# GW - \_\_\_\_\_

# REPORTS

# YEAR(S):



INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS AND CONSULTANTS 
 Malcolm Pirnle, Inc.

 4646 E. Van Buren Street

 Suite 400

 Phoenix, AZ 85008-6945

 602-241-1770
 602-231-0131 FAX

June 29, 2006

Ms. Hope Monzeglio State of New Mexico Environmental Department Hazardous Waste Bureau 2905 Rodeo Park Drive East, Building 1 Santa Fe, New Mexico 87505-6303

Re: Giant Bloomfield Refinery North Boundary Barrier Interim Measures Implementation Report

Dear Ms. Monzeglio:

On behalf of Giant Refining Company Bloomfield (GRCB), Malcolm Pirnie, Inc. is pleased to submit to the State of New Mexico Environmental Department (NMED) the North Boundary Barrier Interim Measures Implementation Report.

If you have any questions or require any additional information, please contact Randy Schmaltz at (505) 632-4171.

Sincerely,

MALCOLM PIRNIE, INC.

Innis L. Jucke

Dennis Tucker, P.E., BCEE Senior Associate

Enclosure

Cc: Wayne Price – OCD Denny Foust - OCD Aztec Office Brandon Powell – OCD Aztec Office Bob Wilkinson – EPA Dave Cobrain - NMED Ed Riege - Giant Randy Schmaltz - Giant

# TABLE OF CONTENTS

1.0	INTRODUCTION	.1
1.1	PURPOSE	.1
	1.1.1 Purpose of North Boundary Barrier	
	1.1.2 Purpose of Fluids Collection System	
1.2		
1.3	BACKGROUND SUMMARY	2
1.4	RELATIONSHIP OF PARTIES	2
2.0	NORTH BOUNDARY BARRIER CONSTRUCTION	.4
2.1	CONSTRUCTION MONITORING ACTIVITES, REPORTS, AND MEETINGS	5
2.2		
	2.2.1 Utility Excavations	
	2.2.2 Slurry Trench Sequence	.6
2.3	BARRIER PROFILE	.6
2.4	FIELD AND LABORATORY MATERIALS TESTING	.7
2.5	TRENCH SPOILS SEGREGATION AND TESTING	.8
3.0	FLUIDS COLLECTION SYSTEM	.9
<b>3.0</b> 3.1		
	Collection System Work Plan	.9
3.1 3.2	Collection System Work Plan	.9 .9
3.1 3.2	COLLECTION SYSTEM WORK PLAN WELL CONSTRUCTION AND INSTALLATION	.9 .9 .9 10
3.1 3.2 3.3	COLLECTION SYSTEM WORK PLAN WELL CONSTRUCTION AND INSTALLATION 3.2.1 Collection Wells 3.2.2 Observation Wells SURVEYING	.9 .9 .9 10
3.1 3.2 3.3 3.4	COLLECTION SYSTEM WORK PLAN WELL CONSTRUCTION AND INSTALLATION 3.2.1 Collection Wells 3.2.2 Observation Wells SURVEYING WELL DEVELOPMENT.	.9 .9 .9 10 10
3.1 3.2 3.3 3.4 3.5	COLLECTION SYSTEM WORK PLAN WELL CONSTRUCTION AND INSTALLATION 3.2.1 Collection Wells 3.2.2 Observation Wells SURVEYING WELL DEVELOPMENT. BASELINE MONITORING	.9 .9 .9 10 11
3.1 3.2 3.3 3.4 3.5	COLLECTION SYSTEM WORK PLAN WELL CONSTRUCTION AND INSTALLATION 3.2.1 Collection Wells 3.2.2 Observation Wells SURVEYING WELL DEVELOPMENT BASELINE MONITORING 3.5.1 Fluid Levels	.9 .9 .9 10 10 11
3.1 3.2 3.3 3.4 3.5	COLLECTION SYSTEM WORK PLAN WELL CONSTRUCTION AND INSTALLATION 3.2.1 Collection Wells 3.2.2 Observation Wells SURVEYING WELL DEVELOPMENT BASELINE MONITORING 3.5.1 Fluid Levels 3.5.2 Groundwater Sampling	.9 .9 .9 10 11 11 11 11
3.1 3.2 3.3 3.4 3.5 3.6	COLLECTION SYSTEM WORK PLAN         WELL CONSTRUCTION AND INSTALLATION         3.2.1       Collection Wells         3.2.2       Observation Wells         SURVEYING       Image: Construction of the system	.9 .9 .9 10 11 11 11 11 11
3.1 3.2 3.3 3.4 3.5 3.6	COLLECTION SYSTEM WORK PLAN         WELL CONSTRUCTION AND INSTALLATION         3.2.1       Collection Wells         3.2.2       Observation Wells         SURVEYING       Image: Surveying         WELL DEVELOPMENT       Image: Surveying         BASELINE MONITORING       Image: Surveying         3.5.1       Fluid Levels         3.5.2       Groundwater Sampling         PERFORMANCE MONITORING PLAN       Image: Surveying	.9 .9 .9 10 11 11 11 11 11 12 12
3.1 3.2 3.3 3.4 3.5 3.6	COLLECTION SYSTEM WORK PLAN         WELL CONSTRUCTION AND INSTALLATION         3.2.1       Collection Wells         3.2.2       Observation Wells         SURVEYING       Image: Surveying         WELL DEVELOPMENT       Image: Surveying         BASELINE MONITORING       Image: Surveying         3.5.1       Fluid Levels         3.5.2       Groundwater Sampling         PERFORMANCE MONITORING PLAN       Image: Surveying         3.6.1       Fluid Levels         3.6.2       Groundwater Sampling	.9 .9 .9 10 10 11 11 11 12 12 12
3.1 3.2 3.3 3.4 3.5 3.6	COLLECTION SYSTEM WORK PLAN         WELL CONSTRUCTION AND INSTALLATION         3.2.1       Collection Wells         3.2.2       Observation Wells         SURVEYING       Image: Surveying         WELL DEVELOPMENT       Image: Surveying         BASELINE MONITORING       Image: Surveying         3.5.1       Fluid Levels         3.5.2       Groundwater Sampling         PERFORMANCE MONITORING PLAN       Image: Surveying	.9 .9 .9 10 10 11 11 11 12 12 12

1.11

6 61

1111 111

11.1

∰i, i,

i

.11 1

111 4 1

# **LIST OF FIGURES**

Figure No.	Description
1	Observation and Collection Well Location Map
2	Fluids Profile along Barrier Alignment

# LIST OF TABLES

Description
Summary of Trench Spoils Analytical Results
Observation and Collection Well Survey Information
Summary of Collection and Observation Well Baseline Fluid Levels
Summary of Groundwater Sampling Baseline Field Parameter Results
Summary of Baseline Groundwater Analytical Results

# LIST OF APPENDICES

Appendix	Description
А	Corrective Action Plan and Agency Comments
В	Record Drawings – Barrier Alignment and Profile
С	RECON – Final Report and QC Test Data
D	Weekly Reports by Malcolm Pirnie, Inc., Slurry Wall Construction
E	Agency Correspondence on Barrier Construction Activities
F	Investigative Derived Waste (IDW) Management and Analytical Results
G	North Boundary Barrier Collection System Design and Monitoring Plan and Agency Correspondence
Н	Observation and Collection Well Diagrams and Observation Well Logs
Ι	Baseline Groundwater Analytical Laboratory Reports
J	Field Sampling Methods
К	Barrier Construction Quality Control Measures

1 1051

1. . . . .

1

ii

# 1.1 PURPOSE

This Interim Measures (IM) Implementation Report summarizes construction and engineering activities, field sampling, quality control testing, and records of survey performed during installation of the north boundary containment barrier and fluids collection system at the Giant Bloomfield Refinery. The containment barrier and fluids collection system are voluntary corrective measures implemented at the Giant Refinery north property boundary as described in the *Corrective Action Plan; Giant Bloomfield Refinery (CAP)* dated November 17, 2004 (Appendix A).

# 1.1.1 Purpose of North Boundary Barrier

The purpose of the containment barrier is to impede the flow of perched-groundwater and petroleum hydrocarbons along the contact of the Jackson Lake Terrace deposit and underlying Nacimiento Formation to the San Juan River bluff along the refinery's north boundary.

# 1.1.2 Purpose of Fluids Collection System

The purpose of the fluids collection system is to provide, as necessary, hydraulic control of fluids (perched-groundwater and petroleum hydrocarbons) that accumulate behind the barrier, and to monitor the effectiveness of mitigating migration of fluids to the San Juan River bluff. In the perched-water flow regime that exists on the top of the Nacimiento Formation, fluids along the refinery-side of the barrier tend to accumulate in the depressions or troughs of the Nacimiento Formation. Fluid collection points located in significant formation depressions (as logged in the field during barrier construction) allow for fluids to be extracted as needed. Observation wells positioned along the riverside of the barrier are used to monitor the effectiveness of the barrier.

### **1.2 FACILITY DESCRIPTION**

The Bloomfield refinery was originally built in the late 1950's and has been operated by Kimball Campbell, O.L. Garretson (Plateau), Suburban Propane, Inc. (Plateau), Bloomfield Refining Company and Giant Refining Company. The facility consists of approximately 285 acres and is located approximately one mile south of Bloomfield, New Mexico on a bluff overlooking the San Juan River.

The Refinery is owned by San Juan Refining Company (SJRC) and is operated by Giant Refining Company. The historical and current activities conducted at the refinery are petroleum processing, crude and product storage, crude unloading and product loading,

waste management (closed and existing facilities), and offices and non-petroleum material storage.

# **1.3 BACKGROUND SUMMARY**

The emergence of active seeps of petroleum hydrocarbons at the face of the San Juan River bluff on the north side of the refinery prompted the New Mexico Oil Conservation Division (OCD) to issue Giant an Emergency Action Directive. Upon receiving the Emergency Action Directive, Giant implemented the tasks outlined therein, which included the installation of temporary catchments in certain bluff draws, excavation of hydrocarbon-stained soil from the impacted draws along the San Juan bluff, and collection of water samples from the San Juan River upstream of the refinery and at the mouth of each draw of concern.

A document outlining the voluntary corrective measures at the Giant Refinery north property boundary, entitled *Corrective Action Plan; Giant Bloomfield Refinery* (CAP), was submitted to New Mexico Oil Conservation Division (OCD), State of New Mexico Environmental Department (NMED), and United States Environmental Protection Agency (EPA) for review. The CAP and review comments by OCD and NMED are provided in Appendix A. The CAP included the following key elements:

- Construction of a soil-bentonite slurry cutoff wall approximately 2,600 feet in length along the north side of the Hammond Ditch.
- Installation of a fluids collection system consisting of multiple wells positioned along the refinery side of the barrier to provide hydraulic control of fluids accumulating along the plant side of the barrier.

# **1.4 RELATIONSHIP OF PARTIES**

The following parties participated in construction of the North Boundary Barrier. Each party was contracted directly to Giant:

- Malcolm Pirnie, Inc. (Pirnie), as the design engineering firm, provided oversight during construction of the barrier.
- Remedial Construction Services (RECON) was contracted through a competitive bid process to construct the North Boundary Barrier.
- B&H Maintenance and Construction (B&H) was contracted directly by Giant to excavate and expose existing natural gas pipelines and product pipelines that crossed the barrier alignment.

The agencies with associated environmental regulatory jurisdiction were:

• State of New Mexico Oil Conservation Division (OCD), Santa Fe, New Mexico

- New Mexico Environmental Department (NMED), Santa Fe, New Mexico
- US Environmental Protection Agency (EPA) Region VI, Dallas, Texas

The following parties participated in construction of the fluids collection system. Each party was contracted directly to Giant:

- Malcolm Pirnie, Inc. (Pirnie) was contracted to provide construction oversight during well installation activities.
- Precision Engineering, Inc. was contacted to install 15 upgradient collection wells and 14 downgradient observation wells along the barrier alignment.

The soil-bentonite wall provides a low permeability subsurface barrier to impede the flow of fluids along the surface contours of the Nacimiento Formation to the San Juan River bluff along the refinery's north boundary. The following general steps were taken to construct the soil-bentonite wall:

- Water and powdered bentonite clay were mixed together to form bentonite slurry; a viscous fluid with a density greater than that of water.
- A trench was excavated and filled with bentonite slurry. The bentonite slurry stabilized the side slopes of the trench.
- Selected soil was mixed with bentonite slurry to form a low permeability material which was placed as backfill in the trench. Backfill was placed up to within one to two feet of the ground surface.
- After about one week, backfill was removed to a depth of about three feet below adjacent grade, covered with a geotextile, and capped with compacted bank-run fill.

Record drawings showing the alignment and profile of the barrier are presented in Appendix B. The barrier was constructed as outlined in the CAP and Construction Documents with the following features:

- The length of the slurry wall was approximately 2,600 feet.
- The slurry wall was at least 30 inches in width.
- As shown on the slurry wall profile (Appendix B), the average depth of the trench was 15 feet below ground surface (bgs).
- The slurry wall extended (keyed) into the Nacimiento Formation approximately 2-1/2 to 7 feet to provide a cutoff to fluids flow and excavate around existing utility pipelines.
- The soil and bentonite slurry mix achieved a maximum permeability of 1x10<sup>-7</sup> centimeters per second (cm/s). Laboratory tests on samples of the soilbentonite indicated permeability ranged from 2.01 x 10<sup>-8</sup> cm/s to 6.90 x 10<sup>-8</sup> cm/s. Laboratory test results are provided in Appendix C.

Perched-groundwater was observed at depths ranging from about 6-1/2 to 13 feet below ground surface (bgs) during excavation of the slurry trench. Since the excavation was kept full of bentonite slurry during excavation activities, the depth to groundwater estimated during construction is approximate based on observation of the degree of saturation of spoils from the excavation. Table 2 summarizes the measured groundwater levels along the length of the barrier following the completion of barrier construction activities and collection well installation.

# 2.1 CONSTRUCTION MONITORING ACTIVITES, REPORTS, AND MEETINGS

A field engineer from Malcolm Pirnie was present on-site throughout construction of the barrier wall. Duties of Malcolm Pirnie's field engineer included the following:

- Observation of trench excavation, soil and rock encountered, estimation of groundwater depth, and excavation conditions
- Identification of Nacimiento Formation key material
- Measurement of trench depth and key depth
- Preparation of daily and weekly reports
- Review of field and laboratory testing conducted by RECON
- Providing consultation to Giant regarding slurry trench construction and contractor cost tracking
- Providing periodic photographic documentation of construction activities (Appendix D)

Weekly reports were prepared by Pirnie for Giant to submit to regulatory agencies. Weekly reports are presented in Appendix D.

Daily reports on construction activities and progress were prepared by RECON and submitted to Giant. Copies of these reports are provided in Appendix C.

Construction progress meetings were held on a weekly basis during construction. Representatives of Giant, Pirnie, and RECON participated in the progress meetings.

# **2.2 BARRIER CONSTRUCTION SEQUENCE**

### 2.2.1 Utility Excavations

The original intent was to first expose all utility pipelines that crossed the barrier alignment, and encase them in concrete. This is referred to as a "dry tie-in" approach. The concrete encasement was to protect the utilities from damage during excavation of the trench. This procedure was used for the following utilities:

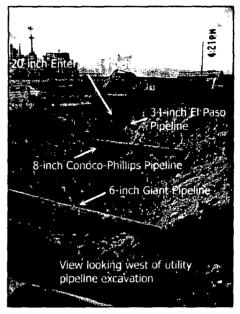
- French Drain Collection System Piping, STA 8+90
- 16-inch Giant Fire Water Pipeline, STA 22+30

However, dry tie-ins could not be used for the natural gas and petroleum product pipelines located in the easement between STA 22+75 and 23+35. The pipelines within the easement included:

- El Paso Natural Gas 34-inch diameter high-pressure natural gas pipeline
- Enterprise Products 20-inch natural gas pipeline
- Conoco-Phillips 8-inch diameter liquid product pipeline
- Giant 6-inch diameter liquid product pipeline; out-of-service

The owners of the pipelines rejected the dry tie-in approach for crossing the pipelines. Primary concerns were that the locations and depth of the pipes were only approximately known, encasing the pipes in concrete would preclude future inspection, and that the excavation would be made perpendicular to the pipes. Other concerns included their unfamiliarity with the slurry wall construction technique and no prior experience with RECON.

At the suggestion of El Paso and Enterprise, bids were requested from three contractors (who regularly perform work with the pipeline owners) to excavate and expose the pipes. B&H was



selected and contracted directly by Giant to excavate around and below the pipelines to a depth of three feet into the Nacimiento formation.

B&H completed the excavation around and under the pipelines. This allowed RECON to construct the slurry wall below the natural gas and petroleum product pipelines. The slurry wall width from about STA 22+50 to 24+50 was approximately eight to ten feet.

### 2.2.2 Slurry Trench Sequence

The slurry trench was constructed in the following sequence:

- STA 0+00 to 19+80
- STA 24+50 to 26+00
- STA 19+80 to 24+50

### 2.3 BARRIER PROFILE

The barrier depth ranged from approximately 12 to 21 feet bgs along the entire length. The key depth into the Nacimiento Formation ranged from approximately 2-1/2 to 7 feet. The area of the barrier measured on the vertical face was approximately 39,685 square

feet (sf). The depth of the barrier and key depth are shown in Figure 2. As-built drawings showing the barrier depth is provided in Appendix B.

The contract documents required that the trench extend vertically through the Jackson Lake Terrace and into the Nacimiento Formation. The key into the Nacimiento Formation was required to extend a minimum of three feet to reduce the potential for underflow of fluids. However, comments provided on the CAP by OCD and NMED required that the key extend five feet into the Nacimiento Formation. This change was made and the authorization was provided to RECON to extend the key depth by two feet.

Between STA 0+00 and 12+60, the key depth was excavated at least five into the Nacimiento Formation except in isolated areas where hard digging prevented further excavation. Notably beginning at STA 7+40, excavation into the Nacimiento Formation became very slow and difficult due to hardness of the Nacimiento Formation. A request was made to OCD and NMED to reduce the key depth from five feet to three feet into the Nacimiento Formation, as originally planned. This request was granted. From STA 12+60 to STA 26+00, the key depth was extended three feet or greater into the Nacimiento Formation. Correspondence documenting the request and approval to reduce the key depth is included in Appendix E.

### 2.4 FIELD AND LABORATORY MATERIALS TESTING

Field and laboratory tests on bentonite slurry and soil-bentonite backfill were conducted in accordance with the contract documents. All reported test results met or exceeded the minimum requirements. Details to referenced construction standards that were followed during field and laboratory testing procedures is provided in Appendix K.

Field tests on bentonite slurry and soil-bentonite backfill samples were conducted by RECON on a daily basis. Results of RECON's tests are presented on their daily reports (Appendix C).

An independent third-party was retained by RECON to conduct field tests as a verification of RECON's results. The third-party retained by RECON was GEOMAT, Inc. of Farmington, New Mexico. Results reported by GEOMAT are included in Appendix C.

Sierra Testing Laboratory of El Dorado Hills, California was retained by RECON to perform permeability tests on samples of soil-bentonite backfill samples. A total of 13 permeability tests were performed; all of which indicated a permeability of less than 1 x  $10^{-7}$  cm/s. Results reported by Sierra Testing Laboratories are included in Appendix C.

# 2.5 TRENCH SPOILS SEGREGATION AND TESTING

A portion of the excavated soil from the trench was utilized for barrier construction and for backfill purposes. Excess excavated material (i.e., spoils mixed with bentonite) was transported to the refinery site. The majority of the spoils were stock-piled in the former storm water retention basins, located in the northwest portion of the refinery. Visually hydrocarbon-stained soil excavated from the trench was segregated and stock-piled in a separate location on the refinery site for subsequent management. Refer to Appendix F for further details on Investigative Derived Waste (IDW) management and analytical sample results.

# 3.1 COLLECTION SYSTEM WORK PLAN

The fluids collection system consists of 15 collection wells and 14 observation wells located upgradient (plant-side) and downgradient (river-side) of the barrier, respectively. The fluids collection system serves a dual purpose. Fluids extracted from collection wells along the plant-side of the barrier provide hydraulic control of petroleum hydrocarbons accumulating along the barrier. Fluid level measurements from observation wells along the river-side of the barrier monitor the effectiveness of the barrier in preventing further migration of fluids towards the river bluff.

A letter report outlining the design and initial monitoring plan for the North Boundary Barrier Collection System, entitled *North Boundary Barrier Collection System Design and Monitoring Plan; Giant Bloomfield Refinery* was submitted to OCD, NMED, and EPA for review on March 7, 2005. The letter report and agency review comments are provided in Appendix G. This plan included the conceptual design of the fluids collection system, and the initial fluids monitoring frequency from the observation and collection wells during the initial 60 days after installation.

# 3.2 WELL CONSTRUCTION AND INSTALLATION

Precision Engineering, Inc. was contracted by Giant to install the collection and observation wells along the north boundary barrier. Malcolm Pirnie provided oversite for placement of the wells along the barrier based on Nacimiento Formation depth measurements collected during barrier construction activities. Drilling and well installation activities of the fluid collection system were completed May 2005. Figure 1 shows the locations of the collection and observation wells along the barrier alignment. The collection well locations correspond to the troughs in the Nacimiento Formation as shown on the barrier profile (Figure 2). Observation and collection well diagrams and observation well logs are provided in Appendix H. Well logs were not developed for the collection wells due to the relative proximity of each corresponding observation well.

# 3.2.1 Collection Wells

The collection wells, located on the plant-side of the barrier, were installed using the hollow stem auger drilling method. The diameter of the borehole was approximately 13-1/2 inches. The following general construction procedures were followed for each well:

- Six-inch diameter Schedule 40 PVC casing was used, with 10 feet of 0.040inch machine slotted well screen and a bottom threaded end cap.
- A filter pack, consisting of Colorado Silica Sand #10 x 20 was placed into the annular space surrounding the well screen to approximately one-foot above

the screen interval.

- Approximately one to two feet of bentonite pellets were placed as a seal. The bentonite pellets were hydrated with potable water.
- Approximately one foot of Colorado Silica Sand was placed into the annular space above the bentonite to allow for adequate drainage of water accumulation within the vault. The remaining space to adjacent grade was filled with native material.
- Well screen extends approximately 2 to 5 feet into the Nacimiento Formation.
- Surface completion of each well included a flush-mounted, traffic-rated box.

### 3.2.2 Observation Wells

The observation wells are located on the river-side of the barrier, approximately 10 feet away from the barrier wall so as to not encroach in the Hammond Ditch service road. The wells were installed using the hollow stem auger drilling method, similar to the method described above. The diameter of each borehole was approximately 4-1/2 inches. The following general construction procedures were followed for each well:

- Two-inch diameter Schedule 40 PVC casing was used, with five feet of 0.040inch machine slotted well screen and a bottom threaded end cap.
- A filter pack, consisting of Colorado Silica Sand #10-20 was placed into the annular space surrounding the screen to approximately one foot above the screen interval.
- Approximately one to two feet of bentonite pellets were placed as a seal. The bentonite pellets were hydrated with potable water.
- Approximately one foot of Colorado Silica Sand was placed into the annular space above the bentonite to allow for adequate drainage of water accumulation within the vault. The remaining space to adjacent grade was filled with native material.
- Well screen extends approximately 1 to 3 feet into the Nacimiento Formation.
- Well surface completion included a 12-inch diameter steel monument approximately three feet above grade surrounded by 3-foot by 3-foot cement pad.

### 3.3 SURVEYING

Inter-Mountain Mapping, a local surveying company, was contracted to survey the top of casing elevations for each collection and observation well along the barrier alignment. Elevations were surveyed in May 2005 at the notch in each well casing where water levels are referenced to and are reported in feet above mean sea level (msl).

In February 2006, Giant contracted Inter-Mountain Mapping to resurvey all wells within the refinery property, including the north boundary barrier collection system wells. A summary of the wells and corresponding top-of-casing well elevations measured in May 2005 and in February 2006 are listed in Table 2. All on-going top-of-casing elevations reference the February 2006 measuring point elevation as summarized in Table 2.

# 3.4 WELL DEVELOPMENT

Upon completion of well installation activities, all fluids were extracted from each collection and observation well using a vacuum truck to purge the well casings. Each well was purged dry during the first week following installation. Extracted fluids were delivered to the API separator at the refinery.

# 3.5 **BASELINE MONITORING**

# 3.5.1 Fluid Levels

Upon completion of well development activities, depths to groundwater and separatephase hydrocarbon measurements were collected at each collection and observation well to assess baseline conditions. All fluid level measurements were measured to an accuracy of 0.01 feet using a Geotech Interface Meter. Fluid level measurements collected during the week of May 9<sup>th</sup>, 2005 are summarized in Table 3.

# 3.5.2 Groundwater Sampling

In response to a written request submitted to Giant by OCD dated May 9<sup>th</sup>, 2005, baseline groundwater samples were collected during the week of June 10, 2005 from the collection and observation wells where fluids had been detected. Groundwater samples were collected using a dedicated hand-bailer. At least three well volumes were purged from each well prior to sample collection. Field parameters (pH, temperature, conductivity, dissolved oxygen, and total dissolved solids) were recorded prior to sample collection using an Ultrameter 6P. The groundwater samples were analyzed for the following parameters:

- Volatile Organic Compounds BTEX by EPA Method 8021B
- Dissolved Metals by EPA Method 6010C
- Dissolved Metals Mercury by EPA Method 7470
- Anions (Sulfate) by EPA Method 300.0

A summary of the field parameter results are provided in Table 4. A summary of the laboratory analytical results are provided in Table 5. Copies of the analytical reports are

provided in Appendix I. Appendix J summarizes field sampling procedures followed during sample collection activities.

# 3.6 PERFORMANCE MONITORING PLAN

# 3.6.1 Fluid Levels

Fluid level measurements were collected twice a week for seven weeks following the completion of well installation activities. From June 28<sup>th</sup>, 2005 through August 11, 2005, fluids level measurements were collected on a weekly basis. The frequency of data collection was reduced to bi-weekly beginning the week of August 23, 2005. A summary of the 2005 fluid level measurements is included in the *System Start-Up Six Month Report of the North Boundary Barrier Collection System Phase II* (Giant, 2006) that was submitted to NMED, OCD, and EPA January 5, 2006.

# 3.6.2 Groundwater Sampling

Following the collection of baseline samples, a second round of groundwater samples were collected from each of the observation and collection wells where fluids were detected during the week of August 15, 2005. During sample collection, field parameters (temperature, pH, dissolved oxygen (DO), conductivity, and dissolved solids (TDS)) were recorded prior to sample collection. The samples were submitted to the laboratory and analyzed for the following parameters:

- Volatile Organic Compounds BTEX by EPA Method 8021B
- Dissolved Metals by EPA Method 6010C
- Dissolved Metals Mercury by EPA Method 7470
- Anions (Sulfate) by EPA Method 300.0

A summary of the 2005 groundwater analytical results and field parameters is included in the System Start-Up Six Month Report of the North Boundary Barrier Collection System Phase II (Giant, 2006) that was submitted to NMED, OCD, and EPA on January 5, 2006. On-going performance monitoring data will be included in the Annual Groundwater Monitoring Reports.

# 3.6.3 Fluids Recovery

Using a vacuum truck, fluids from each of the collection and observation wells is extracted three times per week as requested by OCD and NMED. All extracted fluids are disposed of through the refinery wastewater system.

- 1. API RP 13B-1, "Practice Standard Procedure for Field Testing Water-Based Drilling Fluids," American Petroleum Institute.
- 2. ASTM C143, "Standard Test Method for Slump of Hydraulic Cement Concrete," ASTM International.
- 3. ASTM D422, "Particle-Size Analysis of Soils," ASTM International.
- 4. ASTM D698, "Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort," ASTM International.
- 5. ASTM D2216, "Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass," ASTM International.
- 6. ASTM D5084, "Hydraulic Conductivity Using a Flexible Wall Permeameter," ASTM International.
- 7. Giant Refining Company, 2005. "6-Month North Boundary Barrier Collection System Summary Report, Giant Refinery, Bloomfield, New Mexico." June 2005.
- 8. New Mexico Environmental Department Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program 2005. "*Technical Background Document for Development of Soil Screening Levels Revision 3.0.*" August 2005.
- 9. New Mexico Environmental Department 2005b. "TPH Screening Guidelines." November 2005

h Spoils Analytical Results Table 1: Summary of T

Interim Measures Implementation Report **Giant Refinery - Bloomfield, New Mexico** 

		<u> </u>	Π-	r								
	e ether (MTBE)	.00667 mg/kg <sup>(2)</sup>		ΝA	NA	VN	NA	NA	NA	< 0.1	NA	NA
	analyX-o Xylene XX-o Xy X			NA	AN	NA	NA	NA	NA	NA	NA	0.19
	anslyX-m,q کرین کرین			NA	NA	NA	NA	NA	NA	NA	NA	0.72
EPA Method 8021B	ریف پرکی کری	132 mg/kg <sup>(2)</sup>		NA	NA	NA	0.5	6.2	×	< 0.025	0.079	NA
EPA	Elhyl benzene	128 mg/kg <sup>(2)</sup>		NA	NA	NA	< 0.025	0.92	1.7	< 0.025	< 0.025	0.08
	ansuloT MKS Loluene	252 mg/kg <sup>(2)</sup>		NA	NA	NA	< 0.025	0.29	0.33	< 0.025	< 0.025	0.016
	əuəzuəg (%) (#)	8.08 mg/kg <sup>(2)</sup>		NA	NA	NA	< 0.025	0.12	0.36	<0.025	< 0.025	0.0041
EPA Method 418.1	ی Petroleum ای Hydrocarbons, TPH			NA	NA	NA	NA	NA	NA	< 20	NA	NA
58	) Gasoline Range (GRO) (GRO)	NA		260	350	76	40	120	130	NA	7.4	1.5
EPA Method 8015B	ر Motor Oil Range کچ Organics (MRO) کچ	890 mg/kg <sup>(1)</sup>		< 50	< 50	< 50	< 50	< 50	< 50	NA	< 50	NA
EP	ی Diesel Range کچ Drganics (DRO) کچ Organics (DRO)	1120 mg/kg <sup>(1)</sup>		17	68	150	Ξ	15	< 10	AN	< 10	< 0.1
		New Mexico SSLs> 1120 mg/kg <sup>(1)</sup>	Sample ID	0' - 300'	300' - 600'	,006 - ,009	900' - 1200'	1500' - 1800	1800' - 2100	2100' - 2300	2300' - 2600	Slurry Wall Comp.
		New Mex	Sample Date	2/9/2005	2/10/2005	2/10/2005	2/22/2005	3/5/2005	3/6/2005	3/16/2005	3/6/2005	9/16/2005

Notes:

1 (1111)

NMED SSLs based on New Mexico Environmental Department TPH Screening Guidelines for Industrial Exposure, November 2005.
 NMED SSLs based on 1E-05 industrial target risk for carcinogens or hazard quotient of 1 for non-carcinogens.

Ì

# Interim Measures Implementation Report Giant Refinery - Bloomfield, New Mexico

ł

1 100

1 6. 1

1.0.0

	Measuring Point Elevation	Measuring Point Elevation
Well ID	Prior to February 2006	After February 2006
	(above msl)	(above msl)
OW 0+60	5508.69	5506.62
OW 1+50	5505.22	5508.03
OW 3+85	5506.17	5507.31
OW 5+50	5506.94	5507.59
OW 6+70	5501.32	5504.78
OW 8+10	5503.10	5506.53
OW 11+15	5505.43	5506.70
OW 14+10	5506.95	5508.14
OW 16+60	5507.03	5508.43
OW 19+50	5506.91	5508.03
OW 22+00	5506.47	5506.91
OW 23+10	5510.51	5514.12
OW 23+90	5511.15	5515.18
OW 25+70	5507.59	5509.00
CW 0+60	5506.90	5506.68
CW 1+50	5504.46	5505.13
CW 3+85	5505.05	5503.87
CW 5+50	5504.11	5503.76
CW 6+70	5504.31	5503.84
CW 8+10	5503.52	5504.02
CW 8+45	5505.44	5503.80
CW 11+15	5505.08	5503.95
CW 14+10	5504.57	5504.39
CW 16+60	5505.65	5504.32
CW 19+50	5505.70	5504.52
CW 22+00	5509.04	5508.04
CW 23+10	5510.06	5510.04
CW 23+90	5507.46	5507.32
CW 25+95	5506.81	5505.90

# Table 3: Summary of Collection and Observation Well Baseline Fluid Levels

Well ID	Measurement Date	Measuring Point Elevation (above msl)	Total Well Depth (ft)	Depth To Product (ft)	Depth To. Water (ft)	Corrected Groundwater Elevation (above msl)
OW 0+60	5/9/2005	5508.69	14.98	13.61	14.03	5495.00
OW 1+50	5/9/2005	5505.22	14.98	13.19	13.21	5492.03
OW 3+85	5/9/2005	5506.17	15.06	11.95	13.10	5493.99
OW 5+50	5/9/2005	5506.94	14.09	NPP	NWP	n/a
OW 6+70	5/9/2005	5501.32	14.67	NPP	NWP	n/a
OW 8+10	5/9/2005	5503.10	17.99	NPP	NWP	n/a
OW 11+15	5/9/2005	5505.43	16.67	NPP	11.45	5493.98
OW 14+10	5/9/2005	5506.95	13.03	NPP	12.25	5494.70
OW 16+60	5/9/2005	5507.03	15.21	11.92	12.78	5494.94
OW 19+50	5/9/2005	5506.91	13.07	NPP	11.27	5495.64
OW 22+00	5/9/2005	5506,47	14.31	NPP	10.62	5495.85
OW 23+10	5/9/2005	5510.51	15.79	NPP	13.58	5496.93
OW 23+90	5/9/2005	5511.15	15.07	NPP	13.96	5497.19
OW 25+70	5/9/2005	5507.59	14.01	NPP	10.69	5496.90
CW 0+60	5/9/2005	5506.90	14.93	NPP	8.68	5498.22
CW 1+50	5/9/2005	5504.46	13.84	NPP	6.71	5497.75
CW 3+85	5/9/2005	5505.05	15.21	NPP	7.41	5503.57
CW 5+50	5/9/2005	5504.11	13.45	NPP	7.37	5496.74
CW 6+70	5/9/2005	5504.31	12.70	NPP	7.80	5496.51
CW 8+10	5/9/2005	5503.52	12.02	NPP	7.78	5495.74
CW 8+45	5/9/2005	5505.44	14.95	9.32	9.78	5496.03
CW 11+15	5/9/2005	5505.08	13.88	7.27	7.39	5497.79
CW 14+10	5/9/2005	5504.57	14.09	NPP	7.43	5497.14
CW 16+60	5/9/2005	5505.65	14.87	NPP	8.34	5497.31
CW 19+50	5/9/2005	5505.70	12.07	NPP	8.58	5497.12
CW 22+00	5/9/2005	5509.04	14.10	NPP	10.97	5498.07
CW 23+10	5/9/2005	5510.06	15.5	NPP	11.53	5498.53
CW 23+90	5/9/2005	5507.46	12.66	NPP	9.27	5498.19
CW 25+95	5/9/2005	5506.81	14.07	NPP	9.02	5497.79

11

# Interim Measures Implementation Report Giant Refinery - Bloomfield, New Mexico

Notes:

NPP = No Product Present NWP = No Water Present n/a = Not Applicable

# Table 4: Summary of Groundwater Sampling Baseline Field Parameter Results

Well ID	Date of Sample	Conductivity	рН	Temperature	Total Dissolved Solids
41 		(mmhos/cm)	(Std. Units)	(°F)	( <i>mg/L</i> )
OW 0+60	5/12/05	SPH	SPH	SPH	SPH
OW 1+50	5/12/05	SPH	SPH	SPH	SPH
OW 3+85	5/12/05	SPH	SPH	SPH	SPH
OW 5+50	5/9/05	NS	NS	NS	NS
OW 6+70	5/9/05	NS	NS	NS	NS
OW 8+10	5/9/05	NS	NS	NS	NS
OW 11+15	5/11/05	2507	6.9	57	1951
OW 14+10	5/11/05	2311	6.95	60	1784
OW 16+60	5/12/05	SPH	SPH	SPH	SPH
OW 19+50	5/10/05	2896	6.82	58	2288
OW 22+00	5/10/05	2928	6.84	57	2311
OW 23+10	5/12/05	2678	6.96	59	2095
OW 23+90	5/12/05	2268	6.97	60	1747
OW 25+70	5/12/05	1303	6.94	56	963
CW 0+60	5/10/05	1378	6.82		1023
CW 0+60 CW 1+50	5/10/05	1463	6.86	<u>55</u> 56	1023
CW 1+30 CW 3+85	5/10/05	2880	6.87	56	2270
CW 5+85 CW 5+50	5/10/05	8765	6.81	56	7762
CW 5+30 CW 6+70	5/11/05	8175	6.86	55	7191
$\frac{CW}{CW} \frac{0+70}{8+10}$	5/11/05	5199	6.83	55	4358
CW 8+10 CW 8+45	5/8/05	SPH	0.83 SPH	SPH SPH	
CW 11+15	5/8/05	SPH SPH	SPH SPH	SPH SPH	SPH SPH
$\frac{CW}{CW}$ 14+10	5/11/05	4103	6.85	58	3353
CW 14+10 CW 16+60	5/11/05	2420	6.91	60	1875
CW 10+60 CW 19+50	5/10/05	2844	6.83	56	6724
CW 19+30 CW 22+00	5/10/05	3202	6.83	57	2548
CW 22+00 CW 23+10	5/12/05	3046	6.92	54	2425
CW 23+10 CW 23+90	5/12/05	2702	6.86	55	2124
CW 25+96	5/12/05	1287	6.92	56	949

Interim Measures Implementation Report Giant Refinery - Bloomfield, New Mexico

Notes:

SPH = Well Contains Separate Phase Hydrocarbon - No Sample NA = Not Enough Water in the Well to Sample - Not Analyzed NS = Well is Dry - No Sample Collected

A Kish

Well ID	Date of	Fluoride	Chloride	P	Sulfate	Nitrate
Wen ID	Sample	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
OW 0+60	5/12/05	SPH	SPH	SPH	SPH	SPH
OW 1+50	5/12/05	SPH	SPH	SPH	SPH	SPH
OW 3+85	5/12/05	SPH	SPH	SPH	SPH	SPH
OW 5+50	5/9/05	NS	NS	NS	NS	NS
OW 6+70	5/9/05	NS	NS	NS	NS	NS
OW 8+10	5/9/05	NS	NS	NS	NS	NS
OW 11+15	5/11/05	0.43	320	< 0.5	130	< 0.5
OW 14+10	5/11/05	0.53	73	< 0.5	350	< 0.5
OW 16+60	5/12/05	SPH	SPH	SPH	SPH	SPH
OW 19+50	5/10/05	0.35	290	< 0.5	290	<0.5
OW 22+00	5/10/05	0.78	480	< 0.5	140	< 0.5
OW 23+10	5/12/05	NA	NA	NA	NA	NA
OW 23+90	5/12/05	0.72	320	< 0.5	77	<0.1
OW 25+70	5/12/05	0.53	50	<0.5	350	<0.1
					6 TECHNELSEL	
CW 0+60	5/10/05	0.51	39	<0.5	75	<0.5
CW 1+50	5/10/05	0.59	43	< 0.5	5.8	< 0.5
CW 3+85	5/10/05	0.21	270	< 0.5	32	< 0.5
CW 5+50	5/10/05	0.33	2700	<0.5	75	< 0.5
CW 6+70	5/11/05	<.5	2400	<0.5	170	< 0.5
CW 8+10	5/11/05	0.29	1100	<0.5	720	< 0.5
CW 8+45	5/8/05	SPH	SPH	SPH	SPH	SPH
CW 11+15	5/8/05	SPH	SPH	SPH	SPH	SPH
CW 14+10	5/11/05	2.1	78	<0.5	2300	<0.5
CW 16+60	5/11/05	0.42	150	< 0.5	150	< 0.5
CW 19+50	5/10/05	0.35	230	<0.5	260	< 0.5
CW 22+00	5/10/05	0.74	510	< 0.5	38	< 0.5
CW 23+10	5/12/05	0.59	450	< 0.5	9.7	< 0.5
CW 23+90	5/12/05	0.39	350	< 0.5	4.9	<0.1
CW 25+95	5/12/05	0.43	85	< 0.5	270	<0.1

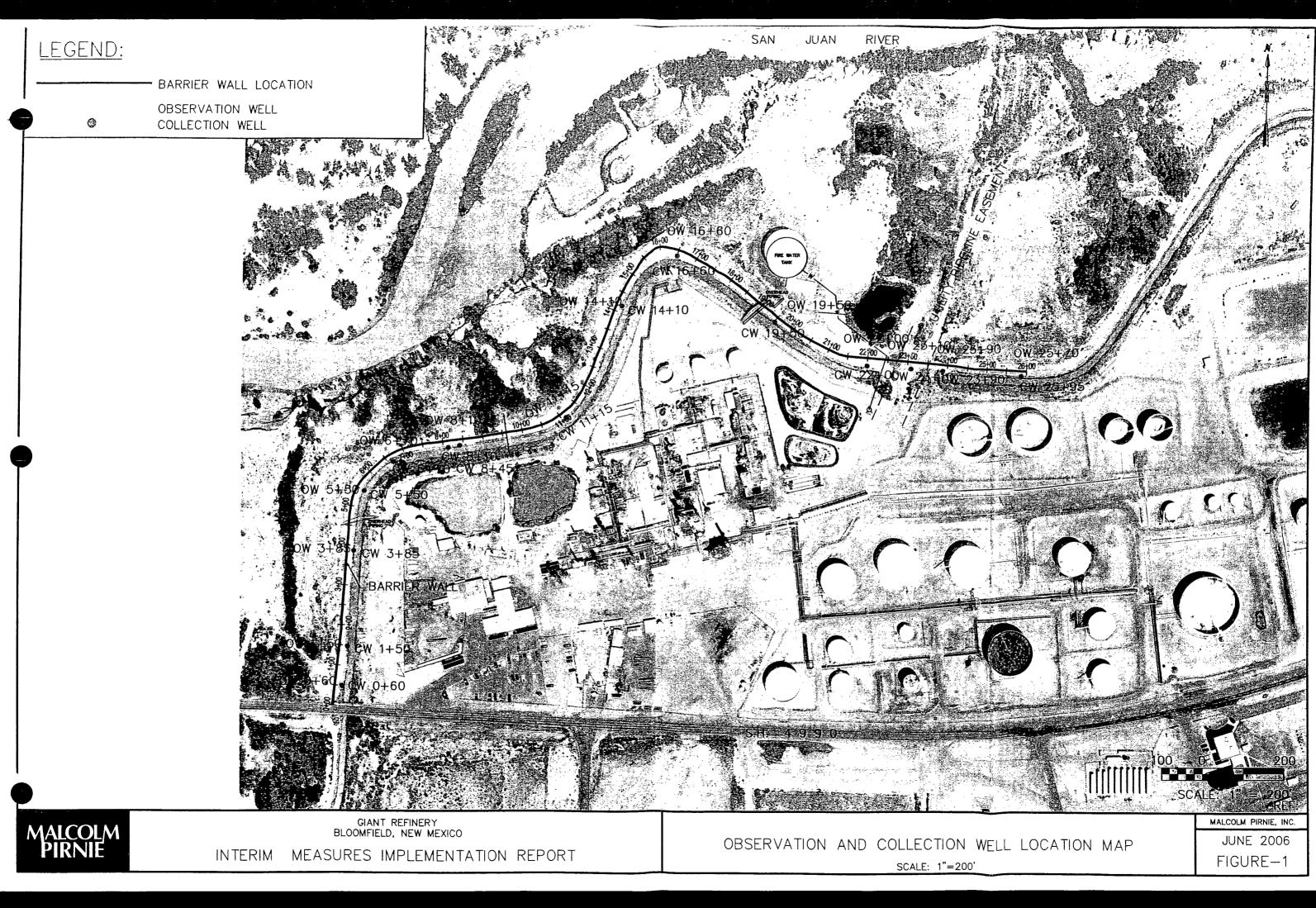
ł

1 103

Interim Measures Implementation Report Giant Refinery - Bloomfield, New Mexico

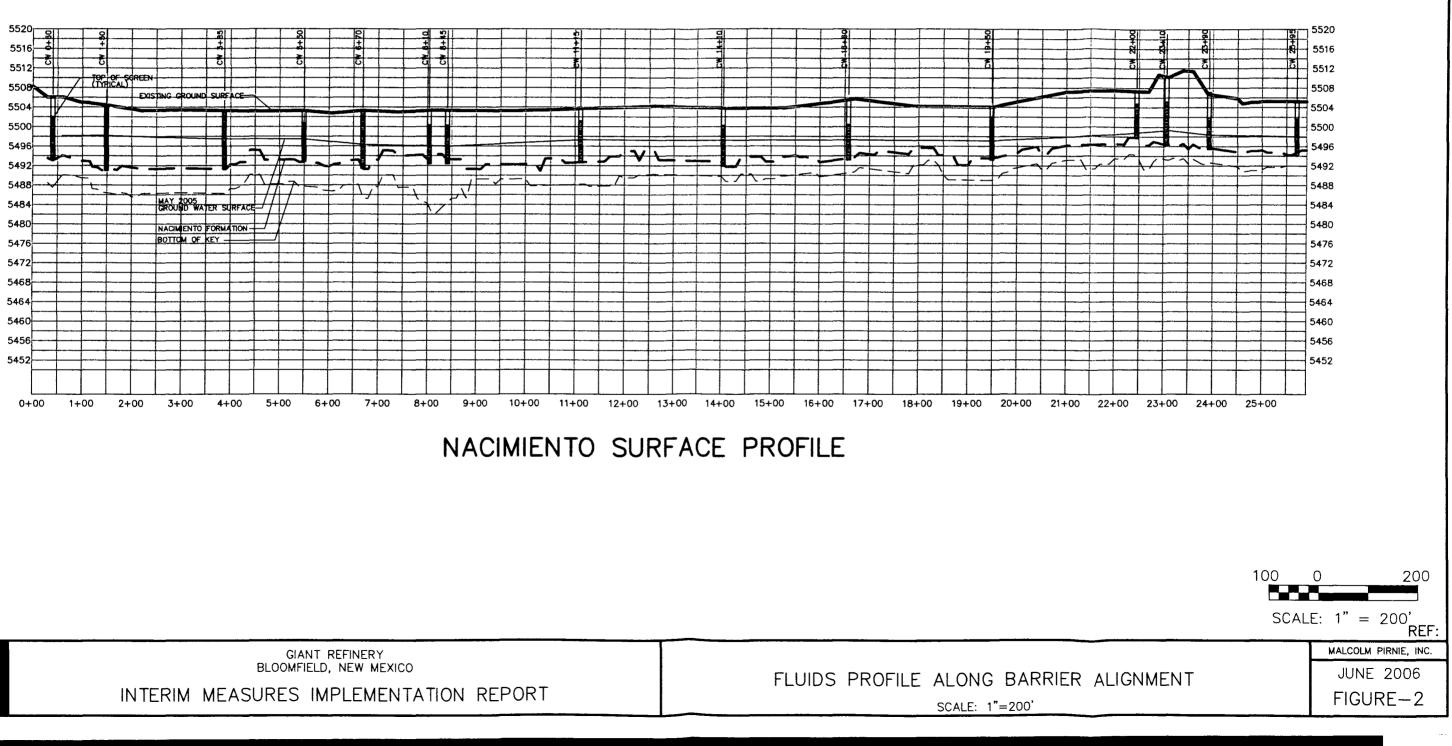
Notes:

SPH = Well Contains Separate Phase Hydrocarbon - No Sample NA = Not Enough Water in the Well to Sample - Not Analyzed NS = Well is Dry - No Sample









# **APPENDIX A**

# **Corrective Action Plan and Agency Comments**

1 i iii

- fi i

# **CORRECTIVE ACTION PLAN** GIANT BLOOMFIELD REFINERY

November 17, 2004

**Prepared for:** Giant Refining Company 50 Road 4990 Bloomfield, New Mexico 87413

Prepared by: Malcolm Pirnie, Inc. 4646 E. Van Buren St., Suite 400 Phoenix, AZ 85008

ا فقر الله التربيب اليوز المعادي التي التي ال

1 146

ի ին և մն



# **TABLE OF CONTENTS**

1.0	INTRODUCTION	4
	1.1 Purpose	4
	1.2 Facility Description	4
	1.3 Corrective Action Description	4
2.0	SITE GEOLOGY	5
3.0	HYDROLOGY	6
4.0	SITE CHARACTERIZATION DATA	7
	4.1 Water Level & Phase-Separated Hydrocarbon (PSH) Data	7
	4.2 Slug Tests	8
	4.3 Nacimiento Formation Surface Contour Model Development	8
5.0	HYDROGEOLOGY OF SHALLOW-ZONE SOILS	10
	5.1 Nacimiento Formation Surface Conceptual Model	10
	5.2 Shallow-Zone Groundwater Conditions	10
	5.3 Aquifer Test Results	11
	5.4 Conclusions	12
	5.5 Additional Monitoring Plan	12
6.0	PROPOSED CORRECTIVE ACTION PLAN	13
	6.1 Barrier Concept	13
	6.1.1 Utility Crossings	14
	6.2 Fluids Collection Concept	15
	6.3 Implementation Concept	15
	6.4 Construction Permits	15
7.0	SCHEDULE	16
8.0	REFERENCES	16

Bloomfield Refining CAP

ļ

Z TIL IPAR IN

K I LUII

1 1 1

1 110 3

Table 1 – Groundwater and Phase-Separated Hydrocarbon (PSH) Level DataTable 2 – Monthly Monitoring Schedule

# LIST OF FIGURES

Figure 1 - Facility Location Map

Figure 2 – July 2004 Nacimiento Formation Surface Contour Model

Figure 3 – North Boundary Soil Boring Location Map

Figure 4 – Updated Nacimiento Formation Surface Contour Model –November 2004

Figure 5 – North Boundary Barrier Cross-Section A-A'

**Figure 6 – Estimated Corrective Action Implementation Schedule** 

#### **APPENDICES**

Appendix A- November 11, 2004 Report from Precision Engineering, Inc. (with boring logs)



Bloomfield Refining CAP

# **1.0 INTRODUCTION**

# 1.1 PURPOSE

This Corrective Action Plan describes Giant's proposed actions to mitigate the off-site migration of petroleum hydrocarbons within the shallow-zone soils along the north property boundary of the Giant Refinery in Bloomfield, New Mexico. For the Corrective Action, Giant has committed to the installation of a containment barrier and fluid collection systems along the north refinery boundary, extending from County Road 4990 to a location approximately 200 feet east of the El Paso Natural Gas Pipelines.

