:57:06 AM |
| Potassium | 5.3    | 1.0    |  | mg/L | 1  | 3/19/2003 3:34:15 PM  |
| Selenium  | ND     | 0.025  |  | mg/L | 1  | 3/19/2003 2:54:33 PM  |
| Silver    | ND     | 0.0050 |  | mg/L | 1  | 3/19/2003 2:08:51 PM  |
| Sodium    | 880    | 5.0    |  | mg/L | 10 | 3/19/2003 3:38:23 PM  |
| Uranium   | ND     | 0.10   |  | mg/L | 1  | 3/19/2003 1:28:18 PM  |
| Zinc      | 0.0081 | 0.0050 |  | mg/L | 1  | 3/19/2003 1:28:18 PM  |

## EPA METHOD 6010C: TOTAL METALS

Analyst: NMO

|           |        |        |  |      |    |                       |
|-----------|--------|--------|--|------|----|-----------------------|
| Arsenic   | ND     | 0.020  |  | mg/L | 1  | 3/10/2003 10:21:47 AM |
| Barium    | 0.17   | 0.0020 |  | mg/L | 1  | 3/10/2003 10:21:47 AM |
| Cadmium   | ND     | 0.0020 |  | mg/L | 1  | 3/10/2003 10:21:47 AM |
| Chromium  | ND     | 0.0060 |  | mg/L | 1  | 3/10/2003 1:21:43 PM  |
| Copper    | 0.0094 | 0.0060 |  | mg/L | 1  | 3/10/2003 1:21:43 PM  |
| Iron      | 13     | 0.20   |  | mg/L | 10 | 3/10/2003 1:34:54 PM  |
| Lead      | ND     | 0.0050 |  | mg/L | 1  | 3/10/2003 10:21:47 AM |
| Manganese | 0.40   | 0.0020 |  | mg/L | 1  | 3/10/2003 10:21:47 AM |
| Selenium  | ND     | 0.020  |  | mg/L | 1  | 3/10/2003 1:21:43 PM  |
| Silver    | ND     | 0.0050 |  | mg/L | 1  | 3/10/2003 2:05:23 PM  |

Qualifiers: ND - Not Detected at the Reporting Limit  
J - Analyte detected below quantitation limits  
B - Analyte detected in the associated Method Blank  
\* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
E - Value above quantitation range

# Hall Environmental Analysis Laboratory

Date: 20-Mar-03

**CLIENT:** San Juan Refining  
**Lab Order:** 0303026  
**Project:** MW #32 Background  
**Lab ID:** 0303026-01

**Client Sample ID:** MW #32  
**Collection Date:** 3/4/2003 8:30:00 AM  
**Matrix:** AQUEOUS

| Analyses                     | Result | Limit  | Qual | Units | DF | Date Analyzed         |
|------------------------------|--------|--------|------|-------|----|-----------------------|
| Uranium                      | ND     | 0.10   |      | mg/L  | 1  | 3/10/2003 10:21:47 AM |
| Zinc                         | 0.017  | 0.0050 |      | mg/L  | 1  | 3/10/2003 10:21:47 AM |
| <b>EPA METHOD 160.1: TDS</b> |        |        |      |       |    | Analyst: MAP          |
| Total Dissolved Solids       | 3800   | 1.0    |      | mg/L  | 1  | 3/10/2003             |

**Qualifiers:** ND - Not Detected at the Reporting Limit  
J - Analyte detected below quantitation limits  
B - Analyte detected in the associated Method Blank  
\* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits  
E - Value above quantitation range

## Hall Environmental Analysis Laboratory

Date: 21-Mar-03

CLIENT: San Juan Refining  
Work Order: 0303026  
Project: MW #32 Background

**QC SUMMARY REPORT**  
Method Blank

| Sample ID  | MBLK #1 | Batch ID: R7560 | Test Code: E300    | Units: mg/L | Analysis Date 3/5/2003 | Prep Date |
|------------|---------|-----------------|--------------------|-------------|------------------------|-----------|
| Client ID: |         |                 | Run ID: LC_030305B |             | SeqNo: 171752          |           |

| Analyte                           | Result | PQL  | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|-----------------------------------|--------|------|-----------|-------------|------|----------|-----------|-------------|------|----------|------|
| Fluoride                          | ND     | 0.10 |           |             |      |          |           |             |      |          |      |
| Chloride                          | ND     | 0.10 |           |             |      |          |           |             |      |          |      |
| Nitrogen, Nitrite (As N)          | ND     | 0.10 |           |             |      |          |           |             |      |          |      |
| Nitrogen, Nitrate (As N)          | ND     | 0.10 |           |             |      |          |           |             |      |          |      |
| Phosphorus, Orthophosphate (As P) | ND     | 0.50 |           |             |      |          |           |             |      |          |      |
| Sulfate                           | ND     | 0.50 |           |             |      |          |           |             |      |          |      |

| Sample ID  | MBLK | Batch ID: R7560 | Test Code: E300    | Units: mg/L | Analysis Date 3/5/2003 | Prep Date |
|------------|------|-----------------|--------------------|-------------|------------------------|-----------|
| Client ID: |      |                 | Run ID: LC_030305B |             | SeqNo: 171768          |           |

| Analyte                           | Result | PQL  | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|-----------------------------------|--------|------|-----------|-------------|------|----------|-----------|-------------|------|----------|------|
| Fluoride                          | ND     | 0.10 |           |             |      |          |           |             |      |          |      |
| Chloride                          | ND     | 0.10 |           |             |      |          |           |             |      |          |      |
| Nitrogen, Nitrite (As N)          | ND     | 0.10 |           |             |      |          |           |             |      |          |      |
| Nitrogen, Nitrate (As N)          | ND     | 0.10 |           |             |      |          |           |             |      |          |      |
| Phosphorus, Orthophosphate (As P) | ND     | 0.50 |           |             |      |          |           |             |      |          |      |
| Sulfate                           | ND     | 0.50 |           |             |      |          |           |             |      |          |      |

Qualifiers: ND - Not Detected at the Reporting Limit  
J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

## Hall Environmental Analysis Laboratory

Date: 21-Mar-03

**CLIENT:** San Juan Refining  
**Work Order:** 0303026  
**Project:** MW #32 Background

# QC SUMMARY REPORT

Method Blank

| Sample ID                      | rb | Batch ID: R7550 | Test Code: SW8260B | Units: µg/L | Analysis Date 3/5/2003 | Prep Date |          |           |             |      |          |      |
|--------------------------------|----|-----------------|--------------------|-------------|------------------------|-----------|----------|-----------|-------------|------|----------|------|
| Client ID:                     |    | Run ID:         | VAL_030305A        |             | SeqNo: 171559          |           |          |           |             |      |          |      |
| Analyte                        |    | Result          | PQL                | SPK value   | SPK Ref Val            | %REC      | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
| Benzene                        |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| Toluene                        |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| Ethylbenzene                   |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| Methyl tert-butyl ether (MTBE) |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| 1,2,4-Trimethylbenzene         |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| 1,3,5-Trimethylbenzene         |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| 1,2-Dichloroethane (EDC)       |    | 0.516           | 1.0                |             |                        |           |          |           |             |      |          | J    |
| 1,2-Dibromoethane (EDB)        |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| Naphthalene                    |    | ND              | 2.0                |             |                        |           |          |           |             |      |          |      |
| 1-Methylnaphthalene            |    | ND              | 4.0                |             |                        |           |          |           |             |      |          |      |
| 2-Methylnaphthalene            |    | ND              | 4.0                |             |                        |           |          |           |             |      |          |      |
| Bromobenzene                   |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| Bromochloromethane             |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| Bromodichloromethane           |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| Bromoform                      |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| Bromomethane                   |    | ND              | 2.0                |             |                        |           |          |           |             |      |          |      |
| Carbon Tetrachloride           |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| Chlorobenzene                  |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| Chloroethane                   |    | ND              | 2.0                |             |                        |           |          |           |             |      |          |      |
| Chloroform                     |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| Chloromethane                  |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| 2-Chlorotoluene                |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| 4-Chlorotoluene                |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| cis-1,2-DCE                    |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| cis-1,3-Dichloropropene        |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |
| 1,2-Dibromo-3-chloropropane    |    | 0.23            | 2.0                |             |                        |           |          |           |             |      |          | J    |
| Dibromochloromethane           |    | ND              | 1.0                |             |                        |           |          |           |             |      |          |      |

**Qualifiers:** ND - Not Detected at the Reporting Limit  
 J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits  
 R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank



# QC SUMMARY REPORT

Method Blank

CLIENT: San Juan Refining  
Work Order: 0303026  
Project: MW #32 Background

|                           |    |     |
|---------------------------|----|-----|
| Dibromomethane            | ND | 2.0 |
| 1,2-Dichlorobenzene       | ND | 1.0 |
| 1,3-Dichlorobenzene       | ND | 1.0 |
| 1,4-Dichlorobenzene       | ND | 1.0 |
| Dichlorodifluoromethane   | ND | 1.0 |
| 1,1-Dichloroethane        | ND | 1.0 |
| 1,1-Dichloroethene        | ND | 1.0 |
| 1,2-Dichloropropane       | ND | 1.0 |
| 1,3-Dichloropropane       | ND | 1.0 |
| 2,2-Dichloropropane       | ND | 1.0 |
| 1,1-Dichloropropene       | ND | 1.0 |
| Hexachlorobutadiene       | ND | 1.0 |
| Isopropylbenzene          | ND | 1.0 |
| 4-Isopropyltoluene        | ND | 1.0 |
| Methylene Chloride        | ND | 3.0 |
| n-Butylbenzene            | ND | 1.0 |
| n-Propylbenzene           | ND | 1.0 |
| sec-Butylbenzene          | ND | 1.0 |
| Styrene                   | ND | 1.0 |
| tert-Butylbenzene         | ND | 1.0 |
| Tetrachloroethene (PCE)   | ND | 1.0 |
| 1,1,1,2-Tetrachloroethane | ND | 1.0 |
| 1,1,2,2-Tetrachloroethane | ND | 1.0 |
| trans-1,2-DCE             | ND | 1.0 |
| trans-1,3-Dichloropropene | ND | 1.0 |
| Trichloroethene (TCE)     | ND | 1.0 |
| Trichlorofluoromethane    | ND | 1.0 |
| 1,2,3-Trichlorobenzene    | ND | 1.0 |
| 1,2,4-Trichlorobenzene    | ND | 1.0 |
| 1,1,1-Trichloroethane     | ND | 1.0 |
| 1,1,2-Trichloroethane     | ND | 1.0 |
| Vinyl chloride            | ND | 2.0 |
| 1,2,3-Trichloropropane    | ND | 2.0 |

Qualifiers: ND - Not Detected at the Reporting Limit  
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B - Analyte detected in the associated Method Blank

# QC SUMMARY REPORT

Method Blank

CLIENT: San Juan Refining  
 Work Order: 0303026  
 Project: MW #32 Background

| Xylenes, Total              | ND    | 1.0 | 10 | 0 | 90.5 | 74.6 | 123 | 0 |
|-----------------------------|-------|-----|----|---|------|------|-----|---|
| Surr: 1,2-Dichloroethane-d4 | 9.052 | 0   | 10 | 0 | 90.5 | 74.6 | 123 | 0 |
| Surr: 4-Bromofluorobenzene  | 10.32 | 0   | 10 | 0 | 103  | 85.6 | 117 | 0 |
| Surr: Dibromofluoromethane  | 9.252 | 0   | 10 | 0 | 92.5 | 78.6 | 115 | 0 |
| Surr: Toluene-d8            | 10.6  | 0   | 10 | 0 | 106  | 84.2 | 115 | 0 |

Qualifiers: ND - Not Detected at the Reporting Limit  
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 S - Spike Recovery outside accepted recovery limits  
 R - RPD outside accepted recovery limits  
 B - Analyte detected in the associated Method Blank

# Hall Environmental Analysis Laboratory

Date: 21-Mar-03

**CLIENT:** San Juan Refining  
**Work Order:** 0303026  
**Project:** MW #32 Background

## QC SUMMARY REPORT

Method Blank

| Sample ID  | BLK    | Batch ID: R7609 | Test Code: SW6010A  | Units: mg/L | Analysis Date | 3/11/2003 11:24:51 AM | Prep Date |             |      |          |      |
|------------|--------|-----------------|---------------------|-------------|---------------|-----------------------|-----------|-------------|------|----------|------|
| Client ID: |        |                 | Run ID: ICP_030311C |             | SeqNo:        | 172601                |           |             |      |          |      |
| Analyte    | Result | PQL             | SPK value           | SPK Ref Val | %REC          | LowLimit              | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
| Arsenic    | ND     | 0.020           |                     |             |               |                       |           |             |      |          |      |
| Barium     | ND     | 0.0020          |                     |             |               |                       |           |             |      |          |      |
| Cadmium    | ND     | 0.0020          |                     |             |               |                       |           |             |      |          |      |
| Calcium    | ND     | 0.50            |                     |             |               |                       |           |             |      |          |      |
| Chromium   | ND     | 0.0060          |                     |             |               |                       |           |             |      |          |      |
| Copper     | ND     | 0.0060          |                     |             |               |                       |           |             |      |          |      |
| Iron       | ND     | 0.020           |                     |             |               |                       |           |             |      |          |      |
| Lead       | ND     | 0.0050          |                     |             |               |                       |           |             |      |          |      |
| Magnesium  | ND     | 0.50            |                     |             |               |                       |           |             |      |          |      |
| Manganese  | ND     | 0.0020          |                     |             |               |                       |           |             |      |          |      |
| Potassium  | ND     | 1.0             |                     |             |               |                       |           |             |      |          |      |
| Selenium   | ND     | 0.020           |                     |             |               |                       |           |             |      |          |      |
| Silver     | ND     | 0.0050          |                     |             |               |                       |           |             |      |          |      |
| Sodium     | ND     | 0.50            |                     |             |               |                       |           |             |      |          |      |
| Uranium    | ND     | 0.10            |                     |             |               |                       |           |             |      |          |      |
| Zinc       | ND     | 0.0050          |                     |             |               |                       |           |             |      |          |      |

**Qualifiers:** ND - Not Detected at the Reporting Limit  
 J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits  
 R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank  
 I

## Hall Environmental Analysis Laboratory

Date: 21-Mar-03

**CLIENT:** San Juan Refining  
**Work Order:** 0303026  
**Project:** MW #32 Background

## QC SUMMARY REPORT

Method Blank

| Sample ID              | MB-3215 | Batch ID: | 3215         | Test Code:  | SW8310 | Units:   | µg/L      | Analysis Date | 3/14/2003 5:02:13 PM | Prep Date | 3/6/2003 |
|------------------------|---------|-----------|--------------|-------------|--------|----------|-----------|---------------|----------------------|-----------|----------|
| Client ID:             |         | Run ID:   | HUGO_030314A |             |        |          |           | SeqNo:        | 173936               |           |          |
| Analyte                | Result  | PQL       | SPK value    | SPK Ref Val | %REC   | LowLimit | HighLimit | RPD Ref Val   | %RPD                 | RPDLimit  | Qual     |
| Naphthalene            | ND      | 2.5       |              |             |        |          |           |               |                      |           |          |
| 1-Methylnaphthalene    | ND      | 2.5       |              |             |        |          |           |               |                      |           |          |
| 2-Methylnaphthalene    | ND      | 2.5       |              |             |        |          |           |               |                      |           |          |
| Acenaphthylene         | ND      | 2.5       |              |             |        |          |           |               |                      |           |          |
| Acenaphthene           | ND      | 2.5       |              |             |        |          |           |               |                      |           |          |
| Fluorene               | ND      | 0.80      |              |             |        |          |           |               |                      |           |          |
| Phenanthrene           | ND      | 0.60      |              |             |        |          |           |               |                      |           |          |
| Anthracene             | ND      | 0.60      |              |             |        |          |           |               |                      |           |          |
| Fluoranthene           | ND      | 0.30      |              |             |        |          |           |               |                      |           |          |
| Pyrene                 | ND      | 0.30      |              |             |        |          |           |               |                      |           |          |
| Benz(a)anthracene      | ND      | 0.020     |              |             |        |          |           |               |                      |           |          |
| Chrysene               | ND      | 0.20      |              |             |        |          |           |               |                      |           |          |
| Benzo(b)fluoranthene   | ND      | 0.050     |              |             |        |          |           |               |                      |           |          |
| Benzo(k)fluoranthene   | ND      | 0.020     |              |             |        |          |           |               |                      |           |          |
| Benzo(a)pyrene         | 0.01    | 0.020     |              |             |        |          |           |               |                      |           | J        |
| Dibenz(a,h)anthracene  | ND      | 0.040     |              |             |        |          |           |               |                      |           |          |
| Benzo(g,h,i)perylene   | 0.02    | 0.030     |              |             |        |          |           |               |                      |           | J        |
| Indeno(1,2,3-cd)pyrene | ND      | 0.080     |              |             |        |          |           |               |                      |           |          |
| Surr: Benzo(e)pyrene   | 16.24   | 0         | 20           | 0           | 81.2   | 54       | 102       | 0             |                      |           |          |