#### **1.2 FACILITY DESCRIPTION**

The Bloomfield refinery was originally built in the late 1950's and has been operated by Kimball Campbell, O.L. Garretson (Plateau), Suburban Propane, Inc. (Plateau), Bloomfield Refining Company and Giant Refining Company. The facility consists of approximately 285 acres and is located approximately one mile south of Bloomfield, New Mexico on a bluff overlooking the San Juan River (Figure 1).

#### **1.3** CORRECTIVE ACTION DESCRIPTION

Recent emergence of active seeps of petroleum hydrocarbons at the face of the river bluff on the north side of the refinery prompted the New Mexico Oil Conservation Division (OCD) to issue Giant an Emergency Action Directive stating the actions required by the agency. Upon receiving the Emergency Action Directive, Giant implemented the tasks outlined therein, which included the installation of temporary catchments and excavation of hydrocarbon-stained soil from the identified areas along the San Juan River bluff. In addition, Giant collected water samples from the San Juan River upstream of the refinery and at the mouth of each draw of concern. Giant continues to provide progress reports of these activities to OCD.

As a corrective action to mitigate further migration of petroleum hydrocarbons towards the San Juan River and beyond the northern property boundaries of the refinery, Giant Bloomfield Refining CAP

November 17, 2004

Page 4 of 16

1 4 6 6 4

has committed to the installation of a containment barrier wall approximately 2,600 feet in length along the north side of the Hammond Ditch and extending from County Road 4990 to a location approximately 200 feet east of the El Paso Natural Gas Pipelines. In addition, a fluids collection system consisting of multiple recovery wells and/or collection galleries positioned along the plant side of the barrier will be installed to provide hydraulic control of fluids accumulating upgradient of the barrier.

Results from previous site characterization activities, information collected during boring campaigns conducted between November 2003 and October 2004, and a conceptual model of the Nacimiento Formation surface elevation will be used to determine the containment barrier design, develop performance specifications for construction of the containment barrier, and prepare a preliminary design for the fluids collection system. Final design of the collection system will be completed upon installation of the containment barrier and collection of additional groundwater and product level data.

# 2.0 SITE GEOLOGY

The Bloomfield Refinery is located within the San Juan Basin, a sub-province of the Colorado Plateau physiographic province, about 120 ft above the present river level and 500 feet from the river.

There are three distinct stratigraphic units that underlay the Bloomfield Refinery. From oldest to youngest these units are: the Nacimiento Formation, the Jackson Lake Terrace, and an unnamed structureless loess unit composed of silts and fine windblown sand that have been deposited as the result of eolian deposition.

#### **GEOLOGY ALONG NORTH BOUNDARY**

#### **Surficial Windblown Sands**

- $\checkmark$  Depth: 0 to 4 feet deep
- Permeability: Low to Moderate
- ✓ Saturation: Dry

#### **Jackson Lake Terrace**

- ✓ Depth: 6 to 10 feet deep
- Permeability: Moderate to High
- Saturation: Dry to 1-ft depth; water bearing
- Seeps located in erosional channels

#### **Nacimiento Formation**

1 4 6 6 11

- ✓ Perching unit for Jackson Lake Terrace
- ✓ Thickness: Approximately 900 feet
- ✓ Permeability: Low
- ✓ Saturation: Non-water bearing

Bloomfield Refining CAP November 17, 2004 During the last glacial retreat, wind blown sand and silt from the floodplains settled over the course clastics to form structureless loess deposits.

The underlining Quaternary Jackson Lake Terrace deposits consist of 10 to 15 feet of course-grained fluvioglacial outwash. It is primarily composed of well rounded gravels, cobbles, and sand sized rocks placed as the result of high energy deposition during melting of the last glacial advance. The cobbles and gravel is often disk-shaped. Cobbles and boulders are commonly observed in the deposits.

The Nacimiento Formation is described as an inter-bedded black carbonaceous mudstone/clay stone with white, medium to coarse-grained sandstones approximately 570 feet thick in this area. The Nacimiento Formation at the outcrop is a tight unfractured rock unit. A permeable saturated cobble and sand layer directly overlies the bedrock (Nacimiento Formation) at the site in areas of depressions (draws) within the bedrock formation. The morphology of the contact between the Quaternary cobble and silt of the Jackson Lake Terrace in the vicinity of the facility and the underlying Nacimiento Formation is important in that it influences control over the direction of the groundwater and SPH flow.

# **3.0 HYDROLOGY**

Surface water in the vicinity of the refinery includes the San Juan River (to the north) and the Hammond Ditch along the north property boundary. The town of Bloomfield and the surrounding areas derive their potable water from the San Juan River, which is controlled by the Navajo Dam. The San Juan River level is approximately 75 feet lower than the Hammond Ditch, and the Hammond Ditch in turn is approximately 25 feet lower than the grade level in the northwestern part of the refinery. Water within the Hammond Ditch, a concrete lined channel, is used for irrigation and watering of livestock and not intended for human consumption.

Bloomfield Refining CAP November 17, 2004

Since the lining of the Hammond Ditch in 2001, it is no longer a contributor to local groundwater recharge at the site. Stormwater within the facility is collected in the curbed, concrete-paved process areas connected to sewers leading to the wastewater treatment system. Some areas not served by sewers collect process and stormwater in sumps, which are then emptied by a vacuum truck for delivery to the wastewater treatment system.

Prior to the lining of the Hammond Ditch, the infiltration of source water through the shallow-zone soils served as a hydraulic curtain for the migration of Phase-Separated Hydrocarbon (PSH) along the north property boundary. Lining of the Hammond Ditch and the decommissioning of unlined surface water ponds within the process area of the refinery has resulted in a significant reduction in groundwater recharge to the shallow-zone water-bearing zone on top of the Nacimiento Formation.

# 4.0 SITE CHARACTERIZATION DATA

This section describes recent site characterization and routine monitoring data that will be used to design and construct the north boundary barrier and fluids collection system.

#### 4.1 WATER LEVEL & PHASE-SEPARATED HYDROCARBON (PSH) DATA

Giant conducts routine monitoring activities at the refinery, which include monthly groundwater and product level measurements in monitoring wells and peizometers (installed in soil borings made to investigate the depth to the Nacimiento Formation) along the north property boundary. Groundwater and product level measurements were collected during the months of August and October of 2004 from these location points along the north property boundary. Table 1 summarizes these data with respect to the well depth and Nacimiento Formation surface elevation. This information, combined with the collection of additional monitoring data, will be used to design the fluids collection system and provide the barrier installation contractor with soil saturation information for excavation purposes.

Bloomfield Refining CAP November 17, 2004

#### 4.2 SLUG TESTS

In order to further understand the nature and variability of the shallow-zone soils and their hydraulic behavior, additional site characterization activities were conducted by Malcolm Pirnie, Inc. and Precision Engineering, Inc. during October 2004. Field activities included the completion of slug tests on monitoring wells MW-45 and MW-47.

The slug tests were performed to monitor the recovery rate of fluids through the shallowzone soils. Results from the slug tests were used to estimate the aquifer properties of the shallow-zone soils and the anticipated amount of fluids accumulation along the barrier. This information will also be provided to the barrier installation contractor for estimating slurry loss into the formation during barrier construction. The following summarizes the hydraulic properties estimated from the slug test data:

Well ID	Transmissivity (Ft <sup>2</sup> /day)	Hydraulic Conductivity (Ft/day)
MW-45	N/A	N/A
MW-47	19.6	31.6

Summary of Hydraulic Properties from Slug Tests

It should be noted that MW-45 penetrates into the Nacimiento Formation approximately 10 feet. In addition, the groundwater level measured in MW-45 during October 2004 was below the top of the Nacimiento formation. As such, the results of the slug test performed on MW-45 are not representative of the hydraulic properties of the shallow-zone soils, but rather the impermeable nature of the Nacimiento Formation.

# 4.3 NACIMIENTO FORMATION SURFACE CONTOUR MODEL DEVELOPMENT

Giant has conducted several drilling campaigns over the years to assess the environmental impacts of historic product releases at the refinery. In 1997, Giant Bloomfield Refining CAP

November 17, 2004

commissioned the development of a Nacimiento Formation conceptual model to assess its topographic character beneath the refinery. An initial conceptual model was developed using information from previous drilling activities. Data collected from additional borings made in November 2003 and July 2004 to specifically investigate the Nacimiento Formation were added to the conceptual model to develop a July 2004 version of the contour model (Figure 2).

A review of the July 2004 Nacimiento Formation contour model identified some uncertainties with respect to the elevation of the Nacimiento Formation along the western and far eastern portions of the proposed barrier alignment. As such, seven (7) additional soil borings were installed by Precision Engineering, Inc. during October 2004; five (5) borings were installed along the west portion and two (2) along the east portion of the proposed barrier alignment. Figure 3 shows the location of the July and October 2004 borings with respect to the proposed barrier alignment.

Each boring installed during the October 2004 drilling campaign was drilled 3 to 5 feet into the Nacimiento Formation. Soil samples were collected every 2.5 ft and submitted to a geotechnical laboratory for grain size analysis to estimate properties important for the design of the barrier and collection system. Samples collected of the Nacimiento Formation were also submitted to the lab for hydraulic conductivity testing. The following summarizes the hydraulic conductivity test results for the samples collected during the October 2004 boring campaign.

Depth of Sample (ft)	Hydraulic Conductivity (cm / sec)
12 - 12.5	$6.0 \times 10^{-7}$
9.5 - 10.5	1.2 x 10 <sup>-9</sup>

#### Hydraulic Conductivity Data of Nacimiento Formation

Bloomfield Refining CAP November 17, 2004 The lithologic logs for the borings installed in July and October 2004 are included in Appendix A. It is our understanding that OCD has copies of the previous borings on file.

# 5.0 HYDROGEOLOGY OF SHALLOW-ZONE SOILS

The hydraulic properties of the shallow-zone soils are key factors in estimating the hydraulic effects of the containment barrier, as well as in the design of the fluids collection system. Results from site characterization activities, in conjunction with the Nacimiento Formation contour model, provide a conceptual understanding of the hydrogeologic behavior of the shallow-zone soils.

#### 5.1 NACIMIENTO FORMATION SURFACE CONCEPTUAL MODEL

As discussed in Section 2.0, the shallow-zone soils (windblown sands and Jackson Lake Terrace deposits) are underlain by the non-water bearing Nacimiento Formation. The surface contour model of the Nacimiento Formation, as discussed in Section 4.3, indicates that depressions (troughs) exist within the Nacimiento Formation surface in areas along the north property boundary and underlying the refinery process areas. With the significant reduction of groundwater recharge after the lining of the Hammond Ditch and decommissioning of unlined surface water ponds within the process areas of the refinery, the surface contours of the Nacimiento Formation likely influence the migration and accumulation of groundwater and PSH beneath the refinery. This notion is further discussed in Section 5.2. Figure 4 shows the updated version of the Nacimiento Formation surface contour model based on information collected during the October 2004 drilling campaign.

# 5.2 SHALLOW-ZONE GROUNDWATER CONDITIONS

Based on the groundwater and product level measurements collected in August and October 2004 (shown in Table 1), the occurrence of fluids along the north property boundary varies based on the underlying topography of the Nacimiento Formation.

Bloomfield Refining CAP November 17, 2004 These fluids level measurements were used to develop a cross-sectional profile along the proposed barrier alignment (Figure 5). As shown in Figure 5, there were areas where no groundwater was detected, which support the notion that the surface contours of the Nacimiento Formation likely influence the collection of fluids within the overlying thin water-bearing zone. Figure 4 shows the location of the north boundary wells containing detectable PSH with respect to the updated surface contour of the Nacimiento Formation.

# 5.3 AQUIFER TEST RESULTS

The hydraulic properties of the perched aquifer located above the Nacimiento Formation were previously tested during several aquifer tests conducted by Groundwater Technologies in June 1994. Two types of tests were attempted: a short-term, variable discharge rate (step-drawdown test), and a long-term pumping test. The objective of the short-term, variable discharge rate test was to estimate the specific capacity of the well and estimate the sustainable flowrate. The objective of the long-term aquifer test was to estimate the hydraulic properties of the saturated zone, which include the transmissivity, hydraulic conductivity, and specific yield. The following is a summary of the estimated hydraulic properties of the shallow-zone developed from these tests (Groundwater Technology, 1994).

Well	Transmissivity	Hydraulic Conductivity	Storativity
No.	(ft <sup>2</sup> / day)	(ft/day)	(Dimensionless)
MP-3	1412	177	0.015
MP-4	1260	158	0.003
RW-22	353	44	NA

#### **Summary of Hydraulic Properties**

The calculated values of transmissivity and hydraulic conductivity from the June 1994 aquifer tests are indicative of a high-permeability saturated zone, representing sand and gravel deposits.

A slug test was performed on MW-47, as discussed in Section 4.2. The results from the slug test have similar hydraulic properties to the wells tested above. Note, the above wells were located in the plant facility and had much greater saturated thickness. Based on the aquifer test and slug test results, the Jackson Lake Terrace Deposits have hydraulic conductivity, ranging between 40 to 180 ft/day, averaging 150 ft/day. The deposits exhibit high permeability characteristics, but have minimal saturated thickness near the Hammond Ditch.

### 5.4 **CONCLUSIONS**

Based on the hydraulic properties of the shallow-zone soils and limited saturation, groundwater flow and fluids accumulating along the proposed barrier are estimated to be below 10 gallons per minute (gpm). This estimate was determined based on the following:

$Q = \underline{KIA}$	where	K = 150  ft/day
η		$\eta = 40\%$ porosity
		I = .002ft/ft gradient
		A = 2600 feet x 2 feet saturation

It is our opinion that groundwater that flows toward the barrier will accumulate in the depressions on the surface of the Nacimiento Formation. Collection methods to extract the groundwater behind the barrier may include collection trenches, wells, or other methods. It is believed that extracting groundwater only in the depressions will provide sufficient capture of groundwater behind the barrier. This approach will cause groundwater to move from the higher elevations to the lower areas of depressions and limit potential groundwater level rise away from the collection areas.

### 5.5 ADDITIONAL MONITORING PLAN

Continued monitoring of the groundwater and PSH levels along the north property boundary, including the soil borings installed in October 2004, will be conducted by Giant on a monthly basis through January 2005. The water level information will be used

Bloomfield Refining CAP November 17, 2004 to confirm preliminary conclusions with respect to the amount of fluids that may accumulate at the barrier and to prepare a final design for the fluids collection system (Section 6.2). Table 2 includes the list of monitoring wells and soil borings along the north property boundary that will be included in the on-going monitoring activities.

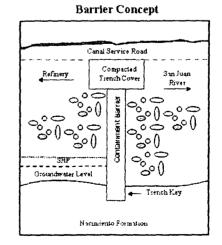
### 6.0 PROPOSED CORRECTIVE ACTION PLAN

As a corrective action to mitigate further off-site migration of petroleum hydrocarbons, Giant has committed to the installation of a containment barrier and fluids collection system along the north property boundary. The containment barrier will extend from County Road 4990 to a location approximately 200 feet east of the El Paso Natural Gas Pipelines. The approximately 2,600-foot long barrier will be installed along the north side of and parallel to the Hammond Ditch, within the existing service roadway. A fluids collection system, consisting of multiple fluids recovery location points along the refinery side of the barrier, will serve to provide hydraulic control of fluids accumulating along the barrier.

### 6.1 BARRIER CONCEPT

In general, the north boundary barrier will be constructed by excavating a narrow trench, typically 3 to 5 feet wide, through the Jackson Lake Terrace and into the Nacimiento Formation. The barrier, varying in depth from approximately 10 to 15 feet along the alignment, will key into the top of the Nacimiento Formation a minimum of 3 feet to mitigate potential underflow of fluids.

The barrier design and method of construction will be determined by Giant based on competitive proposals solicited from experienced barrier contractors. The performance requirement will be to install a finished barrier that provides a hydraulic conductivity (permeability (k)) of  $1 \times 10^{-7}$  cm/sec or less.



Bloomfield Refining CAP November 17, 2004 Several designs and construction methods are available to achieve this performance objective: soil-bentonite slurry trench walls; soil-cement slurry trench walls; slurry trench with geo-membrane barrier; and shallow soil mixing using bentonite and/or cement to create an in-place wall. Contractor proposals will be evaluated based on their ability to achieve the required performance specifications, constructability considering site conditions, ability to meet the desired installation schedule, and cost effectiveness.

Appropriate construction quality control measures will be applied during barrier construction to verify that the performance requirements will be achieved.

Clean soil excavated from the trench may be utilized by the contractor for barrier construction (if appropriate) and for backfill purposes. Contaminated soil will be segregated to the extent possible and properly stock-piled in a separate location on-site for proper characterization and subsequent management. Giant will determine the management approach (e.g., on-site treatment or off-site disposal) for the contaminated soil once the quantity and character of the soil is determined.

### 6.1.1 Utility Crossings

Subsurface utilities have been identified at three locations along the proposed barrier alignment. Those locations are:

- Tank 37 (French Drain Collection System), located approximately 50 feet east of SB1-0704,
- Fire water supply pipeline, located approximately 100 feet west of the El Paso Pipeline easement, and
- El Paso Natural Gas Pipelines, located within a 100-foot easement west of P8 (SB7-1103).

In locations where it is possible to install sufficient barrier height to achieve the desired performance, the barrier will pass beneath the utilities. However, depending on the depth of the subsurface utilities with respect to the Nacimiento Formation in those locations, utilities may be required to penetrate the barrier. If so, proper sealing techniques will be employed at those locations to mitigate leakage. Bloomfield Refining CAP

November 17, 2004

### Page 14 of 16

11

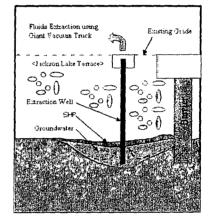
الكالك الأربي فيتخرف المراقات

### 6.2 FLUIDS COLLECTION CONCEPT

Hydraulic control of fluids (groundwater and PSH) captured by the barrier will be accomplished by installing a series of collection wells and/or interceptor trenches at locations along the length of the barrier. Conceptually, collection wells or trenches will

be located at Nacimiento trough intersections along the barrier. Additional collection points may be required along the barrier based on the results of the additional water level monitoring (Section 5.5) and/or operational experience after the barrier is installed.

Fluids will be removed from the collection points using a vacuum truck when necessary based on fluids level monitoring results. Collected fluids will delivered to the existing French Drain collection tank near SB2-0704.



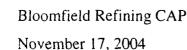
Fluids Collection System

### 6.3 IMPLEMENTATION CONCEPT

Implementation of the barrier and fluids collection system will be completed in two phases. Phase I will include development of construction documents and solicitation of bids for the containment barrier, followed by construction of the barrier. Phase II will consist of the design and installation of the fluids collection system. The fluids collection system will be installed after completion of the containment barrier construction.

### 6.4 CONSTRUCTION PERMITS

Giant will comply with all permitting requirements associated with the construction of the containment barrier.



1 1 1 1 1

Preliminarily, it appears only a construction stormwater permit will be required. Giant will submit a Notice of Intent (NOI) to United States Environmental Protection Agency (USEPA) Region 6 prior to the start of construction activities. The NOI process will include an Endangered Species Act Review by United States Fish and Wildlife Services (USFWS) for the adjacent reach of the San Juan River, and development of a Storm Water Pollution Prevention Plan (SWPPP).

VOC air emissions during the excavation activities are expected to be insignificant and not trigger any state permitting requirements. On-site treatment (e.g., landfarming) of petroleum-contaminated soils may require air permitting activities. Giant will further evaluate that issue if on-site soil treatment is pursued.

### 7.0 SCHEDULE

Construction of the northern boundary containment barrier is anticipated to start by January 17, 2004. Figure 6 shows the estimated implementation schedule.

### 8.0 **REFERENCES**

Groundwater Technology, 1994. Uppermost Aquifer Hydraulic Testing and Modeling; Giant Refining Company.



Bloomfield Refining CAP

3 66 6 6

**TABLES** 



1

# Groundwater and Phase-Separated Hydrocarbon (PSH) Level Data

			Field Data		Dat	<b>Data Interpretation</b>	
		Total Boring Depth Depth to Water Depth to SPH	Depth to Water	Denth to SPH	Denth to	Water Danch an	CPUI Denth on
WellID	Date of Data	Below Grade	Below Grade	Below Grade	Nacimiento Below top of Nacimiento	top of Nacimiento	Top of
	Collection	(ft)	(L)	(IJ)	Grade	(JJ)	Groundwater
MW-47	8/16/2004	14.28	8.86	7.68	100	1 34	
	10/13/2004	14.28	8.59	7.54	10.2	191	1 05
MW-46	8/16/2004	10.39	DN	QN	6.5	C	6
	10/13/2004	10.39	QN	QN	6.5		
SB1-0704	9/1/2004	01	7.67	QN	×	0.33	e
	10/13/2004	10	7.59	QN	- 00	0.41	0
SB2-0704	8/30/2004	11.5	7.47	QN	01	2.53	0
	10/13/2004	11.5	7.4	QN	01	2.6	0
SB3-0704	9/1/2004	11.5	8.42	7.41	10	1.58	1.01
	10/13/2004	11.5	8.43	7.38	10	1.57	1.05
WW-45 (1)	8/16/2004	16.92	Not Measured	Not Measured	1	Not Measured	Not Measured
	10/13/2004	16.92	13.04	8.79	7	(3)	(2)
284-0704	9/1/2004	11	8.21	QN	9.5	1.29	0
	10/13/2004	11	7.96	ŊŊ	9.5	1.54	0
SB5-0704	9/1/2004	10.5	Not Measured	Not Measured	9.25	Not Measured	Not Measured
	10/13/2004	10.5	7.46	QN	9.25	1.79	0
MW-24	8/26/2004	15.14	QN	13.96	12.5	0	(2)
	10/13/2004	15.14	sured	Not Measured	12.5	Not Measured	Not Mcasured
P6 (SB&-1103)	8/30/2004	=	86.6	9.62		1.02	0.36
	10/13/2004	11		9.48	=	1.19	0.33
286-0704	8/30/2004	10.5		QN	8	0.56	0
	10/13/2004	10.5	7.17	DN	80	0.83	0
10/7/00	8/30/2004	10.5	7.35	6.78	6	1.65	0.57
DT (CD0 1003)	10/13/2004	10.5	6.77	6.44	6	2.23	0.33
[c/(SB7-1103)	8/30/2004	14	6.84	QN	12	5.16	0
De seres seres	10/13/2004	14	6.68	ND	12	5.32	0
rs (567-1103)	8/30/2004	12	9.42	9.32	10.5	1.08	0.1
1000	10/13/2004	12	9.38	9.28	10.5	1.12	0.1
	9/1/2004	10.5	6.6	QN	6	2.4	0
1001 1001 D	10/13/2004	10.5	6.55	DN	6	2.45	0
ry (SD0-1103)	8/30/2004	10.5	7.13	QN	8	0.87	0
	10/13/2004	10.5	7.08	DN	8	0.92	C
Notes:							

(1) - Groundwater level not measured in August '04 because monitoring well is currently equipped with a submersible pump, serving as a Recovery Well.

(2) - Depth to groundwater and/or PSH measured to be below top of Nacimiento Formation due to total well depth. Fluid thickness within well sump not representative of fluids depth overlying Nacimiento Formation surface.
ND = Not Detected

Bloomfield Refinery CAP November 8, 2004

1.6 1

	TABLE 2
Monthly	Monitoring Schedule

Well ID	N	lovember 8th, 2004	
SB2-1004	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB3-1004	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
MW-47	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB4-1004	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB5-1004	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
MW-46	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB6-1004	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB1-0704	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB2-0704	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB3-0704	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
MW-45	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB4-0704	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB5-0704	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
P-6 (SB8-1103)	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB6-0704	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB7-0704	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
P-7 (SB9-1103)	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB7-1004	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB8-1004	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
P-8 (SB7-1103)	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
SB8-0704	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005
P-9 (SB6-1103)	November 8 <sup>th</sup> , 2004	December 6 <sup>th</sup> , 2004	January 3 <sup>rd</sup> , 2005

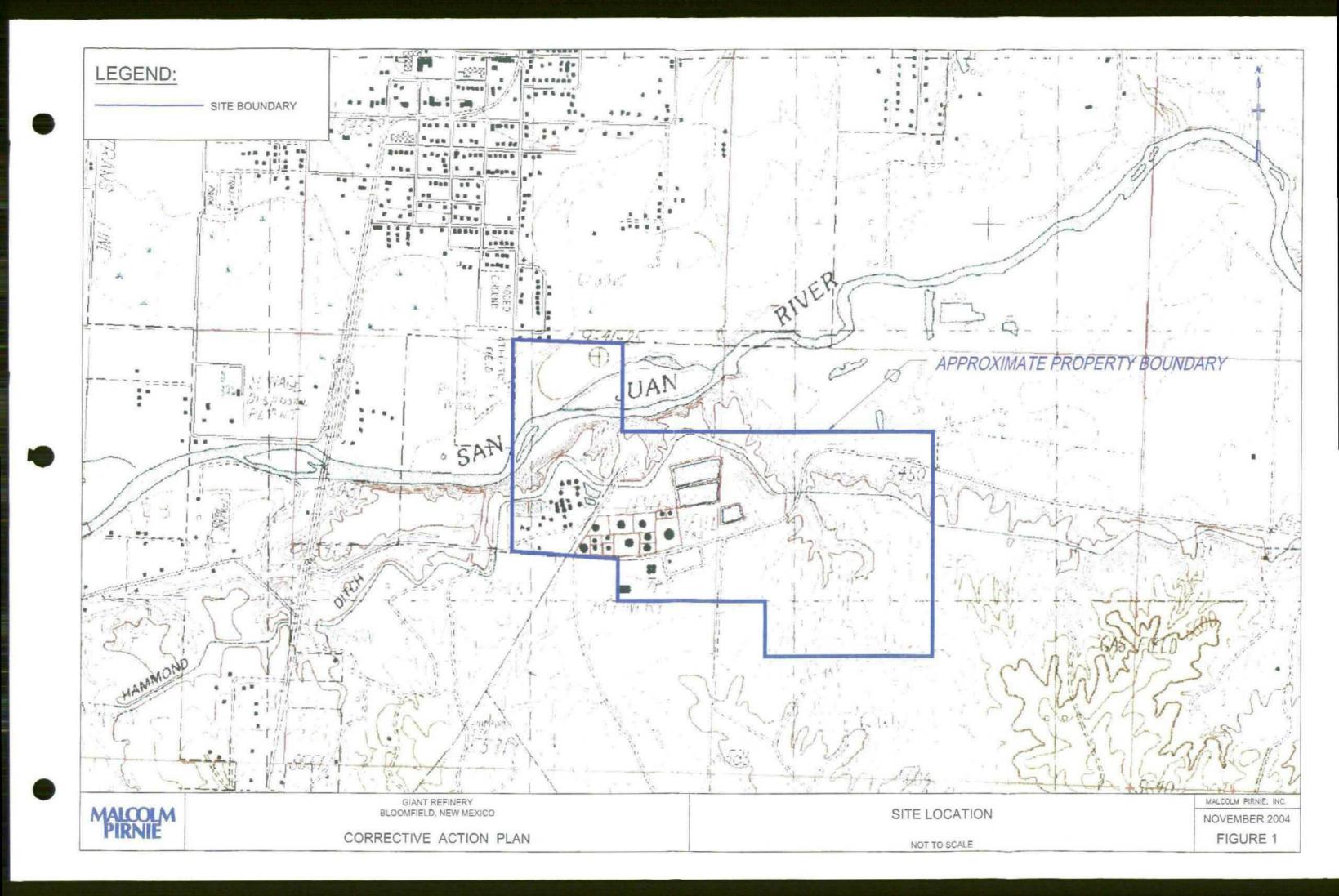
ľ

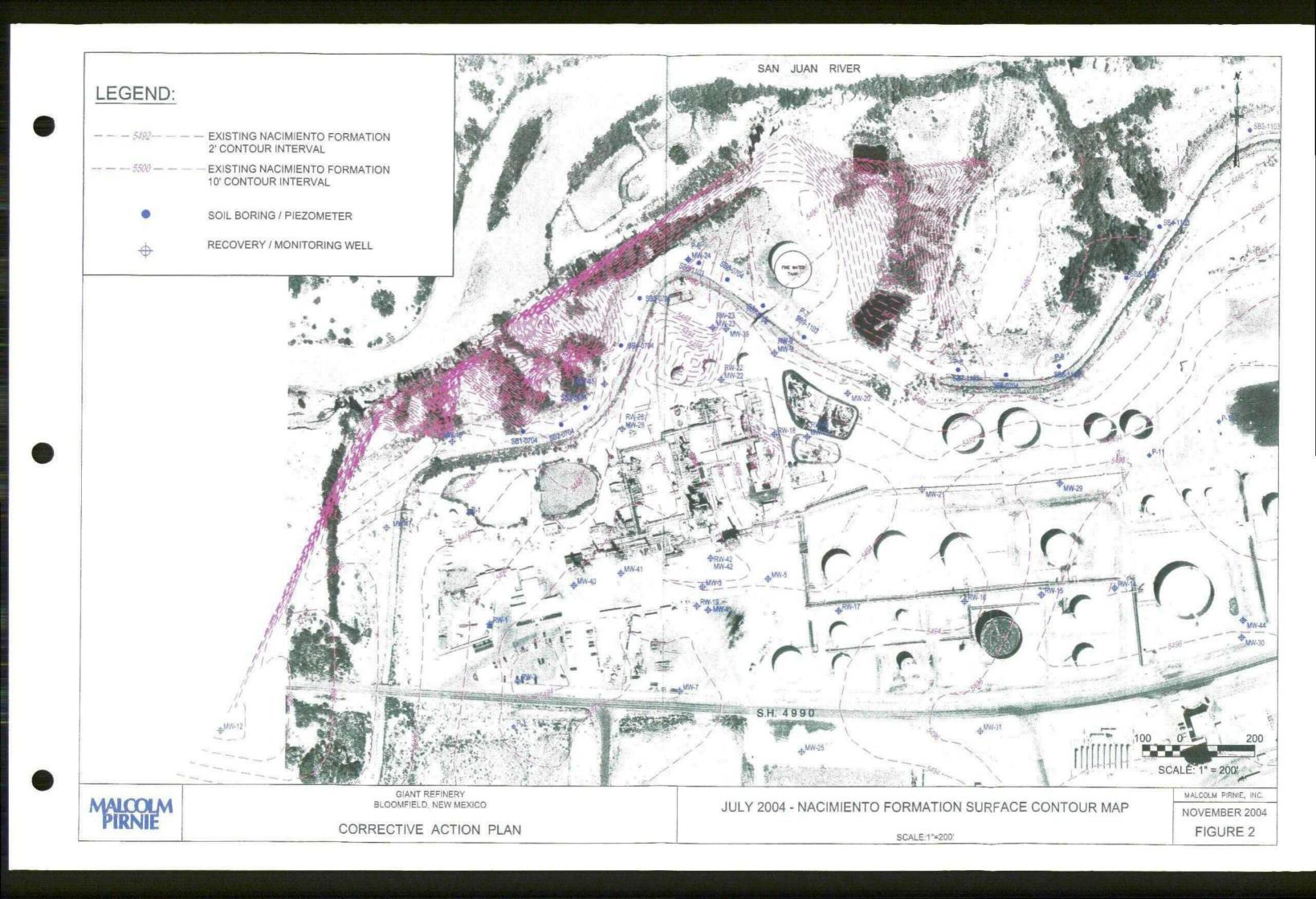
1 10

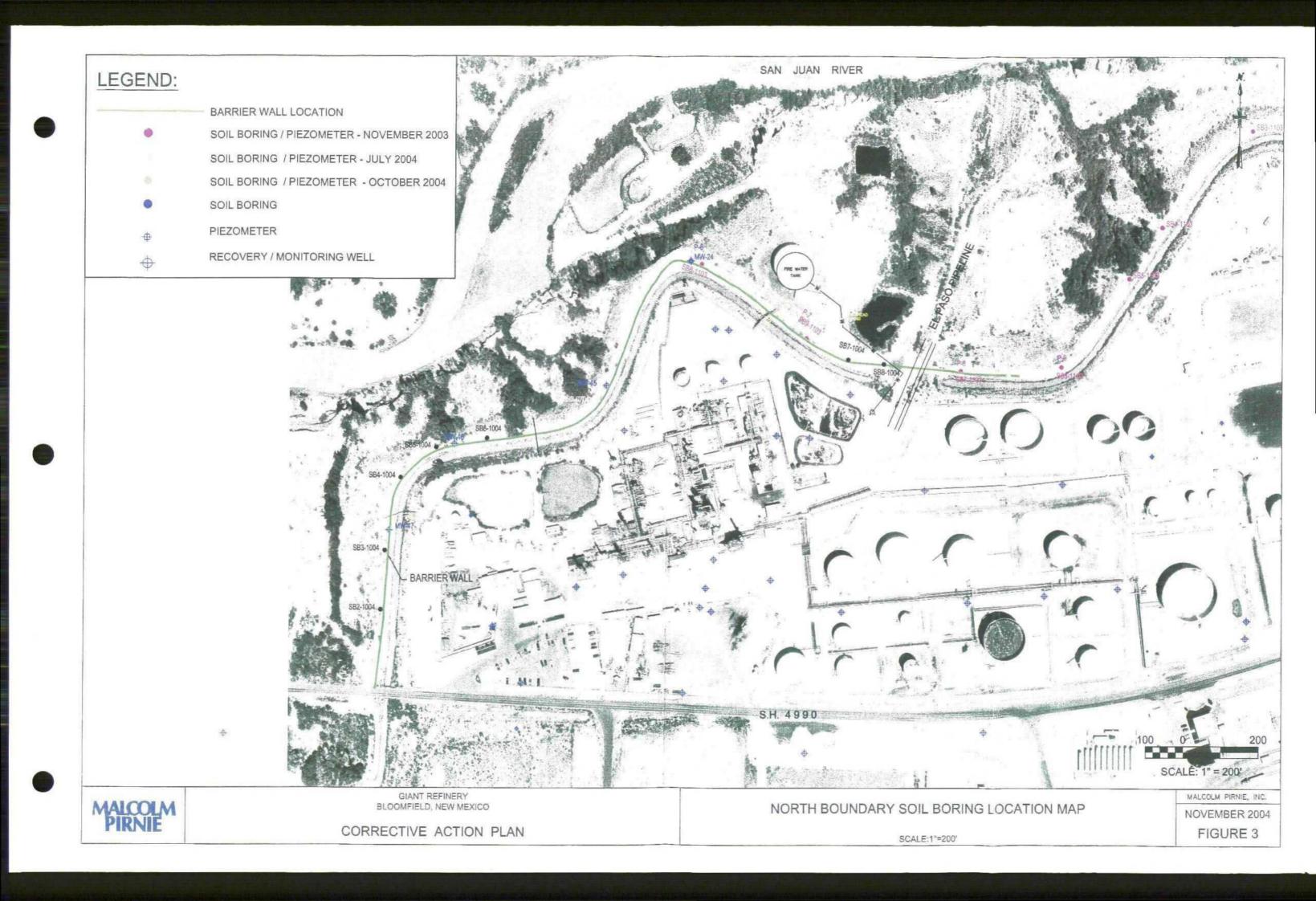
1 . i

1.1

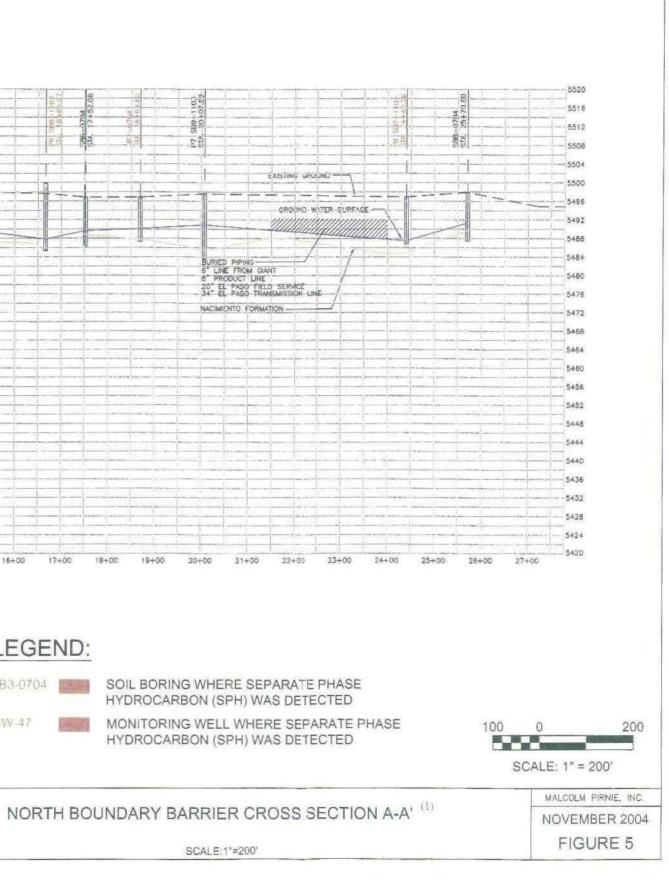
Bloomfield Refinery CAP . November 8, 2004

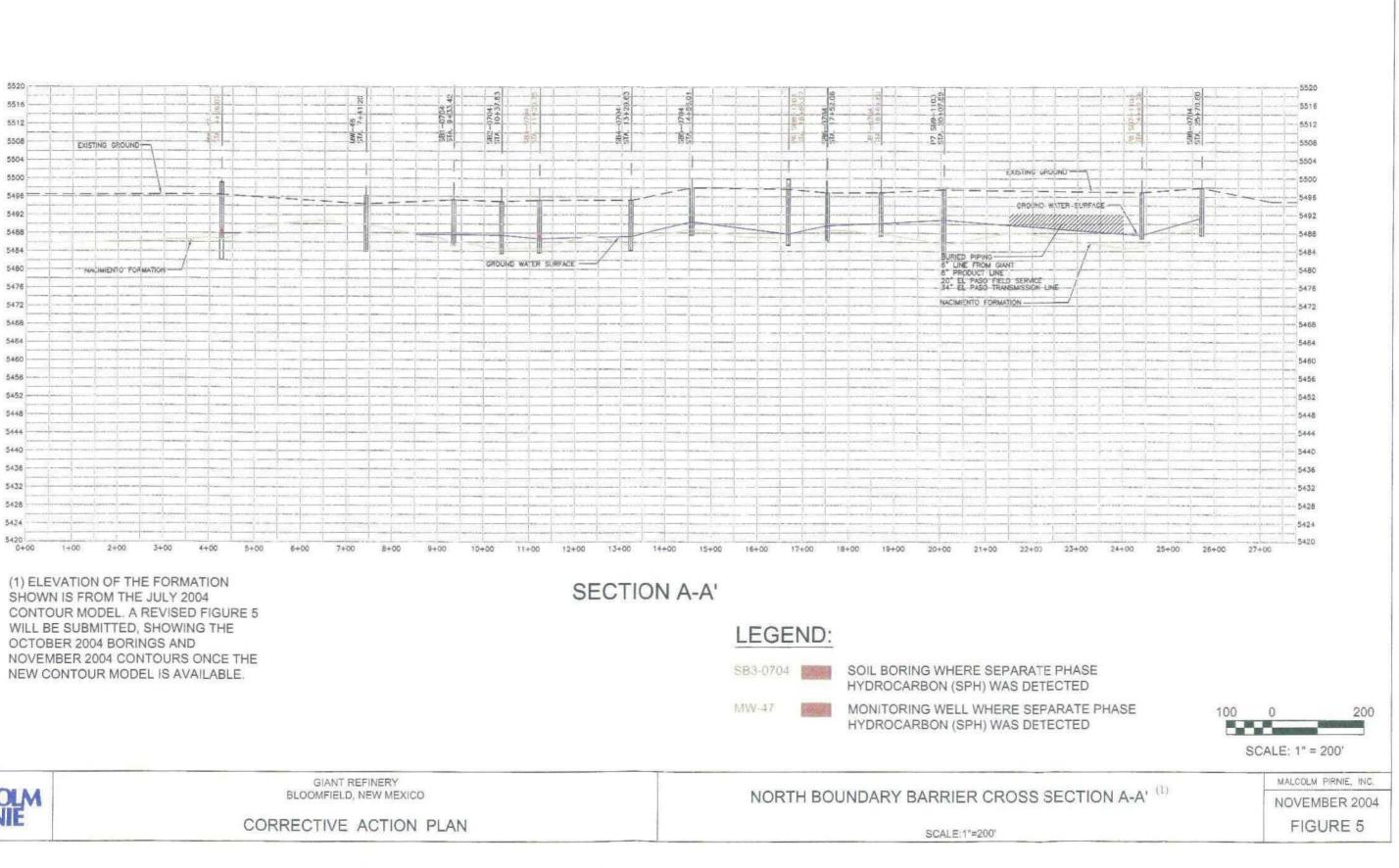






PIRNIE





			Estimated	-	Giant Refining Company Bloomfield Refinery ective Action Implement	Giant Refining Company Bloomfield Refinery Corrective Action Implementation Schedule
<u></u>	Task Name		Duration		Finish	November 2004         January 2005         February 2005         March 2           0/2         0/3         1/11         1/2         1/2         2/1
-	<b>Contractor Selection Process</b>	ocess	35 days	Mon 11/1/04	Mon 12/20/04	
2	Prepare Construction Documents	ocuments	10 days	Mon 11/1/04	Fri 11/12/04	
e	Pre-Bid Site Walk		0 days	Tue 11/23/04	Tue 11/23/04	<ul> <li>11/23</li> </ul>
4	Bid Due Date		0 days	Wed 12/8/04	Wed 12/8/04	<ul> <li>◆ 12/8</li> </ul>
5	Contract Award		0 days	Mon 12/20/04	Mon 12/20/04	<b>•</b> 12/20
9	Construction of Containment Barrier	ment Barrier	25 days	Mon 1/17/05	Fri 2/18/05	
7	Contractor Mobilization		5 days	Mon 1/17/05	Fri 1/21/05	
80	Barrier Wall Construction	u	20 days	Mon 1/24/05	Fri 2/18/05	
6	Fluids Collection System	E	35 days	Mon 1/17/05	Fri 3/4/05	
10	Review Additional Monitoring Data	toring Data	5 days	Mon 1/17/05	Fri 1/21/05	
1	Design Fluids Collection System	ו System	10 days	Mon 1/24/05	Fri 2/4/05	
12	Engage Installation Contractor	ntractor	10 days	Mon 2/7/05	Fri 2/18/05	
13	Install Collection System	٤	10 days	Mon 2/21/05	Fri 3/4/05	
		Task		Milestone		External Tasks
Projet Date:	Project: Estimated CA Schedule_1109 Date: Sat 7/9/05	Split Progress		Summary Project Summary		External Milestone .
Bloon	I Bloomfield Refinery CAP November 8, 2004					

1

(hill

- E 111

# AGENCY CORRESPONDANCE

11

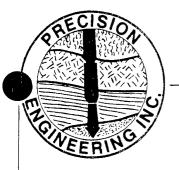
11.41.6

lě

34 B

that is a line

H 116



# PRECISION ENGINEERING, INC.

P.O. BOX 422 • LAS CRUCES, NM 88004 – PH: (505) 523-7674 FAX 505-523-7248 • e-mail: werpei@aol.com

November 11, 2004

Mr. Randy Schmaltz Giant Refining Company Bloomfield Refinery #50 County Road 4990 Bloomfield, New Mexico 87413

Mr. Schmaltz,

Attached are the boring logs advanced along the Hammond Ditch. Included are the logs from the November 2003 drilling, the July 2004 drilling and the October 2004 drilling programs. Using the data the conceptual model of the Nacimiento Formation surface has been updated. Along with the boring data are included some physical properties of the on-site materials. These include gradation and hydraulic conductivity of the materials. Below is a brief geologic summary of the site for your use.

The Giant Refining Company, Bloomfield Refinery is situated on a bluff approximately one hundred (100) feet above the current channel of the San Juan River. There are three (3) major geologic units at the site. The lower most is known as the Nacimiento Formation of Cretaceous Age. The unit has been investigated to a depth of approximately one hundred (100) feet at the site and is comprised of mudstone, siltstone and argillaceous sandstones. Literature concerning the Formation in the area suggests that it is on the order of nine hundred (900) feet in total thickness and is comprised of similar rock types throughout the total thickness. Hydraulic conductivity testing of the formation is attached and confirms our physical findings that the Formation is essentially impervious to water migration under the head encountered at the site. The Nacimiento formation has a weakly defined joint pattern at the site and where exposed at the bluff face does show some erosion along the joints. Drilling in the area indicates that within a few feet of the exposed face the jointing is very tight and does not transmit water. Free water is not encountered in the Nacimiento Formation at the site.

Immediately overlying the Nacimiento Formation is a unit that is comprised of well rounded boulder, cobble, gravel and sand known as the Jackson Lake Terrace. Although the unit is named it, as yet, does not carry formation status because of its relatively limited extent. The material was emplaced as a result of high energy fluvial deposition. As a result the material is relatively clean (devoid of clay or silt size material) and is able to transmit water readily. There is some carbonate and sulfate salt accumulation in the gravels at scattered locations allowing vertical cuts to be made. Any disturbance of the materials or if moisture is added to the soils breaks the bonds and the slope face will collapse. The steepest natural slopes in the area have a horizontal to vertical ratio of 1.5:1. Any excavation in these gravels would require artificial support if not filled with a heavy supporting slurry.

> SUBSURFACE MODELING GEOTECHNICAL INVESTIGATIONS

MATERIALS TESTING LABORATORY ENVIRONMENTAL MONITORING SYSTEMS

Re: Hammond Ditch Conditions File No 04-043

Hammond Ditch Summary File 03-122 November 11, 2004

Where present, overlying the Jackson Lake Terrace at this site is a silty fine sand eolian origin. The sand has a significant amount of material in the silt as well as clay size range. It should be noted that along the Hammond Ditch this unit is typically very thin or absent in most locations.

Historically, water was absent at the site. Development of the site and the areas to the south of the site has produced a weak water table across the top of the Nacimiento Formation. The water ranges from absent to approximately two (2) feet in thickness and rests directly on top of the Nacimiento Formation. The Formation is essentially impervious to the water at the heads encountered and flows laterally across the Nacimiento surface through the Jackson Lake Terrace gravels and sands. The Nacimiento Formation surface grossly follows the present day ground surface profile. Water tends to generally flow on the surface from Southeast to Northwest. The surface model developed from boring logs at the site suggests there is a relative high ridge that runs through the site and that water flows from the high area into natural drainages along the face of the bluff to the north or flows somewhat southwesterly into the drainage running parallel the County Road 4990. Depth to the water along the Hammond Ditch ranges from approximately seven and one half  $(7-\frac{1}{2})$  feet to approximately ten (10) feet. The maximum thickness of the water is on the order of one (1) foot. Some degree of hydrocarbon contamination is encountered at nearly all boring locations.

With this letter is a profile along the Hammond Ditch using the latest model of the Nacimiento surface.

If you need additional information please contact our office.

Sincerely, Precision Engineering, Inc.