**Qualifiers:** ND - Not Detected at the Reporting Limit  
 J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits  
 R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

# QC SUMMARY REPORT

**CLIENT:** San Juan Refining  
**Work Order:** 0303026  
**Project:** MW #32 Background

Method Blank

|                      |         |           |      |            |              |        |          |               |                      |           |          |
|----------------------|---------|-----------|------|------------|--------------|--------|----------|---------------|----------------------|-----------|----------|
| Sample ID            | MB-3215 | Batch ID: | 3215 | Test Code: | SW8310       | Units: | µg/L     | Analysis Date | 3/14/2003 5:02:13 PM | Prep Date | 3/6/2003 |
| Client ID:           |         | Run ID:   |      |            | HUGO_030314A |        |          | SeqNo:        | 173953               |           |          |
| Analyte              |         | Result    | PQL  | SPK value  | SPK Ref Val  | %REC   | LowLimit | HighLimit     | RPD Ref Val          | %RPD      | RPDLimit |
| Naphthalene          |         | ND        | 10   |            |              |        |          |               |                      |           |          |
| 1-Methylnaphthalene  |         | ND        | 10   |            |              |        |          |               |                      |           |          |
| 2-Methylnaphthalene  |         | ND        | 10   |            |              |        |          |               |                      |           |          |
| Benzo(a)pyrene       |         | ND        | 0.10 |            |              |        |          |               |                      |           |          |
| Surr: Benzo(e)pyrene |         | 16.24     | 0    | 20         | 0            | 81.2   | 54       | 102           | 0                    |           |          |

|                        |      |           |       |            |             |        |          |               |             |           |          |
|------------------------|------|-----------|-------|------------|-------------|--------|----------|---------------|-------------|-----------|----------|
| Sample ID              | MBLK | Batch ID: | R7600 | Test Code: | E160.1      | Units: | mg/L     | Analysis Date | 3/10/2003   | Prep Date | 3/7/2003 |
| Client ID:             |      | Run ID:   |       |            | WC_030310D  |        |          | SeqNo:        | 172390      |           |          |
| Analyte                |      | Result    | PQL   | SPK value  | SPK Ref Val | %REC   | LowLimit | HighLimit     | RPD Ref Val | %RPD      | RPDLimit |
| Total Dissolved Solids |      | ND        | 1.0   |            |             |        |          |               |             |           |          |

**Qualifiers:** ND - Not Detected at the Reporting Limit  
 J - Analyte detected below quantitation limits  
 S - Spike Recovery outside accepted recovery limits  
 R - RPD outside accepted recovery limits  
 B - Analyte detected in the associated Method Blank

## Hall Environmental Analysis Laboratory

Date: 20-Mar-03

CLIENT: San Juan Refining

Work Order: 0303026

Project: MW #32 Background

## QC SUMMARY REPORT

Sample Duplicate

| Sample ID  | 0303026-01C | Batch ID: R7560 | Test Code: E300    | Units: mg/L | Analysis Date 3/5/2003  | Prep Date                      |
|------------|-------------|-----------------|--------------------|-------------|-------------------------|--------------------------------|
| Client ID: | MW #32      |                 | Run ID: LC_030305B |             | SeqNo: 171764           |                                |
| Analyte    | Result      | PQL             | SPK value          | SPK Ref Val | %REC LowLimit HighLimit | RPD Ref Val %RPD RPDLimit Qual |

|                                   |       |      |   |   |   |       |   |    |
|-----------------------------------|-------|------|---|---|---|-------|---|----|
| Fluoride                          | 0.138 | 0.10 | 0 | 0 | 0 | 0.138 | 0 | 20 |
| Phosphorus, Orthophosphate (As P) | ND    | 0.50 | 0 | 0 | 0 | 0     | 0 | 20 |

| Sample ID  | 0303026-01C | Batch ID: R7560 | Test Code: E300    | Units: mg/L | Analysis Date 3/5/2003  | Prep Date                      |
|------------|-------------|-----------------|--------------------|-------------|-------------------------|--------------------------------|
| Client ID: | MW #32      |                 | Run ID: LC_030305B |             | SeqNo: 171766           |                                |
| Analyte    | Result      | PQL             | SPK value          | SPK Ref Val | %REC LowLimit HighLimit | RPD Ref Val %RPD RPDLimit Qual |

|                          |       |      |   |   |   |       |       |    |
|--------------------------|-------|------|---|---|---|-------|-------|----|
| Nitrogen, Nitrite (As N) | ND    | 0.50 | 0 | 0 | 0 | 0     | 0     | 20 |
| Nitrogen, Nitrate (As N) | 26.37 | 0.50 | 0 | 0 | 0 | 26.58 | 0.793 | 20 |

| Sample ID  | 0303026-01C | Batch ID: R7569 | Test Code: E300    | Units: mg/L | Analysis Date 3/6/2003  | Prep Date                      |
|------------|-------------|-----------------|--------------------|-------------|-------------------------|--------------------------------|
| Client ID: | MW #32      |                 | Run ID: LC_030306A |             | SeqNo: 171943           |                                |
| Analyte    | Result      | PQL             | SPK value          | SPK Ref Val | %REC LowLimit HighLimit | RPD Ref Val %RPD RPDLimit Qual |

|          |      |    |   |   |   |      |       |    |
|----------|------|----|---|---|---|------|-------|----|
| Chloride | 886  | 10 | 0 | 0 | 0 | 874  | 1.37  | 20 |
| Sulfate  | 1219 | 50 | 0 | 0 | 0 | 1217 | 0.174 | 20 |

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

**CLIENT:** San Juan Refining  
**Work Order:** 0303026  
**Project:** MW #32 Background

**QC SUMMARY REPORT**  
 Sample Duplicate

|            |                 |                 |                     |             |               |                      |           |             |      |          |      |
|------------|-----------------|-----------------|---------------------|-------------|---------------|----------------------|-----------|-------------|------|----------|------|
| Sample ID  | 0303026-01C DUP | Batch ID: R7708 | Test Code: SW6010A  | Units: mg/L | Analysis Date | 3/19/2003 1:31:35 PM | Prep Date |             |      |          |      |
| Client ID: | MW #32          |                 | Run ID: ICP_030319D |             | SeqNo:        | 174917               |           |             |      |          |      |
| Analyte    | Result          | PQL             | SPK value           | SPK Ref Val | %REC          | LowLimit             | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
| Arsenic    | ND              | 0.020           | 0                   | 0           | 0             | 0                    | 0         | 0           | 0    | 20       |      |
| Barium     | 0.0458          | 0.0020          | 0                   | 0           | 0             | 0                    | 0         | 0.04283     | 6.70 | 20       |      |
| Cadmium    | 0.001732        | 0.0020          | 0                   | 0           | 0             | 0                    | 0         | 0.0007428   | 0    | 20       | J    |
| Chromium   | 0.003754        | 0.0060          | 0                   | 0           | 0             | 0                    | 0         | 0.00382     | 0    | 20       | J    |
| Copper     | 0.005972        | 0.0060          | 0                   | 0           | 0             | 0                    | 0         | 0.005198    | 0    | 20       | J    |
| Uranium    | 0.09505         | 0.10            | 0                   | 0           | 0             | 0                    | 0         | 0.09119     | 0    | 20       | J    |
| Zinc       | 0.008344        | 0.0050          | 0                   | 0           | 0             | 0                    | 0         | 0.008059    | 3.48 | 20       |      |

|            |                 |                 |                     |             |               |                      |           |             |      |          |      |
|------------|-----------------|-----------------|---------------------|-------------|---------------|----------------------|-----------|-------------|------|----------|------|
| Sample ID  | 0303026-01C DUP | Batch ID: R7710 | Test Code: SW6010A  | Units: mg/L | Analysis Date | 3/19/2003 2:55:56 PM | Prep Date |             |      |          |      |
| Client ID: | MW #32          |                 | Run ID: ICP_030319E |             | SeqNo:        | 174938               |           |             |      |          |      |
| Analyte    | Result          | PQL             | SPK value           | SPK Ref Val | %REC          | LowLimit             | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
| Selenium   | 0.01213         | 0.020           | 0                   | 0           | 0             | 0                    | 0         | 0.01118     | 0    | 20       | J    |

|            |                 |                 |                     |             |               |                      |           |             |      |          |      |
|------------|-----------------|-----------------|---------------------|-------------|---------------|----------------------|-----------|-------------|------|----------|------|
| Sample ID  | 0303026-01C DUP | Batch ID: R7711 | Test Code: SW6010A  | Units: mg/L | Analysis Date | 3/19/2003 2:09:59 PM | Prep Date |             |      |          |      |
| Client ID: | MW #32          |                 | Run ID: ICP_030319F |             | SeqNo:        | 174945               |           |             |      |          |      |
| Analyte    | Result          | PQL             | SPK value           | SPK Ref Val | %REC          | LowLimit             | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
| Silver     | ND              | 0.0050          | 0                   | 0           | 0             | 0                    | 0         | 0           | 0    | 20       |      |