William H. Kingsley, PE

File No. 03-122 Date November 2, 2004	Atterberg Limits Moisture Unit Wt. Classification	60 #140 #200 LL PI %M PCF USCS AASHTO	10 8.7 N/P 3.8 SP-SM	6 4.7 N/P 15.6 SP /	37 28 23.8 N/P 5.6 SM A-1-b	3 2.5 N/P 19.2 SP		79 71.3 N/P 14.8 ML	29 23.7 N/P 2.5	8 7.0 N/P 0.9	6 5.3 N/P 1.1 GP-GM	13.3	sec 13.8 117.1									
File N		#60 #140 #20		9	<u> </u>	e		56	29	ω	9	/sec	/sec	 	 	 	 		 	 		
		#20 #40 #		73 48	57 45	55 25	96	96	64	22	23 14	6.0 X10 <sup>-7</sup> cm/sec	1.2 X10 <sup>-9</sup> cm/sec			 	 	 	 	 _	 	
	Sieve Analysis %Passing	#10 #	66	81	71	62	100	100								 	 	 	 	 +		 
	lysis %	3/8" #4	100 100	85 82	100 100	68 64	100	100 100	1 79	-	38 32	Hydraulic Conductivity:	Hydraulic Conductivity:		 _	 	 	 	 _	 	 	 
	ive Ana	1/2" 3/1	10	86 8	1	73 6		10	83 81		43 3	lydrauli	łydrauli		 	 		 	+	 	 	
	Sie	3/4"		90	-	89			86	57	54	-	- <b>-</b> -		 			 				
litch		÷		100		100			88	64	64											
ond D		11/2"							93	76	76											<u> </u>
mmd		2"							95	80	86											
Id-Ha		3"							95	96	94											
Project Bloomfield-Hammond Ditch		Depth ft.	5.0-5.4	11.0-11.5	9.0-10.0	10.0-11.0	Surface	Sruface	Surface	Surface	Surface	12-12.5	9.5-10.5									
Project_		PEI Lab No.	46450	46451	46452	46458	46464	46465	46461	46462	46463	46456	46454									
_		Boring No.																				L

Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

and the second second

त च के स्थ∦ो

1010



18-91050

B		1 OF 1 End of Hamme ent to fence ber			Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674				mfield
	Elevation: pring No.:	Not Encounter SE1-1103	ed		Log of Test Borings	Eleva D	tion: ate:		
LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS
	0-5.25	COUNT		SCALE	<u>Gravel</u> , very sandy, cobble and bouldersize rock very common. <u>Jackson Lake Terrace</u>	70101	<u>he</u> <u>L</u>		
	5.25-7.5			5.0	Nacimiento Formation				
		SPT			<u>Sandstone</u> , very weathered, light brown, moist, dense				
	T.D.			7.5					
					v Stemmed Auger 103 xls]Sheet1	LOGG	EDI	3Y:	KM/NS

C:\AAFWFILE\projects\2003\03-122 Bloom\[B1 1103.xls]Sheet1

1

į. 14 The outstand with the state of the state of

i

, F 2	Ditch Road	-3			505-523-7674				
Water		Not Encounter	ed			Eleva	tion:	Exisi	ting
	o <mark>ring</mark> No.:				Log of Test Borings	D	ate:	11/4	/03
		BLOW		1	MATERIAL CHARACTERISTICS				<del></del>
LAB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	PI	CLASS.
LAB #	0-5.0				Gravel, very sandy, cobble and bouldersize				
					rock, light brown, moist. Jackson Lake Terrace				
									4
	1								
				5.0					
	5.0-7.5	· · · · · · · · · · · · · · · · · · ·			Nacimiento Formation				
		SPT			Sandstone, very weathered, green grey, clayey,				
					(N/P), moist, medium dense				
					(possible trace of water at top of the				
					Nacimiento Formation)				
	T.D.			7.5					
								ĺ	
			-						
:	I								
				1					
JIZE &	TYPE OF	BORING 4	⊥ 1/4" I⊓	Hollov	v Stemmed Auger	LOGO		BY:	KM/NS
				1.0100					

C:\AAFWFILE\projects\2003\03-122 Bloom\[B2 1103.xls]Sheet1

1 t

1

a b i bhi il bh' ii

1 iidi

and the state of t

Sheet: 1 OF 1 Bore Point: Near N E. corner of

evaporation lagoon on Hammond

### Precision Engineering, Inc.

P.O. Box 422 Las Cruces, NM 88004 File #: 03-122 Site: Bloomfield Refinery

	on curves				Las Cruces, NM 88004 505-523-7674		R	efine	ry
Water	Elevation:	6 6'				Eleva	tion:	Fyici	itina
	pring No.:				Log of Test Borings		ate:		
	ning No	383-11V3			Log of rear boilings	U	ale.	11/4	100
		BLOW			MATERIAL CHARACTERISTICS				
LAB #	DEPTH	COUNT	PLOT	SCALE	4	%M	LL	PI	CLASS
	0-8.5				Gravel, sandy. cobble and bouldersize rock.				
					light brown, (~ old grade?), water bearing at				
				1	6.6' Jackson Lake Terrace				- 
	1								
ĺ									
				<u>5.0</u>					
	7505			<u>7.5</u>	<b>x</b>				
	7.5-9.0	SPT			Nacimiento Formation				
					<u>Sandstone</u> , weathered, yellow/red -brown, medium-grained, clean, some black inclusions				
					moist, relatively impervious, not water bearing,				
					top of water after 1 hour				
	T.D.			9.0					
	:								
			1						
						1			

ł.

1 litto

C:\AAFWFILE\projects\2003\03-122 Bloom\[B3 1103.xls]Sheet1

Sheet: 1 OF 1

Bore Point: 80' west of straight

on curves

### Precision Engineering, Inc. P.O. Box 422

Las Cruces, NM 88004

### File #: 03-122 Site: Bloomfield Refinery

Sheet: 1 OF 1 Bore Point: 385' West of SB3-1103 along Hammond Ditch Road

Water Elevation: Not Encountered Boring No.: SB4-1103

### Precision Engineering, Inc.

P.O. Box 422 Las Cruces, NM 88004 505-523-7674

Log of Test Borings

File #: 03-122 Site: Bloomfield Refinery

Elevation: Exisiting Date: 11/4/03

`			BLOW			MATERIAL CHARACTERISTICS				
1	LAB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	ΡI	CLASS.
		0-8.5				Gravel, sandy. cobble and bouldersize material				
:						common, moist, dense, very difficult to drill 7.5-				
						8.5', dry from 7.5-8.5'				
						Jackson Lake Terrace				
			1							
			8							
					5.0					
					<u>5.0</u>					
		:								
		:			<u>7.5</u>					
		8.5-9.0				Nacimiento Formation				
		9.0-10.5	SPT			Sandstone, weathered, yellow-brown to light				
					10.0	brown, moist-damp, hard				
		T.D.	 		<u>10.0</u> 10.5					<u></u>
		۲.U.			10.5					
						-				
i										
							:			
	SIZE &	TYPE OF	BORING: 4	-1/4" ID	Hollov	v Stemmed Auger	LOGG	EDE	BY:	KM/NS

C:\AAFWFILE\projects\2003\03-122 Bloom\[B4 1103.xls]Sheet1

I the first states of the

1

11 116

Bore Point: West side outfall, north side of Hammond Ditch Road

Water Elevation: Not Encountered Boring No.: SB5-1103

### Precision Engineering, Inc.

P.O. Box 422 Las Cruces, NM 88004 505-523-7674

Log of Test Borings

### File #: 03-122 Site: Bloomfield Refinery

Elevation: Exisiting Date: 11/4/03

:			BLOW			MATERIAL CHARACTERISTICS	1	[		
	LAB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	ΡI	CLASS.
		0-2.5				Sand, fine, silty (Qe), brown, moist, loose				
1		1								
					<u>2.5</u>					
		2.5-8.75			<u> </u>	<u>Gravel</u> , sandy, cobbies and boulders common,				
		2.0 0.00				light brown, moist, very dense				
J						Jackson Lake Terrace				1
]										
					<u>5.0</u>					
7										
)										
1					<u>7.5</u>					
						Nacimiento Formation				
		8.75-10.25	9-19-20			<u>Sandston</u> e, weathered, yellow-brown to light brown, argillaceous, some black inclusions				
					10.0	medium-grained				
		T.D.			10.25	(no water bearing zones)				
(										
ţ										
1										
1										
ļ										
1										
1										
;										
)		Í								
l I										
	JIZE &		BORING A	-1/4" 10	Hallow	/ Stemmed Auger	LOGG	FDF	 3γ·	KM/NS
						103 visiSheet1	2000			

C:\AAFWFILE\projects\2003\03-122 Bloom\[B5 1103.xls]Sheet1

- al di elkale - 11 Alicati e i en la ferida al -

. 11

d hl

Sheet:	1	OF	1
--------	---	----	---

Bore Point: 275' west of SB5 on

Hammond Ditch Road, west side of road

Vater Elevation: Not Encountered Boring No.: SB6-1103 Precision Engineering, Inc.

P.O. Box 422 Las Cruces, NM 88004 505-523-7674

Log of Test Borings

Elevation: Exisiting Date: 11/4/03

	Boring No.: SB6-1103							/03
	BLOW			MATERIAL CHARACTERISTICS			-	
AB # DEP		PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M		PI	CLASS
0-3	5			<u>Sand</u> , fine, silty (Qe), brown, damp-moist, loose				
3.5-8	.0		<u>5.0</u>	<u>Gravel</u> , sandy, cobble and boulder size material common, light brown, difficult to drill, water bearing. <u>Jackson Lake Terrace</u>				
8.0-1	0.5 17-26-49		<u>10.0</u>	<u>Nacimiento Formation</u> <u>Sandstone</u> , weathered, yellow-brown to light brown, argillaceous, laminar, damp-moist, very dense				-
T.D			10.5	Installed 2" hand slotted PVC (slotted 48")				
IZE & TYPE		4-1/4" ID	Hollov	v Stemmed Auger	LOGG	EDI	BY:	KM/NS

C:\AAFWFILE\projects\2003\03-122 Bloom\[B6 1103.xls]Sheet1

Holler Hereland

1.1

i haraldi

վեր

10 61

Bore Point: 230' west of SB6 on

Hammond Catch Road, adjacent to

siphon on west side of road Water Elevation: 9 0'

Boring No.: SB7-1103

if İ

日日花

48461

### Precision Engineering, Inc.

P.O. Box 422 Las Cruces, NM 88004 505-523-7674

Log of Test Borings

File #: 03-122 Site: Bloomfield Refinery

Elevation: Exisiting Date: 11/4/03

		BLOW			MATERIAL CHARACTERISTICS				
_AB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	PI	CLAS
	0-2.5				Sand				
						1			
				<u>2.5</u>					
	2.5-10.0 !				Gravel, sandy, cobbles and boulders, very				
	:				dense, tan, moist, difficult to drill, water bearing				
					at 9.0', (free product). Jackson Lake Terrace				
				<u>5.0</u>					
				<u>7.5</u>					
				<u>10.0</u>					
	10.5-12.0				Nacimiento Formation				
					Sandstone, weathered, yellow-brown, laminar				
					banded (yellow, brown,red), damp-moist, hard				
į	T.D.	······································		12.0	Installed 2" hand slotted PVC (slotted 48")				
1									
						1			
	1								
				}					
			1	•		1	1		

hl: diffi

C:\AAFWFILE\projects\2003\03-122 Bloom\[B7 1103.xls]Sheet1

W. H. C. i contributed to

	ter	pipe rack Elevation: pring No.:	Not Encou SB8-1103	ntered		505-523-7674 Log of Test Borings	Eleva D	tion: )ate:		-
		<u> </u>	BLOW		-	MATERIAL CHARACTERISTICS				
Ľ	AB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	ΡI	CLAS
		0-7.5				<u>Gravel</u> , sandy, cobbles and boulders, light brown, moist, very dense, difficult drilling, water bearing. <u>Jackson Lake Terrace</u>				
					<u>5.0</u>					
		7.5-10.0	85 (12")			Nacimiento Formation				
					10.0	<u>Sandstone</u> , weathered, not water bearing, very argillaceous, some claystone fragments, hydrocarbon odor at 9.0'				
		10-11.0				<u>Sandstone</u> , weathered, medium grained, slightly argillaceous, yellow-brown, damp- moist, very dense, laminar banded, some red laminae				
		T.D.			<u>11.0</u>	Installed 2" hand slotted PVC (slotted 48")				

C:\AAFWFILE\projects\2003\03-122 Bloom\[B8 1103.xls]Sheet1

Water	crossing on v Ditch Road	260' west of pij west side of Ha Not Encour	mmond		<u>Precision Engineering, Inc.</u> P.O. Box 422 Las Cruces, NM 88004 505-523-7674 Log of Test Borings	File #: 03-122 Site: Bloomfield Refinery Elevation: Existing Date: 11/5/03					
I		BLOW			MATERIAL CHARACTERISTICS				···· .		
LAB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	ΡI	CLASS.		
	0-12.0				<u>Gravel</u> , sandy, silty, cobbles and boulders, light brown, hydrocarbon odor below 11.0' <u>Jackson Lake Terrace</u>						
				<u>5.0</u>							
				<u>10.0</u>	·						
	12-14.0			12.0	<u>Nacimiento Formation</u> <u>Sandstone</u> , light brown-yellow brown, damp- moist, very dense, very argillaceous, laminar banded						
	T.D.			<u>14.0</u>	Installed 2" Hand Slotted PVC (slotted 48")						
SIZE &		BORING: 4	י רו י		Stemmed Auger	1066		ι <b>γ</b> .	KM/NS		

C:\AAFWFILE\projects\2003\03-122 Bloom\[B9 1103.xls]Sheet1

and the second of the second 
1 Not

Sheet: Bore Point: <u>NO BORING</u> ater Elevation:

Boring No.: SB10-1103

Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674 File #: 03-122 Site: Bloomfield Giant Refining Elevation: Date:

### Log of Test Borings

· [			BLOW			MATERIAL CH	HARACTER	S S				
ļ	LAB #	DEPTH	COUNT	PLOT	SCALE	MOISTURE CON		OP ETC.)	%M	LL	PI	CLASS.
					10	NO BORIN BOOR	IN	U				
					<u>5.0</u>							
					<u>7.5</u>							
					<u>10.0</u>							
					<u>15.0</u>							
					<u>20.0</u>							
ŀ		8 TVDE C		A 1/A" ID					LOGO			
L				4 1/4" ID	HULLOV	V STEMMED AUGER			LUGU		01.	
	A:\[B10 (	0704.xls]Shi	eetī									

1911 For bird f

1.1

111 11 11

Bore Point: SW corner of fresh-

water pond

. لخي Precision Engineering, Inc.

P.O. Box 422 Las Cruces, NM 88004 505-523-7674

Log of Test Borings

File #: 03-122 Site: Bloomfield Refinery

Elevation: Exisiting Date: 11/6/03

ter Elevation: Not Encountered Boring No.: SE11-1103

# BLOW MATERIAL CHARACTERISTICS LAB # PLOT SCALE DEPTH COUNT %M LL PI CLASS. (MOISTURE, CONDITION, COLOR, ETC.) 0-7.0 Sand, silty, slightly clayey, brown, moist, loose, (Qe), more clay with depth > 4' 5.0 7.0-10.0 7.0 Clay, sandy, light brown, moist-wet, firm 10.0 10.0-15.0 Gravel, medium to coarse, sandy, cobbles and boulders are abundant, brown, moist 15.0 15.0-20.0 Same as above, with occasional sand lens < 8-10" thick 20.0 SIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger LOGGED BY: KM/NS

C:\AAFWFILE\projects\2003\03-122 Bloom\[B11 1103.xls]Sheet1

Hells I and Local 1

Boring No.: 3811-1103

Bore Point: SW corner of fresh-

er Elevation: Not Encountered

we design the state of the stat

(I)

water pond

Precision Engineering, Inc.

P.O. Box 422 Las Cruces, NM 88004 505-523-7674

Log of Test Borings

File #: 03-122 Site: Bloomfield Refinery

Elevation: Exisiting Date: 11/6/03

·									
		BLOW			MATERIAL CHARACTERISTICS				
LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	Pl	CLASS.
1				<u>22.0</u>					
	22.5-24.0				Nacimiento Formation				
1	1 1				Sandstone, weathered, very light brown, moist-				
					not water bearing, dense				
	T.D.			24.0	Installed 2" hand slotted PVC (slotted 60")				
						1			
1									
				ļ		1			
	1					ļ			
	I								
						l			
				(					
						ļ			
				l		1			
	1								
						{			
				1		1			
						l			
									i
	ļ								
							.		
							(		
SIZE &	TYPE OF	BORING: 4-	1/4" ID H	Hollow	Stemmed Auger	LOGG	ED E	3Y:	KM/NS
					1103.xls]Sheet2			<u> </u>	

11

a i

Bore Point: 25' from Tank 14, 25' from centerline of elbow on most easterly pipe on S. side of Tank 14 er Elevation: Not Encountered

not had a state of the state of the

Boring No.: SB12-1103

- level a

is J

### Precision Engineering, Inc.

P.O. Box 422 Las Cruces, NM 88004 505-523-7674

Log of Test Borings

File #: 03-122 Site: Bloomfield Refinery

Elevation: Exisiting Date: 11/6/03

		BLOW			MATERIAL CHARACTERISTICS				
LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS
	0-3.5				<u>Sand</u> , very fine, silty, light_brown, damp, (Qe)				
	1								
	3.5-7.0				Gravel, sandy, brown, cobbles/boulders	-			
ļ					common, damp-moist, dense, difficult drilling				
				<b>-</b> 0					
				<u>5.0</u>					
				i					
1									
	7.0-11.0			7.0	Sand, medium, clean, light brown, damp,				
					loose, occasional fine gravel				
				10.0					
	11.0-17.5				Gravel, sandy, clean, cobbles and boulders boulders are abundant, brown, damp, very				
					dense, difficult to drill				
			ĺ						
				15.0					
	17.5-20.0				Nacimiento Formation				
	1				<u>Sandstone</u> , weathered, yellow-brown, very dense, not water bearing				
	ş L				aense, not water beating				
	Í								
	T.D.			20.0	Installed 2" hand slotted PVC (slotted 60")				
	1								
175 2					Stommed Auger				KM/NS
					Stemmed Auger 1103.xls]Sheet1	LUGG	EDE	<u>st:</u>	NIVI/NO

Sheet: 1 of 8 Bore Point: See plan Vater Elevation: 6.90 Boring No.: SB1-0704

### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5495.28 Date: 7/6/04

### Log of Test Borings

		BLOW	1		MATERIAL CHARACTERISTICS			
LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	PI	CLAS
	0-2	COUNT	*_**_*_*	JUALL	Sand, silty, brown, moist	70101		
	0-2		*_**_*_*		Sand, sitty, brown, moist			
			*_**_*_*					
			*_**_*_*					
	2-8.0		0*0*0*0	2.5	Cobbles, gravel, silty, sand, brown, moist		 	
	2 0.0		0*0*0*0		<u></u>			
			0*0*0*0					
			0*0*0*0					
	1		0*0*0*0			-		
			0*0*0*0	<u>5.0</u>				
			0*0*0*0					
			0*0*0*0			-		
			0*0*0*0					
			0*0*0*0		Black with hydrocarbon odor			
			0*0*0*0	7.5				
			0*0*0*0					
	8.0-9.0		= = = =		Nacimiento Formation			
			= = = =		T.D. 8.0		 	
				<u>10.0</u>				
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				Placed 2" PVC, 4' hand slotted screen,			
					backfilled with cuttings			
1					17.5' N of canal edge			
				15.0				
				13.0				
				20.0				
				<u></u>				
				HOLLOW	/ STEMMED AUGER	LOGO		WHK

61

i i k

: 11

Sheet: 2 of 8 Bore Point: See plan ater Elevation: 6.85 Boring No.: SE2-0704

iai ai

01

### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5494.96 Date: 7/6/04

### Log of Test Borings

						-,	·		
		BLOW			MATERIAL CHARACTERISTICS				
LAB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	ΡI	CLASS.
	0-2.5		*-**-*-*		<u>Sand</u> , fine, silty, brown, moist, moderately				
			*-**-*-*		dense				
			*_**_*_*						
			*_**_*_*						
			*_**_*_*	2.5					
	2.5-9.0		0*0*0*0		Cobbles, very dense, cobbles to 12", grey, dry				
			0*0*0*0			-			
			0*0*0*0						
			0*0*0*0	1					
			0*0*0*0	5.0					
			0*0*0*0						
			0*0*0*0						
			0*0*0*0			1			
			0*0*0*0						
			0*0*0*0	<u>7.5</u>					
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
	9.0-10.0		* * * * *		<u>Sand</u> , black, water bearing, hydrocarbon odor,				
	40.0.44.5		* * * * *	10.0		1			
	10.0-11.5		====		Nacimiento Formation				
			====		TD 115				
			====		T.D. 11.5				
					Placed 2" PVC, 4' hand slotted screen,				
					backfilled with cuttings				
					16' N of canal edge				
				<u>15.0</u>					
				10.0					
							5		
				20.0					
				20.0					
SI7F	& TYPE C	F BORING	4 1/4" I		V STEMMED AUGER	LOGG	ED	BY:	WHK
		cts\2003\03-1							

C:\AAFWFILE\projects\2003\03-122 Bloom\[B2 0704.xls]Sheet1

in an all half in the first stars have been been as

Sheet: 3 of 8 Bore Point: See plan Vater Elevation: 6.79 Boring No.: SB3-0704

### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5495.21 Date: 7/6/04

### Log of Test Borings

r									
		BLOW			MATERIAL CHARACTERISTICS				:
LAB :	# DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR.ETC.)	%M	LL	PI	CLASS.
	0-4.0		*_**_*_*		Sand, fine, silty, brown, damp, loose				
			*_**_*_*						
			*_**_*_*						
			*_**_*_*						
			*_**_*_*	2.5					
			*_**_*_*						
			*_**_*_*						
			*_**_*_*						
	4.0-8.5		0*0*0*0		Cobbles, gravelly, grey, dry, dense-very dense				
			0*0*0*0	<u>5.0</u>					
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
	-		0*0*0*0						
	2 - -		0*0*0*0	7.5					
			0*0*0*0						
			0*0*0*0						
	8.5-10.0		* * * * *		Sand, fine, black, water bearing, loose				
1			* * * * *						
			* * * * *	10.0					
	10.0-11.5		====		Nacimiento Formation, mudstone, moist, not				
			====		water bearing below 10.5, grey-black, hard				
			====		T.D. 11.5				
4					Placed 2" PVC, 4' hand slotted screen,				
					backfilled with cuttings				
					SPH 6.78 (total .1')				
				<u>15.0</u>					
			1						
							1		
							i i		
				20.0					
SIZ	ZE & TYPE (		4 1/4" IF		V STEMMED AUGER	LOGO	GED	BY:	WHK
· · · · · · · · · · · · · · · · · · ·	FWFILE\proje								

C:\AAFWFILE\projects\2003\03-122 Bloom\[B3 0704.xls]Sheet1

h i le i a

. 1 1 1

11

B

Sheet: 4 of 8 Bore Point: See plan Vater Elevation: 7.50 Boring No.: SB4-0704

511 B 11 11

i di

### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5495.21 Date: 7/6/04

### Log of Test Borings

	DEDTU	BLOW		00415				5	<u></u>
LAB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	PI	CLAS
	0-2.75		*_**_*_*		Sand, silty, some fine gravel, brown, moist,				
			*_**_*_*		loose				
	, t		*_**_*_*						
			*_**_*_*	2.5					
			* ** * *	<u> </u>					
	2.75-8.0		0*0*0*0		<u>Cobbles</u> , gravelly, grey, dry, very dense				
	2.70 0.0 1		0*0*0*0		<u> </u>				
			0*0*0*0						
			0*0*0*0	5.0					
			0*0*0*0						
l			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
1			0*0*0*0	7.5					
			0*0*0*0	·····					·····
	8.0-9.5		0*0*0*0		<u>Sand</u> , fine, some fine gravel, clayey, grey	1			
	4		* * * * *						
	0.5.44.0.1								
ļ	9.5-11.0		====	<u>10.0</u>	Nacimiento Formation, mudstone, very sandy,				
			====		grey, moist-wet				
					T.D. 11.0				
								ļ	
					Placed 2" PVC, 4' hand slotted screen, @ 10.5'				
					backfilled with cuttings				
					SPH 7.49 (total .1')				
ŀ				<u>15.0</u>					
								ļ	
				<u>20.0</u>					
	ļ								
/								l	
	···· ··· ··· · ·		l		/ STEMMED AUGER	l			WHK



1

ì

1

J

1 1

ni fi

1.11

.1 1

Sheet: 5 of 8 Bore Point: See plan ater Elevation: 6.95 Boring No.: SB5-0704

### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5497.98 Date: 7/6/04

### Log of Test Borings

		BLOW			MATERIAL CHARACTERISTICS				
_AB#	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR.ETC.)	%M	LL	PI	CLASS
	0-2.5		*_**_*_*		Sand, fine, silty, brown, damp-moist				
			*_**_*_*						
			*_**_*_*						
			*_**_*_*						
			*_**_*_*	2.5					
	2.5-8.5		0*0*0*0		Cobbles, gravelly, grey, dry, very dense				
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
	8.5-9.25		0*0*0*0 * * * * *		Sand, fine, some fine gravel, grey, moist				
	0.0-9.20		* * * * *		fresh hydrocarbon odor				
	9.25-10.5		====	10.0	Nacimiento Formation, mudstone, very sandy,				
			====		grey, moist-wet				
					T.D. 10.5				
						1	1		
					Placed 2" PVC, 4' hand slotted screen,				
					backfilled with cuttings				
				<u>15.0</u>					
							1		
				20.0					
				<u>20.0</u>					
						}			
0175	2 TVDE C	E PODINO	A 4/A" 1		V STEMMED ALIGER			BY.	WHK
JIZE		cts\2003\03-1			V STEMMED AUGER		1-1-1-1	<u> </u>	VVIIIX

Sheet: 6 of 8 Bore Point: See plan (ater Elevation: 6.68 Boring No.: SB6-0704

If the second

 ιi

# Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5496.86 Date: 7/6/04

### Log of Test Borings

1		BLOW			MATERIAL CHARACTERISTICS				
<u>AB</u> #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR.ETC.)	%M	LL	PI	CLAS
	0-1.0		*_**_*_*		<u>Sand</u> , fine, silty, brown, damp, loose				
			*_**_*_*				ļ		
	1.0-6.5		0*0*0*0		Cobbles, some gravel, grey, dry, very dense				
	İ		0*0*0*0				-		
ĺ			0*0*0*0				ł		
ľ			0*0*0*0						
			0*0*0*0						
			0*0*0*0 0*0*0*0				ſ		
			0*0*0*0	<u>5.0</u>					
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
	6.5-8.0		* * * * *		Sand, fine, black, strong hydrocarbon odor,				
			* * * * *	<u>7.5</u>	wet, water bearing @ 7.0'				
			* * * * *						
	8.0-10.5		====		Nacimiento Formation, sandstone, green-grey				
			====		very dense,				
			====						
			====	<u>10.0</u>					
			====		T.D. 10.5				
					1.0.0				
					Placed 2" PVC, 4' hand slotted screen,				
					backfilled with cuttings				
					, , , , , , , , , , , , , , , , , , ,				
				<u>15.0</u>					
				20.0					
				<u>20.0</u>					
•	į								
			+		V STEMMED AUGER	L	4	L	WHK

111

Sheet: 7 of 8 Bore Point: See plan Vater Elevation: 6.35 Boring No.: SB7-0704

i 11

::

# Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5496.86 Date: 7/7/04

#### Log of Test Borings

		BLOW			MATERIAL CHARACTERISTICS				
<u>AB #</u>	DEPTH	COUNT	PLOT	SCALE		%M	LL	PI	CLAS
	0-1.5		*_**_*_*		Sand, fine, silty, brown, damp, loose				
			*_**_*_*						
		·····	*_**_*_*						
	1.5~8.5		0*0*0*0		<u>Cobbles</u> , grey, damp, very dense				
			0*0*0*0	<u>2.5</u>					
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0 0*0*0*0						
			0*0*0*0						
			0*0*0*0	<u> </u>					
			0*0*0*0						
)	8.5-9.0		****		<u>Sand</u> , fine, black,				
	9.0-10.5		====		Nacimiento Formation, mudstone, sandstone,				
			====	<u>10.0</u>	green-grey				
			====						
					T.D. 10.5				
					Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings				
				15.0					
[									
						ĺ			
				<u>20.0</u>					
/									
0.75			A 4/411.15			LOGO			
SIZE	<u>AITPEU</u>	F BORING: cts\2003\03-1		HULLOV	V STEMMED AUGER			DI.	VVDN

Sheet: 8 of 8 Bore Point: See plan Vater Elevation: 5.92 Boring No.: SB8-0704

11

ii i i

# Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5497.91 Date: 7/7/04

### Log of Test Borings

		BLOW	1		MATERIAL CHARACTERISTICS				
LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLAS
	0-5.0		*_**_*_*		<u>Sand</u> , fine, silty, brown, moist, loose				
	0 0.0		*_**_*_*		,,,,,				
			*_**_*_*						
			*_**_*_*						
			*_**_*_*	2.5					
			*_**_*_*						
			*_**_*_*						
			*_**_*_*						
			*_**_*_*						
			*_**_*_*	<u>5.0</u>					
	5.0-8.5		0*0*0*0		Cobbles, gravelly, grey, dry-damp, very dense				
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
	8.5-9.0		****		Sand, clayey, fine. green-grey-black.				
	9.0-11.0		====	10.0	Nacimiento Formation, mudstone, moist,				
			====	<u>10.0</u>	green-grey	: :			
			====	<u> </u>	T.D. 10.5				
					Placed 2" PVC, 4' hand slotted screen,				
	-			<u>15.0</u>	backfilled with cuttings				
				<u>20.0</u>					
9175	& TYPE (		A 1/A" IF		V STEMMED AUGER		L	B'Y·	WHK

Et it hi

Sheet: 1 of 8 Bore Point: ater Elevation: Boring No.: SB1-1004

### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 03-122 Site: Bloomfield Giant Refining Elevation: Date:

# Log of Test Borings

	I		BLOW			M	ATERI		ARACI		STICS	ĺ		İ		
LAB	#	DEPTH	COUNT	PLOT	SCALE			. COND				C.)	%M	LL	PI	CLASS.
					<u>2.5</u>											
				İ												
											U					
				Ì				nei ani		the state						
					7.5											
		1														
					10.0											
					<u>15.0</u>											
					10.0											
					20.0											
-					1											
	75 6			4 4 1471 12												
			F BORING: cts\2003\03-1					JUEK					LOGO		<u>D</u> Ĭ.	

il dib

C:\AAFWFILE\projects\2003\03-122 Bloom\[B1 1004.xls]Sheet1

11 11 1

P.L

N

Sheet: 2 of 8

i

1

i

N-1: 511

i i

Bore Point: 2117" W of canal edge ater Elevation: 8.0' below ground surface Boring No.: SB2-1004 Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674 File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5498.87 Date: 10/28/04

#### Log of Test Borings

		BLOW			MATERIAL CHARACTERISTICS	1	1		
LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS.
	0-3.0		*_**_*_*		Sand, fine to coarse, silty, damp, tan				
1			*_**_*_*						
			*_**_*_*						
			*_**_*_*						
			*_**_*_*	<u>2.5</u>					
			*_**_*_*						
	3.0-5.0		***0***		Cobbles, gravel, sand, silty, tan, damp				
			0*0*0*0						
			0*0*0*0						
46450	5.0-5.4		0*0*0*0	<u>5.0</u>	Sand fine to source dry clean ten	3.8		N/P	SP-SM
40400	5.0-5.4		******		<u>Sand</u> , fine to coarse, dry, clean, tan, moderately dense	5.0		111/7	A-3
	6.0-7.0		******		Gravel, sand, medium, dry, tan,				
1	0.01.0		*******						
	7.0-11.5		*****	7.5	Sand, medium, gravel, dark grey,				
			******		hydrocarbon odor, moist				
			******						
			*****						
			******		wet at 8'				
			*****	<u>10.0</u>					
			******						
46451	11.0-11.5		******		<u>Sand</u> , medium, gravel, dark grey, moist	15.6		N/P	SP/A-1-b
	11.5-12.0		====		Nacimiento Formation mudstone, dry				
46456	12.0-12.51		====		Sample Number HC 1				
1	12.0-12.01								
					Total depth bottom of well 12'				
					5' of hand slotted screen				
				<u>15.0</u>			-		
-	:				no water for first 8 hours				
						}			
							1		
i.									
]									
				20.0				,	
							)		
SI7F	& TYPE C		4 1/A" IF		V STEMMED AUGER	LOGO	SED.	BY	KM
		cts\2003\03-1							

C:\AAFWFILE\projects\2003\03-122 Bloom\[B2 1004.xls]Sheet1

and the Bitter of the

Sheet: 2 of 8 Bore Point: 17' 7'' W of canal edge (ater Elevation: 7.2' below ground surface Boring No.: SB3-1004

ALL AL

# Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5496.72 Date: 10/28/04

### Log of Test Borings

( i	i		1		MATERIAL CHARACTERISTICS	1			
		BLOW	DIOT		MATERIAL CHARACTERISTICS	04.04			
LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS
	0-1		*_**_*_*		<u>Silt</u> , sandy, very fine to fine, brown, moist				
			*_**_*_*						
	1-8.0		0*0*0*0		<u>Cobbles</u> , gravel, sand, fine, silty, moist, brown				
			0*0*0*0						
			0*0*0*0	<u>2.5</u>					
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0	r 0					
			0*0*0*0	<u>5.0</u>					
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0 0*0*0*0	7 5					
			0*0*0*0	<u>7.5</u>					
	8-10.5		**0**0**		Sand, fine to coarse, gravel,				
	0 10,0		**0**0**		dark grey, wet, hydrocarbon odor				
			**0**0**		aant grey, wet, nyarooarbon oaor				
			**0**0**	<u>10.0</u>					
			**0**0**						
	10.5-11.5		******	• • • • • • • • • • • • • • • • • • • •	Sand, medium, argillaceous, damp				
			*****						
	12.0		= = = =		Nacimiento Formation, mudstone				
					Total depth 11' 9"				
			2						
					5' of hand slotted screen				
					8' 5" top of pipe				
			- - -		no water for first 8 hours				
1									
				<u>20.0</u>					
									141.8
SIZE		F BORING: cts\2003\03-1			STEMMED AUGER	LOGG	ED	RA:	KIVI

C:\AAFWFILE\projects\2003\03-122 Bloom\[B3 1004.xls]Sheet1

Sheet: 4 of 8 Bore Point: 16' 2'' W of canal edge ater Elevation: 8.5' below ground surface Boring No.: SB4-1004

n il i

Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674 File #: 03-122 Site: Bloomfield Giant Refining Elevation: Date: 10/28/04

### Log of Test Borings

		BLOW			MATERIAL CHARACTERISTICS				
_AB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	PI	CLASS
	0-6.0		*_**_*_*		<u>Silt</u> , sandy, very fine to fine, brown, damp				
			*-**-*-*						
			*_**_*_*						
			*_**_*_*						
			*-**-*-*	<u>2.5</u>					
			*-**-*-*						
			*_**_*_* *_**_*_*						
			*_**_*_*						
			 *_**_*_*	<u>5.0</u>					
			*_**_*_*	5.0					
			*_**_*_*						
	6.0-9.0		0*0*0*0		<u>Cobbles</u> , gravel, sand, fine to medium, silty,				
			0*0*0*0		brown, damp				
			0*0*0*0	<u>7.5</u>	,				
			0*0*0*0			:			
			0*0*0*0			:			
			0*0*0*0						
	9.0-10.5		******		<u>Sand</u> , medium to coarse, grey, moist				
			******	<u>10.0</u>	hydrocarbon odor				
			******			<u> </u>			
	10.5-11.0		====		Nacimiento Formation, mudstone	1			
				<u>15.0</u>	Total depth 10' 1/2" 5' of hand slotted screen				
				<u>20.0</u>					

Sheet: 5 of 8 Bore Point: 16' 10'' W of canal edge (ater Elevation: 3.7' below ground surface Boring No.: \$35-1004 Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674 File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5497.21 Date: 10/28/04

# Log of Test Borings

		BLOW	1		MATERIAL CHARACTERISTICS	1			
LAB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	PI	CLASS
	0-6.0		+_*+_*_*		<u>Silt</u> , sandy, very fine to fine, brown, moist	1			
			*_**_*_*						
			*_**_*_*						
			*_**_*_*						
			*_**_*_*	2.5					
			*_**_*_*						
			*_**_*_*						
			*_**_*_*						
			*_**_*_*						
			*_**_*_*	<u>5.0</u>			1		
			*-**-*-*						
			*_**_*_*						
	6.0-9.0		0*0*0*0		Cobbles, gravel, sand, fine to medium, silty,				
	1		0*0*0*0		brown, moist				
			0*0*0*0	<u>7.5</u>	hydrocarbon odor				
			0*0*0*0						
			0*0*0*0						
46452	9.0-10.0		0*0*0*0		Sand, medium, brown, wet	5.6			SM/A-1-
40452	9.0-10.0		******	10.0	Sand, medium, brown, wet	0.0			3M/A-1-
46453	10.0-10.5		====		Nacimiento Formation, mudstone, moist	16.1			
46454	9.5-10.5				Sample Number HC 2	10.1			
					Total depth 10' 7" 5' of hand slotted screen no water for first 8 hours				
SIZE	& TYPE O	F BORING:	4 1/4" ID		/ STEMMED AUGER	LOGO	ED	BY:	KM

C:\AAFWFILE\projects\2003\03-122 Bloom\[B5 1004.xls]Sheet1

Sheet: 6 of 8 Bore Point: 22' 7" W of canal edge /ater Elevation: Not Encountered Boring No.: SB6-1004

-----: :

t I

1.1

1

### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5496.45 Date: 10/28/04

# Log of Test Borings

	DEDTU	BLOW				0/ 5.4		01.40
_AB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	PI	CLAS
	0-0.5		*_**_*_*		Silt, sandy, very fine to fine, brown, damp		 	
	0.5-7.0 '		0*0*0*0		Cobbles, gravel, sand, very fine to medium,			
			0*0*0*0		silty, brown. damp			
			0*0*0*0					
			0*0*0*0	<u>2.5</u>				
			0*0*0*0					
			0*0*0*0					
			0*0*0*0					
			0*0*0*0					
			0*0*0*0	<u>5.0</u>				
			0*0*0*0					
			0*0*0*0 0*0*0*0					
			0*0*0*0					
	7.0-7.5	······	*******	7.5	Sand, medium to coarse, brown, occasional			
46455	7.5-8.5		====	<u> </u>	gravel, damp, slight hydrocarbon odor			
+0+00	1.0-0.0		====		Nacimiento Formation, mudstone, moist	9.3	 	
			====		very compact, grey to black	0.0		
				<u>10.0</u>				
-								
	1							
	ĺ				Total depth 8' 6"			
					5' of hand slotted screen			
				15.0				
	1							
				<u>20.0</u>				
			+		/ STEMMED AUGER	LOGG		1/h/i

Sheet: 7 of 8 Bore Point: 12' 11'' N of canal edge (ater Elevation: 8.6' below ground surface Boring No.: SB7-1004 Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674 File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5497.37 Date: 11/1/04

# Log of Test Borings

		BLOW			MATERIAL CHARACTERISTICS				
LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR.ETC.)	%M	LL	PI	CLASS.
	0-0,5 '		*_**_*_*		Silt, sandy, very fine to fine, brown, damp				
	0.5-9.0		0*0*0*0		Cobbles, gravel, sand, fine to coarse,				
			0*0*0*0		silty, brown, moist				
			0*0*0*0						
			0*0*0*0	2.5					
			0*0*0*0						
			0*0*0*0						
1			0*0*0*0						
			0*0*0*0						
1			0*0*0*0	<u>5.0</u>					
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
	ŕ		0*0*0*0						
	1		0*0*0*0	<u>7.5</u>					
			0*0*0*0		Sand, fine to coarse, brown, occasional				
			0*0*0*0		gravel, wet, slight hydrocarbon odor				
	0.0.0.5		0*0*0*0		Sand, fine to coarse, grey, occasional	1			
	9.0-9.5		******	10.0	wet, slight hydrocarbon odor				
46457	<u> </u>		====		Nacimiento Formation, mudstone, moist	11.8			
40407			====		grav to black	11.0			
	i				Total depth 10' 2"				
					5' of hand slotted screen				
					does not produce water in the first 8 hours				
								ĺ	
	4			<u>15.0</u>					
	1								
	4								
							1		
				<u>20.0</u>					
	,								
0175	0 TVD= ==								
					/ STEMMED AUGER	LOGG		DY:	

C:\AAFWFILE\projects\2003\03-122 Bloom\[B7 1004.xls]Sheet1

Sheet: 8 of 8 Bore Point: 11' N of canal edge (ater Elevation: 9.8' below ground surface Boring No.: SB8-1004

# Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 03-122 Site: Bloomfield Giant Refining Elevation: 5499.02 Date: 10/27/04

# Log of Test Borings

		BLOW			MATERIAL CHARACTERISTICS				
LAB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	PI	CLASS
	0-0.5		*_**_*_*		Silt, sandy, very fine to fine, brown, damp				
	0.5-10.0		0*0*0*0		Cobbles. gravel, sand, fine to coarse,				
			0*0*0*0		silty, brown, moist				
			0*0*0*0	1					
			0*0*0*0	<u>2.5</u>					
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0	<u>5.0</u>					
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0	~ ~					
			0*0*0*0	<u>7.5</u>					
			0*0*0*0						
			0*0*0*0 0*0*0*0						
			0 0 0 0 0						
			0*0*0*0	10.0					
46458	10.0-11.0		*******	10.0	Sand, fine to coarse, grey, strong hydrocarbon	19.2		N/P	SP/A-1-
40430	10.0-11.0		******		odor, water bearing	10.2			01/////
46459	11.0-12.5		====		Nacimiento Formation, argillaceous sandstone	16.5			
46460	12-12.5		====		moist, gray to green gray				
			====		Sample number HC3	5.5			
					Total Depth 12.5'				
				15.0	5' of hand slotted screen				
			:						
								:	
						:			
				<u>20.0</u>					
/									
						1000			1404
- CI7E	· X. TYPE C	H KORING	4 1/4" 10		V STEMMED AUGER	LOGO		HY.	KIVI

December 17, 2004

Mr. James R. Schmaltz Environmental Manager Giant Refining Company (Giant) P.O. Box 159 Bloomfield, New Mexico 87413

Re: Corrective Action Plan

Dear Mr. Schmaltz:

The New Mexico Oil Conservation Division (OCD) is in receipt of the Corrective Action Plan and cover letter dated November 16, 2004. The plan outlines how Giant proposes to mitigate the off-site migration of petroleum hydrocarbons within the shallow-zone soils along the north property boundary of the Bloomfield refinery.

#### OCD hereby approves of the plan with the following conditions:

- 1. All information and or actions required by the New Mexico Environment Department Hazardous Waste Bureau shall become part of this approval.
- 2. The barrier wall shall be imbedded a minimum of 5 feet into the Nacimiento Formation. A barrier wall conceptional "flow net study" shall be conducted to ensure the wall is buried deep enough to stop significant seepage from going under the wall. Please provide for OCD approval before actual installation of wall.
- 3. The final barrier wall type shall be submitted to OCD for approval before installation. Giant shall demonstrate to OCD that the barrier wall type and design will meet any structural requirement and hydraulic conductivity (permeability (k)) of  $1 \times 10^{-7}$  cm/sec.
- 4. Detail "as built drawings" and photo documentation shall be supplied at the end of construction. At least one of the drawings shall show a side view along the entire wall.

Mr. James R. Schmaltz Environmental Manager Giant Refining Company (Giant) December 17, 2004 Page 2

Daily logs shall be kept during the construction phase. All pertinent information shall be logged such as contamination observed, soil characteristics, water levels, depth to Nacimiento formation, progress made each day, general weather, and any other pertinent information that should be logged that may cause a deviation of the approved design and/or any anomalies found in the trench which may cause Giant to deviate from the plan or be of a concern.

- 5. Giant shall submit a weekly progress report and photos via E-mail on Monday morning.
- 6. Giant shall submit the fluid collection system design for approval before actual installation. Giant may remove fluids during the course of the project for logistic and safety reasons. All fluids and waste removed shall be disposed of or recycled in an approved manner.
- 7. Giant shall maintain a qualified technical person on site during the construction phase to ensure quality assurance and control of the project. This person shall be experienced in identifying the Nacimiento Formation. Ample confirmation bottom hole soil samples shall be collected in areas where the proposed collection systems may be placed. Samples shall be collected and preserved to properly identify/classify the soils and perform permeability test in a certified soils laboratory if deemed warranted by OCD.
- 8. Giant will notify the OCD Santa Fe office and the OCD District office at least 72 hours in advance of all scheduled activities such that the OCD has the opportunity to witness the events and/or split samples during OCD's normal business hours.
- 9. Giant shall submit a plan for OCD approval to measure and monitor the effectiveness of the barrier wall. This plan should include any area where contamination as been discovered and various monitoring points behind the barrier wall.

Please be advised that NMOCD approval of this plan does not relieve (Giant) of liability should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve (Giant) of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Mr. James R. Schmaltz Environmental Manager Giant Refining Company (Giant) December 17, 2004 Page 3

If you have any questions please do not hesitate to contact me at 505-476-3487 or e-mail <u>WPRICE@state.nm.us</u>.

Sincerely;

Useper Pini

Wayne Price-Pet. Engr. Spec.

cc: OCD Aztec Office



BILL RICHARDSON GOVERNOR State of New Mexico ENVIRONMENT DEPARTMENT Hazardous Waste Bureau 2905 Rodeo Park Drive East, Building 1 Santa Fe, New Mexico 87505-6303 Telephone (S05) 428-2500 Fax (505) 428-2567 www.nmenv.state.nm.us

#### CERTIFIED MAIL RETURN RECEIPT REQUESTED

December 21, 2004

Mr. Randy Schmaltz Environmental Supervisor Giant Refining Company P.O. Box 159 Bloomfield, New Mexico 87413 Mr. Ed Riege Environmental Superintendent Giant Refining Company Route 3, Box 7 Gallup, New Mexico 87301

#### SUBJECT: APPROVAL WITH CONDITIONS VOLUNTARY CORRECTIVE MEASURES PLAN BLOOMFIELD REFINING COMPANY RCRA PERMIT NO. NMD 089416416 HWB-GRCB-04-005

Dear Mr. Schmaltz and Mr. Riege:

The New Mexico Environment Department (NMED) has completed its review of the Voluntary Corrective Measures Plan titled *Corrective Action Plan* (CAP) dated November 17, 2004, submitted on behalf of Giant Refining Company Bloomfield (GRCB). NMED hereby approves the CAP with the conditions listed below:

- 1. In addition to NMED, all requested information shall be submitted to the Oil Conservation Division Santa Fe office and the OCD District office.
- 2. The barrier wall shall be imbedded a minimum of 5 feet into the Nacimiento Formation. A. barrier wall conceptional "flow net study" shall be conducted to ensure the wall is buried deep enough to stop significant seepage from going under the wall. Please provide the results of the study for NMED approval before actual installation of the wall.



RON CURRY SECRETARY

DERRITH WATCHMAN-MOORE DEPUTY SECRETARY Randy Schmaltz Giant Refining Company Bloomfield December 21, 2004 Page 2 of 4

- 3. The final barrier wall type shall be submitted to NMED for approval before installation. GRCB shall demonstrate to NMED that the barrier wall type and design will meet any structural requirement and hydraulic conductivity (k) of 1 x 10<sup>-7</sup> cm/sec.
- 4. Detailed "as built drawings" and photo documentation shall be supplied at the completion of construction. At least one of the drawings shall show a cross section along the entire wall.
- 5. Daily logs shall be kept during the construction phase. All pertinent information shall be logged such as contamination observed, soil characteristics, water levels, depth to Nacimiento Formation, progress made each day, dewatering or contaminant removal activities, general weather, and all other pertinent information that should be logged that may cause a deviation of the approved design and/or any anomalies found in the trench which may cause GRCB to deviate from the plan or be of a concern. GRCB shall notify NMED of any deviations from the plan within one business day of making the change.
- 6. GRCB shall submit a weekly progress report and photos via E-mail on Monday morning.
- 7. GRCB shall submit the fluid collection system design for approval before actual installation. This should include a map identifying the locations of recovery wells or trenches and all other pertinent information. The Permittee may remove fluids during the course of the project for logistic and safety reasons. All fluids and waste removed shall be disposed or recycled in an approved manner.
- 8. GRCB shall maintain a qualified technical person on site during the construction phase to ensure quality assurance and control of the project. This person shall be experienced in identifying the Nacimiento Formation. Ample confirmation bottom hole soil samples shall be collected in areas where the proposed collection systems may be placed. Samples shall be collected and preserved to properly identify/classify the soils.
- 9. GRCB will notify the NMED at least 72 hours in advance of the start of construction and all scheduled sampling activities throughout the construction process such that the NMED has the opportunity to witness the events and/or collect split samples during NMED's normal business hours.
- 10. GRCB shall submit a plan for NMED approval to evaluate the effectiveness of the barrier wall. This plan should include monitoring points on both sides of the barrier wall.

Randy Schmaltz Giant Refining Company Bloomfield December 21, 2004 Page 3 of 4

- 11. GRCB must submit construction diagrams for the peizometers along the north property boundary installed during the November 2003, July 2004, and October 2004 drilling programs. This information must include the slot-size and slot intervals of the PVC handslotted screens, length of screen, depth at which the screens were set, and depth of water bearing zones. The "Log of Test Borings" (boring logs) found in the CAP do not include all of this information.
- 12. Boring log SB1-0704 states "[b]lack with hydrocarbon odor," the term black is also used in other boring logs SB2-0704, SB3-0704, SB6-0704, and SB7-0704. GRCB must clarify the use of the term "black" in the boring logs. (e.g. is black referring to hydrocarbon staining or is black the actual mineral color in the sand).
- 13. The CAP, Sections 4.2 contains a table presenting the hydraulic properties from a slug test. GRCB must provide the results of the slug test and the associated calculations. Include graphs as necessary.
- 14. The CAP, Section 4.3 states "[e]ach boring installed during the October 2004 drilling campaign was drilled 3 to 5 feet into the Nacimiento Formation. Soil samples were collected every 2.5 ft and submitted to a geotechnical laboratory for grain size analysis to estimate the properties important for the design of the barrier and collection system. Samples collected of the Nacimiento Formation were also submitted to the lab for hydraulic conductivity testing."