|            |                 |                 |                     |             |               |                      |           |             |       |          |      |
|------------|-----------------|-----------------|---------------------|-------------|---------------|----------------------|-----------|-------------|-------|----------|------|
| Sample ID  | 0303026-01C DUP | Batch ID: R7712 | Test Code: SW6010A  | Units: mg/L | Analysis Date | 3/19/2003 3:36:22 PM | Prep Date |             |       |          |      |
| Client ID: | MW #32          |                 | Run ID: ICP_030319G |             | SeqNo:        | 174957               |           |             |       |          |      |
| Analyte    | Result          | PQL             | SPK value           | SPK Ref Val | %REC          | LowLimit             | HighLimit | RPD Ref Val | %RPD  | RPDLimit | Qual |
| Magnesium  | 62.92           | 0.50            | 0                   | 0           | 0             | 0                    | 0         | 60.44       | 4.01  | 20       |      |
| Potassium  | 5.332           | 1.0             | 0                   | 0           | 0             | 0                    | 0         | 5.293       | 0.725 | 20       |      |

**Qualifiers:** ND - Not Detected at the Reporting Limit  
 J - Analyte detected below quantitation limits  
 S - Spike Recovery outside accepted recovery limits  
 R - RPD outside accepted recovery limits  
 B - Analyte detected in the associated Method Blank

**CLIENT:** San Juan Refining  
**Work Order:** 0303026  
**Project:** MW #32 Background

**QC SUMMARY REPORT**  
 Sample Duplicate

|                        |             |                 |                   |             |               |           |           |           |             |      |          |      |
|------------------------|-------------|-----------------|-------------------|-------------|---------------|-----------|-----------|-----------|-------------|------|----------|------|
| Sample ID              | 0303026-01C | Batch ID: R7600 | Test Code: E160.1 | Units: mg/L | Analysis Date | 3/10/2003 | Prep Date | 3/7/2003  |             |      |          |      |
| Client ID:             | MW #32      |                 | Run ID:           | WC_030310D  | SeqNo:        | 172393    |           |           |             |      |          |      |
| Analyte                |             | Result          | PQL               | SPK value   | SPK Ref Val   | %REC      | LowLimit  | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
| Total Dissolved Solids |             | 3942            | 1.0               | 0           | 0             | 0         | 0         | 0         | 3845        | 2.49 | 20       |      |

**Qualifiers:**

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R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank  
3



## Hall Environmental Analysis Laboratory

Date: 20-Mar-03

**CLIENT:** San Juan Refining  
**Work Order:** 0303026  
**Project:** MW #32 Background

## QC SUMMARY REPORT

Sample Matrix Spike

| Sample ID              | 0303026-01BMS | Batch ID: | 3215         | Test Code:  | SW8310    | Units:      | µg/L      | Analysis Date | 3/14/2003 8:14:07 PM | Prep Date   | 3/6/2003 |          |      |
|------------------------|---------------|-----------|--------------|-------------|-----------|-------------|-----------|---------------|----------------------|-------------|----------|----------|------|
| Client ID:             | MW #32        | Run ID:   | HUGO_030314A | PQL         | SPK value | SPK Ref Val | %REC      | LowLimit      | HighLimit            | RPD Ref Val | %RPD     | RPDLimit | Qual |
| Analyte                | Result        | PQL       | SPK value    | SPK Ref Val | %REC      | LowLimit    | HighLimit | RPD Ref Val   | %RPD                 | RPDLimit    | Qual     |          |      |
| Naphthalene            | 15.29         | 2.5       | 40           | 0           | 38.2      | 26.6        | 84.1      | 0             |                      |             |          |          |      |
| 1-Methylnaphthalene    | 15.41         | 2.5       | 40.1         | 0           | 38.4      | 24.2        | 87.5      | 0             |                      |             |          |          |      |
| 2-Methylnaphthalene    | 15.46         | 2.5       | 40           | 0           | 38.7      | 23.4        | 86.3      | 0             |                      |             |          |          |      |
| Acenaphthylene         | 16.17         | 2.5       | 40.1         | 0           | 40.3      | 33.3        | 90        | 0             |                      |             |          |          |      |
| Acenaphthene           | 16.39         | 2.5       | 40           | 0           | 41.0      | 31.9        | 93.1      | 0             |                      |             |          |          |      |
| Fluorene               | 1.85          | 0.80      | 4.01         | 0           | 46.1      | 34.9        | 96.8      | 0             |                      |             |          |          |      |
| Phenanthrene           | 1.23          | 0.60      | 2.01         | 0           | 61.2      | 50.5        | 105       | 0             |                      |             |          |          |      |
| Anthracene             | 1.23          | 0.60      | 2.01         | 0           | 61.2      | 55.5        | 99.1      | 0             |                      |             |          |          |      |
| Fluoranthene           | 2.99          | 0.30      | 4.01         | 0           | 74.6      | 67.8        | 104       | 0             |                      |             |          |          |      |
| Pyrene                 | 3.07          | 0.30      | 4.01         | 0           | 76.6      | 69.3        | 108       | 0             |                      |             |          |          |      |
| Benz(a)anthracene      | 0.34          | 0.020     | 0.401        | 0           | 84.8      | 73.1        | 109       | 0             |                      |             |          |          |      |
| Chrysene               | 1.7           | 0.20      | 2.01         | 0           | 84.6      | 72.7        | 110       | 0             |                      |             |          |          |      |
| Benzo(b)fluoranthene   | 0.45          | 0.050     | 0.501        | 0           | 89.8      | 42.1        | 139       | 0             |                      |             |          |          |      |
| Benzo(k)fluoranthene   | 0.22          | 0.020     | 0.25         | 0           | 88.0      | 71.2        | 112       | 0             |                      |             |          |          |      |
| Benzo(a)pyrene         | 0.23          | 0.020     | 0.251        | 0.01        | 87.6      | 73          | 110       | 0             |                      |             |          |          |      |
| Dibenz(a,h)anthracene  | 0.46          | 0.040     | 0.501        | 0           | 91.8      | 72          | 113       | 0             |                      |             |          |          |      |
| Benzo(g,h,i)perylene   | 0.47          | 0.030     | 0.5          | 0.02        | 90.0      | 71.6        | 118       | 0             |                      |             |          |          |      |
| Indeno(1,2,3-cd)pyrene | 0.929         | 0.080     | 1.002        | 0           | 92.7      | 75          | 114       | 0             |                      |             |          |          |      |
| Surr: Benzo(e)pyrene   | 18.27         | 0         | 20           | 0           | 91.4      | 54          | 102       | 0             |                      |             |          |          |      |

**Qualifiers:** ND - Not Detected at the Reporting Limit  
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S - Spike Recovery outside accepted recovery limits  
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B - Analyte detected in the associated Method Blank

CLIENT: San Juan Refining  
 Work Order: 0303026  
 Project: MW #32 Background

# QC SUMMARY REPORT

Sample Matrix Spike Duplicate

Sample ID 0303026-01BMSD Batch ID: 3215 Test Code: SW8310 Units: µg/L Analysis Date 3/14/2003 9:02:05 PM Prep Date 3/6/2003  
 Client ID: MW #32 Run ID: HUGO\_030314A SeqNo: 173941