GRCB must submit the results of the grain size analyses and hydraulic conductivity testing for all borings.

15. CAP, page 2 of Section 6.1 Barrier Concept, states "Appropriate construction quality control measures will be applied during barrier construction to verify that the performance requirements will be achieved."

GRCB must identify the quality control measures that will be used and the performance requirements that will be achieved.

16. The CAP, Section 6.2 Fluids Collection Concept, states "[f]luids will be removed from the collection points using a vacuum truck when necessary based on fluids level monitoring results. Collection fluids will be delivered to the existing French Drain collection tank near SB2-0704."

Randy Schmaltz Giant Refining Company Bloomfield December 21, 2004 Page 4 of 4

> GRCB must clarify if a vacuum truck is the only method of fluid collection removal to be employed upon completion of the barrier wall and fluid collection system.

- 17. Appendix A provide's results from a sieve analysis. GRCB must identify what soil samples are associated with 'PEI Lab No." 46464, 46465, 46461, 46462, and 46463 because these were not identified in the October boring logs.
- 18. The barrier wall installation may cause the displacement of hydrocarbons. In the future, NMED may require additional sampling and monitoring from the monitoring wells located in the southern portion of the refinery (e.g. MW-32, 33, 34, 35, 36, 36, and 38) and the three outfall locations.

The Permittees must submit the requested information within 30 days of receipt of this letter or NMED will rescind approval.

If you have any questions regarding this approval please contact me at (505) 428-2545.

Sincerely,

Hope Mongelie

Hope Monzeglio Project Leader Hazardous Waste Bureau

HCM:hcm

cc: J. Bearzi, NMED HWB J. Kieling, NMED HWB D. Cobrain, NMED HWB W. Price, OCD D. Foust, OCD Aztec Office B. Wilkinson, EPA

Reading File and GRCB 2004 File



CERTIFIED MAIL # 7099 3220 0010 2242 4863

January 11, 2005

Mr. Wayne Price New Mexico Oil Conservation Division 1220 S. Saint Francis Drive Santa Fe, New Mexico 87505

Re: Giant Bloomfield Refinery – OCD Conditional Approval of North Boundary Barrier Corrective Action Plan

Dear Mr. Price:

Giant received the December 17, 2004 letter from the New Mexico Oil Conservation Division (OCD) stating OCD's conditional approval of the November 17, 2004 Corrective Action Plan (CAP) submitted by Giant for the Bloomfield facility. The purpose of this letter is to provide OCD with the anticipated starting date of the barrier construction and to respond to several of the conditions stated in OCD's letter.

Giant has entered into a contract with Remedial Construction Services, L.P. (RECON) to construct the north boundary barrier. RECON, based in Houston, Texas, is a contractor that specializes in the construction of barrier walls for environmental applications. RECON is tentatively scheduled to mobilize to the Bloomfield refinery the week of January 17, 2005, with barrier excavation activities expected to begin the following week. Construction is anticipated to be completed by the end of March 2005. Giant's environmental consultant (Malcolm Pirnie) will provide a senior geotechnical engineer and a full-time resident engineer to oversee and document the barrier construction activities. The barrier type will be a soil-bentonite slurry wall with permeability less than or equal to  $1 \times 10^{-7}$  cm/sec and a minimum thickness of 30 inches.

#### Response to OCD Conditions of Approval

The following responses correspond to the conditions in OCD's December 17, 2004 approval letter.

1. Condition accepted by Giant.

PHONE 505-632-8013 FAX 505-632-3911 50 ROAD 4990 P.O. BOX 159 BLOOMFIELD NEW MEXICO 87413

#### Mr. Wayne Price January 10, 2005

2. Giant initially planned to key the barrier wall 5 feet into the Nacimiento Formation. However, discussions with a local excavation contractor with experience at the site revealed that achieving a 5-foot key depth using conventional excavation equipment is improbable without using rock-sawing and impact-hammer techniques. Further, hydraulic conductivity testing of samples taken from the Nacimiento Formation along the barrier alignment indicates the formation is essentially impervious to water migration in its upper one-foot interval (soil boring SB2-1004, permeability of 6 x 10<sup>-7</sup> cm/sec at a depth of 12.0 to 12.5 feet below ground surface (bgs); soil boring SB5-1004, permeability of 1.2 x 10<sup>-9</sup> cm/sec at 9.5 to 10.5 bgs). Refer to the November 11, 2004 investigation report by Precision Engineering (Appendix A of CAP) for the testing results. An annotated test results summary table is included with this letter (Attachment A).

Based on the conditions noted above, the construction specifications for the barrier state the following requirements to minimize the potential underflow of fluids: The slurry wall shall be constructed with a minimum key-in depth of 3 feet into the Nacimiento Formation or until refusal is met, whichever is less in depth. Refusal shall be defined as 3 passes for a horizontal distance of 5 feet with less than 0.2 feet of total penetration. Passes shall be made utilizing 90 percent of the manufacturer's maximum-rated down pressure and breakout power of the excavator. The excavator shall have a minimum rated gross power of 140 horsepower.

Flow net analyses are typically used to model seepage through earthen embankments (e.g., dams) and beneath impervious barriers (e.g. sheet pile and clay-material walls) where porous media flow conditions exist under appreciable hydraulic head. Since the proposed soil-bentonite wall will have a permeability less than or equal to  $1 \times 10^{-7}$  cm/sec, and the Nacimiento Formation into which it will be keyed is less permeable, any seepage, if it occurs, will not be through porous media exhibiting Darcy's Law behavior. As such, it is Giant's opinion that a flow net analysis is not technically applicable in this case and will not add technical benefit towards understanding seepage potential.

Giant believes that seepage beneath the wall will be insignificant for these reasons:

A) The groundwater seeps that have been observed and documented at the river bluff indicate that fluid movement is restricted to the sand and gravel deposits (Jackson Lake Terrace) at the interface of the Nacimiento Formation. No seepage has been observed from within the Nacimiento Formation. This observation is consistent with Precision Engineering's conclusion that the Formation does not contain or transmit water. (Appendix A of CAP).

B) Groundwater levels measured in piezometers installed along the proposed barrier alignment show there is generally one foot of water or less on the top of the Nacimiento Formation. This is an inappreciable amount of hydrostatic head.

#### Mr. Wayne Price January 10, 2005

C) The quantity of flow migrating from the facility to the river bluff in the Jackson Lake Terrace gravels (across the entire proposed slurry wall alignment - over 2,600 feet in length) has been estimated (using the Darcy equation) to be less than 20 gallons per minute. This estimate assumes a saturated thickness of 2 feet on top of the Nacimiento Formation (greater than measured), a uniform gradient, and a moderate Jackson Lake Terrace permeability. This relatively low quantity of flow is consistent with the observed "isolated seeps" at the river bluff. As such, the amount of water anticipated to accumulate against the barrier is low.

D) It appears the flow in the gravels at the interface of the Nacimiento Formation is controlled by the surface topography of the Formation and is not a uniform flow through the Terrace Gravels. Therefore, fluids that exist at the interface tend to migrate to low elevations in the top of the Nacimiento Formation and move along depressional troughs. These depressions will be targeted for fluids collection points that will be used to control hydrostatic head against the barrier. It is unlikely that water will accumulate along the full length of the barrier.

G) The hydrostatic head against the barrier at the collection points, even in a worst-case scenario (i.e., no fluid collection system), cannot exceed approximately 4 to 5 feet due to the hydraulic relief drain that exists beneath the Hammond Ditch. This small hydraulic head would not be sufficient to cause seepage beneath the wall through the Nacimiento Formation and would not likely cause seepage through the soil-bentonite barrier, even with its' higher permeability.

- 3. The barrier type will be a soil-bentonite slurry wall with permeability less than or equal to 1 x 10<sup>-7</sup> cm/sec and a minimum thickness of 30 inches. The construction specifications require the soil-bentonite backfill mix design to be approved by Malcolm Pirnie. The specifications also require industry-standard quality control testing by the contractor during construction and verification permeability testing by an independent third-party laboratory.
- 4. As-built drawings and photo documentation are included in the construction procedures and will be provided to OCD as requested. Daily logs will be kept by the full-time on-site resident engineer.
- 5. Weekly progress reports and photos will be provided as requested.
- 6. Giant anticipates installing the fluid collection points in the second quarter of 2005 after construction of the barrier is complete. The contour of the Nacimiento Formation along the barrier alignment will be surveyed during construction to aid in locating collection points. A fluid collection system design will be submitted to OCD for approval prior to installation of the collection points.
- A senior geotechnical engineer and a full-time resident engineer from Malcolm
   Pirnie will oversee and document the barrier construction activities. Due to the character of the Jackson Lake Terrace soils, a slurry trench excavation method will be used. As such, collection of representative soil samples from the trench at

prospective collection system locations is not technically possible. If these soil samples are necessary, Giant proposes they be obtained separately after barrier construction.

- 8. RECON will prepare a detailed construction activity schedule and Giant will provide a copy to OCD prior to start of construction. The schedule will be reviewed weekly during construction progress meetings and revisions will be made as necessary. Schedule changes will be communicated to OCD on a weekly basis.
- 9. Giant anticipates developing a monitoring plan concurrent with the collection system design. Conceptually, the plan will be based on monitoring hydraulic conditions on both sides of the barrier at locations where fluid accumulation is anticipated. The monitoring plan will be submitted to OCD for approval.

If you have any questions in this matter, please contact me at 505-632-4171.

Sincerely,

GIANT REFINING COMPANY

James R. Schmaltz Environmental Manager

Cc: Denny Foust - OCD Aztec Office Hope Monzeglio – NMED Hazardous Waste Bureau Bob Wilkinson – EPA Ed Riege Chad King



FW North Barrier Corrective Action Plan 01-11-05.txt From: Randy Schmaltz [rschmaltz@giant.com] Sent: Thursday, January 13, 2005 2:39 PM To: Chad King; Ed Riege; Cindy Hurtado; Tucker, Dennis Subject: FW: North Barrier Corrective Action Plan

----Original Message----From: lesterwp@netzero.net [mailto:lesterwp@netzero.net] Sent: Thursday, January 13, 2005 2:33 PM To: rschmaltz@giant.com Cc: rcanderson@state.nm.us Subject: North Barrier Corrective Action Plan

Dear Mr. Schmaltz:

Pursuant to our telephone conference call yesterday, OCD hereby approves of Giants Plan dated January 11, 2005 with the following conditions:

Item 2. The barrier wall will be keyed 5 feet into the Nacimiento formation. Any exception shall be approved by OCD.

Item 2. and 8. OCD will not require a flow net study as long as Giant installs a sufficient number monitor points behind the wall the entire length of the wall. All locations to be approved by OCD.

3. OCD shall be part of the approval process.

Staging of soils in the old bentonite fresh water ponds will be allowed. OCD will require proof of clean-up after completion of project. DISCLAIMER: The information contained in this e-mail message may be privileged, confidential and protected from disclosure. If you are not the intended recipient, any further disclosure, use, dissemination, distribution or copying of this message or any attachment is strictly prohibited. If you think you have received this e-mail message in error, please e-mail the sender at the above address and permanently delete the e-mail. Although this e-mail and any attachments are believed to be free of any virus or other defect that might affect any computer system into which they are received and opened, it is the responsibility of the recipient to ensure that they are virus free and no responsibility is accepted by Giant Industries, Inc. or its affiliates for any loss or damage arising in any way from their use.





refining company CERTIFIED MAIL # 7099 3220 0010 2242 4849

January 17, 2005

GIANT

Ms. Hope Monzeglio State of New Mexico Environmental Department Hazardous Waste Bureau 2905 Rodeo Park Drive East, Building 1 Santa Fe, New Mexico 87505-6303

Re: Giant Bloomfield Refinery – NMED Conditional Approval of North Boundary Barrier Voluntary Corrective Measures Plan RCRA Permit No. NMD 089416416 HWB-GRCB-04-005

Dear Ms. Monzeglio:

Giant Refining Company Bloomfield (GRCB) received the December 21, 2004 letter from the New Mexico Environmental Department (NMED) stating NMED's conditional approval of the November 17, 2004 *Corrective Action Plan* (CAP) submitted by GRCB. The CAP describes the voluntary corrective measures to be implemented by GRCB at the Bloomfield refinery. The purpose of this letter is to provide NMED with the anticipated starting date of the barrier construction and to respond to several of the conditions stated in NMED's letter.

Giant has entered into a contract with Remedial Construction Services, L.P. (RECON) to construct the north boundary barrier. RECON, based in Houston, Texas, is a contractor that specializes in the construction of barrier walls for environmental applications. RECON is tentatively scheduled to mobilize to the Bloomfield refinery the week of January 17, 2005, with barrier excavation activities expected to begin the following week. Construction is anticipated to be completed by the end of March 2005. Giant's environmental consultant (Malcolm Pirnie) will provide a senior geotechnical engineer and a full-time resident engineer to oversee and document the barrier construction activities. The barrier type will be a soil-bentonite slurry wall with permeability less than or equal to 1 x  $10^{-7}$  cm/sec and a minimum thickness of 30 inches.

#### **Response to NMED Conditions of Approval**

The following responses correspond to the conditions in NMED's December 17, 2004 approval letter.

PHONE 505-632-8013 FAX 505-632-3911 50 ROAD 4990 P.O. BOX 159 BLOOMFIELD NEW MEXICO 87413

- 1. Condition accepted by Giant.
- 2. Giant will plan to key the barrier wall 5 feet into the Nacimiento Formation. Any exception shall be approved by NMED and OCD.

Hydraulic conductivity testing of samples taken from the Nacimiento Formation along the barrier alignment indicates the formation is essentially impervious to water migration in its upper one-foot interval (soil boring SB2-1004, permeability of  $6 \times 10^{-7}$  cm/sec at a depth of 12.0 to 12.5 feet below ground surface (bgs); soil boring SB5-1004, permeability of 1.2 x  $10^{-9}$  cm/sec at 9.5 to 10.5 bgs). Refer to the November 11, 2004 investigation report by Precision Engineering (Appendix A of CAP) for the testing results. An annotated test results summary table is included with this letter (Attachment A).

Groundwater levels measured in piezometers installed along the proposed barrier alignment show there is generally one foot of water or less on the top of the Nacimiento Formation. This is an inappreciable amount of hydrostatic head.

The quantity of flow migrating from the facility to the river bluff in the Jackson Lake Terrace gravels (across the entire proposed slurry wall alignment - over 2,600 feet in length) has been estimated (using the Darcy equation) to be less than 20 gallons per minute. This estimate assumes a saturated thickness of 2 feet on top of the Nacimiento Formation (greater than measured), a uniform gradient, and a moderate Jackson Lake Terrace permeability. This relatively low quantity of flow is consistent with the observed "isolated seeps" at the river bluff. As such, the amount of water anticipated to accumulate against the barrier is low.

Based on these conditions, Giant anticipates that seepage beneath the barrier will be insignificant. In lieu of conducting a flow net analysis, Giant will install monitoring wells behind the barrier wall at appropriate intervals (to be approved by NMED and OCD). The monitoring well design and spacing will be included as part of the monitoring plan (see Response #10).

- 3. The barrier type will be a soil-bentonite slurry wall with permeability less than or equal to 1 x 10<sup>-7</sup> cm/sec and a minimum thickness of 30 inches. The construction specifications require the soil-bentonite backfill mix design to be approved by Malcolm Pirnie. The mix design will be submitted to NMED and OCD. The specifications also require industry-standard quality control testing by the contractor during construction and verification permeability testing by an independent third-party laboratory.
- 4. As-built drawings and photo documentation are included in the construction procedures and will be provided to NMED as requested.
- 5. Daily logs will be kept by the full-time on-site resident engineer.

Ms. Hope Monzeglio January 17, 2005

- 6. Weekly progress reports and photos will be provided as requested.
- 7. Giant anticipates installing the fluid collection points in the second quarter of 2005 after construction of the barrier is complete. The contour of the Nacimiento Formation along the barrier alignment will be surveyed during construction to aid in locating collection points. A fluid collection system design will be submitted to NMED for approval prior to installation of the collection points.
- 8. A senior geotechnical engineer and a full-time resident engineer from Malcolm Pirnie will oversee and document the barrier construction activities. Due to the character of the Jackson Lake Terrace soils, a slurry trench excavation method will be used. As such, collection of representative soil samples from the trench at prospective collection system locations is not technically possible. If these soil samples are necessary, Giant proposes they be obtained separately after barrier construction.
- 9. RECON will prepare a detailed construction activity schedule and Giant will provide a copy to NMED prior to start of construction. The schedule will be reviewed weekly during construction progress meetings and revisions will be made as necessary. Schedule changes will be communicated to NMED on a weekly basis.
- 10. Giant anticipates developing a monitoring plan concurrent with the collection system design. Conceptually, the plan will be based on monitoring hydraulic conditions on both sides of the barrier at locations where fluid accumulation is anticipated. The monitoring plan will be submitted to NMED for approval.
- 11. A typical log for the piezometers installed in the soil borings along the north property boundary is contained in Attachment B. The depth to water (bgs) in each of the locations is stated in the upper left header of the logs contained in Appendix A of the CAP. It should be noted that many of the subject piezometers will be destroyed during construction of the barrier wall.
- 12. The description "black with hydrocarbon odor" refers to hydrocarbon staining.
- 13. Slug test data for the shallow-zone soils (Jackson Lake Terrace deposit) is contained in Attachment C.
- 14. Grain size analyses were performed only on samples obtained from the October 2004 soil borings SB2-1004, SB5-1004, and SB8-1004 and from the depth intervals indicated on the annotated test results summary table (Attachment A). These three locations are spatially distributed across the area of the October 2004 investigation and the results provided sufficient information for barrier wall bentonite slurry and soil-bentonite backfill mix designs. Hydraulic conductivity

Ms. Hope Monzeglio January 17, 2005

tests were performed only on Nacimiento Formation samples taken from soil borings SB2-1004 and SB4-1004.

- 15. Quality control measures consistent with industry-standard practices will be applied during barrier construction. We have provided Technical Specification Section 02234 for the barrier wall (Attachment D), which contains the construction quality control and testing procedures, primarily in Paragraphs 1.2 and 3.6. Please note this is a construction contract document, and is being provided to NMED for information purposes only.
- 16. Based on the small amount of fluids expected to collect against the barrier (see Response #2), GRCB anticipates a vacuum truck will be the only method of fluid removal from collection points. Operational experience, as it is gained, will determine if a deviation from this approach is required.
- 17. The referenced soil samples were taken from potential borrow sources to aid in mix design for the slurry wall. PEI Lab Nos. 46464 and 46465 were taken from a sand pile at the Foutz and Bursum gravel yard. PEI Lab Nos. 46461, 46462 and 46463 were taken from the earthen embankment adjacent to the Hammond Ditch on the north side.
- 18. GRCB will work with NMED to determine an appropriate long-term sampling and monitoring plan.

If you have any questions in this matter, please contact me at 505-632-4171.

Sincerely,

GIANT REFINING COMPANY

Unnes R. Schmaltz Environmental Manager

Cc: Wayne Price - OCD Denny Foust - OCD Aztec Office Bob Wilkinson – EPA Ed Riege Chad King Letter to Ms. Hope Monzeglio January 17, 2005

# ATTACHMENT A

# Annotated Test Results Summary from Precision Engineering, Inc.

Precision Engineering, Inc. Las Cruces, NM 88004 505-523-7674 P.O. Box 422

2, 2004		Classification	AASHTO	A-3	A-1-b	A-1-b	A-1-b	A-4	A-4	A-2-4	A-1-a	A-1-a																						
Date November 2, 2004		Classi	uscs	SP-SM	SP	SM	SP	ML	ML	SM	GP-GM	GP-GM					5+20		I. N.															
Date		Unit Wt.	PCF										118.7	117.1			STA	272	00															Prepared By:
	,	Moisture	W%	3.8	15.6	5.6	19.2	8.6	14.8	2.5	0.9	1.1	13.3	13.8			4PROX.	20×1	25															Prepa
22		Alterberg	ā	N/P	d/N	N/P	N/P	N/P	N/P	N/P	N/P	d/N					det	APAROX	1-57			T	T				ſ		T	T	1		1	
03-1	ł	Lìn	E					·										1 L	Ũ								Γ				T			
File No. 03-122			#200	8.7	4.7	23.8	2.5	65.2	71.3	23.7	7.0	5.3					274	- 4	NEAR						_				T			T		
File			#140 #200	9	9	28	3	80	79	29	80	9					1 M	3	24		T				_				T	Ť	T	1	1	
ł			09#	31	21	.37	6	92	92	52	16	ი	Hydraulic Conductivity: 6.0 X10 <sup>-7</sup> cm/sec	1.2 X10° cm/sec			5	5	- )		ŀ	T	T				Ī		T	T	Ţ	Ţ		
			#40	74	48	45	25	96	96	64	22	4	(10 <sup>-7</sup> c	(10° c			20	10	SVANON		1	•							T	T	T			JS1
		þ	#20	97	73	57	55	100	66	75	31	23	6.0 X					PLI	SVA	~										T				ch.xls
		Passii	#10	66	81	11	62	100		78	38	29	clivity:	ctivity:			Vortu	504	3	5														ind Dil
		Sieve Analysis %Passing	#	<u>5</u>	82	100	64	100	100	79	40	32	ondu	Hydraulic Conductivity:			L	L		VW N			. ].											ammo
		Analy	3/8"	<u>5</u>	85	100	68		100	81	44	38	aulic C	aulic C			たらけ	FRAT	NokTH5/0E	4														лагу Н
		ieve.	1/2"		86		73			83	49	43	Hydr	Hydr			V Q	0	E13	シー	*												,	Sumn
		0	3/4"		06		89			86	57	54					1 7	ф Т	Ž	A													ļ	ı Size
Ditch					100		100			88	64	64					Ide -	Ń	(			_				_								(Grair
] puo			11/2"							93	76	76					5 5	SID	ANCLER P														;	Bloom
uma			5.							95	80	86					17	1	1060															-122 b
H-pl			м <u></u>							95	96	94					$\mathcal{T}$	Ţ	44															03/03
Project Bloomfield-Hammond Ditch			Depth ft.	5.0-5.4	11.0-11.5	9.0-10.0	10.0-11.0	Surface	Sruface	Surface	Surface	Surface	12-12.5	9.5-10.5			Α.	çċ	Ĵ														001	C:\AAFWFILE\projects\2003\03-122 Bloom\Grain Size Summary Hammond Ditch.xls}S1
<sup>o</sup> roject			PEI Lab No.	46450	46451	46452	46458	46464	46465	46461	46462	46463	46456	46454												_								FWFILEV
			Boring No.		$\mathbf{T}$	4	7			Å.	à	3		4										T					Τ			T		C:VAAI
	L		L		V 72-100+ V	SR F-100	SPQ-1004	SAND PILE	O GRUL PIT				252-1004	584-100H	•	<b>}</b>				L	£		_1_		 1	]	1	i	- <b>k</b>	_}			`	-

ļ

1

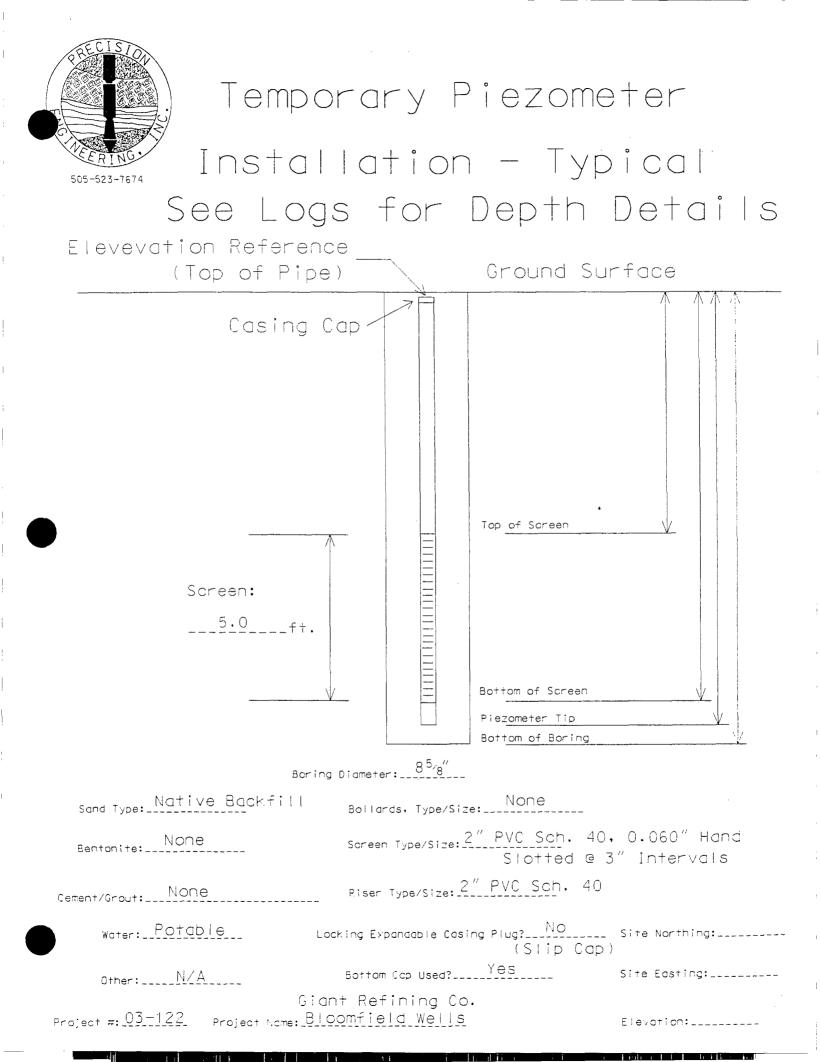
Letter to Ms. Hope Monzeglio January 17, 2005

# ATTACHMENT B

# **Typical Piezometer Log**

 ligli i l

11 1 14



Letter to Ms. Hope Monzeglio January 17, 2005

# ATTACHMENT C

# MW-47 Slug Test Data

#### SLUG TEST RAW DATA FOR MW-47

	Depth Below Grade
Total Boring Depth:	14.28 ft
Static Water:	8.59 ft
Depth to PSH	7.54 ft
Depth to Nacimiento:	10.2 ft
Groundwater Depth Above Naci:	1.61 ft
PSH <sup>(1)</sup> Depth Above Groundwater:	1.05 ft
Total Fluids Above Naci:	2.66 ft

Time	Depth to GW	Dh	h/h <sub>o</sub>
(seconds)	(ft)	(ft)	
0	11.22		
8	12.78	$1.56 = h_0$	1
15	12.12	0.9	0.58
45	11.64	0.42	0.27
60	11.52	0.3	0.19
90	11.42	0.2	0.13
120	11.34	0.12	0.08
150	11.29	0.07	0.04
180	11.27	0.05	0.03
210	11.27	0.05	0.03
240	11.26	0.04	0.03
270	11.26	0.04	0.03
300	11.26	0.04	0.03
330	11.26	0.04	0.03
360	11.26	0.04	0.03

(1) PSH = Phase-Separated Hydrocarbon

The time for the head to rise to 37% of initial change is 4.5 seconds (To). The following parameters are obtained from the geometery of the piezometer:

r =	0.083 ft
R =	0.083 ft
Γ=	10 ft

Therefore:

.

$$K = \frac{r^2 \ln (L/R)}{2LT_o} \ge 8.64 \ge 10^4 \sec/day$$

i li

iùin III

$$K = 32 Ft/Day$$

Letter to Ms. Hope Monzeglio January 17, 2005

# ATTACHMENT D

# **Slurry Wall Construction Specification**

#### SECTION 02234

#### SOIL/BENTONITE SLURRY WALL (Revised 11-28-04)

#### PART 1 - GENERAL

#### 1.1 DESCRIPTION

- A. Scope:
  - 1. CONTRACTOR shall furnish all materials, labor and equipment required for the complete installation of a continuous slurry wall including but not limited to the following Work:
    - a. Furnish, maintain and remove equipment and supplies as necessary for the preparation, mixing and circulation of bentonite slurry.
    - b. Remove and dispose of bentonite-contaminated soils unsuitable for incorporation into the final subgrade.
    - c. Excavate slurry-filled trench to the limits defined by the Specifications and the Drawings. Remove and legally dispose of all materials encountered during excavation operations unsuitable for re-use at no additional cost to the OWNER.
    - d. Furnish, maintain and remove all equipment and supplies as necessary for the mixing and placement of soil-bentonite backfill in the slurry-filled trenches: Soil Bentonite (SB) backfill to provide a permeability (k) less than or equal to  $1 \times 10^{-7}$  cm/sec, to a minimum thickness of 30 inches and the limits defined by the Plans.
    - e. Provide all equipment and materials to test quality of water, bentonite, soils, bentonite slurry, and bentonite-soil backfill and perform all specified tests.
    - f. Grout, seal or reconstruct all points of leakage, and provide a continuous slurry cutoff wall system.
    - g. Clean, cover and protect the top of the slurry wall.
    - h. Where applicable, repair damage to roads.
  - 2. CONTRACTOR shall develop mix designs for the bentonite slurry and soilbentonite backfill and manage those mixes during the Work to meet all the performance requirements specified in this Section.
- B. Related Work Specified Elsewhere:
  - 1. Section 02223, Trench Excavation.
  - 2. Section 01452, Testing Laboratory Services Furnished by Contractor.

#### 1.2 QUALITY ASSURANCE

- A. Installer's Qualifications and Experience:
  - 1. CONTRACTOR shall have a minimum of ten years experience successfully installing soil bentonite slurry trenches to equal or greater depths and areas as

shown on the Plans and as specified. Key labor and supervisory personnel shall be experienced in this type of work. A slurry trench specialist approved by the ENGINEER shall supervise the construction, slurry preparation and quality control.

- 2. If OWNER is not satisfied with field personnel qualifications, CONTRACTOR must provide different qualified people as indicated.
- B. Minimum Criteria:
  - 1. Minimum criteria for the installation of the slurry wall are shown on the Drawings and described herein. CONTRACTOR shall be responsible for construction methods which account for the actual field conditions.
- C. Testing and Inspection:
  - 1. Testing and inspection of the slurry, backfill, stabilizing agent and finished slurry wall shall be performed by the contractor. At a minimum, the following tests shall be conducted:

Description	<b>Test Designation</b>	Frequency
Bentonite Slurry		
Viscosity (Marsh	API RP 13B-1	1. At time of mixing
Funnel)		2. Twice daily
Filtrate Loss	API RP 13B-1	1. At time of mixing
		2. Twice daily
Density	API RP 13B-1	1. At time of mixing
		2. Twice daily
Sand Content	API RP 13B-1	1. At time of mixing
		2. Twice daily
pH	API RP 13B-1	1. At time of mixing
		2. Twice daily
Soil Bentonite Backfill		
Slump Cone	ASTM	Twice daily
	C143/C143M	
Fines Content	ASTM D1140	Daily
Density	ASTM D698 &	Daily
	Para. C.2	

- 2. The density of the SB backfill shall be calculated using a 101.6 mm (4-inch) cylindrical mold as described in Paragraph 6 of ASTM D 698. SB backfill shall be placed in the mold and rodded 10 times. Additional SB backfill shall then be added to fill the mold. The weight and volume of the molded SB backfill shall then be used to determine the density.
- 3. CONTRACTOR shall provide all necessary services to perform the specified tests at no additional cost to OWNER.
- 4. CONTRACTOR shall provide all assistance necessary to obtain representative samples of the slurry and backfill for quality assurance checks by ENGINEER.

5. CONTRACTOR shall use the services of an independent qualified geotechnical laboratory for the performance of slurry and soil-bentonite backfill conformance testing during construction. The CONTRACTOR shall collect representative samples of soil-bentonite backfill to the satisfaction of the ENGINEER. Samples shall be delivered to an independent testing laboratory, selected by the CONTRACTOR and approved by the ENGINEER, within 48 hours of sample collection. The independent testing laboratory shall initiate testing within 24 hours of receipt of samples. At a minimum, the following conformance tests shall be conducted on soil bentonite backfill:

Description	Test Designation	Frequency
Moisture Content	ASTM D 2216	per 250 cubic yards
Density	ASTM D698 &	per 250 cubic yards
	Para. C.2	
Grain-Size Distribution	ASTM D422	per 250 cubic yards
Hydraulic Conductivity	ASTM D5084 &	per 250 cubic yards
	Para. C.6	

6. The confining pressure used to perform permeability testing should be representative of site conditions. To simulate site conditions, the confining pressure specified should be representative of one-half of the wall depth at the location of sample collection.

- 7. OWNER will perform independent Quality Assurance Tests. The Quality Assurance tests performed by OWNER will be the basis of acceptance of the Work.
- D. Reference Standards
  - 1. ASTM American Standard for Testing of Materials.
  - 2. API Standard 13 A "Drilling Fluid Materials"
  - 3. API Standard 13B-1 "Standard Procedures for Testing Drilling Fluids."

### E. Test Reports

A report summarizing the procedures and results of the all testing performed by the CONTRACTOR and independent laboratory shall be submitted to the ENGINEER following completion of all testing. The report shall reference all procedures and include all test results in tabular form.

#### F. Surveys

1. Provide certified surveys by licensed land surveyor of the Slurry Wall as indicated in Section 01722, Field Engineering.

### <u>1.3</u> SUBMITTALS

- A. Not less than 10 days prior to start of slurry wall construction, submit the following information for review:
  - 1. Drawings to include:
    - a. Plan layout of slurry wall showing the proposed location, length, width and depth of wall. Also indicate work bench requirements, the planned sequence of installation, and protection and/or replacement of utilities and structures.
    - b. Location of all Work areas including bentonite slurry mixing and storage area, and soil/bentonite mixing and storage area.
  - 2. Written reports, calculations or other data to include:
    - a. Resumes of supervisory and key labor personnel including field and laboratory technicians with required experience in slurry wall construction and testing.
    - b. Soil-bentonite backfill mix designs prepared and sealed by a Professional Engineer.
    - c. Bentonite slurry mix proportions prepared and sealed by a Professional Engineer.
    - d. Description of all processing equipment to be used, including space requirements for operations and storage of materials.
    - e. Two examples of laboratory tests of production mixes including grain size analysis, slump cone test and hydraulic conductivity of soil-bentonite backfill mix.
    - f. Qualifications of the geotechnical laboratory for quality assurance/quality control testing during construction.
    - g. Qualifications of registered Professional Engineer who will prepare mix designs.
- B. During slurry wall construction, submit the following to the ENGINEER:
  - 1. As-built field data:
    - a. Slurry wall thickness as well as elevations at top and bottom of the trench at 20-foot or less intervals.
    - b. Dates, time and depth of excavation and backfill placement.
    - c. Description of soils encountered, obstructions, excavation problems and use of admixtures, if any.
    - d. Any unusual conditions as noted.
    - e. As-built field data shall be submitted daily to the OWNER.
  - 2. Results of construction quality assurance/quality control testing by the independent qualified geotechnical laboratory including tests on bentonite, water, bentonite slurry, bentonite-soil backfill, stabilizing agents, and all other specified tests.
    - a. Test results shall be submitted within 1 day of test completion.

### 02234-4

### 1.4 STORAGE AND HANDLING OF MATERIALS

- A. Methods of handling and storage of materials and equipment are subject to the approval of the ENGINEER.
  - 1. Stockpiled materials and any mixing plant setup shall be allowed only in areas designated by OWNER.
  - 2. Excavated materials unsuitable for re-use and surplus materials, including bentonite slurry, shall be disposed of at no additional cost to the OWNER.
  - 3. Special care shall be taken to properly dispose of all used bentonite materials and slurries. Disposal of bentonite slurry in any sewer system will not be permitted.
  - 4. Public ways and areas shall be kept clear of all spillages from construction operations.
- B. The OWNER identified existing former raw water ponds behind the refinery office building for slurry and SB spoils disposal during the Pre-Bid Conference on November 22, 2004. The CONTRACTOR shall haul and dispose of slurry and SB spoils to the location identified by the OWNER. Hauling and disposal shall be conducted in a manner that will not impede or disrupt operation of the refinery and associated activities. If the former raw water disposal ponds are not appropriate to CONTRACTOR, the CONTRACTOR shall construct suitable spoils disposal ponds in a location designated by the OWNER, at no additional cost to the OWNER.

### 1.5 JOB CONDITIONS

- A. Subsurface Information: Refer to Project Information Summary for data on subsurface conditions. Data is not intended as a representation or warranty of continuity of conditions between soil borings nor of groundwater levels at dates and times other than date and time when measured. OWNER will not be responsible for interpretations or conclusions drawing therefrom by CONTRACTOR. Data is solely made available for the convenience of CONTRACTOR.
  - 1. Additional test borings and other exploratory operations may be made by CONTRACTOR, at no additional cost to the OWNER.
- B. Existing Structures and Utilities: The Drawings show certain existing facilities and surface and underground utilities located on or adjacent to the Work. This information has been obtained from existing records. It is not guaranteed to be correct or complete and is shown for the convenience of CONTRACTOR. CONTRACTOR shall explore ahead of the required excavation to determine the exact location of all piping and utilities. They shall be supported and protected from damage by CONTRACTOR. If they are broken or damaged, they shall be restored immediately by CONTRACTOR at his expense. All utilities shall remain in service during the Work.

Should uncharted or incorrectly charted piping or utilities be encountered during excavation, consult ENGINEER immediately for directions as to procedure.

Cooperate with OWNER and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

- C. Use of Explosives:
  - 1. The use of explosives will not be permitted.

### PART 2 - PRODUCTS

### 2.1 BENTONITE

- A. Bentonite shall be high swelling, pure, premium grade type, sodium cation-based bentonite consisting of montmorillonite.
- B. Bentonite shall meet the requirements of API Standard 13A. A certificate of compliance (for each lot shipped to the site) from the bentonite manufacturer stating that the bentonite complies with applicable standards shall be provided to the ENGINEER. No bentonite from the bentonite manufacturer shall be used prior to acceptance of the compliance certification by the ENGINEER. Bentonite not meeting specifications shall be promptly removed from the site at the CONTRACTOR's expense. Bentonite shall be protected from moisture during transit and storage.
- C. Chemical treatment of bentonite shall not be permitted without approval of ENGINEER.

### 2.2 WATER

- A. Water used for mixing with bentonite shall satisfy the following requirements:
  - 1. Be clean, fresh and free from oil, acid, alkali, organic matter or other deleterious substances.
  - 2. Demonstrate the following minimum quality:
    - a. Hardness < 50 ppm.
    - b. TDS < 500 ppm.
    - c. TOC < 50 ppm.
    - d. 6<pH<8.
- B. The CONTRACTOR shall be responsible for obtaining all water needed for the work at no additional cost to the OWNER. OWNER identified the refinery fire water reservoir as a construction water source during the November 23, 2004 Pre-Bid Conference. CONTRACTOR shall coordinate required construction water volumes with OWNER in advance to avoid impacts on OWNER's operational water needs.

### 2.3 BENTONITE SLURRY

- A. Bentonite slurry shall consist of a stable colloidal suspension comprised of bentonite in water. Resulting bentonite slurry shall have the following minimum characteristics:
  - 1. Viscosity of stabilizing fluid shall be as required to provide stable trench conditions but shall be a minimum of 35 seconds (V>35 sec-Marsh @ 68 degrees F) using Marsh Funnel Viscometer prior to placement of backfill.
  - 2. Filtrate loss: 20 cc maximum in 30 minutes @ 100 psi using standard filter press.
  - 3. Bentonite slurry shall be allowed to hydrate a minimum of 8 hours after it is mixed with water and before it is used, except where specifically requested and approved.
  - 4. Sand content of 10 percent measured 5 feet above the trench bottom.
  - 5. pH shall be controlled between 7 and 12.

### 2.4 SOIL-BENTONITE BACKFILL

- A. Soil-Bentonite backfill mix for use in the slurry wall shall be comprised of select soil and bentonite.
- B. Soil-Bentonite backfill shall meet the following requirements at time of placement:

Hydraulic Conductivity: Less than or equal to 1 x 10<sup>-7</sup> cm/sec (0.0000001 cm/sec)

- C. The density of the soil-bentonite backfill shall be such that it completely and rapidly displaces the bentonite slurry upon placement.
- D. Selected soils used in the soil-bentonite backfill shall meet the following requirements:
  - 1. Soils excavated from the slurry trench may be used if the requirements of this specification are met. If the trench soils do not meet the specification requirements, then the CONTRACTOR shall provide off-site soils that meet the requirements, or soil that when mixed with the trench soils meet the requirements of this specification.
  - 2. Shall be a mixture of clean gravel, sand, silt and clay with no physical organic matter or other deleterious substances.

### 2.5 BANK-RUN GRAVEL

A. Bank run gravel for trench cover shall consist of well graded hard, sound, tough, durable particles of uncrushed gravel free from soft, thin, elongated or laminated pieces, organic matter and other deleterious substance. The percentage by weight

passing a No. 100 square mesh sieve shall not exceed ten percent, and it shall not contain stones larger than 6-inches.

### PART 3 - EXECUTION

### 3.1 GENERAL REQUIREMENTS

- A. Perform preparatory work to discover, protect, maintain, and restore utilities, manholes, pipe, force-mains or other facilities in the vicinity of the slurry wall.
- B. Employ construction methods and provide protective coverings which prevent the leakage and spillage of excavated materials, bentonite slurry or backfill into adjacent utilities or structures.
- C. CONTRACTOR shall be responsible for the proper disposal of excess slurry.
- D. At the completion of slurry wall work, all surfaces of adjacent areas and structures shall be restored to their original condition.
- E. Take all necessary measures to prevent collapse of the excavated slurry trench prior to backfilling, provide covers and/or barricades at open trench areas as required for safety.
- G. Construct work platform as necessary to achieve installation of the slurry wall and adequate support of all construction equipment.

### 3.2 TRENCH EXCAVATION

- A. Excavation equipment shall be capable of removing all materials required for excavation of the slurry wall so that the required width trench can be carried to its final depth of cut continuously along the trench line. The width of the excavating tool shall be equal to or greater than the specified width of the slurry wall. Drilling, hydraulic excavating, scraping or other methods may be used, subject to approval of the ENGINEER.
- B. The excavation equipment shall be able to reach at least 5 feet deeper than, for a horizontal length of 8 feet, the maximum depth shown on the drawings. The excavation equipment shall have a minimum gross power of 140 horsepower.
- C. The excavation shall begin from the working surface and shall provide a vertical, within 2 percent, continuous 30-inch minimum width trench along the centerline of the excavation. If trench excavation overlaps into previously completed slurry trench, the excavation shall extend a minimum of 10 feet into the previously placed SB backfill at all depths. Any removed section of completed slurry trench shall be refilled with SB backfill at no additional expense to the OWNER.

E. The slurry wall shall be constructed with a minimum key-in depth of 3 feet into the lower Nacimiento Formation or until refusal is met; whichever is less in depth. Refusal shall be defined as 3 passes for a horizontal distance of 5 feet with less than 0.2 feet of total penetration. Passes shall be made utilizing 90 percent of the manufacturer's maximum-rated down pressure and breakout power of the excavator.

F. The trench bottom shall be cleaned at the start of each day and as the excavation proceeds. The trench bottom shall be cleaned by using an excavator bucket or other equipment approved by ENGINEER to ensure removal of sand, gravel, sediment, and other material left in the trench during excavation or which has settled out of the slurry. Cleaning equipment shall not remove material from the walls of the trench.

- G. Each excavation shall be filled and maintained with a stable suspension of bentonite slurry. Excavation shall proceed through the slurry. Slurry shall be added to the excavated trench as necessary to maintain the slurry level within 2' of the top of the trench. Losses of bentonite slurry into utilities and underground structure may occur, CONTRACTOR shall take all measures necessary to contain such losses. The slurry shall be circulated and cleaned to control uniformity and remove coarse material greater than 4" in diameter throughout its depth.
- E. The slurry shall consist of a stable suspension of powdered or granular bentonite thoroughly mixed with water. All slurry for use in trenching shall be mixed in a batch or continuous mixer. No slurry is to be made in the trench. It shall be adequate in all respects to support the sides of the excavation.
- F. Losses of bentonite slurry into the surrounding soils may occur. The CONTRACTOR shall take all measures necessary to contain such losses and maintain the stability of the trench.

### 3.3 MIXING

A. Bentonite Slurry

- 1. Mixing method shall be capable of producing a homogenous colloidal suspension of bentonite in water, in pumps, valves, hoses, supply lines, and all other equipment as required to adequately supply slurry to the trench.
- 2. Mixing of water and bentonite shall continue until bentonite particles are fully hydrated and the resulting slurry appears homogeneous.
- 3. No slurry is to be made in the trench.

### 02234-9

### B. Soil-Bentonite Backfill

- 1. Soil-Bentonite backfill shall be mixed in such a manner that results in a backfill mixture that is homogenous with uniform distribution of properties to be tested during construction.
- 2. Mixing and blending shall be performed in such a manner as to produce the required gradation of backfill.
- 3. The backfill shall be thoroughly mixed to produce a homogenous mass, free from large lumps or pockets of fine-grained soil, sand, or gravel. Occasional lumps of up to 3-inches in their largest dimension will be permitted. Occasional rocks greater than 3-inches in their largest dimension will be permitted, provided they are not nested (i.e., in contact with one another) in the backfill. All particles shall be coated with slurry. The SB backfill may be sluiced with slurry during the mixing operations. Sluicing with water is not permitted.
- 4. Backfill shall not be mixed in the trench.

### 3.4 BACKFILL PLACEMENT

- A. The bottom of the slurry-filled trench, defined as the bottom of the key into the Nacimiento Formation, shall be cleaned of all loose material prior to the placement of backfill.
- B. Initially, the backfill shall be placed into the trench at one location only by placement at the bottom of the trench through a tremie pipe until the backfill material emerges from the slurry with no less than a 1H:1V slope. Additional backfill may then be placed in such manner that the backfill enters the trench by sliding down the forward face of the backfill slope.
- C. Backfill shall be placed continuously from the beginning of the trench, in the direction of the excavation, to the end of daily excavation.
- D. Backfill shall be placed in such a manner that the backfill displaces the slurry progressively from the bottom, rising uniformly to the surface, and such that intermixing of the backfill and slurry will not occur.
- E. Free dropping of backfill materials through the slurry is not permitted. The backfill shall not be dropped or deposited in any manner that will result in a segregated mixture.
- F. The toe of the trench excavation slope shall precede the toe of the backfill slope so that the toe of the backfill shall not be less than 50 feet following the toe of the excavation, or as required to permit proper cleaning of the trench bottom and to permit inspection and measurement.

- H. Soil-bentonite backfill shall not be placed if it contains ice particles or will freeze in the trench. If this occurs, all Work shall cease and an adjustment will be made to the schedule based on the number of days the Work is delayed.
- I. CONTRACTOR shall be responsible for the proper disposal of excess slurry.

### 3.5 TREATMENT OF TOP OF SLURRY TRENCH

- A. Prior to placement of the compacted trench cover, a temporary plastic sheeting cover shall be placed over the trench to prevent desiccation. The temporary cover material shall be placed within 2 days after SB backfill placement is completed over each 100 foot reach.
- B. If any depression develops within the completed slurry trench area, it shall be repaired by placing soil bentonite mix.
- C. After a minimum 3 weeks, the temporary trench cover shall be removed and replaced by a final compacted trench cover.
- D. A final compacted trench cover over the entire width of the trench and 3-feet deep shall be placed. A woven geotextile of Mirafi Geolon HP465 or equivalent shall be placed over the top of the SB backfill and along trench walls prior to backfill placement. Backfill in the upper 3 feet of trench shall consist of bank-run gravel placed at 90 percent of maximum density at optimum moisture to plus 3 percent in accordance with ASTM D 698.

### 3.6 INSPECTION AND TESTING DURING CONSTRUCTION

- A. CONTRACTOR shall perform the following quality control testing during construction of the slurry wall.
  - 1. Testing of bentonite slurry and soil-bentonite backfill shall be in accordance with PART 1 General, 1.2 Quality Assurance.
  - 2. CONTRACTOR shall be responsible for verifying that base of excavation is clear of all loose soil or other foreign materials, as well as verifying the depth of the slurry trench. CONTRACTOR shall be responsible for verifying to the ENGINEER that the trench is continuous and keyed the minimum specified depth into the underlying lower clay unit. Trench continuity shall be assured by the action of movement of the trench excavation equipment such that the excavating tools can be passed vertically from top to bottom of the trench as well as moved horizontally along the axis of the trench without encountering unexcavated material. Verification of the key-in depth of the slurry trench,

depth of trench and vertical continuity shall be by sounding techniques with a drop line at 10-foot intervals along the centerline of the trench.

### 3.7 TOLERANCES

- A. The overall out-of-plumb tolerances for the entire cutoff wall from top to bottom shall not exceed 2.0% of the height of the slurry wall at that point.
- B. The alignment of the slurry wall shall be limited to a lateral displacement of 1-foot from the alignment identified by the CONTRACTOR prior to trench excavation. Alignment changes as necessary to bypass obstructions may be made with the approval of the ENGINEER.