| Analyte                | Result | PQL   | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|------------------------|--------|-------|-----------|-------------|------|----------|-----------|-------------|------|----------|------|
| Naphthalene            | 18.16  | 2.5   | 40        | 0           | 45.4 | 26.6     | 84.1      | 15.29       | 17.2 | 27.4     |      |
| 1-Methylnaphthalene    | 18.62  | 2.5   | 40.1      | 0           | 46.4 | 24.2     | 87.5      | 15.41       | 18.9 | 31.8     |      |
| 2-Methylnaphthalene    | 18.53  | 2.5   | 40.       | 0           | 46.3 | 23.4     | 86.3      | 15.46       | 18.1 | 33.9     |      |
| Acenaphthylene         | 19.65  | 2.5   | 40.1      | 0           | 49.0 | 33.3     | 90        | 16.17       | 19.4 | 29.6     |      |
| Acenaphthene           | 19.62  | 2.5   | 40        | 0           | 49.1 | 31.9     | 93.1      | 16.39       | 17.9 | 30.9     |      |
| Fluorene               | 2.05   | 0.80  | 4.01      | 0           | 51.1 | 34.9     | 96.8      | 1.85        | 10.3 | 32       |      |
| Phenanthrene           | 1.3    | 0.60  | 2.01      | 0           | 64.7 | 50.5     | 105       | 1.23        | 5.53 | 21.6     |      |
| Anthracene             | 1.31   | 0.60  | 2.01      | 0           | 65.2 | 55.5     | 99.1      | 1.23        | 6.30 | 18.7     |      |
| Fluoranthene           | 3.09   | 0.30  | 4.01      | 0           | 77.1 | 67.8     | 104       | 2.99        | 3.29 | 12.4     |      |
| Pyrene                 | 3.17   | 0.30  | 4.01      | 0           | 79.1 | 69.3     | 108       | 3.07        | 3.21 | 12.5     |      |
| Benz(a)anthracene      | 0.34   | 0.020 | 0.401     | 0           | 84.8 | 73.1     | 109       | 0.34        | 0    | 13.6     |      |
| Chrysene               | 1.72   | 0.20  | 2.01      | 0           | 85.6 | 72.7     | 110       | 1.7         | 1.17 | 12.6     |      |
| Benzo(b)fluoranthene   | 0.45   | 0.050 | 0.501     | 0           | 89.8 | 42.1     | 139       | 0.45        | 0    | 13.3     |      |
| Benzo(k)fluoranthene   | 0.22   | 0.020 | 0.25      | 0           | 88.0 | 71.2     | 112       | 0.22        | 0    | 17       |      |
| Benzo(a)pyrene         | 0.23   | 0.020 | 0.251     | 0.01        | 87.6 | 73       | 110       | 0.23        | 0    | 12.1     |      |
| Dibenz(a,h)anthracene  | 0.46   | 0.040 | 0.501     | 0           | 91.8 | 72       | 113       | 0.46        | 0    | 13.6     |      |
| Benzo(g,h,i)perylene   | 0.47   | 0.030 | 0.5       | 0.02        | 90.0 | 71.6     | 118       | 0.47        | 0    | 15.5     |      |
| Indeno(1,2,3-cd)pyrene | 0.944  | 0.080 | 1.002     | 0           | 94.2 | 75       | 114       | 0.929       | 1.60 | 15.4     |      |
| Surr: Benzo(e)pyrene   | 17.85  | 0     | 20        | 0           | 89.3 | 54       | 102       | 18.27       | 2.33 | 20       |      |

Qualifiers: ND - Not Detected at the Reporting Limit  
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B - Analyte detected in the associated Method Blank

**CLIENT:** San Juan Refining  
**Work Order:** 0303026  
**Project:** MW #32 Background

**QC SUMMARY REPORT**  
 Sample Matrix Spike

|            |                |                 |                     |             |               |                      |           |             |      |          |      |
|------------|----------------|-----------------|---------------------|-------------|---------------|----------------------|-----------|-------------|------|----------|------|
| Sample ID  | 0303026-01C MS | Batch ID: R7708 | Test Code: SW6010A  | Units: mg/L | Analysis Date | 3/19/2003 1:34:52 PM | Prep Date |             |      |          |      |
| Client ID: | MW #32         |                 | Run ID: ICP_030319D |             | SeqNo: 174918 |                      |           |             |      |          |      |
| Analyte    | Result         | PQL             | SPK value           | SPK Ref Val | %REC          | LowLimit             | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
| Arsenic    | 0.9237         | 0.020           | 1                   | 0           | 92.4          | 75                   | 125       | 0           |      |          |      |
| Barium     | 0.9629         | 0.0020          | 1                   | 0.04283     | 92.0          | 75                   | 125       | 0           |      |          |      |
| Cadmium    | 0.9311         | 0.0020          | 1                   | 0.0007428   | 93.0          | 75                   | 125       | 0           |      |          |      |
| Chromium   | 0.8911         | 0.0060          | 1                   | 0.00382     | 88.7          | 75                   | 125       | 0           |      |          |      |
| Copper     | 1.039          | 0.0060          | 1                   | 0.005198    | 103           | 75                   | 125       | 0           |      |          |      |
| Uranium    | 0.1281         | 0.10            | 1                   | 0.09119     | 3.69          | 75                   | 125       | 0           |      |          | S    |
| Zinc       | 0.8378         | 0.0050          | 1                   | 0.008059    | 83.0          | 75                   | 125       | 0           |      |          |      |

|            |                |                 |                     |             |               |                      |           |             |      |          |      |
|------------|----------------|-----------------|---------------------|-------------|---------------|----------------------|-----------|-------------|------|----------|------|
| Sample ID  | 0303026-01C MS | Batch ID: R7710 | Test Code: SW6010A  | Units: mg/L | Analysis Date | 3/19/2003 2:59:18 PM | Prep Date |             |      |          |      |
| Client ID: | MW #32         |                 | Run ID: ICP_030319E |             | SeqNo: 174940 |                      |           |             |      |          |      |
| Analyte    | Result         | PQL             | SPK value           | SPK Ref Val | %REC          | LowLimit             | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
| Selenium   | 1.003          | 0.020           | 1                   | 0           | 100           | 75                   | 125       | 0           |      |          |      |

|            |                |                 |                     |             |               |                      |           |             |      |          |      |
|------------|----------------|-----------------|---------------------|-------------|---------------|----------------------|-----------|-------------|------|----------|------|
| Sample ID  | 0303026-01C MS | Batch ID: R7711 | Test Code: SW6010A  | Units: mg/L | Analysis Date | 3/19/2003 2:11:03 PM | Prep Date |             |      |          |      |
| Client ID: | MW #32         |                 | Run ID: ICP_030319F |             | SeqNo:        | 174946               |           |             |      |          |      |
| Analyte    | Result         | PQL             | SPK value           | SPK Ref Val | %REC          | LowLimit             | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
| Silver     | 0.7093         | 0.0050          | 1                   | 0           | 70.9          | 75                   | 125       | 0           |      |          | S    |

|                   |                |                 |                     |             |               |                      |           |             |      |          |      |
|-------------------|----------------|-----------------|---------------------|-------------|---------------|----------------------|-----------|-------------|------|----------|------|
| Sample ID         | 0303026-01C MS | Batch ID: R7712 | Test Code: SW6010A  | Units: mg/L | Analysis Date | 3/19/2003 3:40:27 PM | Prep Date |             |      |          |      |
| Client ID: MW #32 |                |                 | Run ID: ICP_030319G |             | SeqNo: 174959 |                      |           |             |      |          |      |
| Analyte           | Result         | PQL             | SPK value           | SPK Ref Val | %REC          | LowLimit             | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
| Magnesium         | 73.25          | 0.50            | 10                  | 60.44       | 128           | 75                   | 129       | 0           |      |          | S    |
| Potassium         | 14.3           | 1.0             | 10                  | 5.293       | 90.1          | 75                   | 125       | 0           |      |          |      |

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 R - RPD outside accepted recovery limits  
 B - Analyte detected in the associated Method Blank

# QC SUMMARY REPORT

Sample Matrix Spike

CLIENT: San Juan Refining  
Work Order: 0303026  
Project: MW #32 Background

|                        |             |          |            |           |        |             |      |               |           |           |          |
|------------------------|-------------|----------|------------|-----------|--------|-------------|------|---------------|-----------|-----------|----------|
| Sample ID              | 0303026-01C | Batch ID | R7600      | Test Code | E160.1 | Units       | mg/L | Analysis Date | 3/10/2003 | Prep Date | 3/7/2003 |
| Client ID              | MW #32      | Run ID   | WC_030310D | PQL       | 1.0    | SPK value   | 1000 | SeqNo         | 172392    |           |          |
| Analyte                |             | Result   | 4945       | %REC      | 110    | LowLimit    | 80   | HighLimit     | 120       | %RPD      | RPDLimit |
|                        |             |          |            |           |        | SPK Ref Val | 3845 | RPD Ref Val   |           |           | Qual     |
| Total Dissolved Solids |             |          |            |           |        |             |      |               |           |           |          |

|             |                                                |                                                     |                                                     |
|-------------|------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| Qualifiers: | ND - Not Detected at the Reporting Limit       | S - Spike Recovery outside accepted recovery limits | B - Analyte detected in the associated Method Blank |
|             | J - Analyte detected below quantitation limits | R - RPD outside accepted recovery limits            | 4                                                   |