### 3.8 CANAL SERVICE ROAD

Canal service road shall be restored to its original grade and condition by placing a minimum 6-inch layer of compacted General Fill material. Finished grade of the service road shall slope away from the canal a minimum of 1/8-inch per foot.

+ + END OF SECTION + +

# **APPENDIX B**

# **Record Drawings – Barrier Alignment and Profile**

5127-002 Giant Refining Company

-'n

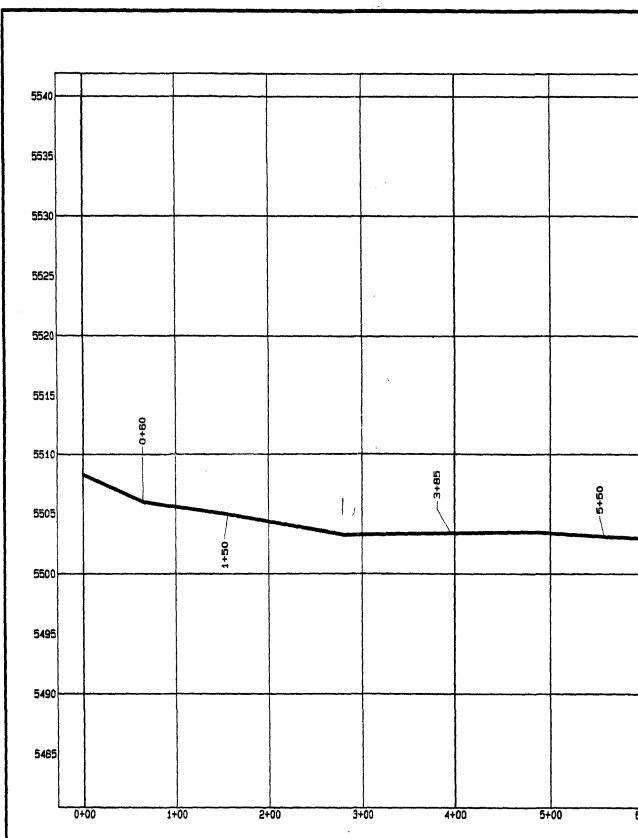
, • \_\_\_\_\_ N. .

,

• -

Note: Wells were not perpendicular to centerline, so road shots were an average between CW and OW wells

•



•



PROFILE ROAD ABOVE BARRIER WALL Bloomfield Refinerty San Juan County, New Mexico

.

-	•		

	6+70		-B+10 B+45			11+15			- 14+10			:	~ 19+50		05:52	23+10		- 25+95
																	53+90	- 25+70-
6+(		00 8+	+00 9-	+00 104	+00 11+	00 12	+00 13·	+00 14	-00 15 <sup>-</sup>	+00 16+	00 17+							

y ico	Vertical Scale: 1"= 10' Horizontal Scale: 1"= 100' Elevations based on NGS CORS Network.	ACCOUNT: DATE: May, 16, 2005 DESIGNED BY: DRAWN BY: CHECKED BY: APPROVED BY:	INTERMOUNTAIN MAPPING SERVICES, LLC 1875 Highway 170 La Plata New Mexico 87418 (505) 325-5244	PROJECT MANAGER: ENGR. of RECORD: REG. NO: SRVYR of RECORD: Scott Andrae REG. NO: 9625	REVISION           1           2           3           4           5	
----------	---	---	--	--	--	--



-

•

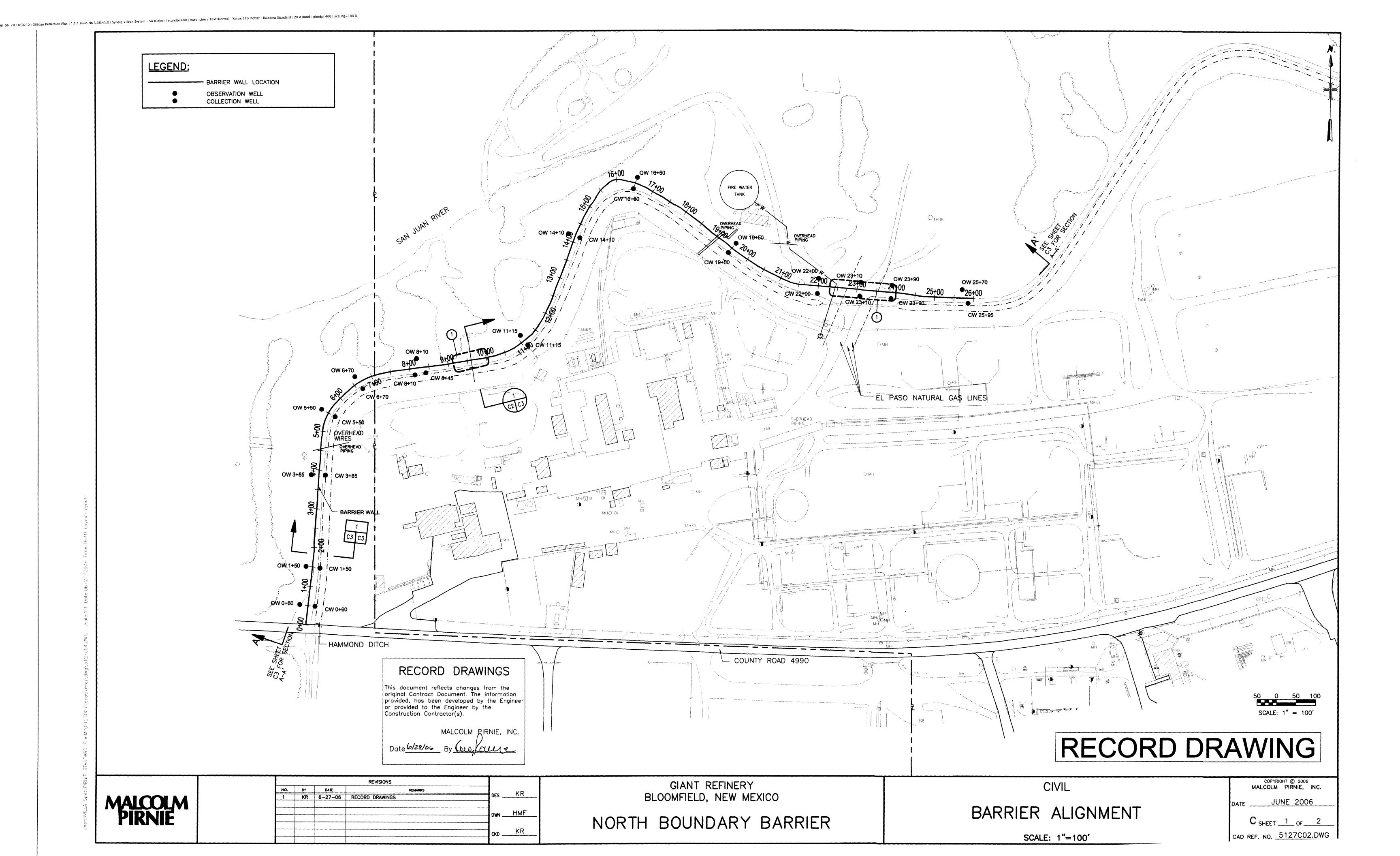
-

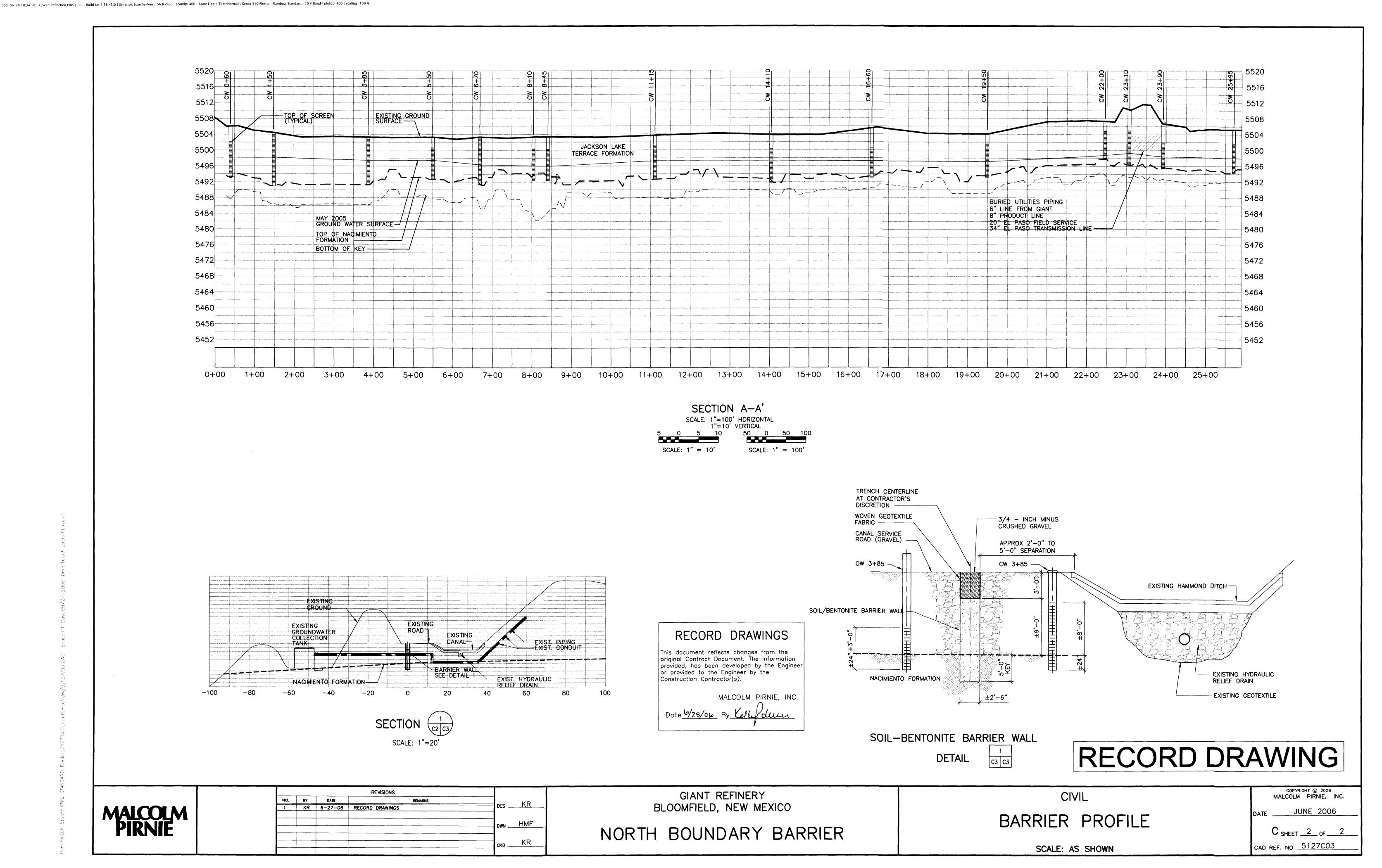
1

;

.

-





# **APPENDIX C**

# **RECON** – Final Report and QC Test Data

5127-002 Giant Refining Company



Remedial Construction Services, L.P.

P.O. Box 690708 Houston, TX 77269 9720 Derrington Houston, TX 77064

tel 281.955.2442 fax 281.890.5172 sales@recon-net.com www.recon-net.com

4/20/05

Mr. Randy Schmaltz Giant Refining Company 50 Road 4990 Bloomfield, NM 87413

Re: Giant Bloomfield Refinery North Boundary Barrier Final Report and Test Data

Dear Mr. Schmaltz:

Enclosed is a construction summary and final test data for the North Bloomfield Barrier project. Laboratory and field-testing information provided by Recon and third party testing contractors, contained within this report, was collected in accordance with Giants contractual requirements throughout the slurry wall project.

As indicated in enclosed report, Recon achieved required pemeabilities of  $1 \times 10^{-7}$  or less and completed all required tie-ins into the Nacimiento formations to the depths as specified and approved by Malcolm Pirnie, which are shown on the attached barrier profile, Appendix E.

Should you have any questions relating to this report, please call me. In closing, we appreciate the opportunity in working with Giant and especially your assistance during the construction phase of the project and look forward to serving Giant on future projects.

Best Regards,

Bob Carlson Project Manager



# FINAL REPORT AND TEST DATA FOR

# GAINT REFINERY COMPANY

# **BLOOMFIELD REFINERY NORTH BOUNDARY BARRIER**

# PREPARED BY: Bob Carlson RECON

# PREPARED FOR: MR. RANDY SCHMALTZ GAINT REFINERING COMPANY

**APRIL 2005** 

# TABLE OF CONTENTS

	Page
INTRODUCTION	3
REASON FOR BARRIER WALL	3
DESIGN CRITERIAL AND REAMOVAL OF CONTAMINATED/OUTOF SPC. MATERIAL	3
CONSTRUCTION SITE	3
UNDERGROUND UTIITIES	3
TESTING AND INSPECTION	4
LABORATORY TESTING	4
THIRD PARTY CQA	4
SITE CONTROL	4
BARIER PROFILE	4
Construction Schedule	5
Conclusion	5

Appendix A Appendix B Appendix C Appendix D Appendix E Daily Quality Control Sheets Hydraulic Conductivity Test Report Third Party Daily Inspection Report As-Built Slurry Wall Drawing Barrier Profile - Actual

# **Introduction**

This report summarizes construction and testing results conducted during the construction of the Giants North Barrier retaining wall. Giant Refining Company contracted Remedial Construction Services to construction a 2600-foot long slurry wall at their Bloomfield, New Mexico facility. The refinery facility is sited on approximately 285 acres and is located approximately one mile south of Bloomfield, New Mexico on a bluff over looking the San Juan River.

### **Reason for the Barrier Wall**

Due to petroleum hydrocarbon release over the years at the refinery, Giant responded to the State of New Mexico oil conservation Division and agreed to place a soil bentonite slurry wall along the north boundary to mitigate further off-site migration of petroleum hydrocarbons from beneath the facility.

# Design Criteria and Removal of Contaminated/out of Spec. Materials

RECON developed a design capable of attaining  $1 \times 10^{-7}$  cm/sec. Based upon this design, 70% of the excavated sand, gravel and cobbles had to be excavated and removed from the immediate site due to either contamination or in order to fulfill design specifications. This design required prior to beginning excavation and mixing operations, that fine materials be trucked to the site and deposited along the routing of the slurry wall to be used later in the mixing operation.

# **Construction Site**

The construction site of the barrier wall was located in the service road running adjacent to the existing Hammond Ditch on one side and stockpiled overburden on the other side. The width of the service road (working area for installation of the wall) was 12 to 16 feet.

This requiring RECON to performed the excavation, mixing and capping operations in series along the centerline of the trench. Bentonite slurry was remotely mixed and pumped as needed to the trench operations

# **Underground Utilities**

In addition, several underground utilities crossed the barrier alignment. These utilities with the exception of El Paso natural gas lines and Giants product lines were protected and the slurry wall was advanced. In the areas of the El Paso Natural gas line and Giants product lines, Giant contracted a third party to expose, inspect and make appropriate repairs. Following repairs of the lines by others, Recon constructed the slurry wall under the gas and product lines.

# **Testing and Inspection**

Resident engineering services and inspection were provided by Malcolm Pirnie during the project. These services included extensive on-site construction observation, sampling, field-testing of bentonite slurry and bentonite-soil materials, and tie-in depth confirmations. Visual inspections of excavated soils and bedrock were extensively conducted by Malcolm Pirnie and Recon, to detect and confirm when adequate bedrock was encountered and that appropriate key-in depths were maintained. Recon also conducted daily testing and reporting throughout the project to assure that required testing criteria were met and/or exceeded during the project. Recon's testing requirements consisted of monitoring Viscosity, Filtrate, Density, pH, Fines Content and Density for the bentonite slurry and soil bentonite backfill including conducting slumps of the soil bentonite backfill. Sierra Testing Laboratories conducted permeability tests. See Appendix A for RECON Daily Quality Control Reports

# Laboratory Testing

Recon contracted Sierra Testing Laboratories to perform mix designs and perform permeability studies during the project. Representative samples were collected from the Giant site and sent to Sierra for mix design development. During the project, permeability testing was conducted by Sierra Testing Laboratories in accordance with Giants conformance testing requirements. As indicated in enclosed reports, all permeability's were  $1 \times 10^{-7}$  or less. See Appendix B for permeability results.

# Third Party CQA

Recon contracted GEOMAT to perform third party testing at the site consisting of performing slump, viscosity, unit weight, filtrate and pH in accordance with project requirements. See Appendix C for field tests results.

# SITE CONTROL

RECON contracted Intermountain Mapping Services to provide controls for construction of the slurry wall and to provide, following completion of the project, electronic record drawings showing the surveyed centered line of the barrier wall. See Appendix D for electronic record drawing.

### **Barrier Profile**

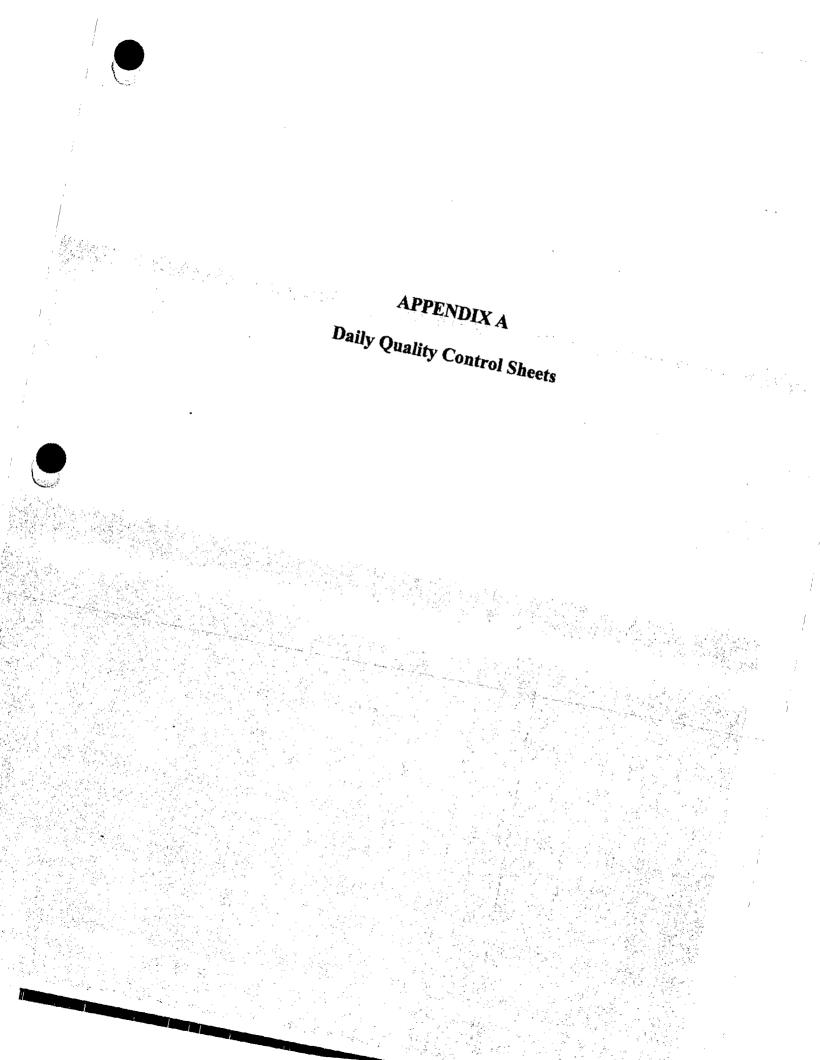
A Barrier Profile was maintained by RECON and Malcolm Pirnie. The profile documented Recons daily excavation through the Jackson Lake Terrace formation and tie-in into the Nacimiento Formation. See Appendix E for the AS Built Profile.

# **Construction Schedule**

Recon completed the slurry wall construction project three weeks ahead of the mid April completion date set by Giant.

# **Conclusion**

The construction of the slurry wall was performed in accordance with the specified quality control standards. Full time monitoring and testing of construction operations allowed for quick and informed actions in remedying any problem while minimizing down time. All slurry wall construction operations were completed in accordance with Giants contractual documentations and specifications. Even though the construction areas of the slurry wall was very narrow and difficult to maneuver, Recon's field team was able to maintain steady progress, exceed required conformance testing and complete the project well ahead of the mid April deadline imposed by Giant.



roject:						Job Name: Job Numb	er: 7	NT NEI -1720	-/ N/ N
						Date:		5-05	
<u>,</u>									
			Remedial	Constru	ction Ser	vices, L.P	) •		
						Quality Con		t	
SF	11. 92.5		<b>*</b>	[	SFTD	16.13,5		1	<u> </u>
					1		<u></u>	1	
			E	Excavation	Data Cent	er			
Station	Depth	Key	Comments		Station	Depth	Key	Comments	<u>s</u> :
9463									
	16.5								
5+40	18.5							4	
1460	11.		4					4	
) 4 YO	15.5		-			ļ		_	
1400	14,50		4			ļ		_	
1-+15	14.5		4	•		· · · · · · · · · · · · · · · · · · ·	<u> </u>	4	
			4					-{	
								-	
	+		4					-	
			-					-	
			-			+		-1	
	+		1			<u> </u>		-	
	-l	L	I	Backfill [	) Data Center	, L <sub>enge</sub> , <sub>1</sub>			
Station	Time	Unit Wt.	Slump		#200	Comments	401	Tulit	<u></u>
2400		131	- E''		38,85	1		7,10	
			1			1	0	1110	
						]			
			1						
			······	Slurry D	ata Center	<u>~</u>			
rench	T 7:	Destil	1 1	1 \ <i>C</i>	Plant	E literater	) Bara	· · · · · · ·	1 <b>T</b> ime
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH ∽	Tin OP
0+10	1010	1411	1.5		1.414		40		164
コナカシ	1430	MIS	1.4	40	144	17	40 27 *4		131
· / · · ·	1735		107	70	1.4	17	1	+->	145
		<u> </u>	1	<u>}</u>				1	
omment	s;	L	.1		1				1
<u>erninoilli</u>	<b>Z</b> .								
-									
*	-								
-		1.25				Demerlief	• •	lan Pantan	- 1
lient:	-THNT	TIEF.	1.1.1.1			Remedial ( By:	and the second sec	ion Service	s, L.P.

roject:						Job Name: Job Numb	or:	14/07	
						Date:	<u>9. 11</u>	- <u>1920</u> - 05	
							<u>/</u>		<u> </u>
	······,	F	Remedial	Constru	ction Ser	vices. L.P			 
			onite Slurry					t	
SF	1751,6			[	SFTD	41.45			T
		•	E	Excavation					
Station	Depth	Key	Comments		Station	Depth	Key	Comments	<u>s</u> :
+30	15.5				141.0	17	<i></i>	_	
430	151		-		3-110	17		4	
-1-410	19-18				2+33	/7		4	
1451	18					<u> </u>		-	
176	177-		-					-	
14 21	17.5	<u> </u>						1	
14 11	18		1					-1	
) + 6 -	1%		]					]	
1416	17		]					]	
14-15	17								
247:	17		4			L		4	
2-4/0	17		4			L		4	
يريس مريد (م	17	l		Book Still P	ata Center	L			<u> </u>
Station	Time	Unit Wt.	Slump		ata Center #200	Comments	•	211	.) .
+			Sidilip S	/0-1		1		2%	
						Sterri	ē - Š		
· · ·		121	<u> </u>			1	•		
				1					
						4			•
						L			
ronch				Slurry Da	ata Center				
	Time	Depth			Plant	Filtrate	Visc		Tim
Station	Time	Depth	Unit Wt.	Slurry Da	Plant Unit Wt.	Filtrate	Visc.	pH ×	
			Unit Wt.		Plant Unit Wt.	Filtrate		рН ×	Aria
Station	<u>، ا</u> پر چار ا	÷		Visc.	Plant Unit Wt.	Contraction of the local division of the loc	39	X	Aria
Station	نام را			Visc.	Plant Unit Wt.	Contraction of the local division of the loc	39	X	Тіт И ні 1 і ті 1
Station		ALLA MARK		Visc.	Plant Unit Wt.	Contraction of the local division of the loc	39	X	Aria
Station		ALLA MARK		Visc.	Plant Unit Wt.	Contraction of the local division of the loc	39	X	Aria
Station		ALLA MARK		Visc.	Plant Unit Wt.	Contraction of the local division of the loc	39	X	Keit
Station		ALLA MARK		Visc.	Plant Unit Wt.	Contraction of the local division of the loc	39	X	A ria
Station		ALLA MARK		Visc.	Plant Unit Wt.	Contraction of the local division of the loc	39	X	Aria
Station		ALL ALLAN		Visc.	Plant Unit Wt.	Contraction of the local division of the loc	39	X	Aria
Station		ALL ALLAN		Visc.	Plant Unit Wt.	Contraction of the local division of the loc	39	X	Aria
Station		ALL ALLAN		Visc.	Plant Unit Wt.	Contraction of the local division of the loc	39	X	Aria
Station		ALL ALLAN		Visc.	Plant Unit Wt.	Contraction of the local division of the loc	39	X	Aria
		ALL ALLAN		Visc.	Plant Unit Wt.	Contraction of the local division of the loc	39	X	Aria
Station		ALL ALLAN		Visc.	Plant Unit Wt.	Contraction of the local division of the loc	39	X	Aria
Station		1111 1111 1111 1204 111		Visc.	Plant Unit Wt.			¥ 	
Station		1111 1111 1111 1204 111		Visc.	Plant Unit Wt. (,	Remedial (		ion Service	

|.

		4				Job Name:	<u> </u>	IANT	
						Job Numbe Date:	<u>r: a</u>	-1730	
						Date:	<u> 1 - 7 -</u>	<u>23</u>	
		and the second se			and the second se	vices, L.P.			
·		Soil Bento	nite Slurry	Trench Cu		Quality Cont	rol Sheet	· · · · · · · · · · · · · · · · · · ·	
SF	0145				SFTD	1.740			
[		I <u></u>				<u>I</u>			
	O	14 million		xcavation					
Station	Depth	Key	<u>Comments</u>		Station	Depth	Key	Comments	
54.70	17	51						<u> </u>	
2415	17					<u> </u>		4	
	17							ļ	
3430 8430	17		-			ł		4	
	17		2					1	
3+46 7+50	17	· · · · ·				<u> </u>			
$\frac{730}{3+60}$	17			•	······	<u>}</u>		1	
5+70	17					1		1	
3+80	17					<u> </u>		1	
2+70	17							1	
1400	16							]	
1+111	110	i						]	
					ata Center				
Station	Time	Unit Wt.	Slump		#200	Comments:	Said	392	4.0
2+51	K(i) [	1.2.3	<i>5</i> ,	37.	2	4		- 70 5 1 C	L
<u></u>					ļ.,	4	Sand	2.5%	r + i
3 +11	F 777	1 - 2,5	44	34.	5	4			
				l		-			
L		I		Shurry De	ta Center	L			
rench			· · · · · · · · · · ·		Plant	<u> </u>			
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pН	Tim
110	L.1331	i) hel	72.	53	6-4	16	39	4	D 11
		Jan Here	75	le C	<u> </u>	<u> </u>			
-65	Epril	Blief	71	22	64.5	$15 \leq 1$	416 1	4	$\rho_{n}$
		to Hour	$\gamma \in$	40					

1

Ì

Ì

ĺ

(

Project:						Job Name:		ZNT	
						Job Numb		-115	
1						Date:		2-21-	T
				~ ~ ~					1
						vices, L.P			
	a 10		onite Slurry	Trench C		Quality Con		<u>t</u>	<u> </u>
SF	9312.0			}	SFTD	8962.	)	_ <u></u>	
	<u> </u>	<u> </u>	<u>}</u>	Everyntion	Data Cent				
Station	Depth	Key	Comments	and the second second second second second second second second second second second second second second second	Station	Depth	Key	Comment	<u>e'</u>
6141011 4/4-11	16.			2.	541.0	15.5	ney		<u>.</u> .
111	14.5	-	•					-	
4440	14.17		4						
6/456	13					1		-	
44.6	13	1	-					-	
11-170	15							]	
4436	17		]						
44900	15							4	
5433	15					·		4	
7-71:	15	<u> </u>	1					-	
M4 .36	14.5		4		ļ	· · · · · · · · · · · · · · · · · · ·	<b>_</b>	4	
17470	14.5							-	
X+43 T+53	15.5		-		}			-	
<u>-, 7,</u>	L. Murk			Backfill D	l Data Center				
Station	Time	Unit Wt.	Slump		#200			· · ·	i
4+00	ANY	197	41/2	26.	17	1	aut		1
						1 2	11° N O	3.5- <sup>3%</sup> 4. 1/2	
4+46	PM	135	5	38.	17	]	dert 1	1. 16	12
						، د. ا	19 10 -	<i>,</i> .	•
		<u>_</u>						<u> </u>	
Trench				Slurry D	ata Center Plant		<u></u>	<u> </u>	
nenon	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Τ
Station			777	57	14	15.5	3.7	8	
Station		ATT	1 / 1		1 41				
Station 4/+ 3 (	AM	MIN TOTA Y	73	57	1 4	172.3			
		7: 77 4 MIN	73		1.4.1.		41.		
4+30	AM	1: 7 4	73	57					
4+30 4+90	A M T/M	7: 77 4 MIN	73	57					
4+30	A M T/M	7: 77 4 MIN	73	57					
4+30 4+90	A M T/M	7: 77 4 MIN	73	57					
4+30 4+90	A M T/M	7: 77 4 MIN	73	57					
4+30 4+90	A M T/M	1: 7 4 MIN	73	57					
4+30 4+90	A M T/M	1: 7 4 MIN	73	57					
4+30 4+90	A M T/M	1: 7 4 MIN	73	57					
4+30 4+90	A M T/M	1: 7 4 MIN	73	57					
4+30 4+90	A M T/M	1: 7 4 MIN	73	57					
4+30 4+90	A M T/M	1: 7 4 MIN	73	57					
4+30 4+90	A M T/M	1: 7 4 MIN	73	57					
4776 4777 Comments	A M 1/M	1: 7 9 MID 1: 71 9	73 73 75	57			41		
<u>4776</u> <u>4776</u> Comments	A M 1/M	1: 7 4 MIN	73 73 75	57		Remedial C	41	ion Service	

;

					Job Name: Job Numbe	and the second second second second second second second second second second second second second second second	1190
					Date:		>~ 05
					<u> </u>		
	F	Remedial	Constru	ction Ser	vices, L.P	•	* <u></u>
<u></u>							
7/19.2							[
					1		1
	±	E	Excavation	Data Cent	er		
Depth	Key		and the second se	Station	Depth	Key	Comments
15.5			-	7410	13		]
11 am				7470	13		
16				1430	13		
	ļ			ļ	<u> </u>		ł
					<u> </u>		1
	ļ		•		ļ		{
					<u> </u>	<u></u>	4
10	<u> </u>				·		4
	<u> </u>				<u> </u>		{
							1
							1
							1
<u>· · /</u>			Backfill D	ata Center	l		<u></u>
Time	Unit Wt.	Slump			Comments:		454
Ant	<u></u>	<u> </u>	: 1,	2	4		
	L				4	Liber A	$\geq 1/2$
1 + 1	<u> </u>		<u> </u>	<u> </u>			
					4		
	L	L	Slurry D	ata Center	.1		
				Plant	· · · · · · · · ·		
Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	рН
411	11.1	2 <b>4</b> 4 4		1.4	107	24	9
	1	1 2					
<u>[-'/: ]</u>				1.4.5	18	<u> </u>	4
· · · · · · · · · · · · · · · · · · ·	- In the sec	1-1	1 2 4		<u> </u>		
•	L		L	l	<u> </u>	<u></u>	L
	Depth 75,5 76,7 76,7 75,7	Depth     Key       15.6       16.7       16.7       16.7       16.7       16.7       16.7       16.7       16.7       16.7       17.7 <t< td=""><td>9/43.4       Image: Comments         Depth       Key       Comments         <math>15.6</math> <math>11.1</math> <t< td=""><td><math>\mathcal{I}_{1}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math>         Depth       Key       Comments:         <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math></td><td>2/43.4       SFTD         Excavation Data Cent         Depth       Key       Comments:       Station         <math>1/5.6</math>       7.47.0       7.47.0       7.47.0         <math>1/5.7</math>       7.5       7.6       7.47.0         <math>1/5.7</math>       7.5       7.6       7.47.0         <math>1/5.7</math>       7.5       7.6       7.47.0         <math>1/5.75</math>       7.6       7.5       7.6         <math>1/5.75</math>       7.6       7.5       7.6         <math>1/5.75</math>       7.6       7.5       7.6         <math>1/5.75</math>       7.6       7.5       7.6</td><td><math display="block">\begin{array}{c c c c c c c c c c c c c c c c c c c </math></td><td>Depth         Key         Comments:         Station         Depth         Key           15.6        </td></t<></td></t<>	9/43.4       Image: Comments         Depth       Key       Comments $15.6$ $11.1$ <t< td=""><td><math>\mathcal{I}_{1}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math>         Depth       Key       Comments:         <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math> <math>\mathcal{I}_{2}</math></td><td>2/43.4       SFTD         Excavation Data Cent         Depth       Key       Comments:       Station         <math>1/5.6</math>       7.47.0       7.47.0       7.47.0         <math>1/5.7</math>       7.5       7.6       7.47.0         <math>1/5.7</math>       7.5       7.6       7.47.0         <math>1/5.7</math>       7.5       7.6       7.47.0         <math>1/5.75</math>       7.6       7.5       7.6         <math>1/5.75</math>       7.6       7.5       7.6         <math>1/5.75</math>       7.6       7.5       7.6         <math>1/5.75</math>       7.6       7.5       7.6</td><td><math display="block">\begin{array}{c c c c c c c c c c c c c c c c c c c </math></td><td>Depth         Key         Comments:         Station         Depth         Key           15.6        </td></t<>	$\mathcal{I}_{1}$ $\mathcal{I}_{2}$ $\mathcal{I}_{2}$ Depth       Key       Comments: $\mathcal{I}_{2}$	2/43.4       SFTD         Excavation Data Cent         Depth       Key       Comments:       Station $1/5.6$ 7.47.0       7.47.0       7.47.0 $1/5.6$ 7.47.0       7.47.0       7.47.0 $1/5.6$ 7.47.0       7.47.0       7.47.0 $1/5.6$ 7.47.0       7.47.0       7.47.0 $1/5.6$ 7.47.0       7.47.0       7.47.0 $1/5.6$ 7.47.0       7.47.0       7.47.0 $1/5.7$ 7.47.0       7.47.0       7.47.0 $1/5.7$ 7.47.0       7.47.0       7.47.0 $1/5.7$ 7.47.0       7.47.0       7.47.0 $1/5.7$ 7.47.0       7.47.0       7.47.0 $1/5.7$ 7.5       7.6       7.47.0 $1/5.7$ 7.5       7.6       7.47.0 $1/5.7$ 7.5       7.6       7.47.0 $1/5.75$ 7.6       7.5       7.6 $1/5.75$ 7.6       7.5       7.6 $1/5.75$ 7.6       7.5       7.6 $1/5.75$ 7.6       7.5       7.6	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Depth         Key         Comments:         Station         Depth         Key           15.6

ļ

Project:						Job Name		ANT	
l.				,		Job Numb Date:	er:	-17 St.	
						Date;			<u>s</u>
	<u></u>		Pomodial	Construe	tion Sor	vices, L.P		_ <u></u> 1~	<u> </u>
						Quality Cor			
SF	957.5		inte Sturry	TERCI OL	SFTD	V2542.	-	· •	T
	10/15	+				<u>r=27.*.</u> *			+
		1	E	xcavation	Data Cent	er	L	<u></u>	1
Station	Depth	Key	Comments		Station	Depth	Key	Comment	<u>s</u> :
7+40	15.5			• ·					_
7+56	15,5								
7+60	15.5								
7+70	15,5								
7+80	18	1	-						
7470	18.5							7	
						·		1	
		1	]					1	
		1							
								7	
			]				4	· ·	
		,			ata Center				
Station	Time	Unit Wt.	Slump		#200	Comments	· < 12	v 1.4.5	5-1
5+60	AM	133	5	37.	-)		/ <i>T</i>	// / ··	
<b> </b>		<u> </u>		·		4	- 1.	14.5	161
6+66	PM	100	.5	36,	9	4	5111	• • • • • • • • • • • • • • • • • • •	
		<u> </u>			ļ	-			
l		<u> </u>	I	Shurry De	ta Center	<u> </u>			
Trench				Sidily De	Plant		· <u></u>	·	
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Tir
7+00	AM	Mil	7?	51	64	1.5	39	8	177
	(	Bitten		60	<u> </u>		<u> ≤/==</u>	1	
		1			]			.	
7+20	PM	Mid	75	60	64.5	17	46	5	121
		BETTEM	16	63					
Comments:					; i				
		• •						,	
			· · · · -			a ser harr a son here e		اسر، ،	
						•		بالانتخاريب	
				•				- <b>1</b> -1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	
·									·
			معرف المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد ا	~					
			بوریون مسیر مسیر میرون میرون	~					•••
			۵۳۵۲ ۱۹۹۳ ۱۹۹۳ - ۲۰۰۰ ۱۹۹۳ - ۲۰۰۰ ۱۹۹۳ - ۲۰۰۰	~			•	· · ·	· • •
-			and a second and a second a second a second a second a second a second a second a second a second a second a s Second a second br>second a second a	- 		· ·		· · · · ·	***
-			المان مستقدم المستقدم المستقدم المستقدم المستقدم المستقدم	-			• •		
-	-	· · ·							
Client: (- By:	LIN MT	RI- FIN					Construct	ion Service	es, L.P.

-

Project:					-	Job Name:	E.L.	IFILT	
Il Project.				•		Job Numb		-1780	
						Date:		11-05	
							/	415	
		F	Remedial	Constru	ction Ser	vices, L.P	) . •		
						Quality Con		t	
SF	997,5	1			SFTD	13540			
	· · · · · ·								
					Data Cent	······································			
Station	Depth	Key	Comments		Station	Depth	Кеу	Comments	
8400		<u> </u>	-		ļ			-4	
8+10	<u>  </u> 		4						
8490	<u> </u>	<u> </u>	-						
8430	19	+	d _			·			
		<u> </u>	4				· · · · · · · · · · · · · · · · · · ·		
	<u></u>	<u>+</u> -	1			· · ·		-	
	<u> </u>							-1	
			1				:		
			1					-	
ļ	<u></u>		4			·		-4	
		<u> </u>	4		<u> </u>				
	i'' <sup></sup> i'''''''	<u> </u>	<u></u>	Backfill [	Data Center	_!		<u></u>	
Station	Time	Unit Wt.	Slump		#200	Comments	: 11 10	1 (.11	
						1	NO LO	JCKT: 11	
						] San		ackfill 76 Hun 8% Par	
		<u> </u>	ļ	·		1	76	Par Par	
					<u></u>	- Strat		5 76 1 1 1	"
JJ				Shurpy D	ata Center				
Trench		<u></u>		Siulty D	Plant			<u></u>	
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	
FIFIFIC	1114	rilici	AC	1	64PS			8	Ę.
		Detter	<b>\$</b> 79				-		
RG74840	PHI	privel					•		
	<u></u>	better	29	(att	<u> </u>		<u> </u>		
Comments	· · · · · · · · · · · · ·	<u> </u>		l	<u> </u>	. I			
Comments									
		• • •							
a state							- ·		
	-		•				Ŧ		
1		,	•						
						1			- i
Client:	117 NI 1	St. 1-1 11.	star t			Remedial (	Construct	ion Services	
Client: /	117 NT 1	REPINI:	<u>17 - 5</u>			Remedial C			<u>, L</u>

l

Project:         Job Name:         Image: Ima								i		
Job Number: 3-47%C           Date: 7-47%C           Date: 7-47%C           Date: 7-47%C           Soil Bentonite Siurry Trench Cut Off Wall Quilty Control Sheet           SF // 47.5           Excavation Data Center           Station Depth Key Comments:           Station Time Unit Wt. Siump %>#200           Comments: Nise boots (+11) 2           Station Time Unit Wt. Visc. Unit Wt. Filtrate Visc. pH           Station Time Depth Unit Wt. Visc. Unit Wt. Filtrate Visc. pH           Station Time Depth Unit Wt. Visc. Unit Wt. Filtrate Visc. pH           Station Time Depth Unit Wt. Visc. Unit Wt. Filtrate Visc. pH           Station Time Xi & G X 4 4           Better: 7.6 5.6           Station Time Xi & G X 4 4           Depth Visc. Unit Wt. Filtrate Visc. pH           Station Time Xi & G X 4 4           Depth Visc. Construction Services, By: W. W. W. W. W. W. W. W. W. W. W. W. W.	Destast					- 	Lob Nome	/ 11	during the	- /-
Date: 7-40007       Remedial Construction Services, L.P.       Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet       SF //4/75       Second Data Center       Station       Depth       Key       Comments:       Station       Depth       Key       Comments:       Station       Depth       Key       Comments:       Station       Time       Unit Wt.       Slump Data Center       Station       Time       Depth       Mix do       Station       Time       Depth       Mix do       Station       Time       Mix do       Station       Time       Mix do       Station       Time       Mix do       Station       Mix do       Ado <tr< th=""><th>Project:</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>- 101 115</th><th>_</th></tr<>	Project:								- 101 115	_
Remedial Construction Services, L.P.       Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet       SF     // 4/7.5     SFTD     /.5 O/7.07.4       Excavation Data Center       Station Depth Key Comments:       Station     Depth     Key     Comments:       Station     7.4	li i									
Soll Bentonite Slurry Trench Cut Off Wall Quality Control Sheet           SF         //4/75         SFTD         //2 0/5           Excavation Data Center           Station Depth Key Comments:           Station         Depth         Key         Comments:         Station         Depth         Key         Comments:           Station         Depth         Key         Comments:         Station         Depth         Key         Comments:           Station         J./         Station         J./         Station         Comments:         Station         Comments:         Station         Comments:         No.e         Context from the station           Station         Time         Unit Wt.         Slump         %>#200         Comments:         No.e         No.et from the station           Station         Time         Depth         Unit Wt.         Slump Data Center         Station         PH         Station         No.et from the station         PH         Station         Station         Station         Station         Time         Depth         Att is         Ge Att is         Att is         Att is         Att is         Att is         Att is         Att is         Att is         Att is         Att is							Date		<del>7 33</del>	<u> </u>
Soll Bentonite Slurry Trench Cut Off Wall Quality Control Sheet           SF         //4/75         SFTD         //2 0/5           Excavation Data Center           Station Depth Key Comments:           Station         Depth         Key         Comments:         Station         Depth         Key         Comments:           Station         Depth         Key         Comments:         Station         Depth         Key         Comments:           Station         J./         Station         J./         Station         Comments:         Station         Comments:         Station         Comments:         No.e         Context from the station           Station         Time         Unit Wt.         Slump         %>#200         Comments:         No.e         No.et from the station           Station         Time         Depth         Unit Wt.         Slump Data Center         Station         PH         Station         No.et from the station         PH         Station         Station         Station         Station         Time         Depth         Att is         Ge Att is         Att is         Att is         Att is         Att is         Att is         Att is         Att is         Att is         Att is				Remedial	Constru	iction Sei	vices   P		_L	-L
SF         // 475         SFTD         // 50/5           Excavation Data Center           Station         Depth         Key         Comments:         Station         Depth         Key         Comments:           Station         Depth         Key         Comments:         Station         Depth         Key         Comments:           Station         14         15         16         17         16         17         14         14         14         16         17         16         17         16 <td< td=""><td> </td><td><u></u></td><td></td><td></td><td></td><td></td><td></td><td></td><td>t</td><td></td></td<>		<u></u>							t	
Station         Depth         Key         Comments:         Station         Depth         Key         Comments:           \$7 4 Cr.         1 4         Comments:         Station         Depth         Key         Comments:           \$7 4 Cr.         1 4         Comments:         Station         Depth         Key         Comments:           \$7 4 Cr.         1 4         Cr.         C	SFI	1475			Trenen e	SFTD	15015			Γ
Station         Depth         Key         Comments:         Station         Depth         Key         Comments:           \$7 4 \beta \		<del>f. i. L. i</del>					1-2-1	···		╈
2450       12         2477       14         2477       16         2476				E	xcavatior	Data Cent	er			
Station       Time       Unit Wt.       Slumy Data Center         Station       Time       Unit Wt.       Slumy Data Center         Station       Time       Unit Wt.       Slumy Data Center         Station       Time       Unit Wt.       Slumy Data Center         Station       Time       Unit Wt.       Slumy Data Center         Station       Time       Unit Wt.       Slumy Data Center         Station       Time       Depth       Unit Wt.       Visc.       pH         Station       Time       Depth       Joshtw.       7.0       5.6       Joshtw.       Joshtw. </td <td></td> <td>Depth</td> <td>Key</td> <td>Comments</td> <td></td> <td>Station</td> <td>Depth</td> <td>Кеу</td> <td>Comment</td> <td><u>3</u>:</td>		Depth	Key	Comments		Station	Depth	Кеу	Comment	<u>3</u> :
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	8+50	18		]						
Q+50       14         Q+10       14         Q+11       14         Q+11       14         Q+11       14         Q+11       14         Q+11       15         Q+11       16         Q+11       17         Q+11       17         Q+11	8+60			]						
$\begin{array}{c c c c c c c c c c c c c c c c c c c $				]					_	
Image: Station 1 ime Unit Wt.       Slump 965#200       Comments: Note back fill 2         Image: Station 1 ime Unit Wt.       Slump 965#200       Comments: Note back fill 2         Image: Station 1 ime Unit Wt.       Slump 965#200       Comments: Note back fill 2         Image: Station 1 ime Unit Wt.       Slump 965#200       Comments: Note back fill 2         Image: Station 1 ime Unit Wt.       Slump 965#200       Comments: Note back fill 2         Image: Station 1 ime Depth Unit Wt.       Visc.       Unit Wt.         Image: Station 1 ime 1 bepth Unit Wt.       Visc.       Unit Wt.         Image: Station 1 ime 1 bepth 1 Unit Wt.       Visc.       Unit Wt.         Image: Station 1 ime 1 bepth 1 Unit Wt.       Visc.       Unit Wt.         Image: 1 image: Station 1 image:									_	
3 + 10 $14$ $7 + 70$ $14$ $7 + 70$ $14$ $7 + 70$ $14$ $7 + 70$ $14$ $7 + 70$ $14$ $7 + 70$ $14$ $7 + 70$ $14$ $7 + 70$ $14$ $7 + 70$ $14$ $9 + 70$ $14$ $16$										
747c $14$ $747c$ $14$ $747c$ $14$ $747c$ $14$ $747c$ $14$ $747c$ $14$ $747c$ $14$ $747c$ $14$ $747c$ $14$ $747c$ $14$ $747c$ $14$ $71me$ Unit Wt.         Slurry Data Center         Trench       Plant         Station       Time         Depth       Unit Wt.         Visc.       Unit Wt. $84$ $166$ $166$ $175$ $166$ $175$ $164$ $175$ $164$ $175$ $164$ $175$ $164$ $175$ $164$ $175$ $164$ $175$ $164$ $175$ $164$ $175$ $164$ $175$ $164$ $175$ $164$ $175$ $164$ $175$ $164$ $175$ <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td>·</td><td><u>-</u></td><td></td><td></td></t<>							·	<u>-</u>		
Product       Product       Backfill Data Center         Station       Time       Unit Wt.       Slump       %>#200       Comments: No.e back frill 2         Station       Time       Unit Wt.       Slump       %>#200       Comments: No.e back frill 2         Station       Time       Unit Wt.       Visc.       Unit Wt.       Filtrate       Visc.       PH         Station       Time       Depth       Unit Wt.       Visc.       Unit Wt.       Filtrate       Visc.       PH         X4       Mid       6 \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$ \$\$		ميد خيم من المحصيف			•	ļ	· · · · · · · · · · · · · · · · · · ·		4	
Backfill Data Center       Station     Time     Unit Wt.     Slump %>#200       Comments: Noe back frill 2       Slurry Data Center       Trench     Plant       Slurry Data Center       Trench     Plant       Station     Time       Depth     Unit Wt.     Visc.       Plant       Station     Time     Depth     Unit Wt.     Visc.     DH       Ørid     Go S     U 3     U 1     18     3 9     X       Mid     6     4     3     6     3     4     4       Mid     Go S     U 1     164.5     17.5     40     8       Souther     78     6     3     4     4       Comments:     Souther     78     6     3     4       By: M.M.M.			·	4					-	
Station       Time       Unit Wt.       Slump       %>#200       Comments:       Noe       Dack fill       2	7770	14		ł					-	
Station       Time       Unit Wt.       Slump       %>#200       Comments:       Noe       Dack fill       2	┠	<u></u>							-	
Station       Time       Unit Wt.       Slump       %>#200       Comments:       Noe       Dack fill       2	∦+			4			· · · ·		-1	
Station       Time       Unit Wt.       Slump       %>#200       Comments:       Noe       Dack fill       2	╟────┼		<u> </u>	1					-	
Station       Time       Unit Wt.       Slump       %>#200       Comments:       Noe       Dack fill       2		·······		1				······	-	
Obse Cutter IT is       Slurry Data Center       Trench       Plant       Station Time Depth Unit Wt. Visc. Unit Wt. Filtrate Visc. pH       Ø i     Mi d     Ø S     Y 3     Ø I       Ø i     Mi d     I S     I S     I I       Ø i     Mi d     I S     Y 4     I I       Ø i     Mi d     I S     I I     I S       Ø i     Mi d     I S     I I     I S       Ø i     Mi d     I S     I I S     I I S       Image: Station Time Depth Unit Wt.     Visc.     Unit Wt.     Filtrate     Visc.     pH       Ø i     Ø i     I S     I S     I I S     I I S     I I S       Image: Station Time Depth I     Image: Station Time Depth I I I S     I I S     I I S     I I S       Comments:     Image: Station Time Depth I S     I I S     I I S     I I S       Client: A I AM I Mithum S       By:     Remedial Construction Services, By:										
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Station	Time	Unit Wt.	Slump	%>	×#200	Comments	Nor b	ackfill	2.
Trench       Plant         Station       Time       Depth       Unit Wt.       Visc.       Unit Wt.       Filtrate       Visc.       pH         Mid $65$ 43 $64$ $18$ $39$ $8$ bettow $7c$ $56$ $  41$ $64.5$ $17.5$ $40$ $8$ $ Nid$ $67$ $41$ $64.5$ $17.5$ $40$ $8$ $ Nid$ $67$ $41$ $64.5$ $17.5$ $40$ $8$ Comments: $   -$									-	-
Trench       Plant         Station       Time       Depth       Unit Wt.       Visc.       Unit Wt.       Filtrate       Visc.       pH         Mid $65$ 43 $64$ $18$ $39$ $8$ bettow $7c$ $56$ $  41$ $64.5$ $17.5$ $40$ $8$ $ Nid$ $67$ $41$ $64.5$ $17.5$ $40$ $8$ $ Nid$ $67$ $41$ $64.5$ $17.5$ $40$ $8$ Comments: $   -$					·		-			
Trench       Plant         Station       Time       Depth       Unit Wt.       Visc.       Unit Wt.       Filtrate       Visc.       pH         Mid $65$ 43 $64$ $18$ $39$ $8$ bettow $7c$ $56$ $  41$ $64.5$ $17.5$ $40$ $8$ $ Nid$ $67$ $41$ $64.5$ $17.5$ $40$ $8$ $ Nid$ $67$ $41$ $64.5$ $17.5$ $40$ $8$ Comments: $   -$	l			<u> </u>			-			
Trench       Plant         Station       Time       Depth       Unit Wt.       Visc.       Unit Wt.       Filtrate       Visc.       pH         Mid $65$ 43 $64$ $18$ $39$ $8$ bettow $7c$ $56$ $  41$ $64.5$ $17.5$ $40$ $8$ $ Nid$ $67$ $41$ $64.5$ $17.5$ $40$ $8$ $ Nid$ $67$ $41$ $64.5$ $17.5$ $40$ $8$ Comments: $   -$	┠		+				-			
Trench       Plant         Station       Time       Depth       Unit Wt.       Visc.       Unit Wt.       Filtrate       Visc.       pH         Mid $65$ 43 $64$ $18$ $39$ $8$ bettow $7c$ $56$ $  41$ $64.5$ $17.5$ $40$ $8$ $ Nid$ $67$ $41$ $64.5$ $17.5$ $40$ $8$ $ Nid$ $67$ $41$ $64.5$ $17.5$ $40$ $8$ Comments: $   -$	[L		_!	I;	Slurry D	ata Center				
Station       Time       Depth       Unit Wt.       Visc.       Unit Wt.       Filtrate       Visc.       pH $\mathcal{M}_{id}$ $\mathcal{G}$	Trench				Utany D			<u></u>		
$Mid$ $65$ $43$ $64$ $18$ $39$ $8$ bettom $70$ $56$ $75$ $17.5$ $40$ $8$ $Mid$ $67$ $41$ $64.5$ $17.5$ $40$ $8$ $Mid$ $63$ $41$ $64.5$ $17.5$ $40$ $8$ Comments: $10$ $78$ $63$ $17.5$ $40$ $8$ Client: $A1AM$ $NEF_{IWINK}$ Remedial Construction Services,       By: $By:$ $By:$ $Mid$ $Mid$		Time	Depth	Unit Wt.	Visc.		Filtrate	Visc.	pН	Т
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	× 4	par	Mid	65		64	18	39	8	
Comments: Comments: Client: AIAMI NEFINING By: By: By: By: By: By: By: By:			porton					:		
Comments: Comments: Client: AIAMI NEFINING By: By: By: By: By: By: By: By:	<u> </u>					64.5	17.5	40	8	Ļ
Client: AIAMI MEFINING By: By: By: By: By: By: By: By: By: By:			botton	78	63		<u> </u>			+
Client: AIAMI MEFINING By: By: By: By: By: By: By: By: By: By:			<u> </u>			<u> </u>	<u> </u>			L
By: By: by tot,	<u>Comments</u> :					÷		• •		
By: By: by tot,				- n				• .	,	
By: By: by tot,					•			,		
By: By: by tot,										
By: By: by tot,										
By: By: by tot,										
By: By: by tot,										
By: By: by tot,									· ·	
By: By: by tot,		•								
By: By: by h Yel,										
By: By: by h Yet,		<del>م. بر</del>					<u> </u>			
•	Client: (1)	ANI MI	EP-INING				Remedial C	Construct	ion Service	5,
	ву:						шу: / т	11 Vel.	·	
								11		