## Hall Environmental Analysis Laboratory

Date: 20-Mar-03

CLIENT: San Juan Refining

Work Order: 0303026

Project: MW #32 Background

# QC SUMMARY REPORT

Laboratory Control Spike - generic

| Sample ID                         | LCS #1 | Batch ID: R7560    | Test Code: E300 | Units: mg/L | Analysis Date 3/5/2003 | Prep Date |           |             |      |          |      |
|-----------------------------------|--------|--------------------|-----------------|-------------|------------------------|-----------|-----------|-------------|------|----------|------|
| Client ID:                        |        | Run ID: LC_030305B |                 |             | SeqNo: 171753          |           |           |             |      |          |      |
| Analyte                           | Result | PQL                | SPK value       | SPK Ref Val | %REC                   | LowLimit  | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
| Fluoride                          | 1.78   | 0.10               | 1.923           | 0           | 92.6                   | 90        | 110       | 0           |      |          |      |
| Chloride                          | 5.4    | 0.10               | 5.769           | 0           | 93.6                   | 90        | 110       | 0           |      |          |      |
| Nitrogen, Nitrite (As N)          | 1.847  | 0.10               | 1.923           | 0           | 96.0                   | 90        | 110       | 0           |      |          |      |
| Nitrogen, Nitrate (As N)          | 5.636  | 0.10               | 5.769           | 0           | 97.7                   | 90        | 110       | 0           |      |          |      |
| Phosphorus, Orthophosphate (As P) | 5.659  | 0.50               | 5.769           | 0           | 98.1                   | 90        | 110       | 0           |      |          |      |
| Sulfate                           | 11.4   | 0.50               | 11.54           | 0           | 98.8                   | 90        | 110       | 0           |      |          |      |

| Sample ID                         | LCS #1 | Batch ID: R7569    | Test Code: E300 | Units: mg/L | Analysis Date 3/6/2003 | Prep Date |           |             |      |          |      |
|-----------------------------------|--------|--------------------|-----------------|-------------|------------------------|-----------|-----------|-------------|------|----------|------|
| Client ID:                        |        | Run ID: LC_030306A |                 |             | SeqNo: 171942          |           |           |             |      |          |      |
| Analyte                           | Result | PQL                | SPK value       | SPK Ref Val | %REC                   | LowLimit  | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
| Fluoride                          | 1.828  | 0.10               | 1.923           | 0           | 95.1                   | 90        | 110       | 0           |      |          |      |
| Chloride                          | 5.269  | 0.10               | 5.769           | 0           | 91.3                   | 90        | 110       | 0           |      |          |      |
| Nitrogen, Nitrite (As N)          | 1.886  | 0.10               | 1.923           | 0           | 98.1                   | 90        | 110       | 0           |      |          |      |
| Nitrogen, Nitrate (As N)          | 5.632  | 0.10               | 5.769           | 0           | 97.6                   | 90        | 110       | 0           |      |          |      |
| Phosphorus, Orthophosphate (As P) | 5.695  | 0.50               | 5.769           | 0           | 98.7                   | 90        | 110       | 0           |      |          |      |
| Sulfate                           | 11.6   | 0.50               | 11.54           | 0           | 101                    | 90        | 110       | 0           |      |          |      |

## Qualifiers:

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R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

## Hall Environmental Analysis Laboratory

Date: 21-Mar-03

CLIENT: San Juan Refining

Work Order: 0303026

Project: MW #32 Background

## QC SUMMARY REPORT

Laboratory Control Spike - generic

| Sample ID             | 50ccv  | Batch ID: R7550     | Test Code: SW8260B | Units: µg/L | Analysis Date | 3/6/2003 | Prep Date |             |      |          |      |
|-----------------------|--------|---------------------|--------------------|-------------|---------------|----------|-----------|-------------|------|----------|------|
| Client ID:            |        | Run ID: VAL_030305A |                    |             | SeqNo: 171560 |          |           |             |      |          |      |
| Analyte               | Result | PQL                 | SPK value          | SPK Ref Val | %REC          | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
| Benzene               | 10.69  | 1.0                 | 10                 | 0           | 107           | 78.7     | 122       | 0           |      |          |      |
| Toluene               | 10.79  | 1.0                 | 10                 | 0           | 108           | 87.7     | 122       | 0           |      |          |      |
| Chlorobenzene         | 9.946  | 1.0                 | 10                 | 0           | 99.5          | 85.6     | 136       | 0           |      |          |      |
| 1,1-Dichloroethene    | 10.14  | 1.0                 | 10                 | 0           | 101           | 70.7     | 117       | 0           |      |          |      |
| Trichloroethene (TCE) | 10.74  | 1.0                 | 10                 | 0           | 107           | 76.9     | 130       | 0           |      |          |      |

| Sample ID             | 50ccvb | Batch ID: R7550     | Test Code: SW8260B | Units: µg/L | Analysis Date | 3/6/2003 | Prep Date |             |       |          |      |
|-----------------------|--------|---------------------|--------------------|-------------|---------------|----------|-----------|-------------|-------|----------|------|
| Client ID:            |        | Run ID: VAL_030305A |                    |             | SeqNo:        | 171561   |           |             |       |          |      |
| Analyte               | Result | PQL                 | SPK value          | SPK Ref Val | %REC          | LowLimit | HighLimit | RPD Ref Val | %RPD  | RPDLimit | Qual |
| Benzene               | 10.75  | 1.0                 | 10                 | 0           | 108           | 78.7     | 122       | 10.69       | 0.559 | 11       |      |
| Toluene               | 10.75  | 1.0                 | 10                 | 0           | 108           | 76       | 128       | 10.79       | 0.316 | 12.2     |      |
| Chlorobenzene         | 10.08  | 1.0                 | 10                 | 0           | 101           | 85.6     | 136       | 9.946       | 1.32  | 12       |      |
| 1,1-Dichloroethene    | 10.27  | 1.0                 | 10                 | 0           | 103           | 70.7     | 117       | 10.14       | 1.23  | 19.3     |      |
| Trichloroethene (TCE) | 10.94  | 1.0                 | 10                 | 0           | 109           | 76.9     | 130       | 10.74       | 1.84  | 15.5     |      |

Qualifiers: ND - Not Detected at the Reporting Limit  
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R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

I

## Hall Environmental Analysis Laboratory

Date: 21-Mar-03

**CLIENT:** San Juan Refining  
**Work Order:** 0303026  
**Project:** MW #32 Background

# QC SUMMARY REPORT

Laboratory Control Spike Duplicate

|            |          |           |             |            |           |             |      |               |                     |             |                    |
|------------|----------|-----------|-------------|------------|-----------|-------------|------|---------------|---------------------|-------------|--------------------|
| Sample ID  | LCS-3219 | Batch ID: | 3219        | Test Code: | SW6010A   | Units:      | mg/L | Analysis Date | 3/7/2003 2:11:04 PM | Prep Date   | 3/6/2003           |
| Client ID: |          | Run ID:   | ICP_030307H |            |           |             |      | SeqNo:        | 172277              |             |                    |
| Analyte    |          | Result    |             | PQL        | SPK value | SPK Ref Val | %REC | LowLimit      | HighLimit           | RPD Ref Val | %RPD RPDLimit Qual |
| Arsenic    |          | 1.047     |             | 0.020      | 1         | 0           | 105  | 70            | 130                 | 0           |                    |
| Chromium   |          | 1.024     |             | 0.0060     | 1         | 0           | 102  | 70            | 130                 | 0           |                    |

|            |          |           |             |            |           |             |      |               |                      |             |                    |
|------------|----------|-----------|-------------|------------|-----------|-------------|------|---------------|----------------------|-------------|--------------------|
| Sample ID  | LCS-3219 | Batch ID: | 3219        | Test Code: | SW6010A   | Units:      | mg/L | Analysis Date | 3/10/2003 9:10:43 AM | Prep Date   | 3/6/2003           |
| Client ID: |          | Run ID:   | ICP_030310A |            |           |             |      | SeqNo:        | 172330               |             |                    |
| Analyte    |          | Result    |             | PQL        | SPK value | SPK Ref Val | %REC | LowLimit      | HighLimit            | RPD Ref Val | %RPD RPDLimit Qual |
| Arsenic    |          | 1.029     |             | 0.020      | 1         | 0           | 103  | 70            | 130                  | 0           |                    |
| Barium     |          | 1.059     |             | 0.0020     | 1         | 0           | 106  | 70            | 130                  | 0           |                    |
| Cadmium    |          | 0.9749    |             | 0.0020     | 1         | 0           | 97.5 | 70            | 130                  | 0           |                    |
| Copper     |          | 1.026     |             | 0.0060     | 1         | 0           | 103  | 70            | 130                  | 0           |                    |
| Iron       |          | 1.002     |             | 0.020      | 1         | 0           | 100  | 70            | 130                  | 0           |                    |
| Lead       |          | 1.038     |             | 0.0050     | 1         | 0           | 104  | 70            | 130                  | 0           |                    |
| Manganese  |          | 0.9764    |             | 0.0020     | 1         | 0           | 97.6 | 70            | 130                  | 0           |                    |
| Uranium    |          | 1.008     |             | 0.10       | 1         | 0           | 101  | 70            | 130                  | 0           |                    |
| Zinc       |          | 1.06      |             | 0.0050     | 1         | 0           | 106  | 70            | 130                  | 0           |                    |

|            |          |           |             |            |           |             |      |               |                      |             |                    |
|------------|----------|-----------|-------------|------------|-----------|-------------|------|---------------|----------------------|-------------|--------------------|
| Sample ID  | LCS-3219 | Batch ID: | 3219        | Test Code: | SW6010A   | Units:      | mg/L | Analysis Date | 3/10/2003 1:54:20 PM | Prep Date   | 3/6/2003           |
| Client ID: |          | Run ID:   | ICP_030310C |            |           |             |      | SeqNo:        | 172380               |             |                    |
| Analyte    |          | Result    |             | PQL        | SPK value | SPK Ref Val | %REC | LowLimit      | HighLimit            | RPD Ref Val | %RPD RPDLimit Qual |
| Silver     |          | 1.009     |             | 0.0050     | 1         | 0           | 101  | 70            | 130                  | 0           |                    |

## Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

/

CLIENT: San Juan Refining

Work Order: 0303026

Project: MW #32 Background

## QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID LCS-3219 Batch ID: 3219 Test Code: SW6010A Units: mg/L Analysis Date 3/10/2003 12:50:55 PM Prep Date 3/6/2003  
Client ID: Run ID: ICP\_030310B SeqNo: 174636

| Analyte  | Result | PQL    | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|----------|--------|--------|-----------|-------------|------|----------|-----------|-------------|------|----------|------|
| Chromium | 0.8885 | 0.0060 | 1         | 0           | 88.9 | 70       | 130       | 0           |      |          |      |
| Copper   | 1.045  | 0.0060 | 1         | 0           | 104  | 70       | 130       | 0           |      |          |      |
| Iron     | 1.003  | 0.020  | 1         | 0           | 100  | 70       | 130       | 0           |      |          |      |
| Selenium | 1.004  | 0.020  | 1         | 0           | 100  | 70       | 130       | 0           |      |          |      |

Sample ID LCSD-3219 Batch ID: 3219 Test Code: SW6010A Units: mg/L Analysis Date 3/10/2003 12:53:07 PM Prep Date 3/6/2003  
Client ID: Run ID: ICP\_030310B SeqNo: 174637

| Analyte  | Result | PQL    | SPK value | SPK Ref Val | %REC | LowLimit | HighLimit | RPD Ref Val | %RPD | RPDLimit | Qual |
|----------|--------|--------|-----------|-------------|------|----------|-----------|-------------|------|----------|------|
| Chromium | 0.9123 | 0.0060 | 1         | 0           | 91.2 | 70       | 130       | 0.8885      | 2.64 | 30       |      |
| Copper   | 1.09   | 0.0060 | 1         | 0           | 109  | 70       | 130       | 1.045       | 4.25 | 30       |      |
| Iron     | 1.039  | 0.020  | 1         | 0           | 104  | 70       | 130       | 1.003       | 3.56 | 30       |      |
| Selenium | 1.058  | 0.020  | 1         | 0           | 106  | 70       | 130       | 1.004       | 5.30 | 30       |      |

Qualifiers: ND - Not Detected at the Reporting Limit  
J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits  
R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank



# Hall Environmental Analysis Laboratory

## Sample Receipt Checklist

Client Name **SJR**

Date and Time Receive

3/5/03

Work Order Number **0303026**

Received by **AT**

Checklist completed by

Signature

Date

Matrix:

Carrier name: UPS

|                                                         |                                                 |                                         |                                                 |
|---------------------------------------------------------|-------------------------------------------------|-----------------------------------------|-------------------------------------------------|
| Shipping container/cooler in good condition?            | Yes <input checked="" type="checkbox"/>         | No <input type="checkbox"/>             | Not Present <input type="checkbox"/>            |
| Custody seals intact on shipping container/cooler?      | Yes <input type="checkbox"/>                    | No <input type="checkbox"/>             | Not Present <input checked="" type="checkbox"/> |
| Custody seals intact on sample bottles?                 | Yes <input type="checkbox"/>                    | No <input type="checkbox"/>             | Not Present <input checked="" type="checkbox"/> |
| Chain of custody present?                               | Yes <input checked="" type="checkbox"/>         | No <input type="checkbox"/>             |                                                 |
| Chain of custody signed when relinquished and received? | Yes <input checked="" type="checkbox"/>         | No <input type="checkbox"/>             |                                                 |
| Chain of custody agrees with sample labels?             | Yes <input checked="" type="checkbox"/>         | No <input type="checkbox"/>             |                                                 |
| Samples in proper container/bottle?                     | Yes <input checked="" type="checkbox"/>         | No <input type="checkbox"/>             |                                                 |
| Sample containers intact?                               | Yes <input checked="" type="checkbox"/>         | No <input type="checkbox"/>             |                                                 |
| Sufficient sample volume for indicated test?            | Yes <input checked="" type="checkbox"/>         | No <input type="checkbox"/>             |                                                 |
| All samples received within holding time?               | Yes <input checked="" type="checkbox"/>         | No <input type="checkbox"/>             |                                                 |
| Water - VOA vials have zero headspace?                  | No VOA vials submitted <input type="checkbox"/> | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/>                     |
| Water - pH acceptable upon receipt?                     | Yes <input type="checkbox"/>                    | No <input type="checkbox"/>             | N/A <input checked="" type="checkbox"/>         |
| Container/Temp Blank temperature?                       | 3°                                              | 4° C ± 2 Acceptable                     |                                                 |

COMMENTS:

Client contacted \_\_\_\_\_ Date contacted: \_\_\_\_\_ Person contacted \_\_\_\_\_

Contacted by: \_\_\_\_\_ Regarding: \_\_\_\_\_

Comments: \_\_\_\_\_

Corrective Action \_\_\_\_\_



EPA METHOD 8240  
HSL VOLATILE COMPOUNDS

Client: BLOOMFIELD REFINING CO.  
Sample ID: MW-32  
Project ID: Bloomfield, New Mexico  
Laboratory ID: B952080  
Sample Matrix: Water

Date Reported: 03/15/95  
Date Sampled: 03/02/95  
Date Received: 03/03/95  
Date Extracted: NA  
Date Analyzed: 03/06/95

| Parameter                   | Analytical Result | Detection Limit | Units |
|-----------------------------|-------------------|-----------------|-------|
| 1,1,1-Trichloroethane       | 5                 | 5               | ug/L  |
| 1,1,2,2-Tetrachloroethane   | ND                | 5               | ug/L  |
| 1,1,2-Trichloroethane       | ND                | 5               | ug/L  |
| 1,1-Dichloroethane          | ND                | 5               | ug/L  |
| 1,1-Dichloroethene          | ND                | 5               | ug/L  |
| 1,2-Dichloroethane          | ND                | 5               | ug/L  |
| 1,2-Dichloropropane         | ND                | 5               | ug/L  |
| 2-Butanone (MEK)            | ND                | 20              | ug/L  |
| 2-Hexanone                  | ND                | 5               | ug/L  |
| 4-Methyl-2-pentanone (MIBK) | ND                | 5               | ug/L  |
| Acetone                     | ND                | 20              | ug/L  |
| Benzene                     | ND                | 5               | ug/L  |
| Bromodichloromethane        | ND                | 5               | ug/L  |
| Bromoform                   | ND                | 5               | ug/L  |
| Bromomethane                | ND                | 5               | ug/L  |
| Carbon Disulfide            | ND                | 5               | ug/L  |
| Carbon Tetrachloride        | ND                | 5               | ug/L  |
| Chlorobenzene               | ND                | 5               | ug/L  |
| Chloroethane                | ND                | 5               | ug/L  |
| Chloroform                  | ND                | 5               | ug/L  |
| Chloromethane               | ND                | 5               | ug/L  |
| cis-1,3-Dichloropropene     | ND                | 5               | ug/L  |
| Dibromochloromethane        | ND                | 5               | ug/L  |
| Ethylbenzene                | ND                | 5               | ug/L  |
| m,p-Xylene                  | ND                | 5               | ug/L  |
| Methylene chloride          | ND                | 20              | ug/L  |
| o-Xylene                    | ND                | 5               | ug/L  |
| Styrene                     | ND                | 5               | ug/L  |

EPA METHOD 8240  
HSL VOLATILE COMPOUNDS

Client: BLOOMFIELD REFINING CO.  
Sample ID: MW-32  
Laboratory ID: B952080  
Sample Matrix: Water

Date Reported: 03/15/95  
Date Sampled: 03/02/95  
Date Analyzed: 03/06/95

| Parameter                 | Analytical Result | Detection Limit | Units |
|---------------------------|-------------------|-----------------|-------|
| Tetrachloroethene (PCE)   | ND                | 5               | ug/L  |
| Toluene                   | ND                | 5               | ug/L  |
| trans-1,2-Dichloroethene  | ND                | 5               | ug/L  |
| trans-1,3-Dichloropropene | ND                | 5               | ug/L  |
| Trichloroethene (TCE)     | ND                | 5               | ug/L  |
| Vinyl Chloride            | ND                | 5               | ug/L  |

ND - Compound not detected at stated Detection Limit.