Project:						Job Name	: Giant	<u>r</u>	
				·			er: <u>2 - 1 -</u>		
1						Date: 🤶	.18.05	r	
			Pomodial	Constru	tion So	vices, L.F	L	L	L
J						Quality Cor			
SF	1270	Son Denic	Inte Sturry	Trench Ct	SFTD	16'285	III DI SHEEL		·
	1-10		<u> </u>		0110	14 285			
1		1	F	xcavation	Data Cent	er	l		I
Station	Depth	Key	Comments		Station	Depth	Key	Comments	
9+40	15			•	Oldion				<u>.</u>
9+50	14	11						1	
4+60	14	11	1					1	
9+70	14		1			1		1	
9+80	14	11	f .						
9+90	14	11						1	
1+00	14		1					1	
1+10	14	11	1				· ·	1	
1+20	14	11				1		1	
	· ·	·····	1				,	1	
						1		1	
1		· ·	1			· ·	:	1	
							. 1	]	
			·				÷ ÷		
· · ·				Backfill D	ata Center	•			
Station	Time	Unit Wt.	Slump		#200	Comments	S < 1	7.9 %	11
9+60	PM	119.5	52	310.9		<b>.</b> * .		6	
							Savel	16. %	loot
	· · ·	; ;				1			
		<u> </u>			·	1			× 94
l				,		<u> </u>			
				Slurry Da	ta Center			· · · · · · · · · · · · · · · · · · ·	
Trench Station	Time	Donth			Plant Unit Wt.	Filtrote	Visc.		Τ
Station Cert 8 + 2	Pm	Depth	Unit Wt.	Visc.	6.4.5	Filtrate	40	PH 8	P
ICCERT X T K	Pin	Which bottom	1.4.5		117.5	18	70		
<b>├</b> ───	<u></u>	DOTTOM	<u> </u>					<u>+</u>	┼───
-			}			+	<u>_</u>	+	
		·	<u> </u>			+		<u> </u>	
Comments:		<u> </u>	1	L	· · ·			<u> </u>	<u> </u>
1	Sée	60	com et	- <1	1 L	. for	ANI	+->+	340
			Urv Le (			101			
					*			· .	. •
									· · ·
								•	
							· .		
-	-								
-	-			-		· ·			
- Client:	-			- -		Remedial	Constructio	on Service	s, L.F

Project:	-					Job Name		17N1	
						Job Numb Date:	er: <u></u>	-1780	
1		<b>.</b>					1- 3	<u> </u>	<u> </u>
			Romodial	Constru	ction So	rvices, L.F	)	<u></u>	L
						I Quality Cor		,	
SF	767,5		I Sturry	Trench Ci		17052	, 5	T	r
	101,0	l				11002	<u>, )</u>		
		L	I	xcavation	Data Cen	tor		<u> </u>	<u>L</u>
Station	Depth	Key	Comments		Station	Depth	Key	Comments	<u>.                                    </u>
10+20	1512	Ney			Station	Depin	Ney		<u>.</u>
the second second second second second second second second second second second second second second second s	15 1/2		4					-	
10+40	1544		4					-	
	1512		-		<u> </u>			-	
10+60	15 12		-					4	
14+70	1372		-		<u> </u>			4	
								-	
		l	-	•			L	4	
			4		<u> </u>		<u> </u>	4	
┝			4					4	•
	•	·	4		<u> </u>			-	
			4				//	4	
			4			· · · ·	1.3.4	4	
			4				- injet	4.	
<u> </u>		L	I	Doel/fill D	I Conto		l	<u>1 / / </u>	
Station	Time	Unit Wt.	<u> </u>		ata Cente			0 00	· · ·
Station	Time		Slump		#200	Comments	: Sand	9.%	
11410	1-1 n 1	- <u>  </u> 7	51/2	37.5	11	-	<i></i>		
┝		<u> </u>		,	<u>}'</u>				
		[		<u></u>	f23	-			2
					ļ			1 50 C	NV N
L		I	<u> </u>	Shurny Dr	ta Center			1214	
Trench				Siully Di	1-1				······································
Station	Time	Depth	Unit Wt.	Visc.		Filtrate	′′ Visc.	pH /	Time
10420	Am	Mud	68	50	64	441255	40	8 2	
	PTVA	Victor	22	50	1.07		N N	<del>- 0 ~</del>	
		LICTICAL	73	<u>v</u> e			1 Prof	+	
									5
		<u> </u>				· { · · · · · · · · · · · · · · · · · ·		N.M	
Comments:		1	.4		L		<u> </u>	<u> </u>	(
<u>oomments</u> .						• •	-		
									·
·								· · · ·	
						s .		,	• •
		\$							
-	-					· .			
-	-							100	
-	1.10.1				•	//		an Condoo	e i D
Client: (	FIANT	RET	TININS			Remedial			<u>s, L.P.</u>
Client: (	FIANT	ÎĨĔĬ	TNINS				Constructi		s, L.P.
By:		·····	TININ S						<u>s, L.P.</u>
By:		·····	TNINS						s, L.P.
By:		·····	<u>ININS</u>					1 Senel	••••••••••••••••••••••••••••••••••••••
Client: ( By: QAQC Slurr		·····	TININS					1 Senel	<u>s, L.P.</u>

•.

,

						vices, L.F			· ·
					ut Off Wall	<b>Quality Con</b>	ntrol Sheet		
SF	757,5				SFTD	17210			
					Data Cent				
Station	Depth	Key	Comments	•	Station	Depth	Key	Comments	:
10480	15			,				-	
10+90	15					<u></u>		-	
11400 11410	15-12						ļ	-	
11+36	15		-			<u>+</u>		4	
the second second second second second second second second second second second second second second second s						<u>+</u>		1	
							÷	1	
								]	
							1	4	1
	·				L	<u> </u>		ļ	
						+		4	
							<u> </u>		
						<u>+</u>			
		L	<u></u>	Backfill D	ata Center		f		
Station	Time	Unit Wt.	Slump		#200	Comments		1 829	
10+40	C <sub>PN</sub>	119	51/2	369			Jan	JI 835%	
					<u> </u>	8			<b>.</b>
					120				
	<u> </u>		· · · · · · · · · · · · · · · · · · ·		25.3	A. 2.	O <sub>M</sub>		9
		l	l	Slurry D	ata Center	<u> </u>	<u>e()</u>		
French					Plant	Easer too		hof 1 and	خر .
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	< Filtrate _	Visc.	р́Ӊ	Time
OIC+UM	Pril	11.1	59	47	64.5	1700	140	811.	Pm
<u> </u>		1++	3 في ا	58					
					·	<u> </u>		<u> </u>	Y Ki
							h	4	
		L., .,	L		L	1		<u>,                                     </u>	L
	• •	••			· · · · · · · · · · · · · · · · · · ·	· ·			
				;			•	1	· · · ·
						`			
							:		
-	*				•				
	·	~ ~				/a			
<mark>Client:</mark> ( By:	<u> </u>		NING			Remedial	-		

roject:					<u> </u>	Job Name Job Numb		1750	
,						Date:	<u></u> 7	1-05	
								T	
			Remedia	I Constru	ction Ser	vices, L.P	·	· · · · · · · · · · · · · · · · · · ·	
						Quality Cor			
SF	1525		1		SFTD	19335	/		
	,								
				Excavation		the second second second second second second second second second second second second second second second s			
Station	Depth	Key	Comment	<u>s</u> :	Station	Depth	Key	Comments	:
11430	16		_			ψ <u>_</u>		_	
1446	$T_{c}$	·	4		÷			4	1. A. A. A. A. A. A. A. A. A. A. A. A. A.
11450	16	+	4			6,	12	4	(
11+60		+	4			×**	·~~.	4	
<u>11470</u> 114-30	16		-					4	
11730	16	+	4				<u> </u>	-	
1770	14	·	-	·		+		1	
17410	$\frac{1}{14}$	1	-	Mq				1	N. WE
1. J. 1.	-1-1		1		8			1	~ 6
	·····		1		04			1	
		· · · · · · · · · · · · · · · · · · ·	]			~			
						- 1 -	1.1.1	x	
							KI /		
					ata Center		:		
Station	Time	Unit Wt.	Slump		#200	Comments	Sand	ANG .	. 동가신 📗
<u>10+70</u>	Aina	119	5%	37.3	ļ	-	Ś. J	L'é	.949
		19-	wer El	· ·	ļ	0	OH IN A		
10+40	Part	120	51/2	- i				n je statu n	6.3
			+	·		-			1 V
	L	:	<u> </u>	Slurry Da	ta Center			4 <sup>1</sup> .	
rench		:			Plant	. ). ¥		1. J	
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	[ pH	lime
	AIVI	Miel	70	41	64.5	18.5	- 40	8	Kn1
	14101	koth.	73	75	104	18	39	8	Phil
	12.11	mil	21	49			4	<u> </u>	1 set
	$\rho_{nn}$	tou Hom	73	78		+			┟─────┦
omments	•		<u> </u>	L	l	L	L	<u> </u>	<b></b>
Uninents	•				•			- 	
				н на на на на на на на на на на на на на					·
2.									
-									· · ·
دهن							• •		1
<u>ح</u>									
								·	
-									
				-					
		:							
lient: / ·	+1HNT	REFI	NINS			Remedial ( By: Vote	Construct	and the second second second second second second second second second second second second second second second	s, L.P.

LAQC Slurry Form.xls

~

Project:						Job Name		ANT KE	د المماد المنسل م
						Job Numb		-1780	
						Date:	<u> </u>	<u> 65- 3</u> .	- <u>73 - (</u> T
J		 E	Remedial	Constru	ction So=	vices I r	L	<u> </u>	<u> </u>
			onite Slurry					•	
SF	2535		Ante Siurry		SFTD	21870		<u>.</u>	T
	1.20			· · · · · · · · · · · · · · · · · · ·		12/2/0		<u> </u>	
<u> </u>	1	<u> </u>	IF	Excavation	Data Cent	er		_L	1
Station	Depth	Key	Comments		Station	Depth	Key	Comments	 S:
	14.5	11	1	•	13170.	14	11		-
19+30 19+40	14.5		1		13+86	14		1	
12+50	14.5		]		13+90	14			
1946.	14		]		14400	74			
14+71.	14	3				<i>,</i>			
111490	14	·	4		· · · · · · · · · · · · · · · · · · ·	I			
19+96	14	· · · · · · · · · · · · · · · · · · ·		•		·		1	
13+00	14		4 .		ļ	<b> </b>		4	
13410	14	· · · ·	4					4	
15+00	14	<u> </u>						4.	
17+30	14		1					-	
13+10	4	·	{					4	
1340	14				.]	<u> </u>		-	
<u> </u>		L	L	Backfill D	ata Center	L	L		
Station	Time	Unit Wt.	Slump		#200	Comments	: e. v		
Cilico	Fish	120	5	36.3		1 Ann	- Jard	1 Mid 7	1.5 /
11+20						1		better	9.5%
					· ·	] <sup>3-</sup> [``b ,	5. 1	htid 7	<
13460		11-8	51/2			] . [n]	29.04	latter 1	·•• • • • •
H.	<u> </u>	l	l			1		1001101/1 B	₩.₩/.
				Showay De		·····			
Tropph				Siulty D	ata Center	·····			
Trench	Time	Depth			Plant	Eiltroto	Vico		Tim
Station	Time	Depth	Unit Wt.	Visc.	Plant Unit Wt.	Filtrate	Visc.	pH	
	Time होता	Depth Mil.1	71	Visc.	Plant	Filtrate	Visc.	рН &	
Station 12+41	HIM	Depth Mill botton	71 72	Visc.	Plant Unit Wt.	17.5	3 G	8	H.:
Station		Depth Mill Deffen Mild	71	Visc.	Plant Unit Wt.				
Station 12+90 12±1,0	Pni Pni	Depth Mill botton	71 72 70	Visc. 41 169 42	Plant Unit Wt.	17.5	3 G	8	H. 11
Station 12+40	Pni Pni	Depth Mill Deffen Mild	71 72 70	Visc. 41 169 42	Plant Unit Wt.	17.5	3 G	8	H. 4
Station 12+40 12±40	Pni Pni	Depth Mill Deffen Mild	71 72 70	Visc. 41 169 42	Plant Unit Wt.	17.5	3 G	8	H.e.
Station 12+40 12+40	Pni Pni	Depth Mill Deffen Mild	71 72 70	Visc. 41 169 42	Plant Unit Wt.	17.5	3 G	8	H.e.
Station 12+40 12+40	Pni Pni	Depth Mill Deffen Mild	71 72 70	Visc. 41 169 42	Plant Unit Wt.	17.5	3 G	8	H.:
Station 12+40 12+40	Pni Pni	Depth Mill Deffen Mild	71 72 70	Visc. 41 169 42	Plant Unit Wt.	17.5	3 G	8	H.e.
Station 12+40 12±40	Pni Pni	Depth Mill Deffen Mild	71 72 70	Visc. 41 169 42	Plant Unit Wt.	17.5	3 G	8	H. 4
Station 12+40 12+40	Pni Pni	Depth Mill Deffen Mild	71 72 70	Visc. 41 169 42	Plant Unit Wt.	17.5	3 G	8	
Station 12+40 12+40	Pni Pni	Depth Mill Deffen Mild	71 72 70	Visc. 41 169 42	Plant Unit Wt.	17.5	3 G	8	H. 11
Station 12+40 12+40	Pni Pni	Depth Mill Deffen Mild	71 72 70	Visc. 41 169 42	Plant Unit Wt.	17.5	3 G	8	H. 11
Station 12+40 12±40	Pni Pni	Depth Mill Deffen Mild	71 72 70	Visc. 41 169 42	Plant Unit Wt.	17.5	3 G	8	H. 11
Station 12+40 12+40	Pni Pni	Depth Mill Deffen Mild	71 72 70	Visc. 41 169 42	Plant Unit Wt.	17.5	3 G	8	H. 11
Station $12 \pm 41$ $12 \pm 1$ c Comments	Am Pni	Depth Mill Dettern Dettern	71 72 72	Visc. 41 169 42	Plant Unit Wt.	17.5		8	
Station 12+40 12+40	Am Pni	Depth Mill Deffen Mild	71 72 72	Visc. 41 169 42	Plant Unit Wt.	/7.5		Service	

· · ·		1	,				<u></u>		<u></u>
Project:						Job Name:	(-1/-	LUT INCH	1 <u>(1772)</u>
··· ··· ·		· · · · · · · · · · · · · · · · · · ·				Job Numbe Date:	the second second second second second second second second second second second second second second second s	3-05	
							· · · · · · · · ·	<u>, , , , , , , , , , , , , , , , , , , </u>	·····
		F	Remedial	Construc	tion Ser	vices I P	· · · ·		·····
			nite Slurry					•	
SF	2085		line oldrig	Trenon ou	SFTD	23955			
	2000					32/201			
	<u>}</u>		Ē	xcavation	Data Cent	er		<u>.                                    </u>	
Station	Depth	Key	Comments:		Station	Depth	Кеу	Comments:	
14+10	14				15+50	14	¥		
14+20	14		~	· · · ·				· .	• •
14+30	161							<b>1</b>	
14+40	13.5				· · ·			]	
14+56	13.5			· · · · · · · · ·					
14+60	135						· ·		
14+70	14								
14+80	14			· · ·		<u> </u>			:
14+96	1-1 -			· · · · · · · ·		·, ····		<b>1</b>	
15+00	14			- 		<u>   </u>		· · · · · · · · · · · · ·	
15410	14		·						<u></u>
15+20					· .		ء تدليد د د	-	
<u>15430</u> 15440	14		· · · · · · · · ·			<u> </u>	2	4	
12 470	1 17	<u> </u>		Backfill D	ata Center		<u> </u>	<del>مىشىغا ئىرىكى ئىك يەل</del> ى	
Station	Time	Unit Wt	Slump		#200		nis	~l mid	7%
14+20	Am	1.118 -		359			HM		
								bottors	-1.5 /6
···. • 18 11.				1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -			0	el mid 7	59
14+40	Pm .	- 121 -	41/2	nin solataa					
		and the second second						bettern 1	0/0
· 영국 가격학	arts ungelo k Thomas			Slurry Da	ta Center	<u> </u>	· · · · ·		
Trench	Time	Depth		Visc.	Plant Unit Wt.	Filtrate	Visc.	pH	Time
Station	Fime Anlo		Unit Wt.	43	645	18	40	8	Am
14+40	14110	boHenr	77	<u>~73</u> ~~7~~~~		n the second for	and the second second second second second second second second second second second second second second second		
No davra pošeja		FIC HONT	A State State	ার্ক মহানাই	64	18.5	39	8	$\rho_{m} \approx$
141+60	PM	Mid	69	-42 20				· · · · · · · · · · · · · · · · · · ·	
and the Marris	Anna and the	botton	72	× 62 m		gest of a	tal Polisederi		
	<u>s</u>								
<u>Client:</u> By:	<u>[] jant</u>		VINS			D (/)	Construct	ion Services	<u>, L.P. ·</u>
		S	ورب در الدی با از از میچ داند آرد. محک البراه و روان از دروان و م محکوم بروانی دروان و محکوم و محکوم			$ 1^{-7}$	1.	ار به در رقب کرد. میشود مربع میشود مربع از میرود از این مربع میشود. میشود مربع از میرود از میشود از این میشود.	

				· -			Avil N	F.F. I. VIII	
					Job Nar		9-175	0	
					Job Nut	mper.	2-3-03		
cti					Date:				
			ام در مدر به ایندهای در محمد میکند به ایندهای در		Services, Nall Quality	L.P.			
		Reme	dial Cons	truction	Services, Wall Quality TD 9/25	Control Sh	leet		
	Soil B	entonite S	lurry Trenc	h Cur On	TD 19/2	75		-	
SE 19220			and the second sec	- 1					
SF 2720			Excava	ation Data	Center ation Der	oth Ke	y Comn	nents:	
l	Ke	V ICom	ments:	30	$\frac{1}{400} \frac{1}{14}$			and a second second second second second second second second second second second second second second second	
tation Depth		2			+10 14			· · · · · · · · · · · · · · · · · · ·	
760 14									
+ 10							_	منع من من من الماني الماني. 19 مع مارين الماني الماني الماني الماني الماني الماني الماني الماني الماني الماني ال	
-48-0 14 5-490 14				$\vdash$				میں است کی اور اور اور اور اور اور اور اور اور اور	
1400 17									
1.+10 15								معاد المراجع معاد المراجع المراجع معاد المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع ا معاد المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع ال	
1.+30 15				E F		<u>L</u>			
16 +40 15								and a second second second second second second second second second second second second second second second	
16+50 15			an a san a				in the second se		
16+60 15					Constant State of State				
$\frac{11.+70}{11.+5015}$					Contor				
16+90 15			E	Backfill Da %>#	a Center	omments:		2. %===	
	ime	Unit Wt.	Slump	31.7	<u> </u>	- 3 m	oHom -1	0%	
Station	01	121	_5	- Sterry		6)		العدينة من التربي 	
				7. /					· · · · · · · · · · · · · · · · · · ·
14+80 1							· . · · · ·		
								i en pagos	
				Slurry Da	ata Center	<ul> <li>1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -</li></ul>		an an an an Araba an Araba an Araba an Araba an Araba an Araba an Araba an Araba an Araba an Araba an Araba an	Time
				and the second	Ata Center Plant	1	Visc.	pH	Time
Trench		Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc. 4 ()	an an an an Araba an Araba an Araba an Araba an Araba an Araba an Araba an Araba an Araba an Araba an Araba an	PM
Trench	Time	Depth	72	Visc.	Plance	Filtrate	Visc. 4 ()	pH Y	Pm Ime
Trench	Time Pm	Depth Mid botton		Visc.	Unit Wt.	Filtrate	Visc. 4 ()	pH G	PM A
Trench Station		mid	72	Visc.		Filtrate	Visc. - 4 ()	pH Y	Pm Ime
Trench	Pm	Mid Laotton1	72	Visc.	Unit Wt.	Filtrate	Visc. 4 ()	pH G	PM A
Trench Station Ray 15+44		Mid Lastions	72	Visc.		Filtrate	Visc. 4 ()	pH G	PM A
Trench Station	Pm	Mid Laotton1	72	Visc.		Filtrate	Visc. 4 ()	pH G	PM A
Trench Station Ram 1544 Comments:	Pm	Mid Laotton1	72	Visc.		Filtrate	Visc. 4 ()	pH G	PM A
Trench Station Ram 15+44	Pm	Mid Laotton1	72	Visc.		Filtrate	Visc. 4 ()	pH G	PM A
Trench Station Ram 1544 Comments:	Pm	Mid Laotton1	72	Visc.		Filtrate	Visc. 4 ()	pH G	PM A
Trench Station Ram 15+44	Pm	Mid Laotton1	72	Visc.		Filtrate	Visc. 4 ()	pH G	PM A
Trench Station Ram 15+44	Pm	Mid Laotton1	72	Visc.		Filtrate	Visc. 4 ()	pH G	PM A
Trench Station Ram 15+44	Pm	Mid Laotton1	72	Visc.		Filtrate	Visc. <u> 4</u> ()	PH 9	
Trench Station Ram 15+44	Pm	Mid Laotton1	72	Visc.		Filtrate	Visc. <u> 4</u> ()	PH 9	
Trench Station Ram 15+44	Pm	Mid Laotton1	72	Visc.		Filtrate		PH 9	
Trench Station Comments:	Pm	Mid lastens		Visc.		Filtrate	Visc. 4 () Iial Constru	PH 9	PM A
Trench Station Rem 15+c	Pm	Mid Laotton1		Visc.		Filtrate		PH 9	
Trench Station Comments:	Pm	Mid la Hunn		Visc.		Filtrate	Visc. 4 () Iial Constru	PH 9	

roject:						Job Name:	(LIA)	VT RE	MININES
rojecti						Job Numbe		-1750	
· · · · ·						Date:		4-05-	· · · · · · · · · · · · · · · · · · ·
				·					
		F	Remedial	Construe	ction Ser	vices. L.P			
			onite Slurry					<b>F</b>	
SF	9135	Son Denic		Trench Ou	SFTD	28410	III OI ONCE	<b>.</b>	
	N/ 55					22 910			
1		ļ	<u>  </u> F	veavation	Data Cente	<u> </u> 1 9r			_
Station	Depth	Key	Comments		Station	Depth	Key	Comment	s'
					18+60	15	1(0)		<u></u> .
17+20	14	۹ 	· · · · · ·		18+70	15	•		
7+30	14		[., ·		15 710	<u></u>			
17440 17450	14								
	14				· · · · · · · · · · · · · · · · · · ·		· · · ·	-	
17+60 17+70	14	[	4			<u> </u>	<u> </u>	- ·	
17+90	14	<u> </u>	4	i de la composición de la comp	<u> </u>	<u> </u>		1	
17+90	14	<u> </u>	- ····	n na na Arriga. Arriga		<u> </u>	<u> </u>		
18400	12	· · · · · · · · · · · · · · · · · · ·		· · · ·			<u> </u>		
18700	1-1-1-				4.4			1 .	
8420	12		1	n na sana na minana n Na minana na minana na minana na minana na minana na minana na minana na minana na minana na minana na minana na				<b>-</b>	
8+30	12	·····-		· · · · · · · · · · · · · · · · · · ·			1		
8+40	13					· · · · · · · · · · ·			
18+50	10			· · · · · .			in the second second second second second second second second second second second second second second second		•
17.001	/ /			Backfill D	ata Center			<u> </u>	
Station	Time	Unit Wt.	- Slump		#200		Contraction		9%
15the	FIM	120	- 5	31.3		Comments Aw	Sand	- must	6/ ····
				<u>~_</u>					
16+10	PM	121	5.1/-		A Stylet			- mid	6 . S. C. 198
						] ≓grick∧	1 Jund	- Micles	
•		1					1997 - 19	botton	10.92
1		111		Slurry Da	ata Center	ada ya ya ya	· · · · · · · · · · · · · · · · · · ·	·	
rench		<u>ny ang p</u>	a di seconda di seconda di seconda di seconda di seconda di seconda di seconda di seconda di seconda di second	\$43.37 Store	Plant 💠	e e se de la ser	fyr i sef o s		
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH_	Time
17+00	H M	Mid	70	46	1:4.5	18	40	×	AM S
الأصلاب الرائين	and a start with	Dotteni	74	70					1
7+40	PM	ni A	71	45	1.4.5	-18	40	8	· PM
	and the second	100 Honi	75-	78				-	a and a second second second second second second second second second second second second second second second
	1. St. 1994.								
<u>Comments</u>	ېرېزې د بېښته وې د مېښت سيند. د د بېښته وې د مېښت سيند. س			ۇرىيەت ئىلمىيە بىلىمىيە ئەر يېڭىمىر بىيىتىنى خان بىيونىڭ 1996-يەر ئۆزىن ئىير بىلىكىر ئ			الم الم الم الم الم الم الم الم الم الم		
									an an 1949, 1997 - 1947 an 1978 (2019) 1977 - Jacob Maria, 1977 - 1977 (2019) 1977 - 1977 - 1977 - 1977 - 1977 - 1977 (2019)
								Alta - Sala Alta Alta - Sala Alta - Sa	
				الم من معاد بالم المعاد . معاد معاد المعاد . معاد المعاد المعاد . معاد المعاد المعاد المعاد .					
	이 가지 않는 것이 있다. 1997년 - 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 - 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1997년 1								
		لوني ( المراجع الي المراجع ) مرجع المرجع المرجع ( المرجع )				مراجع المراجع ا المراجع المراجع br>المراجع المراجع			
liont		1111	사망한 관광 관광 수가 201		د المحدة به تاعده والمعاد. 	Remedial	Panaturat	ion Sondo	
lient:	-1/7N1	ITH MI	NINC	suite de terre d'autoria de la composition de la composition de la composition de la composition de la composit La composition de la composition de la composition de la composition de la composition de la composition de la c La composition de la composition de la composition de la composition de la composition de la composition de la c	n daga tarihing tarih				GƏ <b>, L.F.</b> Qəzə (429-1444)
Зу:		یا کار اور اور اور اور اور اور اور اور اور ا		rit etter 	en de la composition de la composition de la composition de la composition de la composition de la composition Receiver de la composition de la composition de la composition de la composition de la composition de la composi	By: (	+ MAU	and the second	الایون در این مربع بر در منا را مسعور برای این مرب
			<b>*</b>			11 80	- 1/1		والمجارب والمحاربة والمحاربة
	ry Form.xls		سور البينة أمريكة كالعلم ورواد من المراجع المراجع المراجع		الاست بالمحموم والمحمد المحمد المحمد المحمد br>المحمد المحمد		25 4 1.30	and the second second second second second second second second second second second second second second secon	

and the providence

برجي بالمتعدد

			<u> </u>			Job Name		1ANT	11/EI - 175	<u></u>	ी गर्म,
oject:			. ·			Job Numb	er;	2	-05		
ينې ورونۍ وليو ژمند د د مېرونۍ وليو ژمند	and a second second second second second second second second second second second second second second second					Date:	· · · · · · · · · · · · · · · · · · ·	· <u> </u>			
۰ ۲۰ ۵ محمد می اسم. ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰		Rei	medial C	onstruct	tion Ser	vices, L.I	<u>،</u>	1			
	·	Re Soil Bentoni	te Slurry Ti	rench Cut	Off Wall	Quality Co	niioro	neet			
		Son Bentom	te ordrig -		SFTD	3004	5				
SF	16.35				· ·		1				
1			FX	cavation D	Data Cent	er					
			omments:		Station	Depth	Ke	<u>y  </u>	Commer	<u>its</u> :	
Station	Depth	<u>Key</u>	unments.			11.1. N. N. N.	<u> </u>				ж
18,450	.15					11 A. A. A. A. A. A. A. A. A. A. A. A. A.	1				
8490	15										
19400	15			ľ						 	
12-110	15		- 1	:							
5+10	15	ļ	-								
19+30	15									<u>.</u>	
9+40	15	<u> </u>									
19+50	15	<mark>↓</mark>						<u> </u>	- 1		
14+60	15_	+		n an an an an an an an an an an an an an	1. 1. M.M.						
19+70:	1.14	<u> </u>	and the state of the	······································							
19480	14_	4		······································							
· · · · · · · · · · · · · · · · · · ·	·····	- <u>+</u>		· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · ·					·
								· · ·	<u></u>	<u></u>	<u></u> N
	×1 ·				1 ( ) ( ) ( ) ( )	er	·				<u>.</u>
		هم من المسلم المسلم الم		Backfill L	lata Centi						
			Slump	Backfill L	ata Cento #200	Comme	nts.		mid	87	
Station	Time	Unit Wt.	Slump	%>	#200	<u> Comme</u> 	nts: M Sa	nd -	Mid - EcHon	87	10
Station		Unit Wt.	Slump 5	Backfill L %> 34, 3	#200	<u> Comme</u> 	nts: M Sa	nd	Mid- EcHon	87 -10 -2.5	16
18403	Am	119	5	%>	#200	<u> Comme</u> 	nts: MSa DMS	nd	Mid Forton Mid	87	10
and the second se	Am			%>	#200		nts: M Sa DM S	nd and	Mid EcHon Mid Voetto	87 -10 -5.5 -10	10 %
18+03	Am	119	5	<u>%&gt;</u> 34, 3	*#200		nts: M Sa DM S	nd and	Mid EcoHon Mid Voo Ho	87 -10 -5.5 -10	10 %
18+6.5	Am	119	5	<u>%&gt;</u> 34, 3	#200		nts: M Sa DM S	urd anel	Mid Getter Mid Vatter	87 -10 -2.5 	10 %
18+1.0	Am	172	5	%> 36_3 / / Slurry D	#200 Data Cente Plant	Comme A	2m 5	and	Wiel Voo Ho-	~ 1C	16 5% 5%
18+63 18+1.0 Trench	Am p Pm	122	5	<u>%&gt;</u> 34, 3	#200 Data Cento Plant Unit W	t. Filtrat		Visc.	Wiel voethou	87 -10 -52 -52 -57 -57 -57 -57 -57 -57 -57 -57 -57 -57	5% Tir
18+63 18+1:co	Am D Om Time	LIG 127 Depth	5	%> 36_3 / / Slurry D	#200 Data Cente Plant	Comme A		and	Wiel voethou	~ 1C	5%
18+63 18+1.0 Trench	Am O Om Time	Depth	5 4 ½ Unit Wt.	%> 3( <u>,</u> 3 / Slurry D / Visc.	#200 Data Cento Plant Unit W (c4	Comme A A A A A A A A A A A A A		Visc.	Miel Voe Ho-	~ 1C	5%
$\frac{ \Re + 6.5 }{ \Re + 1.4}$ Trench Station $ \Re + \Re (6)$	Am O Om Time	Depth M.A In-Hea	5 4 <sup>1</sup> /2 Unit Wt. 7 2	%> 3(; 3 / / Slurry D Visc. 4(; 75 4(;	#200 Data Cente Plant Unit W (c4	Comme A A A A A A A A A A A A A	e N	Visc. Visc.	Miel Voe Ho-	~ 1C	5% 5%
18+63 18+1:co	Am Orn Time	Depth M.J.	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme A A A A A A A A A A A A A	2 M S	Visc. Visc.	Miel Voe Ho-	~ 1C	- 5% - 5% - Τιτ - Α.γ
$\frac{ 8+63 }{ 8+1/2}$ Trench Station $\frac{ 8+8 }{ 8+8 }$ $\frac{ 8+2 }{ 8+2 }$	Am O Om Time Am Dan	Depth M.A In-Hea	5 4 1/2 Unit Wt. 7 2 2 7 (c 7 2	%> 3(; 3 / / Slurry D Visc. 4(; 75 4(;	#200 Data Cento Plant Unit W (c4	Comme A A A A A A A A A A A A A	e N	Visc. Visc.	Miel Voe Ho-		- 5% ΤΙΙ Α.ν
$\frac{ \Re + 6.5 }{ \Re + 1.00 }$ Trench Station $\frac{ \Re + \Re (6) }{ \Re + \Re (6) }$	Am Don Time Am Don	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme A A A A A A A A A A A A A	2 M S	Visc. Visc.	Miel Voe Ho-		5% 5%
$\frac{ 8+63 }{ 8+1/2}$ Trench Station $\frac{ 8+8 }{ 8+8 }$ $\frac{ 8+2 }{ 8+2 }$	Am Don Time Am Don	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme A A A A A A A A A A A A A	2 M S	Visc. Visc.	Miel Voe Ho-		- 5% - 5% - Τιτ - Α.γ
$\frac{ \Re + 6.5 }{ \Re + 1.00 }$ Trench Station $\frac{ \Re + \Re (6) }{ \Re + \Re (6) }$	Am Don Time Am Don	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme A A A A A A A A A A A A A	2 M S	Visc. Visc.	Miel Voe Ho-		τι Α.η Ρ.ν
$\frac{ \Re + 6.5 }{ \Re + 1.00 }$ Trench Station $\frac{ \Re + \Re (6) }{ \Re + \Re (6) }$	Am Don Time Am Don	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme A A A A A A A A A A A A A	2 M S	Visc. Visc.	Miel Voe Ho-		τι Α.η Ρ.ν
$\frac{ \Re + 6.5 }{ \Re + 1.00 }$ Trench Station $\frac{ \Re + \Re (6) }{ \Re + \Re (6) }$	Am Don Time Am Don	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme A A A A A A A A A A A A A	2 M S	Visc. Visc.	Miel Voe Ho-		Σς/ Σς/ ΠΙΙ Α.Ν Ρ.ν
$\frac{ \Re + 6.5 }{ \Re + 1.00 }$ Trench Station $\frac{ \Re + \Re (6) }{ \Re + \Re (6) }$	Am Don Time Am Don	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme A A A A A A A A A A A A A	2 M S	Visc. Visc.	Miel Voe Ho-		Σς/ Σς/ ΠΙΙ Α.Ν Ρ.ν
$\frac{ \Re + 6.5 }{ \Re + 1.00 }$ Trench Station $\frac{ \Re + \Re (6) }{ \Re + \Re (6) }$	Am Don Time Am Don	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme A A A A A A A A A A A A A	2 M S	Visc. Visc.	Miel Voe Ho-		- 5% ΤΙΙ Α.ν
$\frac{ \Re + 6.5 }{ \Re + 1.00 }$ Trench Station $\frac{ \Re + \Re (6) }{ \Re + \Re (6) }$	Am Don Time Am Don	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme A A A A A A A A A A A A A	2 M S	Visc. Visc.	Miel Voe Ho-		- 5% ΤΙΙ Α.ν
$\frac{ \Re + 6.5 }{ \Re + 1.00 }$ Trench Station $\frac{ \Re + \Re (6) }{ \Re + \Re (6) }$	Am Don Time Am Don	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme A A A A A A A A A A A A A	2 M S	Visc. Visc.	Miel Voe Ho-		Σς/ Σς/ ΠΙΙ Α.Ν Ρ.ν
$\frac{ \Re + 6.5 }{ \Re + 1.00 }$ Trench Station $\frac{ \Re + \Re (6) }{ \Re + \Re (6) }$	Am Don Time Am Don	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme A A A A A A A A A A A A A	2 M S	Visc. Visc.	Miel Voe Ho-		Σς/ Σς/ ΠΙΙ Α.Ν Ρ.ν
$\frac{ \Re + 6.5 }{ \Re + 1.00 }$ Trench Station $\frac{ \Re + \Re (6) }{ \Re + \Re (6) }$	Am Ora Time Am Pan hts:	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme F		Visc.	Miel Vzetto-		Σ 5% <u>Τιι</u> <u>Α</u> .γ
$\frac{ \Re + 6.5 }{ \Re + 1.00 }$ Trench Station $\frac{ \Re + \Re (6) }{ \Re + \Re (6) }$	Am Ora Time Am Pan hts:	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme F		Visc.	Miel Vzetto-		Σ 5% <u>Τιι</u> <u>Α</u> .γ
$\frac{ \Re + 0.5 }{ \Re + 1.4}$ Trench Station $\frac{ \Re + 2.4}{ \Im + 2.4}$ Commer	Am O Om Time S Am Dan	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme F		Visc.	Miel Voe Ho-		-5% -5% 
$\frac{ \Re + 6.5 }{ \Re + 1.00 }$ Trench Station $\frac{ \Re + \Re (6) }{ \Re + \Re (6) }$	Am O Om Time S Am Dan	Depth M.J botton M.J	$\frac{5}{4 \frac{1}{2}}$ Unit Wt. $\frac{72}{276}$ $\frac{72}{77}$	%> 34, 3 / Slurry D Visc. 44, 75 44, 75 44, 75	#200 Data Cento Plant Unit W (c4	Comme F		Visc.	Miel Vzetto-		τιι Α.γ

Ē

QAQC Slurry Form.xls

٣,

Drojach				· · · · · ·	-	Job Name:	(-JIA	NIKEP	ININC
Project:					1a	Job Numbe	the second second second second second second second second second second second second second second second s	-1780	
<del>7</del>						Date:	,7-9	7-05	
		F	Remedial	Construc	ction Ser	vices, L.P	•		· · ·
· · · ·		Soil Bento	nite Slurry	Trench Cu	t Off Wall		trol Shee	t	
SF	3980				SFTD	36125	· · · ·		
	, , , , , , , , , , , , , , , , , , ,		<u> </u>						
				xcavation			Vev	Commonte	•
Station	Depth	<u>Key</u>	Comments:		Station 93490	Depth	Key	Comments	•
33+56		· · · · · ·		· · · · · · · · · · · · · · · · · · ·	33790	15		-	
7+41.0	161				34410	14'		-	
11+90	<u>    1 0                               </u>		an an an an an an an an an an an an an a		74+30	14			
3-3+90	2.01			·	74+30	147			
77+66	201		1		-34 4 4 6	141			· · ·
-13+10.	. 21%			· · · · · · · · · · •	74-45-6				·····
はい+ってい					34460	$\omega^{i}$			aanaa aaraa Na sa
73436	24"			· · · · · · · ·	· · · ·		•	-	
13+46	22'	<u>.</u>							
13+50	24	1 1 1 1 1 1							چانیسیسیسیانی د ماریک رویین د د میتارید کرد د د
53+70	-221								
33456			1				1		
					ata Center				
Station	Time	-Unit Wt.	-Slump -	·····%>;	#200	Comments	Sara	Amminit	7%王
28+lai	Am	130	C224045/1	31, 5		-			\$5%
				<u> </u>			Sund	Pnini	1.5%
241420	Pn1	125-	Ξ		· · · · · · · ·			2011년 - 고민국 프로그램은 영양	ستبنى بالإناء منسي ال
Production of			al the S	1493	the entry of		e de la composition de la composition de la composition de la composition de la composition de la composition d	A Contro	NE 10 6
	the trace of		,14公司等于委任		ata Center				
					Plant		Visc.	pH -	Time
Trench	inter terretaria de la composición de la composición de la composición de la composición de la composición de la	I Dankle	1.1		1 1 1 - 14 18/4	Eiltroto			
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate			Time
Station 22+60		Mid	Unit Wt.	44	Unit Wt.	Filtrate 19	4 <u>6</u>	2. 1997 C	Ц <sub>м</sub> т.
Station 22+Co	AM +	Mid betting	10 dates			e 1. 19 hour		1 149 9 1 S	the second second second second second second second second second second second second second second second s
Station 22+60	AM	Mid	70 0000 73 000	-44 <u>4</u> -5-0 -5-0-8-6	1.4 5	r at <b>19</b> hand I han talen an t	- 4G -	2019-202 2. 1923-2023	Hm DM
Station 22+6-3 2441-6	AM 44 Frances 440 PM 466 Garage American Garage American	Mid + + + + + + + + + + + + + + + + + + +	70	-44 -50 -415	1.4 5	19	- 4G -	1. 1929 9 1934 2. 1939 200 200 2. 1979 200 200 2. 1979 9 200 200	Hm DM
Station 22+60	AM 44 Frances 440 PM 466 Garage American Garage American	Mid hi High t Mid Heart he Heart	70	44 50 415	1,4 5 (c4) (c4)	19 19 19 19 19 19 19 19 19 19 19 19 19 1	- 4G -	1. 1929 9 1934 2. 1939 200 200 2. 1979 200 200 2. 1979 9 200 200	Hm DM
Station 22+6-3 2441-6	AM 44 Frances 440 PM 466 Garage American Garage American	Mid hi High t Mid Heart he Heart	70	44 50 415	1,4 5 (c4) (c4)	19 19 19 19 19 19 19 19 19 19 19 19 19 1	- 4G -	1. 1929 9 1934 2. 1939 200 200 2. 1979 200 200 2. 1979 9 200 200	Hm DM
Station 22+6-3 2441-6	AM 44 Frances 440 PM 466 Garage American Garage American	Mid hi High t Mid Heart he Heart	70	44 50 415	1,4 5 (c4) (c4)	19 19 19 19 19 19 19 19 5 19 19 5	- 4G -	1. 1929 9 1934 2. 1939 200 200 2. 1979 200 200 2. 1979 9 200 200	Hm DM
Station 22+6-3 2441-6	AM 44 Frances 440 PM 466 Garage American Garage American	Mid hi High t Mid Heart he Heart	70	44 50 415	1,4 5 (c4) (c4)	19 19 19 19 19 19 19 19 5 19 19 5	- 4G -	1. 1929 9 1934 2. 1939 200 200 2. 1979 200 200 2. 1979 9 200 200	Hm DM
Station 22+6-3 2441-6	AM 44 Frances 440 PM 466 Garage American Garage American	Mid hi High t Mid Heart he Heart	70	44 50 415	1,4 5 (c4) (c4)	19 19 19 19 19 19 19 19 5 19 19 5	- 4G -	1. 1929 9 1934 2. 1939 200 200 2. 1979 200 200 2. 1979 9 200 200	Hm DM
Station 22+6-3 2441-6	AM 44 Frances 440 PM 466 Garage American Garage American	Mid hi High t Mid Heart he Heart	70	44 50 415	1,4 5 (c4) (c4)	19 19 19 19 19 19 19 19 5 19 19 5	- 4G -	1. 1929 9 1934 2. 1939 200 200 2. 1979 200 200 2. 1979 9 200 200	Hm DM
Station 22+6-3 2441-6	AM 44 Frances 440 PM 466 Garage American Garage American	Mid hi High t Mid Heart he Heart	70	44 50 415	1,4 5 (c4) (c4)	19 19 19 19 19 19 19 19 5 19 19 5	- 4G -	1. 1929 9 1934 2. 1939 200 200 2. 1979 200 200 2. 1979 9 200 200	Hm DM
Station 22+6-3 2441-6	AM 44 Frances 440 PM 466 Garage American Garage American	Mid hi High t Mid Heart he Heart	70	44 50 415	1,4 5 (c4) (c4)	19 19 19 19 19 19 19 19 5 19 19 5	- 4G -	1. 1929 9 1934 2. 1939 200 200 2. 1979 200 200 2. 1979 9 200 200	Hm DM
Station 22+6-3 2441-6	AM 44 Frances 440 PM 466 Garage American Garage American	Mid hi High t Mid Heart he Heart	70	44 50 415	1,4 5 (c4) (c4)	19 19 19 19 19 19 19 19 5 19 19 5	- 4G -	1. 1929 9 1934 2. 1939 200 200 2. 1979 200 200 2. 1979 9 200 200	Hm DM
Station 22+6-3 2441-6	AM 44 Frances 440 PM 466 Garage American Garage American	Mid hi High t Mid Heart he Heart	70	44 50 415	1,4 5 (c4) (c4)	19 19 19 19 19 19 19 19 5 19 19 5	- 4G -	1. 1929 9 1934 2. 1939 200 200 2. 1979 200 200 2. 1979 9 200 200	Hm DM
Station 27+Co Comments	AM 44 Frances 440 PM 466 Garage American Garage American	Mid hi High t Mid Heart he Heart	70	44 50 415	1,4 5 (c4) (c4)	19	4()	1. 1929 9 1934 2. 1939 200 200 2. 1979 200 200 2. 1979 9 200 200	<u> Д</u> м1 СМ
Station 22+Co Comments Comments Client: (	AM 44 Frances 440 PM 466 Garage American Garage American	Mid hi High t Mid Heart he Heart	70	44 50 415	1,4 5 (c4) (c4)	19 195	4()	9 8 1 1 1 1 1 1 1 1 1 1 1 1 1	<u> Д</u> м1 СМ
Station 27+Co Comments	AM 44 Frances 444 PM 444 American Conception	Mid hi High t Mid Heart he Heart	70	44 50 415	1,4 5 (c4) (c4)	19 195	4(, 39	9 8 1 1 1 1 1 1 1 1 1 1 1 1 1	<u> Д</u> м1 СМ
Station 22+Co Comments Comments Client: ( By:	AM 44 Frances 444 PM 444 American Conception	M.J h.H.n N.H.J he Hear	70	44 50 415	1,4 5 (c4) (c4)	19 195	4(, 39	9 8 1 1 1 1 1 1 1 1 1 1 1 1 1	<u> Д</u> м1 СМ

roject:						Job Name: Job Numbe		101 KE 3-178	
1						Date:		9-05	
							<u> </u>	<u></u>	
		F	Remedial	Constru	ction Ser	vices, L.P	•		
	<u></u>					Quality Con		t	
SF	3835				SFTD	35980			[
	· · · · · · · · · · · · · · · · · · ·			}				1	1
	<u> </u>	•	I	Excavation	Data Cente	er		<u>.</u>	• • • • • • •
Station	Depth	Кеу	Comments	·	Station	Depth	Key	Comments	<u>.</u> :
27450	14				23490	15			
1-1+60	16				74460	14		_	
17+70	17				34410	14		4	
21450	21				94470	14		4	
<u> </u>	20				74+76	14			
37+60	20				74440	14		4	
37+10	<u>]</u> ]			· •	244 50	14		-	
13+20	31					<u> </u>		-	
3+36	74	<u> </u>				<u> </u>		-	
13440	22					┝		-	
17460	24					<u>∤</u>	· · ·		
13470	32					<u> </u>	• • • • • • • • • • • • • • • • • • •	-	
17770	18					<u> </u>	, <u>, , , , , , , , , , , , , , , ,</u>	4	
<u> </u>		•	h	Backfill D	ata Center	··			
Station	Time	Unit Wt.	Slump		#200	Comments:	. 1,	111 Mail	11:12
13+60	FM	130	4.34			]	SANC	INMIJ Better	1 59 5
				36.5		]		/3 <i>CH</i> CN	5.1
				;		ļ	SANS	L PM MIL Botto	85
14+20	1-14	125	5	ļ	ļ	4.		Betty	19-168
	L	l		Churry D	to Contor	L			
rench				Siurry Da	ata Center Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	рН	Tim
19+100		MIL	70	-44	64.5	18	40	9	171
<u>~ 1.5.6 </u>	<u></u>	BUTTUM	73	50		-1		·	<del>                                     </del>
4+60	M	MIL	79	45	64	18.5	39	8	Pr
		B.TIEM	75	60	<u></u>				
								,	
omments									
						•		· · ·	
		· -· ····a			•			н ст. н. С	
•.								· · · ·	
				,					
			. ,						
								• •	
							•		
						•			
-	-				-2°-				
		· ·				A			
lient: (-	FIFNT	REFU	VILC	<u></u>		Remedial C	onstruct	ion Service	s, L.P.
/:	·	<u> </u>				By: Jost in			
						- Port	<del>`</del> ]]]		·
AOC Slur	ry Form.xls		•						
						· /			