J - Meets identification criteria, below Detection Limit.

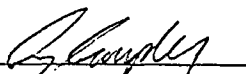
B - Compound detected in method blank.

## QUALITY CONTROL:

| Surrogate Recovery    | %   | Water QC Limits |
|-----------------------|-----|-----------------|
| 1,2-Dichloroethane-d4 | 95  | 76 - 114        |
| Toluene-d8            | 102 | 88 - 110        |
| Bromofluorobenzene    | 108 | 86 - 115        |

## References:

Method 8240, Gas Chromatography/Mass Spectrometry for Volatile Organics,  
Test Methods for Evaluating Solid Wastes, SW-846, United States  
Environmental Protection Agency, Third Edition, November 1986.

  
Analyst

  
Reviewed

**EPA METHOD 8270  
HSL SEMI-VOLATILE COMPOUNDS  
BASE/NEUTRAL/ACID EXTRACTABLES**

Client: BLOOMFIELD REFINING CO.  
Sample ID: MW-32  
Project ID: Bloomfield, New Mexico  
Laboratory ID: B952080  
Sample Matrix: Water

Date Reported: 03/24/95  
Date Sampled: 03/02/95  
Date Received: 03/03/95  
Date Extracted: 03/09/95  
Date Analyzed: 03/20/95

| Parameter                       | Analytical Result | Detection Limit | Units |
|---------------------------------|-------------------|-----------------|-------|
| 1,2,4-Trichlorobenzene          | ND                | 10              | ug/L  |
| 1,2-Dichlorobenzene             | ND                | 10              | ug/L  |
| 1,3-Dichlorobenzene             | ND                | 10              | ug/L  |
| 1,4-Dichlorobenzene             | ND                | 10              | ug/L  |
| 2,4,5-Trichlorophenol           | ND                | 10              | ug/L  |
| 2,4,6-Trichlorophenol           | ND                | 10              | ug/L  |
| 2,4-Dichlorophenol              | ND                | 10              | ug/L  |
| 2,4-Dimethylphenol              | ND                | 10              | ug/L  |
| 2,4-Dinitrophenol               | ND                | 50              | ug/L  |
| 2,4-Dinitrotoluene              | ND                | 10              | ug/L  |
| 2,6-Dinitrotoluene              | ND                | 10              | ug/L  |
| 2-Chloronaphthalene             | ND                | 10              | ug/L  |
| 2-Chlorophenol                  | ND                | 10              | ug/L  |
| 2-Methylnaphthalene             | ND                | 10              | ug/L  |
| 2-Methylphenol                  | ND                | 10              | ug/L  |
| 2-Nitroaniline                  | ND                | 50              | ug/L  |
| 2-Nitrophenol                   | ND                | 10              | ug/L  |
| 3,3'-Dichlorobenzidine          | ND                | 20              | ug/L  |
| 3-Methylphenol/4-Methylphenol * | ND                | 10              | ug/L  |
| 3-Nitroaniline                  | ND                | 50              | ug/L  |
| 4,6-Dinitro-2-methylphenol      | ND                | 50              | ug/L  |
| 4-Bromophenyl-phenylether       | ND                | 10              | ug/L  |
| 4-Chloro-3-methylphenol         | ND                | 20              | ug/L  |
| 4-Chloroaniline                 | ND                | 20              | ug/L  |
| 4-Chlorophenyl-phenylether      | ND                | 10              | ug/L  |
| 4-Nitroaniline                  | ND                | 20              | ug/L  |
| 4-Nitrophenol                   | ND                | 50              | ug/L  |
| Acenaphthene                    | ND                | 10              | ug/L  |
| Acenaphthylene                  | ND                | 10              | ug/L  |
| Anthracene                      | ND                | 10              | ug/L  |
| Benzo(a)anthracene              | ND                | 10              | ug/L  |
| Benzo(a)pyrene                  | ND                | 10              | ug/L  |
| Benzo(b)fluoranthene            | ND                | 10              | ug/L  |
| Benzo(g,h,i)perylene            | ND                | 10              | ug/L  |
| Benzo(k)fluoranthene            | ND                | 10              | ug/L  |
| Benzoic Acid                    | ND                | 50              | ug/L  |

EPA METHOD 8270  
HSL SEMI-VOLATILE COMPOUNDS  
BASE/NEUTRAL/ACID EXTRACTABLES

Client: BLOOMFIELD REFINING CO.  
Sample ID: MW-32  
Laboratory ID: B952080  
Sample Matrix: Water

Date Reported: 03/24/95  
Date Sampled: 03/02/95  
Date Analyzed: 03/20/95

| Parameter                   | Analytical Result | Detection Limit | Units |
|-----------------------------|-------------------|-----------------|-------|
| Benzyl Alcohol              | ND                | 20              | ug/L  |
| bis(2-Chloroethoxy)methane  | ND                | 10              | ug/L  |
| bis(2-Chloroethyl)ether     | ND                | 10              | ug/L  |
| bis(2-Chloroisopropyl)ether | ND                | 10              | ug/L  |
| bis(2-Ethylhexyl)phthalate  | ND                | 50              | ug/L  |
| Butylbenzylphthalate        | ND                | 10              | ug/L  |
| Chrysene                    | ND                | 10              | ug/L  |
| Di-n-Butylphthalate         | ND                | 50              | ug/L  |
| Di-n-Octylphthalate         | ND                | 10              | ug/L  |
| Dibenz(a,h)anthracene       | ND                | 10              | ug/L  |
| Dibenzofuran                | ND                | 10              | ug/L  |
| Diethylphthalate            | ND                | 10              | ug/L  |
| Dimethylphthalate           | ND                | 10              | ug/L  |
| Fluoranthene                | ND                | 10              | ug/L  |
| Fluorene                    | ND                | 10              | ug/L  |
| Hexachlorobenzene           | ND                | 10              | ug/L  |
| Hexachlorobutadiene         | ND                | 20              | ug/L  |
| Hexachlorocyclopentadiene   | ND                | 10              | ug/L  |
| Hexachloroethane            | ND                | 20              | ug/L  |
| Indeno(1,2,3-cd)pyrene      | ND                | 10              | ug/L  |
| Isophorone                  | ND                | 10              | ug/L  |
| N-Nitrosodi-n-propylamine   | ND                | 10              | ug/L  |
| N-Nitrosodiphenylamine      | ND                | 10              | ug/L  |
| Naphthalene                 | ND                | 10              | ug/L  |
| Nitrobenzene                | ND                | 10              | ug/L  |
| Pentachlorophenol           | ND                | 50              | ug/L  |
| Phenanthrene                | ND                | 10              | ug/L  |
| Phenol                      | ND                | 10              | ug/L  |
| Pyrene                      | ND                | 10              | ug/L  |

ND - Compound not detected at stated Detection Limit.

J - Meets identification criteria, below Detection Limit.

\*\* - Compounds coelute by GCMS.

B - Compound detected in Method Blank.

EPA METHOD 8270  
HSL SEMI-VOLATILE COMPOUNDS  
BASE/NEUTRAL/ACID EXTRACTABLES

Client: BLOOMFIELD REFINING CO.

Sample ID: MW-32

Laboratory ID: B952080

Sample Matrix: Water

Date Reported: 03/24/95

Date Sampled: 03/02/95

Date Analyzed: 03/20/95

## QUALITY CONTROL:

| Surrogate Recoveries | %  | Water<br>QC Limits |
|----------------------|----|--------------------|
| 2-Fluorophenol       | 60 | 21 - 100           |
| Phenol-d6            | 54 | 10 - 94            |
| Nitrobenzene-d5      | 70 | 35 - 114           |
| 2-Fluorobiphenyl     | 64 | 43 - 116           |
| 2,4,6-Tribromophenol | 86 | 10 - 123           |
| Terphenyl-d14        | 44 | 33 - 141           |

## Reference:

Method 8270, Gas Chromatography/Mass Spectrometry for Semivolatile  
Organics, Test Methods for Evaluating Solid Wastes, SW-846,  
United States Environmental Protection Agency, Third Edition, November 1986.

  
\_\_\_\_\_  
Analyst  
\_\_\_\_\_  
Reviewed