Project:						Job Name	GIAN	I REP	ININC
ч <del>-</del> ,						Job Numb	er: 🤶	-1780	· · · · · ·
1						Date:	3-1	1-05	
			· · ·				-		
		7	Remedial	Construe	ction Ser	vices, L.F	).		
						Quality Cor			
SF	1615				SFTD	37575			
	12.027.2					1			
	1	· · · · · · · · · · · · · · · · · · ·	E	xcavation	Data Cent	er	L	L,,,	L
Station	Depth	Key	Comments		Station	Depth	Key	Comments	•
21440	16								
31+50								1	
31+60	11.							1	
11+70	15								
31450	12							1	
31470	15								
39460	14			•					
32+10	14							}	
37+-36	11								1
21470	13	·						]	
39440	13								
							1	]	
·									
 		l						<u> </u>	
	· · · · · · · · · · · · · · · · · · ·	<del></del>			ata Center				
Station	Time	Unit Wt.	Slump		#200	Comments	: Sect	Mi jaki bre	1 54
121+50	12.и_	120	5	36.3		4	10000	b <del>r</del> t	
						4			2.5%
21 +70	Pm_	123	4 1/2	2		Saud	Gran ale	1 556	
l				ļ			1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	6. 7.61	94 - 1
[	[	<u>I</u>		Shurpy De	ita Center				
Trench				Sidiry Da	Plant				<u></u>
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
21256	Rm	Miel	71	-416	1145	15	40	8	HINI.
		1/20 +1. 00	-7 -7 -7 -7	49	<u>• • • • • • •</u>	1 - 1	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
=1+90	Pm	ndiel	71	45	44.5	18	417 :	9	Pol
		DeHim	75	52	<u> </u>				,
		<u></u>							
Comments	<u>.</u>			_	1				
		· ··· ··					· · ·		× ···
									1
			,						
							*		
-	-								
· ·									
۹ <del>میں</del>			<u>`</u>		<u> </u>				
<u>Slient: /</u>	FIANT	ITE MI	1/10 Ca			the supervised statement of th		on Service	s, L.P.
By:			ر. 			By: (/	- A Til	11 1	
			· ·			11 .	M.		~
QAQC Slur	rry Form.xls	, i				l se se se se se se se se se se se se se	1		
			وأحداث والمستهين و			-			

Project:						Job Name Job Numb	$\frac{(4/17)}{2}$	VI IRE. -1780	MINING
J					<u> </u>	Date:	<u>-</u> ~	12-05	
							[	Í	
······································		F	Remedial	Constru	ction Ser	vices, L.F			
	·					Quality Cor			
SF	1277.4				SFTD	2887		T	
	/	1							
	A	- · · · · · · · · · · · · · · · · · · ·	E	Excavation	Data Cent	er	4	-t	
Station	Depth	Key	Comments		Station	Depth	Key	Comments	;
20+50	15			-					
20+66	15							]	
<u>20+70</u>	14							]	
20+80	14							]	
76+96	14		-					7	
01400	14								
31+10	14			•				]	
01420	14							]	
11+30	14							]	1
					:		[	7	
								]	
								]	
								]	
				Backfill D	ata Center	r			
Station	Time	Unit Wt.	Slump	%>;	#200	Comments		N 6.5%	
204lrc	Hanl		4 1/2	21.4		Send &	2414 STIC	2 6 1 m 1.5 2 m Tai	
20+10	Pni		414				Por Mid	7%	•
		<u> </u>				JUNE		tento 1/2	
	L	<u> </u>	L		L		1.04	ten in le	
				Slurry Da	ata Center				
rench		1 5 0	11-11-11-14		Plant	<b>P</b> (1)			
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	PH	Time
20460	Am	Mid	70	43	104.5	18	40	9	Aut.
26+90		butdown	75.5	58	16 -		<u></u>		
20+ 70	PNI	WA ie	72	Ule	64.5	18	40:	9	IFA1
		1.h. 46.a.	76.5	61		<u> </u>			<u> </u>
`ommonto	<u></u>	I	·			_I	l	1	L
Comments	2.								
<u>.</u> .	· .								
								:	
•	٠								
-	•	1			ets .				
				1	and the second second	.1		· · ·	
lionti /	11205	Q <del>57, 1, 1, 1, 1</del> ,	•	<u></u>		/] Domositi i		on Conilaci	
	HANT 1	FEFINI	<u>, , , , , , , , , , , , , , , , , , , </u>				the second second second second second second second second second second second second second second second s	on Service	3, L.P.
By:		· · · · ·		······································		By: 14.2	un A Yell	ny	
						11	•		
	rry Form.xls	• ·							

ł

roject:						Job Name: Job Numb		<u>1 KE</u> -1780	
,						Date:		-14-65	
						Date.	<u>~~</u>	//- 00	
		c	omodial	Constru	ction for	vices I D	) .	l	
						vices, L.P Quality Cor			
SF	Se 10 100	Son Benio	nite Sturry	Trench Cl	SFTD				
<u> </u>	812.5			<u> </u>	Srib	3968:			
	L	L			Data Cente			[	
Station	Depth	Key	Comments		Station	Depth	Key	Comments	,
19496	13,5	Ney	Comments	•	Station	Depui	ney	Comments	
	13.5							ł	
<u>20700</u>	13.5							}	
<u>10+10</u>	13.5						· · · · · ·		
11.490	13.5								
and the second se	13.5				}				
20+40	12.2				ļ	·····		1	
	<u></u>			•				ł	
						<u> </u>			
					·	,		{	
							·	4	
		·		•				ļ	
								1	
					ļ			4	
	I	I	<u> </u>	Backfill D	lata Center	1	L	l	
Station	Time	Unit Wt.	Slump	and the second second second second second second second second second second second second second second second	#200	Commonia	•		
0160	14111	123	4 %	3(c. 1	1		.А	1 7.5%	
<u>~</u>	<u>  · · · · · · · · · · · · · · · · · · ·</u>	· · · · · · · · · · · · · · · · · · ·			<u> </u>	Saudi	، [۲۹ ملاسط در ۱	0 4 C	
	Pm	122	4%			1	004	041 4 10	
			7/)		1	1			an di seconda di seconda di seconda di seconda di seconda di seconda di seconda di seconda di seconda di second Seconda di seconda di se
						1			
				Slurry Da	ata Center				
rench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pН	Tim
0+10	Dm	Mid	72	46	64.5	18	40	9	AM
		buttom	75	40					
					1				
					1				
						· ·			
				·	· · · · · · · · · · · · · · · · · · ·				
omments	2:				. /				
omments									
omments	:				· · · · · · · · · · · · · · · · · · ·				
omments	2:	· · · · · ·	· · · · · ·						
omments	2:	· · · · · · · · · · · · · · · · · · ·	· · · · ·						
omments			· · · · · · · · · · · · · · · · · · ·						
omments			· · · · · · · · · · · · · · · · · · ·						
omments	2:		· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·				
omments	2:				· · · · · · · · · · · · · · · · · · ·				
omments	2:								
omments									
iomments	-1ANT	REF11	1 11/ 5.			Remedial ( By:	and the second se	on Service	s, L.P.

i.

# **APPENDIX B**

# Hydraulic Conductivity Test Report

### HYDRAULIC CONDUCTIVITY TEST REPORT GIANT REFINERY COMPANY NORTH BOUNDARY BARRIER

Ç

1

SAMPLE ID STA 2+00 STA 4+00 STA 6+00 STA 6+00 STA 10+00 STA 10+00 STA 12+00 STA 12+00 STA 14+00 STA 16+00 STA 18+00 STA 20+00 STA 22+00	PER. CM/SEC 2.10E-08 6.90E-08 2.08E-08 2.01E-08 2.71E-08 4.04E-08 2.38E-08 3.09E-08 3.62E-08 4.58E-08 2.71E-08 2.71E-08
STA 22+00 STA 24+00 STA 26+00	2.71E-08 2.72E-08 2.81E-08
STA 20 F00	2.01-00



GEOTECHNICAL AND MATERIALS TESTING SERVICES

February 17, 2005

Remedial Construction Services Attn: Bob Carlson PO Box 690708 Houston TX 77269-0708

SLT Project No: 05-103 Subject: Giant Refinery Co Farmington NM Project No.: 2-1780

#### LABORATORY TEST RESULTS

Dear Mr. Carison:

As requested, Sierra Testing Laboratories, Inc. performed laboratory testing on **one sample** of material from the subject site. The sample was identified as: **4+00**, **2/10/05**. Our laboratory received the sample on **February 11**, **2005**. The tests performed on the submitted sample were as follows:

1) Flexible Wall Permeability (ASTM D5084)

2) Particle Size Analysis, Percent Passing #200 Sieve (ASTM D1140

The results of the above referenced testing are presented on the attached figure(s).

We appreciate the opportunity to be of service to you on this project and look forward to providing additional service, as needed, in the future.

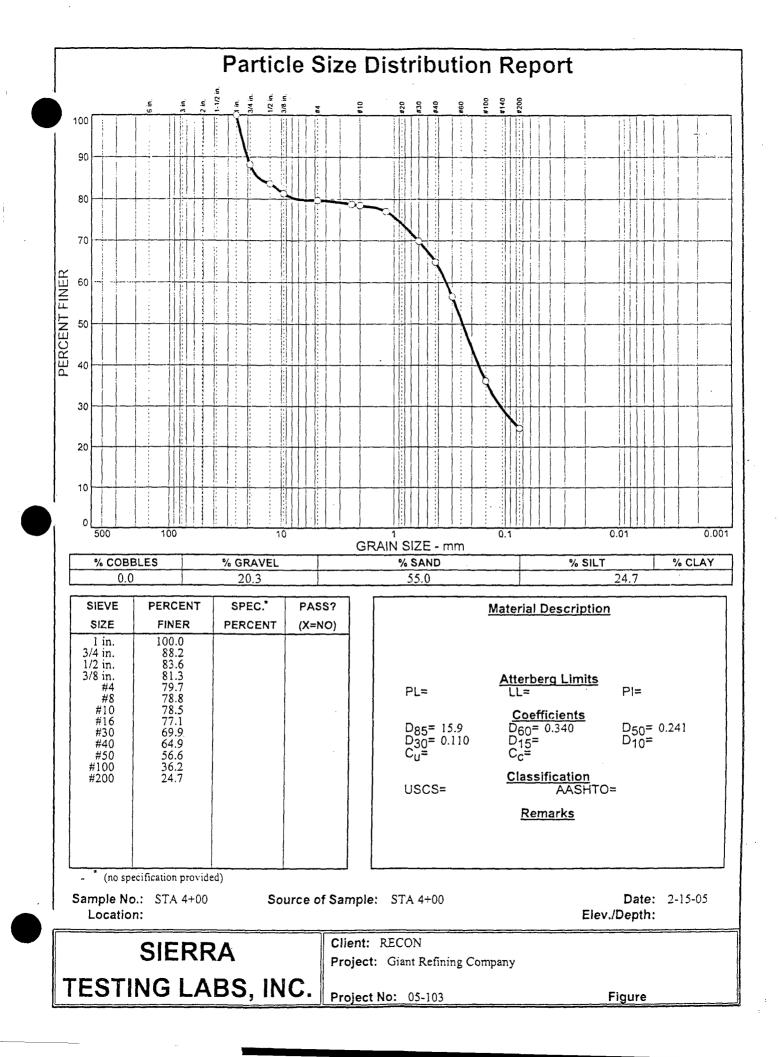
Should you have any questions or require additional information, please contact our office at your convenience.

Very truly yours

Chad M. Walker Project Manager

Enclosures

ks



#### SAMPLE DATA

Sample Identification: Sta 4+00, 2/10/05 Visual Description: N/A Remarks:

Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### **TEST RESULTS**

Permeability, cm/sec.: 6.93E-08

Average Hydraulic Gradient: 8.4

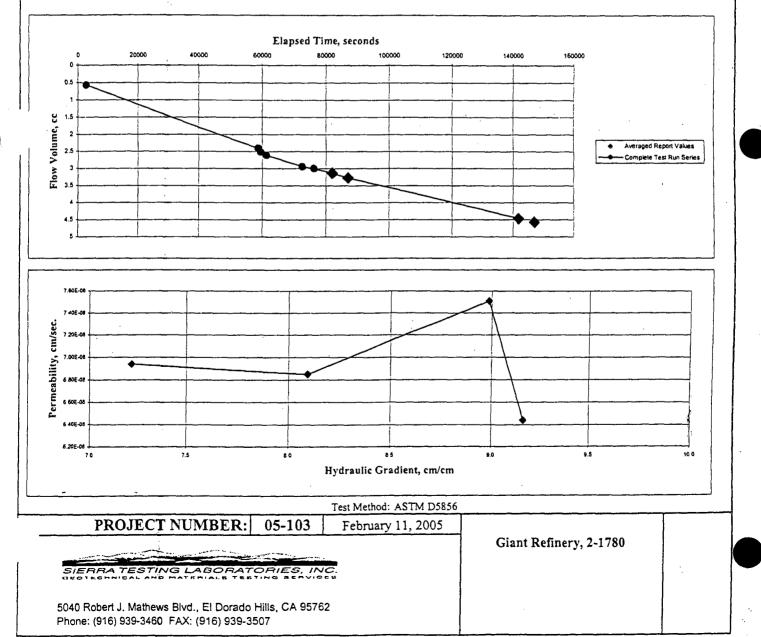
Effective Cell Pressure, psi: 5

#### **TEST SAMPLE DATA**

#### **Before** Test

Specimen Height, cm: 5.84 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 80.3 Moisture Content, % 40.3 Specific Gravity, Assumed Percent Saturation:

After Test Specimen Height, cm: 4.98 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 94.2 Moisture Content, % 27.6





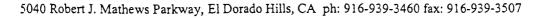
GEOTECHNICAL AND MATERIALS TESTING SERVICES

# Table 1

### Percent Passing #200 (ASTM D1140) Giant Refinery Co. STL Job #05-103

Sample Name	Percent Passing #200
Sta 4+00, 2-10-05	21.4

Notes:





GEOTECHNICAL AND MATERIALS TESTING SERVICES

February 17, 2005

Remedial Construction Services Attn: Bob Carlson PO Box 690708 Houston TX 77269-0708

SLT Project No: 05-103 Subject: Giant Refinery Co Farmington NM Project No.: 2-1780

#### LABORATORY TEST RESULTS

Dear Mr. Carlson:

As requested, Sierra Testing Laboratories, Inc. performed laboratory testing on **one sample** of material from the subject site. The sample was identified as: **4+00**, **2/10/05**. Our laboratory received the sample on February 11, 2005. The tests performed on the submitted sample were as follows:

1) Flexible Wall Permeability (ASTM D5084)

2) Particle Size Analysis, Percent Passing #200 Sieve (ASTM D1140

The results of the above referenced testing are presented on the attached figure(s).

We appreciate the opportunity to be of service to you on this project and look forward to providing additional service, as needed, in the future.

Should you have any questions or require additional information, please contact our office at your convenience.

Verv trul

Chad M. Walker Project Manager

Enclosures

ks

5040 Robert J. Mathews, Suite 1, El Dorado Hills, CA 95762 (916) 939-3460 Fax (916) 939-3507 www.sierratestinglaboratories.com

#### SAMPLE DATA

Sample Identification: Sta 4+00, 2/10/05 Visual Description: N/A Remarks:

Sample Depth, ft.: N/A Sample Type: SB Backfill Material

### **TEST RESULTS**

Permeability, cm/sec.: 6.93E-08

Average Hydraulic Gradient: 8.4

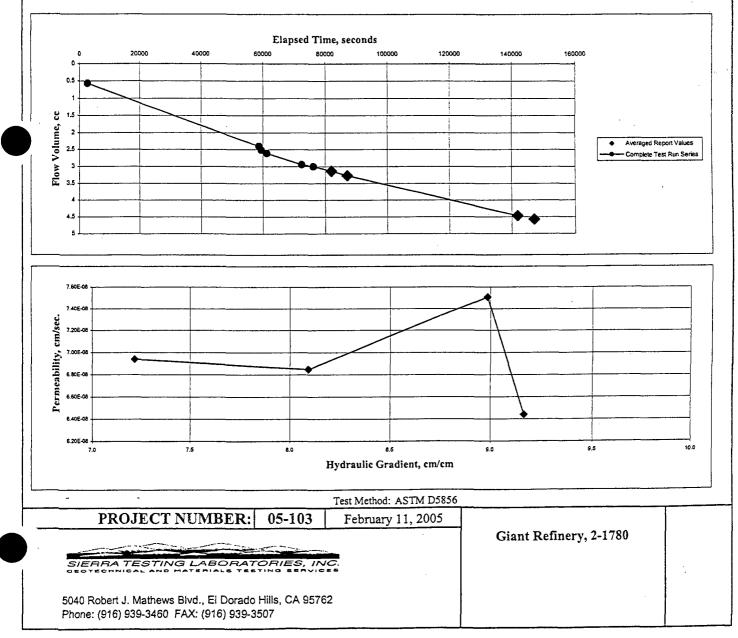
Effective Cell Pressure, psi: 5

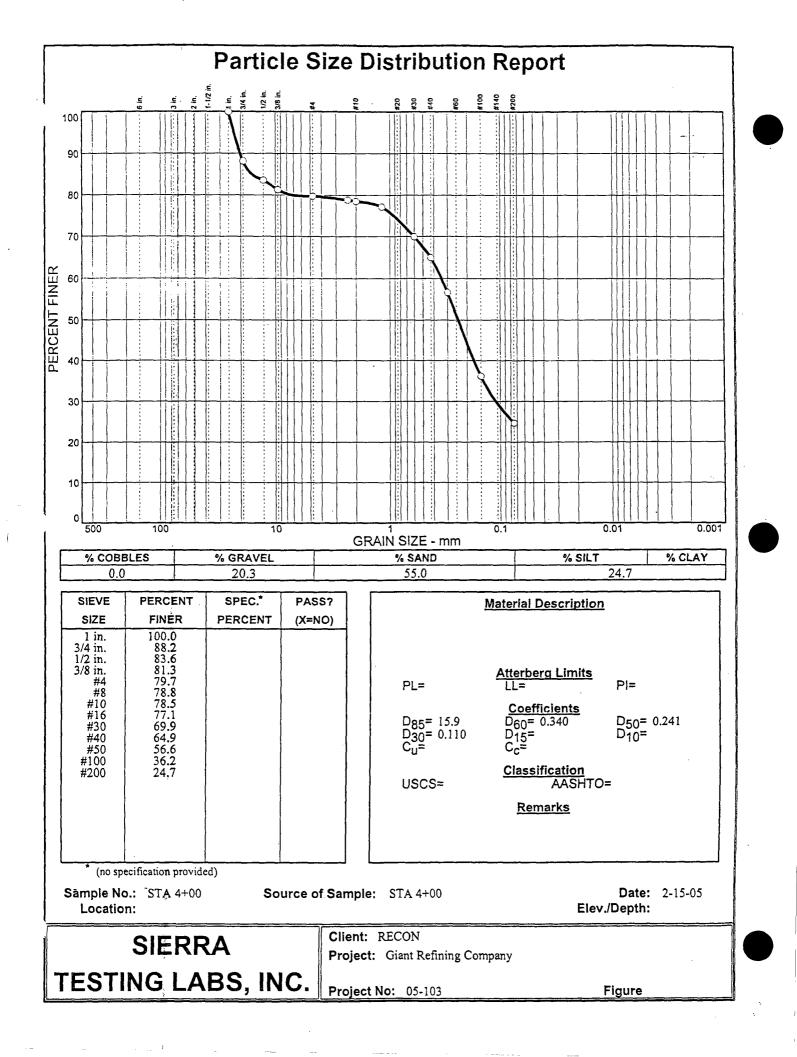
#### **TEST SAMPLE DATA**

#### **Before Test**

Specimen Height, cm: 5.84 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 80.3 Moisture Content, % 40.3 Specific Gravity, Assumed Percent Saturation:

After Test Specimen Height, cm: 4.98 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 94.2 Moisture Content, % 27.6







## Table 1

### Percent Passing #200 (ASTM D1140) Giant Refinery Co. STL Job #05-103

Sample Name	Percent Passing #200
Sta 4+00, 2-10-05	21.4

Notes:

5040 Robert J. Mathews Parkway, El Dorado Hills, CA ph: 916-939-3460 fax: 916-939-3507



GEOTECHNICAL AND MATERIALS TESTING SERVICES

February 17, 2005

Remedial Construction Services Attn: Bob Carlson PO Box 690708 Houston TX 77269-0708

SLT Project No: 05-103 Subject: Giant Refinery Co Farmington NM Project No.: 2-1780

#### LABORATORY TEST RESULTS

Dear Mr. Carlson:

As requested, Sierra Testing Laboratories, Inc. performed laboratory testing on **one sample** of material from the subject site. The sample was identified as: **4+00**, **2/10/05**. Our laboratory received the sample on **February 11**, **2005**. The tests performed on the submitted sample were as follows:

1) Flexible Wall Permeability (ASTM D5084)

2) Particle Size Analysis, Percent Passing #200 Sieve (ASTM D1140

The results of the above referenced testing are presented on the attached figure(s).

We appreciate the opportunity to be of service to you on this project and look forward to providing additional service, as needed, in the future.

Should you have any questions or require additional information, please contact our office at your convenience.

Verv truly

Chad M. Walker Project Manager

Enclosures

ks

5040 Robert J. Mathews, Suite 1, El Dorado Hills, CA 95762 (916) 939-3460 Fax (916) 939-3507 www.sierratestinglaboratories.com



### SAMPLE DATA

Sample Identification: Sta 4+00, 2/10/05 Visual Description: N/A Remarks:

Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### **TEST RESULTS**

Average Hydraulic Gradient: 8.4

Permeability, cm/sec.: 6.93E-08

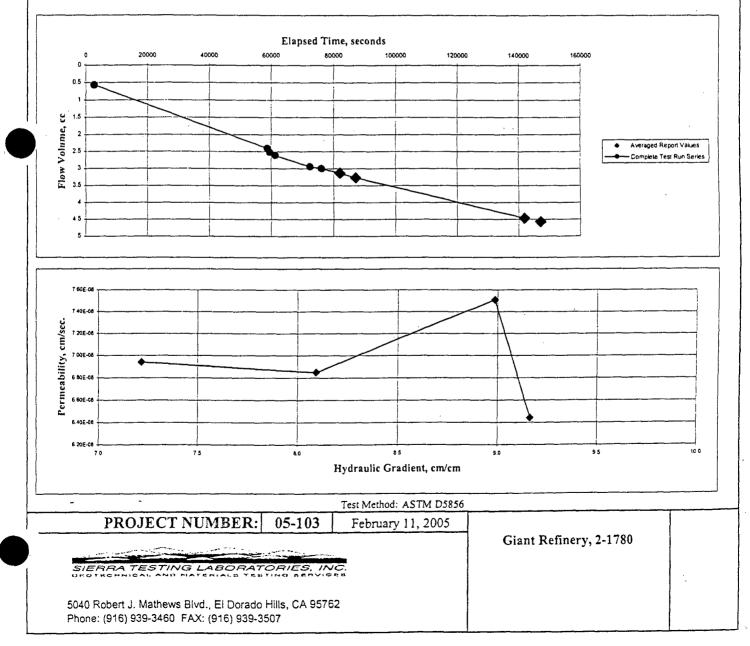
Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

#### **Before Test**

Specimen Height, cm: 5.84 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 80.3 Moisture Content, % 40.3 Specific Gravity, Assumed Percent Saturation:

After Test Specimen Height, cm: 4.98 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 94.2 Moisture Content, % 27.6





# Table 1

### Percent Passing #200 (ASTM D1140) Giant Refinery Co. STL Job #05-103

Sample Name	Percent Passing #200
Sta 4+00, 2-10-05	21.4

Notes:

5040 Robert J. Mathews Parkway, El Dorado Hills, CA ph: 916-939-3460 fax: 916-939-3507



GEOTECHNICAL AND MATERIALS TESTING SERVICES

March 8, 2005

Remedial Construction Services Attn: Bob Carlson PO Box 690708 Houston TX 77269-0708

SLT Project No: 05-103 Subject: Giant Refinery Company . Project No.: 2-1780

#### LABORATORY TEST RESULTS

Dear Mr. Savage:

As requested, Sierra Testing Laboratories, Inc. performed laboratory testing on three samples of material from the subject site. The samples were identified as: Mix Design Composite; Mix Design 0.5% Bentonite; and Mix Design 1.0% Bentonite. Our laboratory received the samples on January 5, 2005. The tests performed on the submitted samples were as follows:

- 1) Flexible Wall Permeability (ASTM D5084)
- 2) Moisture Content (ASTM D2216)
- 3) D698 Mod/ C-2, Density (ASTM D698)
- 4) Particle Size Analysis, Percent Passing #200 Sieve (ASTM D1140)

The results of the above referenced testing are presented on the attached figure(s).

We appreciate the opportunity to be of service to you on this project and look forward to providing additional service, as needed, in the future.

Should you have any questions or require additional information, please contact our office at your convenience.

Very truly yours,

Chad M. Walker Project Manager

Enclosures ks



Mix Design #2 Mix Design #1 **Composite of Excavated Material** Imported Material Notes: Notes: Notes: Notes: Notes: Noies: EOTECHNICAL AND MATERIALS TESTING SERVICES Permeability Sample #2 ASTM D5084 Permeability Sample #2 ASTM D5084 Slump ASTM C143 Results of ASTM D1140 0.5% (by dry wt) Dry Bentonite was added and 40 marsh shurry was then added to achieve slump of the backfill The excavated material and the import were mixed inorder to achieve a composite with at least 35% fines. The import material was classified as an orange brown sandy SILT (ASTM D2488). The fines content exibited little plasticity. Permeability Sample #1 ASTM D5084 The excavated material and the import were mixed inorder to achieve a composite with at least 35% fines Permeability Sample #1 ASTM D5084 Moisture Content ASTM D2216 **Moisture Content ASTM D2216** The excavated material was classified as a brown silly Sand with gravel and cobble (ASTM D2488). Fines content was of no plasticity Slump ASTM C143 **Moisture Content ASTM D2216 Moisture Content ASTM D2216** Moisture Content ASTM D2216 Density ASTM D698 Para C.2 **Moisture Content ASTM D2216** Density ASTM D698 Para C.2 **Results of ASTM D1140** Dry Density ASTM D698 Para C.2 **Results of ASTM D1140** Dry Density ASTM D698 Para C.2 **Results of ASTM D1140** Density ASTM D698 Para C.2 Results of ASTM D1140 Density ASTM D698 Para C.2 1.0% (by dry wt) Dry flentonite was added and 40 marsh slurry was then added to achieve slump of the backfill. Results of ASTM D1140 39.8% Density (pcf) Density (pcf) Moisture Content (%) Perm Rate (cm/sec) Perm Rate (cm/sec) Moisture Content (%) Perm Rate (cm/sec) Density (pcf) Moisture Content (%) Density (pef) Moisture Content (%) Perm Rate (cm/sec) 92.8pcf 26.5% 71.4pcf 9.9% 77.6pcf 64.7pcf Initial 35.9% Initial 23.5% 38.5% 9.9% 71.4pcf 35.9% 10.7% 43.7% 7.4% 11.4% 26.2 95.4 92.8 4.0" 76.1 26.5 0.86 23.8 76.1 23.5 4.5" 6.99E-08 4.92E-08 8.1213-08 7.49E-08 19.1 Final 21.3 103.5 Final 103.8 20.7 106.6 9.9 Recon Job No.: Sierra Testing Laboratories Job No. 05-103 Bloomfield, New Mexico **Giant Refining Company, SB Slurry Wall** - ne ÷ 

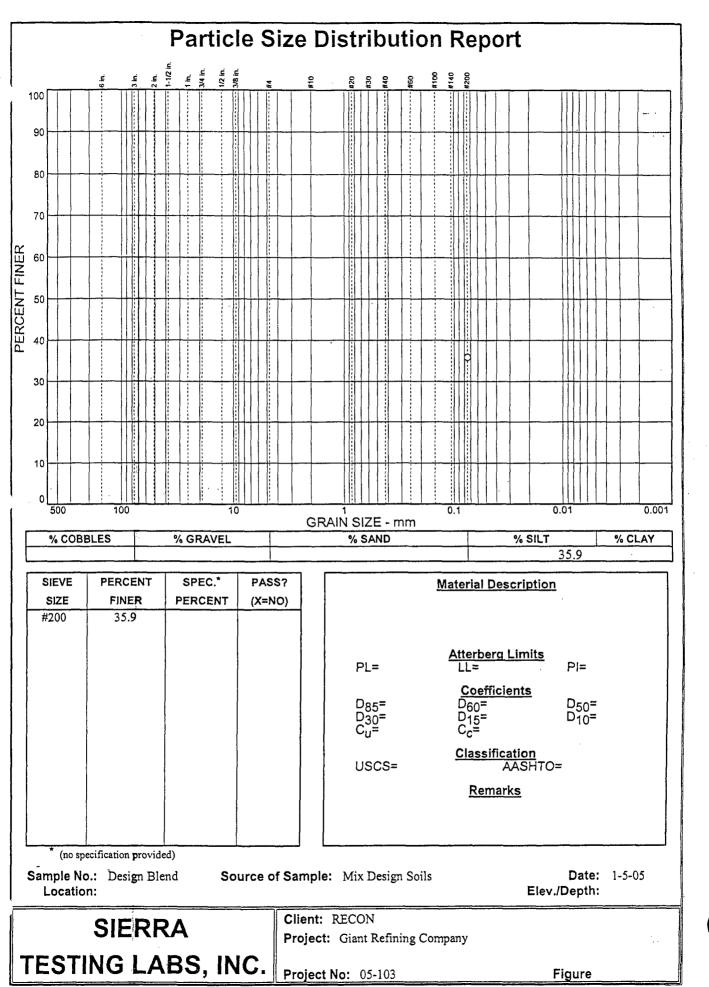
5040 Robert J. Mathews Parkway, El Dorado Hill 1 95762 (ph) 916-939-3460 (fax) 916-939-3507

# **MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS**

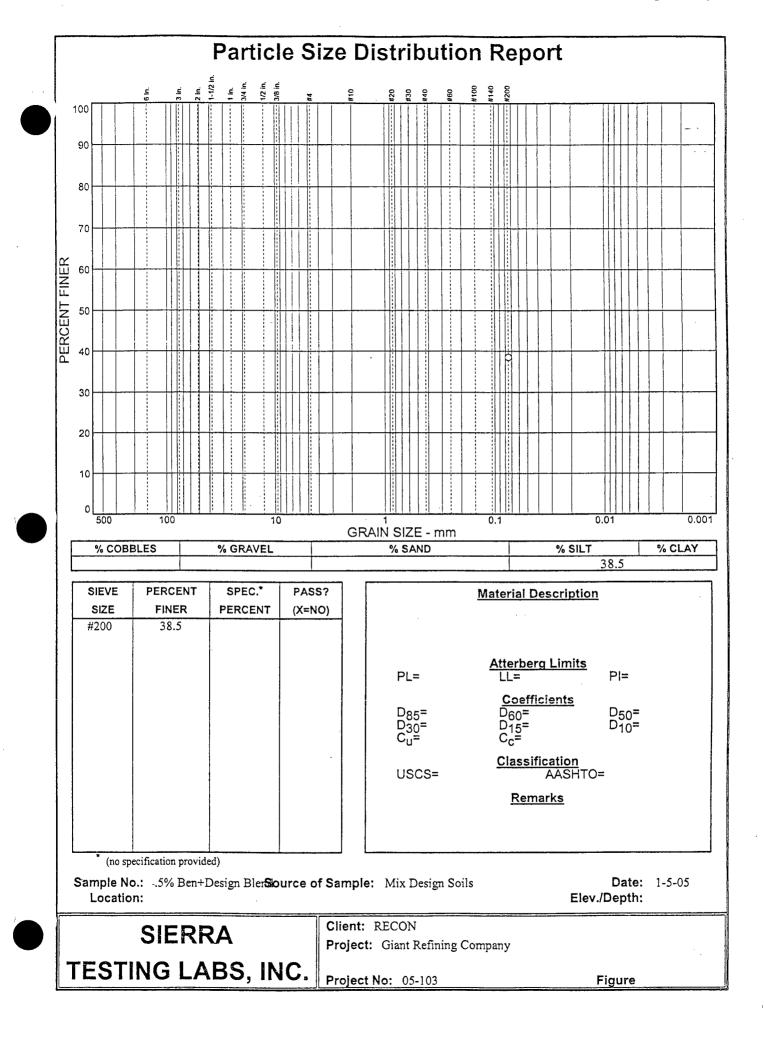
Sample	78.5 71.4	Moisture	
Identification	Weight, lb/ft. <sup>3</sup>	Weight. lb/ft. <sup>3</sup>	Content, %
Fill material next to site	71.6	64.7	10.7
Composite sample of excavation	83.3	77.6	7.4
Design Blend	78.5	71.4	9.9
0.5% Bentonite + Design Blend	94.0	76.1	23.5
1.0% Bentonite + Design Blend	117.4	92.8	26.5

Test Method: ASTM D2216, ASTM D698 Para C.2

- PROJECT NUMBER: 05-103 January 4, 2005		
	Giant Refinery	
SIERRA TESTING LABORATORIES, INC.		
5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762		
Phone: (916) 939-3460 FAX; (916) 939-3507		



\_\_\_\_\_<u>\_</u>\_\_\_



### SAMPLE DATA

Sample Identification: Mix w / 0.5% Bentonite #1Sample Depth, ft.: N/AVisual Description: N/ASample Type: SB Backfill Material

Remarks:

### TEST RESULTS

Permeability, cm/sec.: 8.12E-08

Average Hydraulic Gradient: 5.7

Effective Cell Pressure, psi: 5

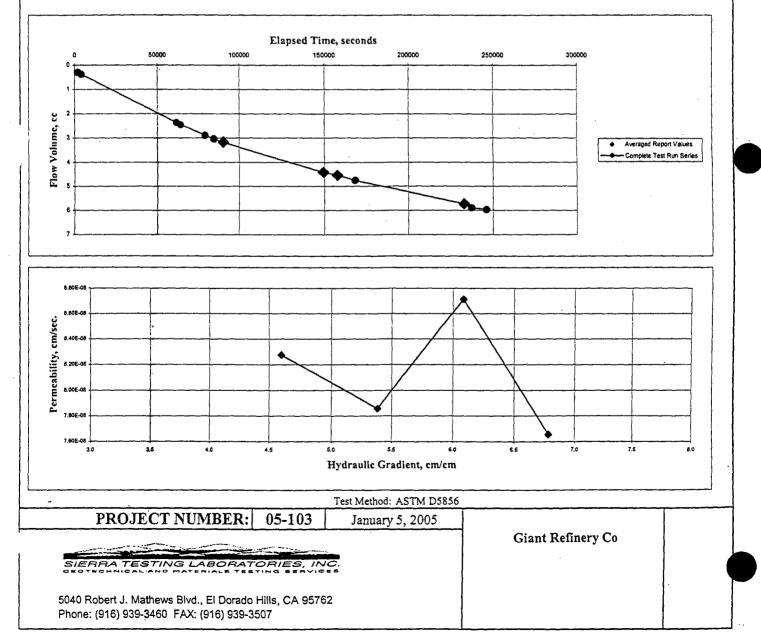
#### TEST SAMPLE DATA

#### Before Test

Specimen Height, cm: 7.19 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 76.1 Moisture Content, % 23.5 Specific Gravity, Assumed Percent Saturation:

1

<u>After Test</u> Specimen Height, cm: 6.53 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 106.6 Moisture Content, % 19.9



### SAMPLE DATA

Sample Identification: Mixed w/ 0.5% Bentonite #2 Visual Description: N/A Sample Depth, ft.: N/A Sample Type: SB Backfill Material

Remarks:

#### **TEST RESULTS**

Permeability, cm/sec.: 7.49E-08

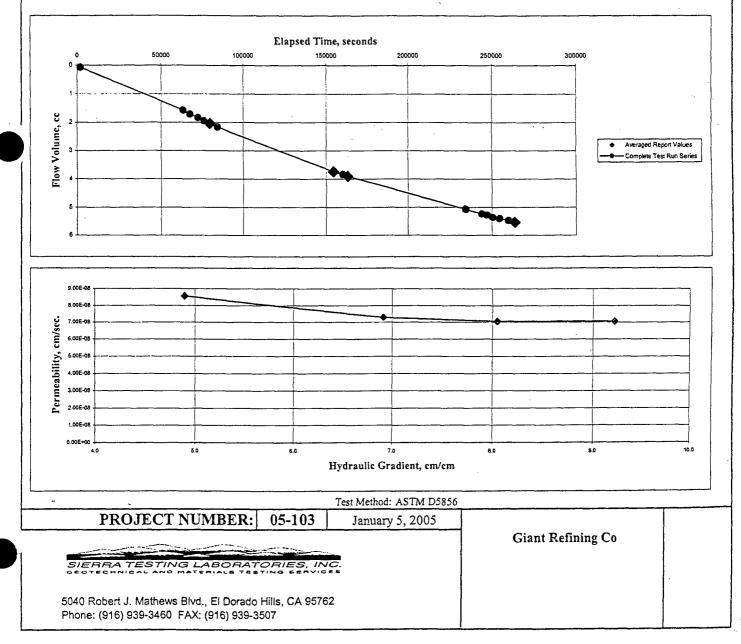
Average Hydraulic Gradient: 7.3

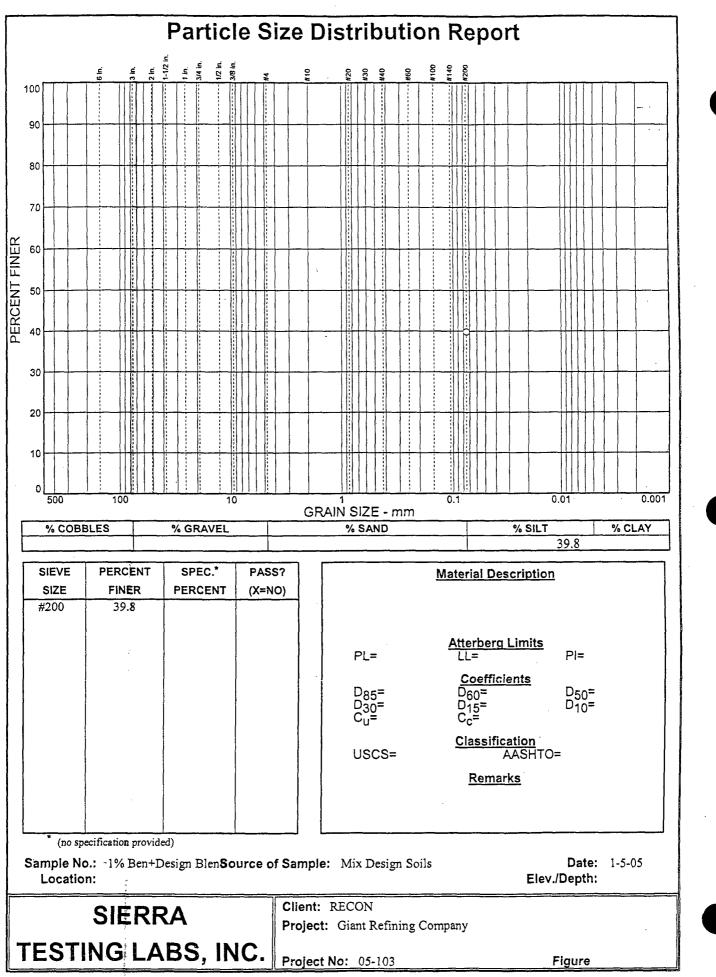
Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

#### Before Test

Specimen Height, cm: 5.97 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 98.0 Moisture Content, % 23.8 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 5.41 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 108.1 Moisture Content, % 19.1





### SAMPLE DATA

Sample Identification: Mix w / 1% Bentonite #1 Visual Description: N/A Sample Depth, ft.: N/A Sample Type: SB Backfill Material

Remarks:

#### **TEST RESULTS**

Permeability, cm/sec.: 4.92E-08

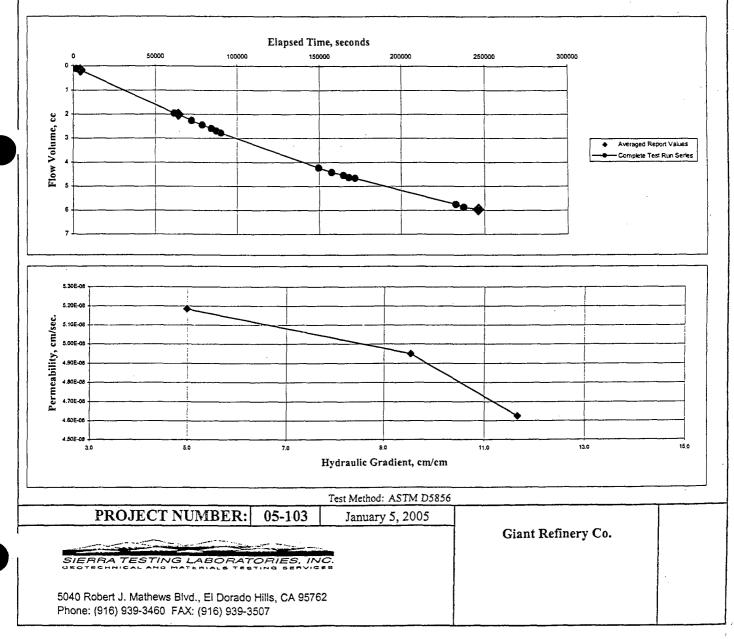
Average Hydraulic Gradient: 8.7

Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

#### Before Test

Specimen Height, cm: 6.48 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 92.8 Moisture Content, % 26.5 Specific Gravity, Assumed Percent Saturation: After Test Specimen Height, cm: 5.77 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 103.8 Moisture Content, % 20.7



### SAMPLE DATA

Sample Identification: Mixed w/1% Bentonite #2 Sampl Visual Description: N/A Sample Sa

Sample Depth, ft.: N/A Sample Type: SB Backfill Material

Remarks:

### TEST RESULTS

Permeability, cm/sec.: 6.99E-08

Average Hydraulic Gradient: 7.0

Effective Cell Pressure, psi: 5

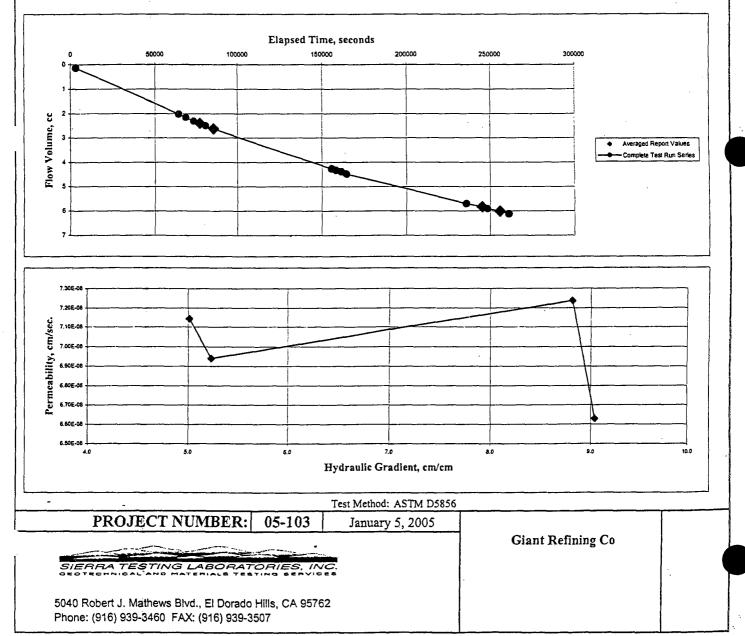
#### TEST SAMPLE DATA

#### Before Test

Specimen Height, cm: 6.48 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 95.4 Moisture Content, % 26.2 Specific Gravity, Assumed Percent Saturation:

6

<u>After Test</u> Specimen Height, cm: 5.97 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 103.5 Moisture Content, % 21.3



### SAMPLE DATA

Sample Identification: STA 8+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

Average Hydraulic Gradient: 8.3

Effective Cell Pressure, psi: 5

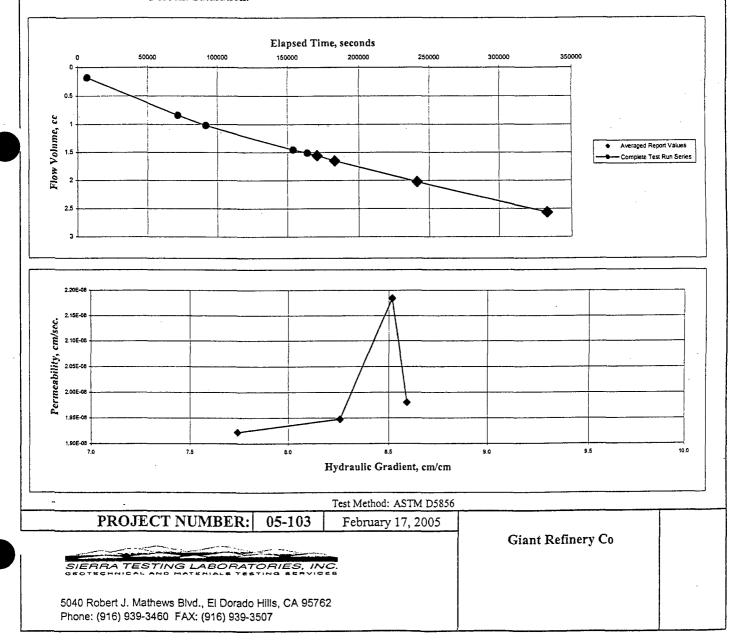
#### TEST SAMPLE DATA

**TEST RESULTS** 

#### Before Test

Permeability, cm/sec.: 2.01E-08

Specimen Height, cm: 7.11 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 65.6 Moisture Content, % 55.2 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 5.94 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 78.5 Moisture Content, % 40.6





SIERRA TESTING LABORATORIES, INC. GEOTECHNICAL AND MATERIALS TESTING SERVICES

March 8, 2005

Remedial Construction Services Attn: Bob Carlson PO Box 690708 Houston TX 77269-0708

SLT Project No:05-103Subject:Giant Refinery CompanyProject No.:2-1780

#### LABORATORY TEST RESULTS

Dear Mr. Savage

As requested, Sierra Testing Laboratories, Inc. performed laboratory testing on two samples of material from the subject site. The samples were identified as: STA 8+00; and STA 4+00. Our laboratory received the samples on February 16, 2005. The tests performed on the submitted samples were as follows:

- 1) Rigid Piston Driven Permeability (ASTM D5856)
- 2) Moisture Content (ASTM D2216)
- 3) D698 Mod/ C-2, Density (ASTM D698)
- 4) Particle Size Analysis, Sieve Analysis to #200 Sieve (ASTM D422)

The results of the above referenced testing are presented on the attached figure(s).

We appreciate the opportunity to be of service to you on this project and look forward to providing additional service, as needed, in the future.

Should you have any questions or require additional information, please contact our office at your convenience.

Very truly yours. Chad M. Walker

Project Manager

Enclosures ks

5040 Robert J. Mathews, Suite 1, El Dorado Hills, CA 95762 (916) 939-3460 Fax (916) 939-3507 www.sierratestinglaboratories.com

#### SAMPLE DATA

Sample Identification: STA 8+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

TEST RESULTS

Average Hydraulic Gradient: 8.3

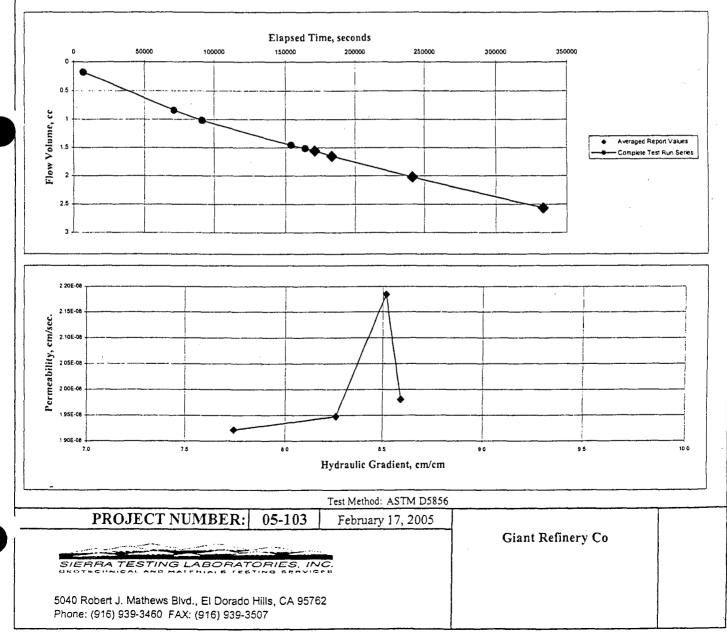
Effective Cell Pressure, psi: 5

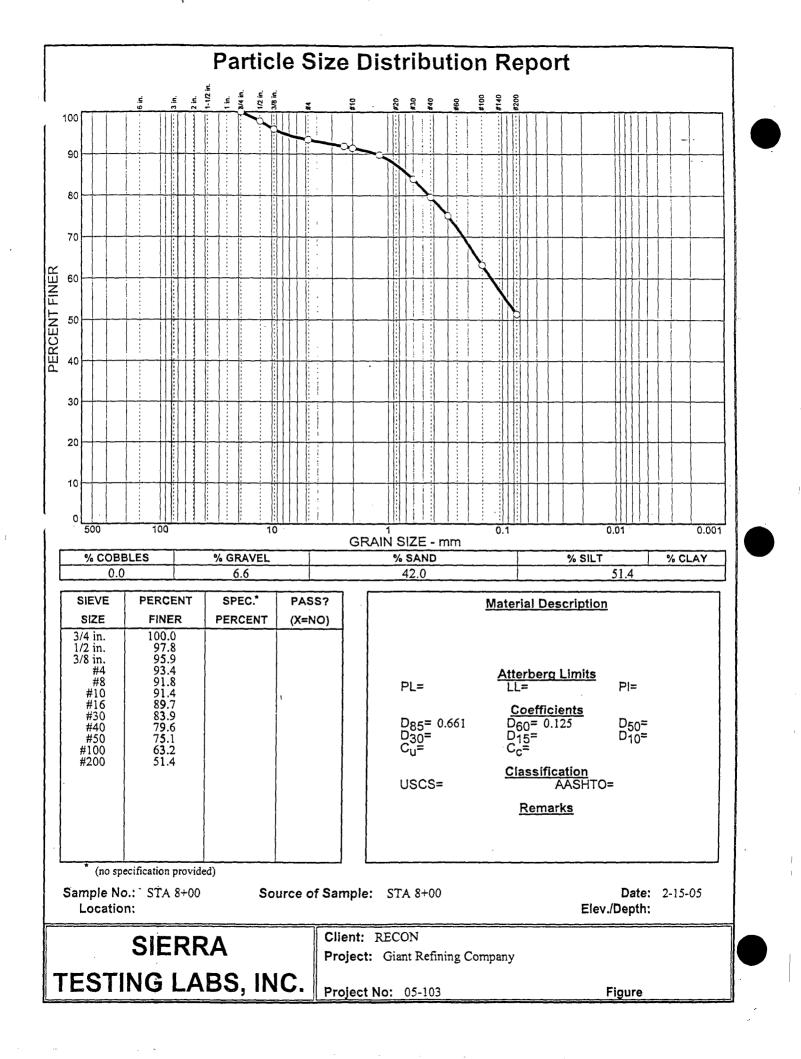
#### TEST SAMPLE DATA

#### Before Test

Permeability, cm/sec.: 2.01E-08

Specimen Height, cm: 7.11 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 65.6 Moisture Content, % 55.2 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 5.94 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 78.5 Moisture Content, % 40.6





# **MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS**

Sample <u>Identification</u> <u>Depth. ft.</u> STA 4+00 STA 8+00 Wet Unit <u>Weight, lb/ft.<sup>3</sup></u> 117.7 106.1 Dry Unit <u>Weight. lb/ft.<sup>3</sup></u> 86.6 69.4 Moisture <u>Content. %</u> 35.8 52.8

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: 05-103 February 25, 2005

**Ginant Refinery** 

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762 Phone: (916) 939-3460 FAX: (916) 939-3507

SIERRA TESTING LABORATORIES, INC.



March 9, 2005

Remedial Construction Services Attn: Bob Carlson PO Box 690708 Houston TX 77269-0708

SLT Project No: 05-103Subject:Giant Refinery CompanyProject No.:2-1780

#### LABORATORY TEST RESULTS

Dear Mr. Carlson:

As requested, Sierra Testing Laboratories, Inc. performed laboratory testing on three samples of material from the subject site. The samples were identified as: STA 2+00; STA 6+00; and STA 10+00. Our laboratory received the samples on February 24, 2005. The tests performed on the submitted samples were as follows:

- 1) Rigid Piston Driven Permeability (ASTM D5856)
- 2) Moisture Content (ASTM D2216)
- 3) Density (ASTM D698 Mod / C-2)
- 4) Particle Size Analysis, Sieve Analysis to #200 (ASTM D422)

The results of the above referenced testing are presented on the attached figure(s).

We appreciate the opportunity to be of service to you on this project and look forward to providing additional service, as needed, in the future.

Should you have any questions or require additional information, please contact our office at your convenience.

Very truly your:

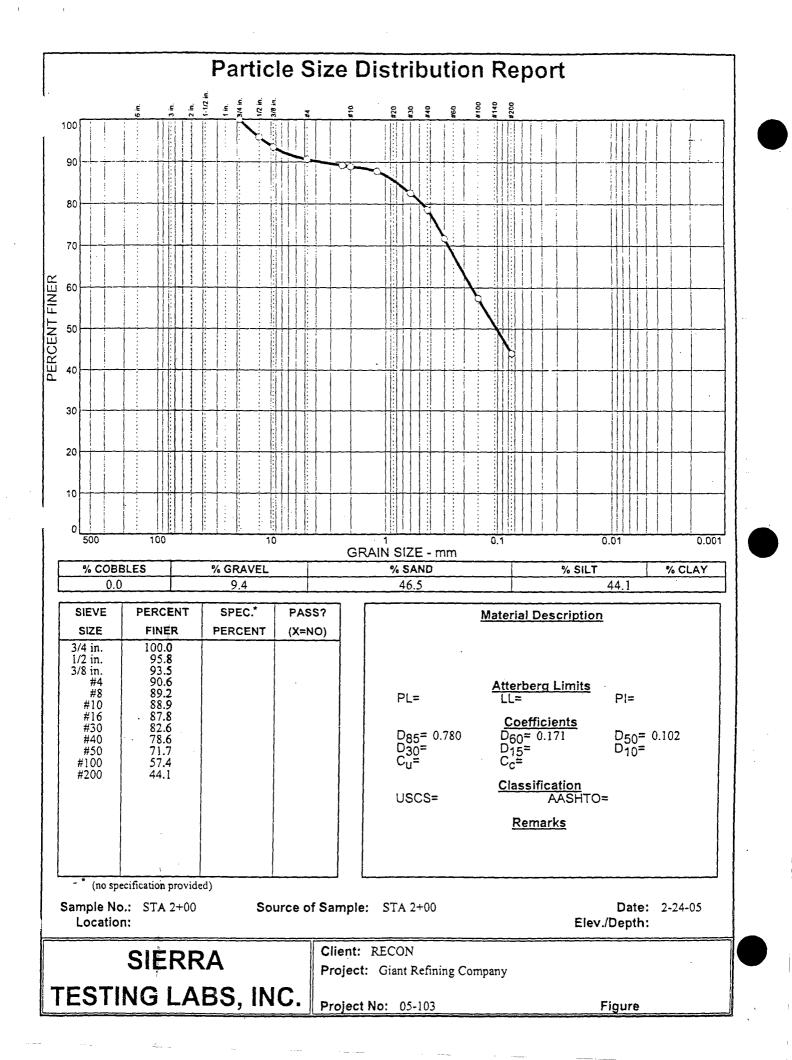
Chad M. Walker Project Manager

Enclosures ks

Sample		Wet Unit	Dry Unit	Moisture
<b>Identification</b>	Depth, ft.	Weight, lb/ft. <sup>3</sup>	Weight. lb/ft. <sup>3</sup>	Content, %
STA 2+00		113.1	83.4	35.7
STA 6+00		112.1	76.9	45.7
STA 10+00		108.7	75.5	44.1

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: 05-103 February 24, 2005		
	Giant Refinery Company	
SIERRA TESTING LABORATORIES, INC.		
5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762		
Phone: (916) 939-3460 FAX: (916) 939-3507		



#### SAMPLE DATA

Sample Identification: STA 2+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### **TEST RESULTS**

Permeability, cm/sec.: 2.12E-08

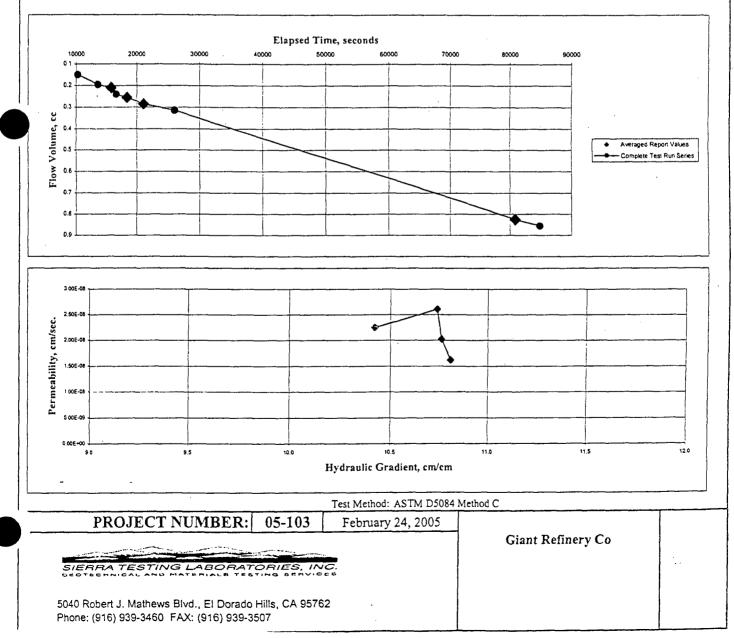
Average Hydraulic Gradient: 10.7

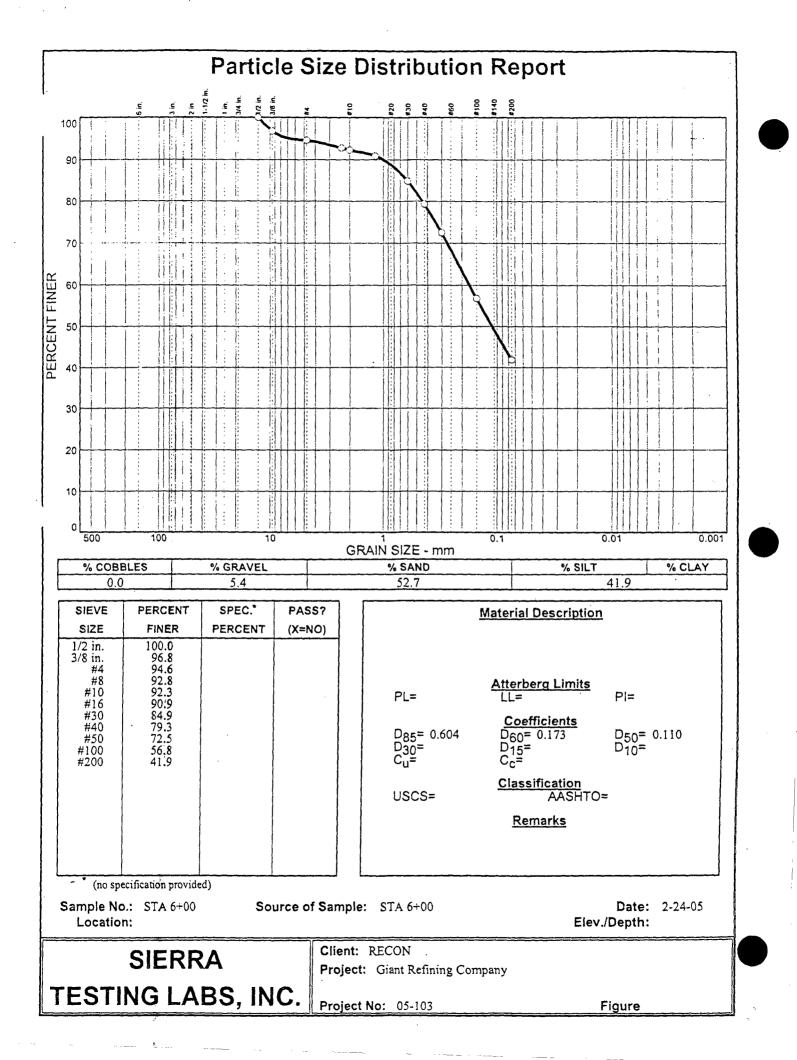
Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

Before Test

Specimen Height, cm: 7.37 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 73.3 Moisture Content, % 48.2 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 6.38 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 84.7 Moisture Content, % 36.9





### SAMPLE DATA

Sample Identification: STA 6+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### **TEST RESULTS**

Permeability, cm/sec.: 2.08E-08

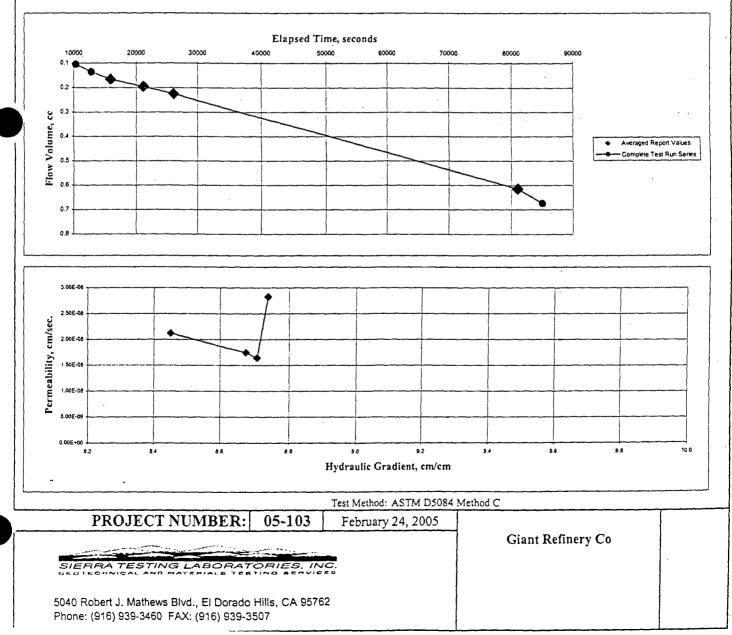
Average Hydraulic Gradient: 8.6

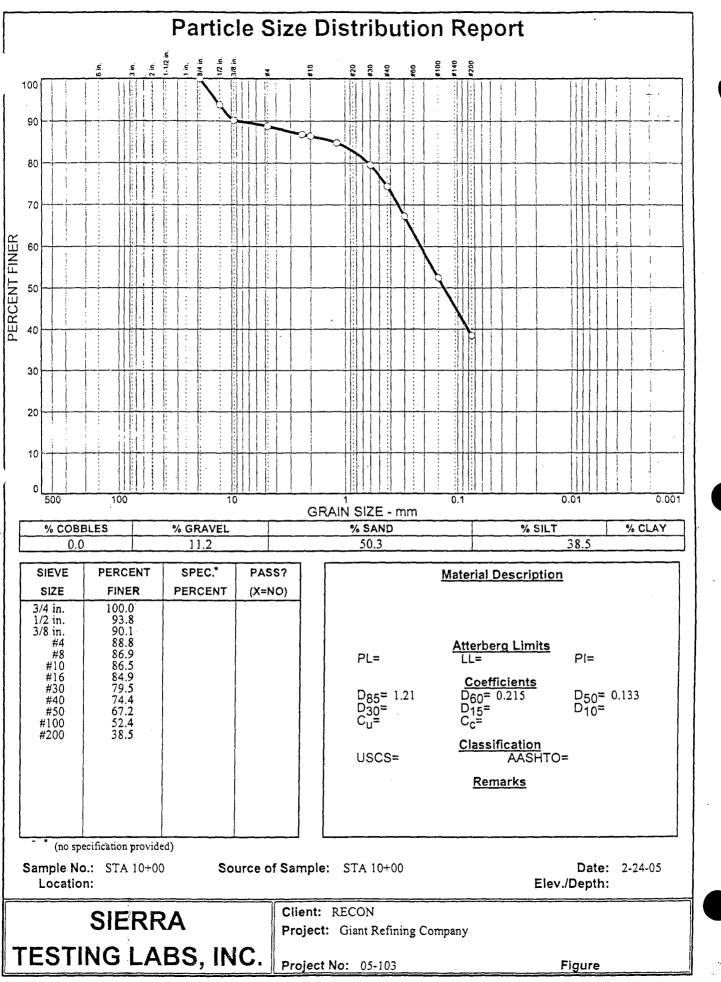
Effective Cell Pressure, psi: 5

#### **TEST SAMPLE DATA**

#### Before Test

Specimen Height, cm: 7.21 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 71.1 Moisture Content, % 49.4 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 6.27 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 81.8 Moisture Content, % 36.9





### SAMPLE DATA

Sample Identification: STA 10+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

### TEST RESULTS

Permeability, cm/sec.: 2.71E-08

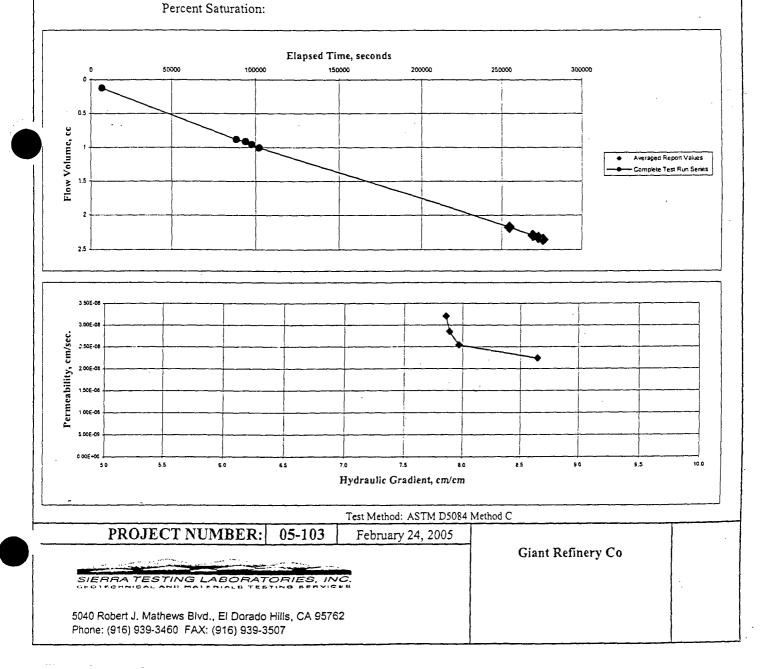
Average Hydraulic Gradient: 8.1

Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

#### <u>Before Test</u> Specimen Height, cm: 7.49 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 70.2 Moisture Content, % 48.8 Specific Gravity, Assumed

<u>After Test</u> Specimen Height, cm: 6.30 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 83.5 Moisture Content, % 35.4





March 9, 2005

Remedial Construction Services Attn: Bob Carlson PO Box 690708 Houston TX 77269-0708

SLT Project No: 05-103Subject:Giant Refinery CompanyProject No.:2-1780

#### LABORATORY TEST RESULTS

Dear Mr. Carlson:

As requested, Sierra Testing Laboratories, Inc. performed laboratory testing on three samples of material from the subject site. The samples were identified as: STA 2+00; STA 6+00; and STA 10+00. Our laboratory received the samples on February 24, 2005. The tests performed on the submitted samples were as follows:

- 1) Rigid Piston Driven Permeability (ASTM D5856)
- 2) Moisture Content (ASTM D2216)
- 3) Density (ASTM D698 Mod / C-2)
- 4) Particle Size Analysis, Sieve Analysis to #200 (ASTM D422)

The results of the above referenced testing are presented on the attached figure(s).

We appreciate the opportunity to be of service to you on this project and look forward to providing additional service, as needed, in the future.

Should you have any questions or require additional information, please contact our office at your convenience.

Very truly yours

Chad M. Walker Project Manager

Enclosures	
ks	

Sample		Wet Unit	Dry Unit	Moisture
<b>Identification</b>	Depth, ft.	Weight, lb/ft. <sup>3</sup>	Weight, lb/ft. <sup>3</sup>	Content. %
STA 2+00		113.1	83.4	35.7
STA 6+00		112.1	76.9	45.7
STA 10+00		108.7	75.5	44.1

Test Method: ASTM D2216, ASTM D2937

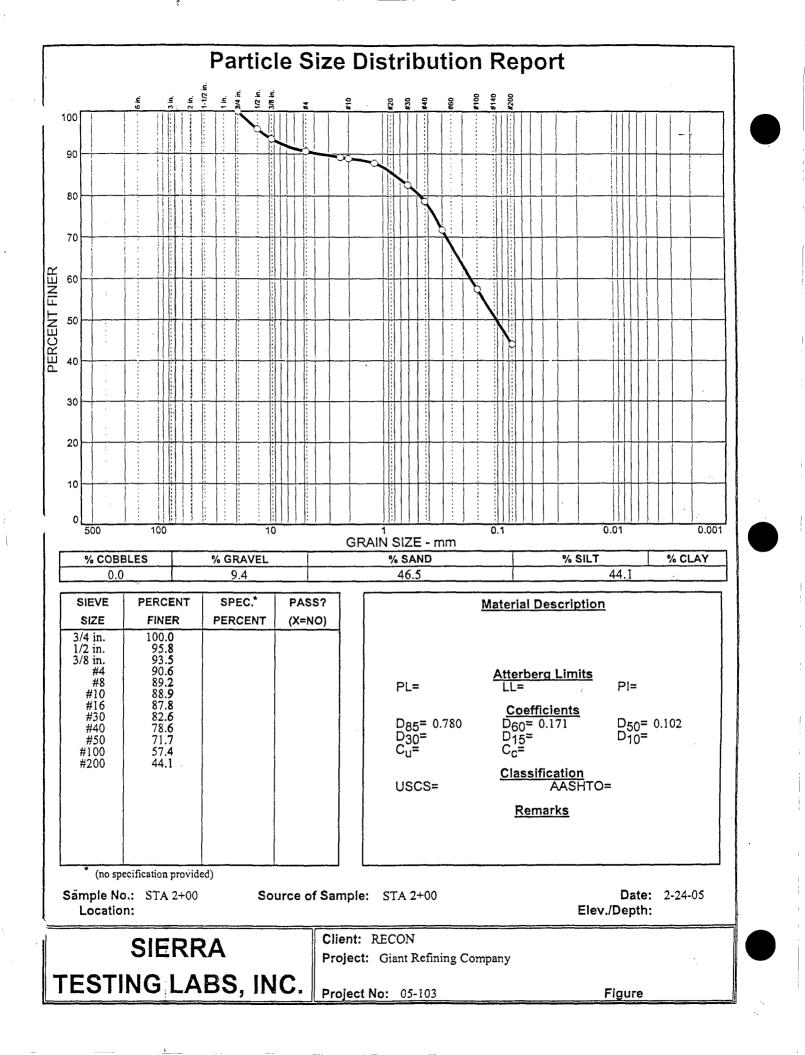
PROJECT	NUMBER:	05-103	February	24, 2005

SIERRA TESTING LABORATORIES, INC. GEGTEGHNIGAL AND MATERIALE TESTING EERVICES

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762 Phone: (916) 939-3460 FAX: (916) 939-3507 **Giant Refinery Company** 

----

\_



## SAMPLE DATA

Sample Identification: STA 2+00 Visual Description: N/A Remarks:

Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### **TEST RESULTS**

Permeability, cm/sec.: 2.12E-08

Average Hydraulic Gradient: 10.7

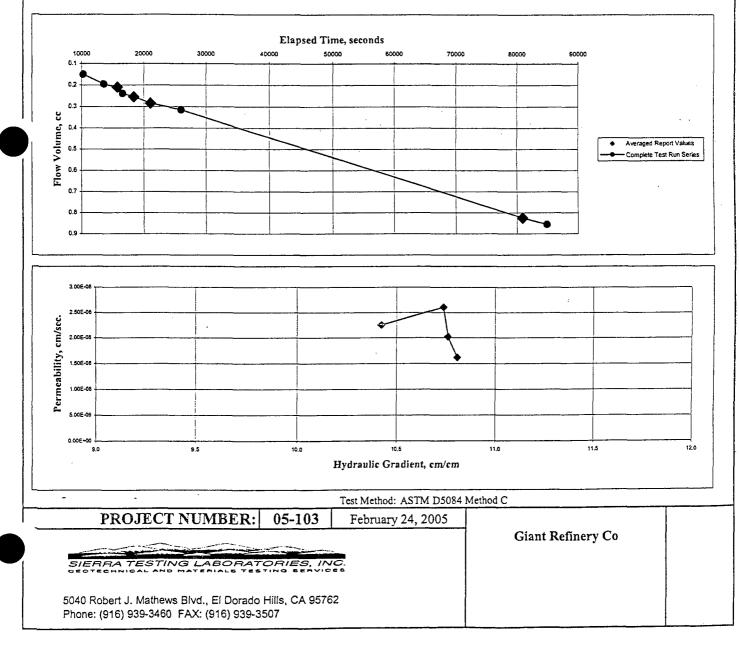
Effective Cell Pressure, psi: 5

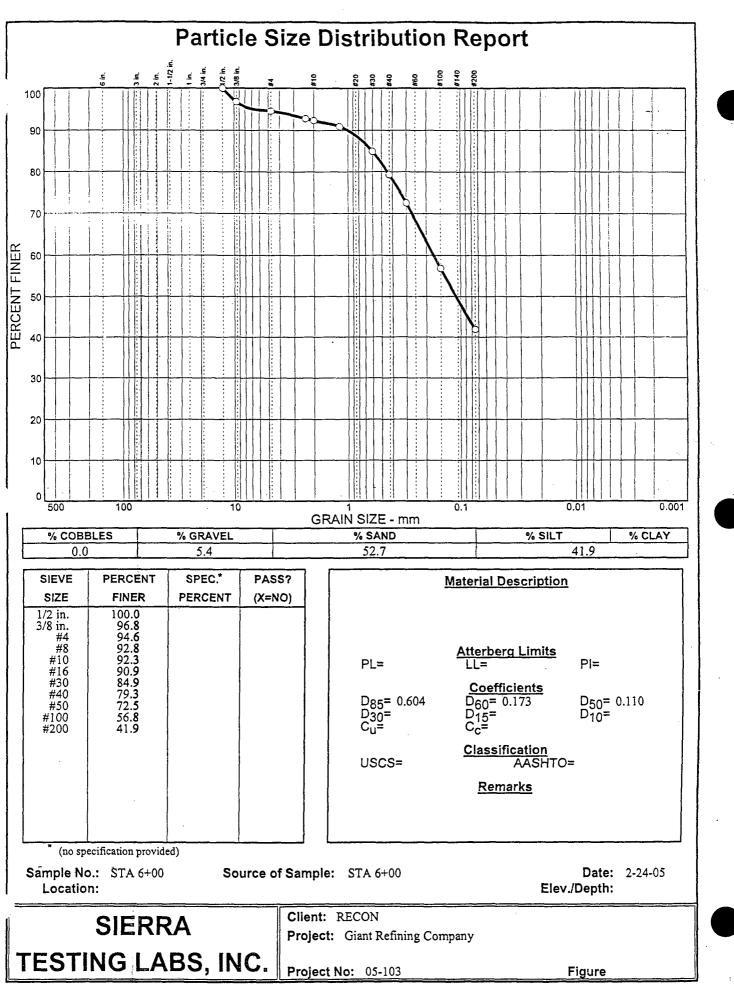
#### TEST SAMPLE DATA

#### **Before Test**

Specimen Height, cm: 7.37 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 73.3 Moisture Content, % 48.2 Specific Gravity, Assumed Percent Saturation:

After Test Specimen Height, cm: 6.38 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 84.7 Moisture Content, % 36.9





### SAMPLE DATA

Sample Identification: STA 6+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### **TEST RESULTS**

Permeability, cm/sec.: 2.08E-08

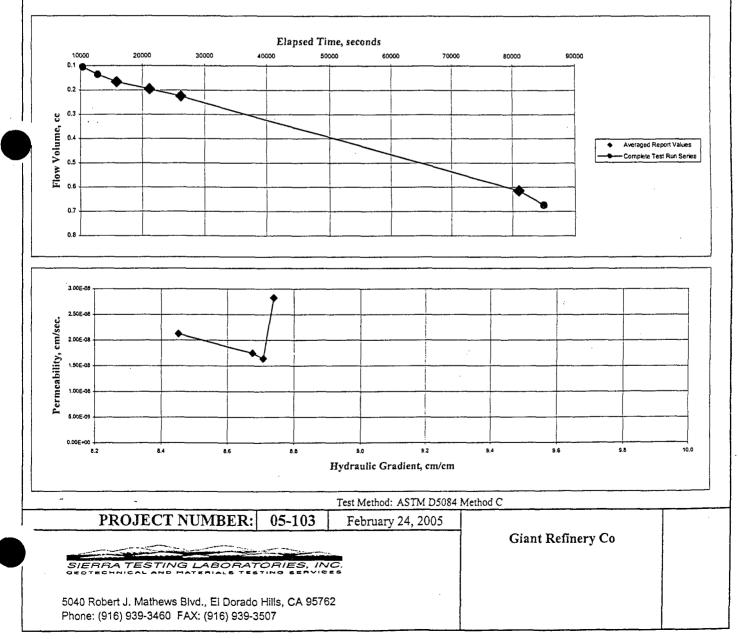
Average Hydraulic Gradient: 8.6

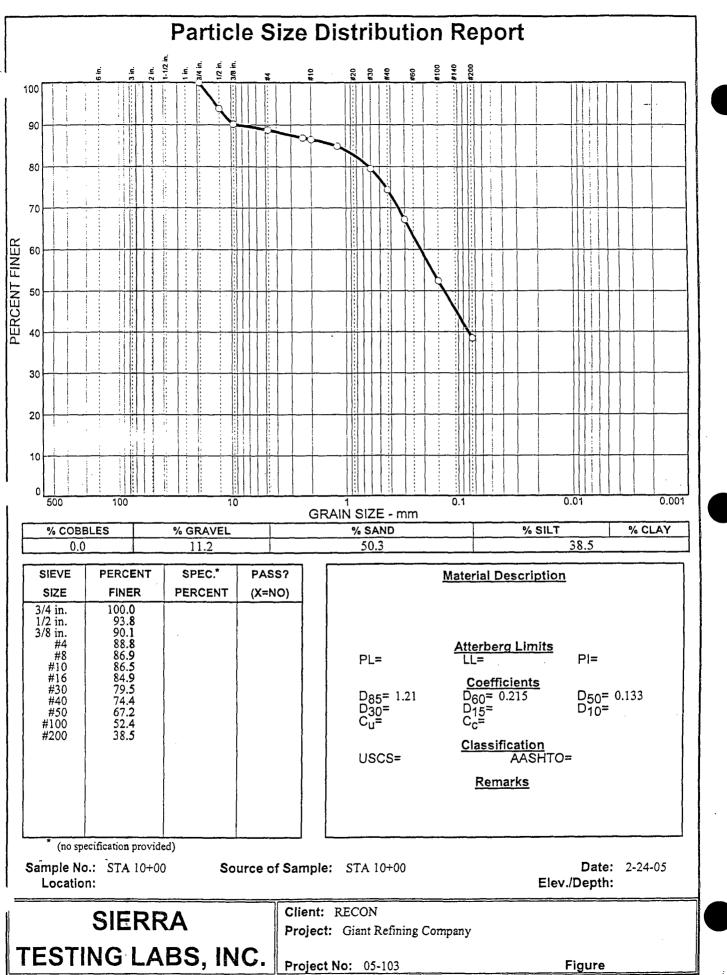
Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

#### Before Test

Specimen Height, cm: 7.21 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 71.1 Moisture Content, % 49.4 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 6.27 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 81.8 Moisture Content, % 36.9





## SAMPLE DATA

Sample Identification: STA 10+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### **TEST RESULTS**

Permeability, cm/sec.: 2.71E-08

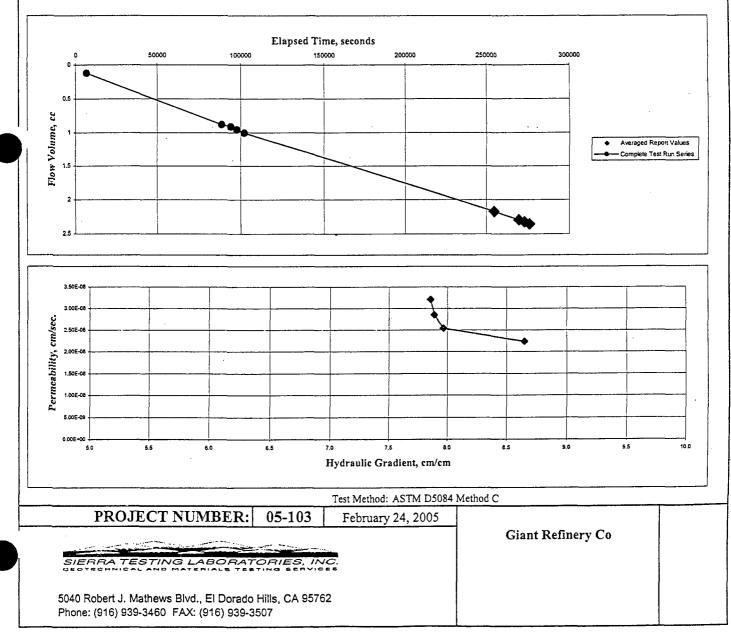
Average Hydraulic Gradient: 8.1

Effective Cell Pressure, psi: 5

### TEST SAMPLE DATA

### Before Test

Specimen Height, cm: 7.49 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 70.2 Moisture Content, % 48.8 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 6.30 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 83.5 Moisture Content, % 35.4





GEOTECHNICAL AND MATERIALS TESTING SERVICES

March 14, 2005

Remedial Construction Services Attn: Bob Carlson PO Box 690708 Houston TX 77269-0708

SLT Project No: 05-103 Subject: Giant Refining Company Farmington NM Project No.: 2-1780

#### LABORATORY TEST RESULTS

Dear Mr. Carlson:

As requested, Sierra Testing Laboratories, Inc. performed laboratory testing on **one sample** of material from the subject site. The sample was identified as: **STA 12+00**. Our laboratory received the sample on **March 2, 2005**. The tests performed on the submitted sample were as follows:

- 1) Rigid Piston Driven Permeability (ASTM D5856)
- 2) Moisture Content (ASTM D2216)
- 3) Particle Size Analysis, Sieve Analysis to #200 (ASTM D422)
- 4) C-2, Density (ASTM D698-Mod)

The results of the above referenced testing are presented on the attached figure(s).

We appreciate the opportunity to be of service to you on this project and look forward to providing additional service, as needed, in the future.

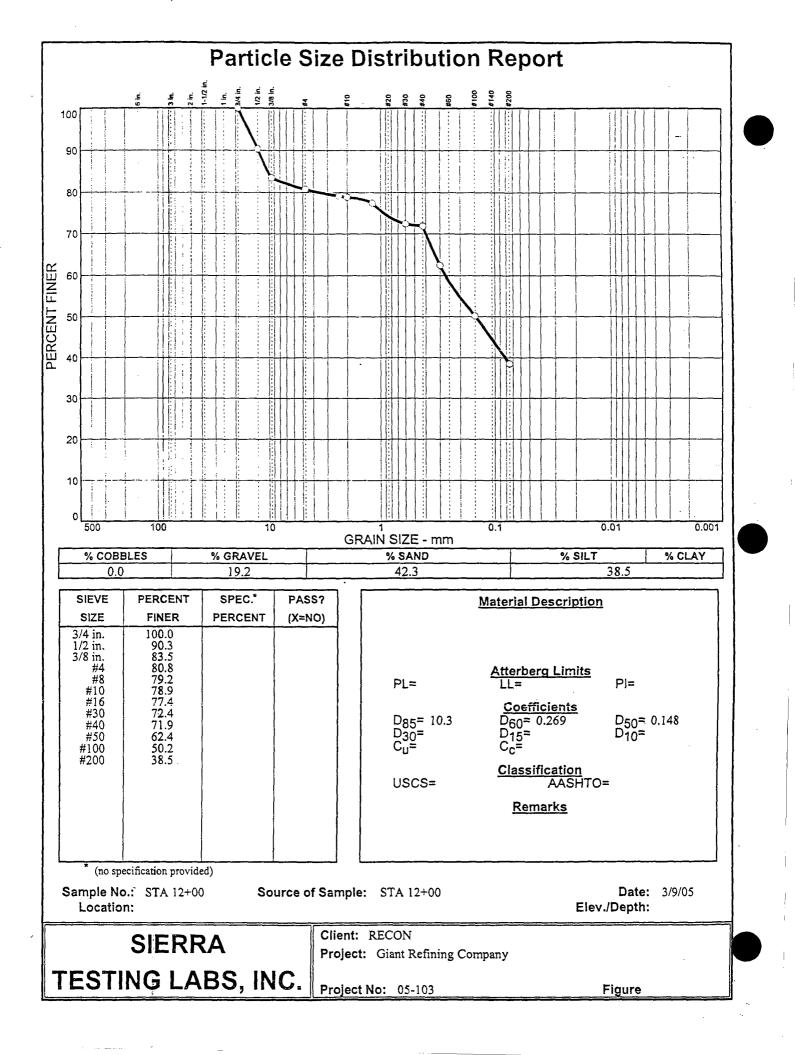
Should you have any questions or require additional information, please contact our office at your convenience.

Very truly yours Chad M. Walker

Project Manager

Enclosures ks

					·
Sample		Wet Unit	Dry Unit	Moisture	
Identification	Depth. ft.	Weight, lb/ft. <sup>3</sup>	Weight, lb/ft.3		
STA 12+00		122.5	96.0	27.7	
		-			
		•			
1					
		Test Metho	od: ASTM D2216, ASTM I	D2937	
			······		
				······································	
- PROJEC	CT NUMBER:	05-103 Marc	ch 9, 2005	Giant Refinery Company	
				Stant Rennery Company	
SIERRA Georgen	A IESTING LA	BORATORIES, IN	/C.		
5040 Robert	t J. Mathews Blvd., El	Dorado Hills, CA 95762			
	6) 939-3460 FAX: (91				



### SAMPLE DATA

Sample Identification: STA 12+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

TEST RESULTS

Permeability, cm/sec.: 4.06E-08

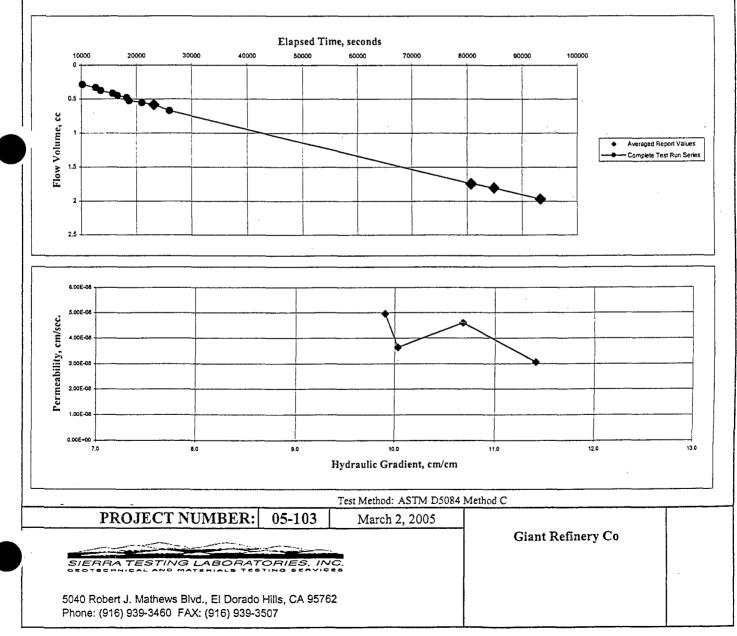
Average Hydraulic Gradient: 10.5

Effective Cell Pressure, psi: 5

### **TEST SAMPLE DATA**

#### Before Test

Specimen Height, cm: 6.99 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 84.4 Moisture Content, % 27.6 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 5.79 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 101.8 Moisture Content, % 22.9





GEOTECHNICAL AND MATERIALS TESTING SERVICES

March 17, 2005

Remedial Construction Services Attn: Bob Carlson PO Box 690708 Houston TX 77269-0708

SLT Project No: 05-103 Subject: Giant Refining Company Farmington NM Project No.: 2-1780

#### LABORATORY TEST RESULTS

Dear Mr. Carlson:

As requested, Sierra Testing Laboratories, Inc. performed laboratory testing on **one sample** of material from the subject site. The sample was identified as: **STA 14+00**. Our laboratory received the sample on **March 4, 2005**. The tests performed on the submitted sample were as follows:

- 1) Flexible Wall Permeability (ASTM D5084)
- 2) Moisture Content (ASTM D2216)
- 3) Particle Size Analysis, Sieve Analysis to #200 (ASTM D422)
- 4) C-2, Density (ASTM D698-Mod)

The results of the above referenced testing are presented on the attached figure(s).

We appreciate the opportunity to be of service to you on this project and look forward to providing additional service, as needed, in the future.

Should you have any questions or require additional information, please contact our office at your convenience.

Verv trulv vours Chad M. Walker

Project Manager

Enclosures ks

Sample <u>Identification</u> STA 14+00

Depth, ft.

Wet Unit <u>Weight, lb/ft.<sup>3</sup></u> 124.6 Dry Unit <u>Weight, lb/ft.<sup>3</sup></u> 101.2 Moisture <u>Content, %</u> 23.1

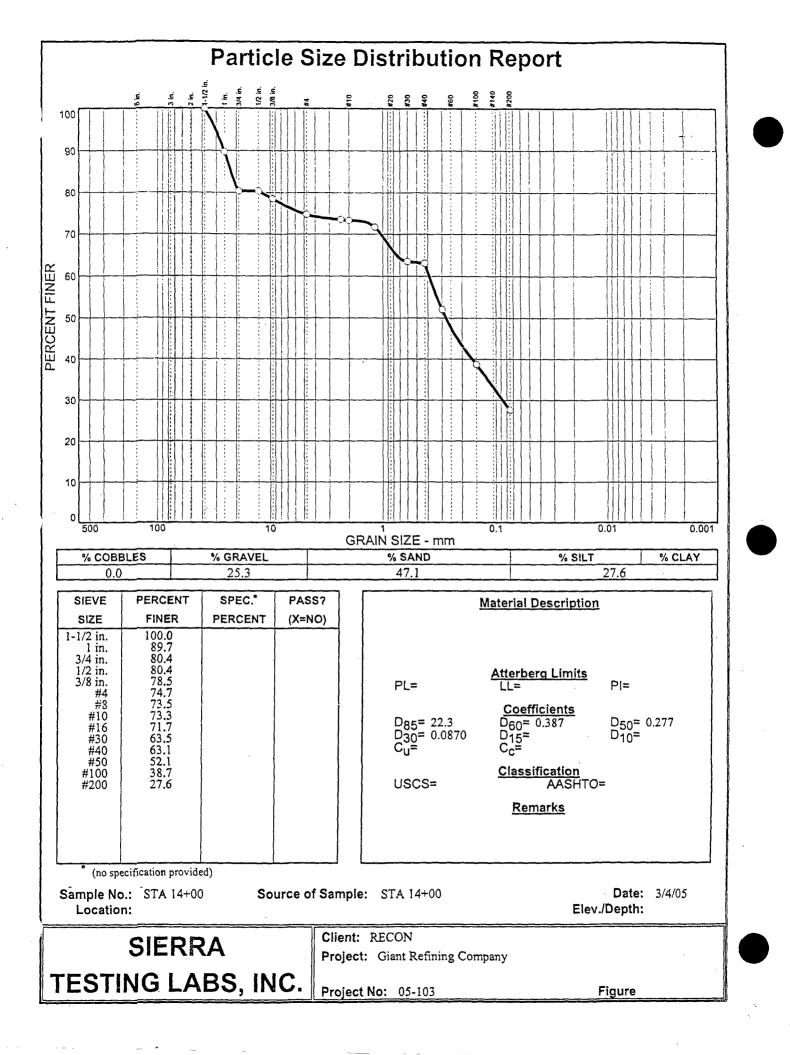
Test Method: ASTM D2216, ASTM D2937

<b>PROJECT NUMBER:</b>	05-103	March 9, 2005

-

SIERRA TESTING LABORATORIES, INC.

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762 Phone: (916) 939-3460 FAX: (916) 939-3507 **Giant Refinery Company** 



### SAMPLE DATA

Sample Identification: STA 14+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

## TEST RESULTS

Permeability, cm/sec.: 2.38E-08

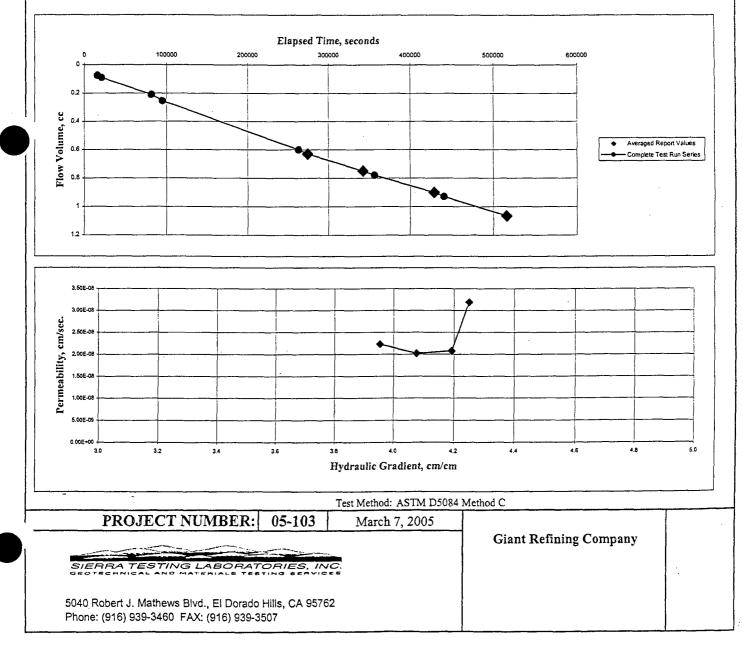
Average Hydraulic Gradient: 4.1

Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

#### Before Test

Specimen Height, cm: 8.46 Specimen Diameter, cm: 5.08 Dry Unit Weight, pcf: 108.5 Moisture Content, % 21.9 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 8.61 Specimen Diameter, cm: 5.08 Dry Unit Weight, pcf: 106.6 Moisture Content, % 20.6





GEOTECHNICAL AND MATERIALS TESTING SERVICES

March 15, 2005

Remedial Construction Services Attn: Bob Carlson PO Box 690708 Houston TX 77269-0708

SLT Project No: 05-103 Subject: Giant Refining Company Farmington NM Project No.: 2-1780

#### LABORATORY TEST RESULTS

Dear Mr. Carlson:

As requested, Sierra Testing Laboratories, Inc. performed laboratory testing on three samples of material from the subject site. The samples were identified as: STA 16+00; STA 18+00; and STA 20+00. Our laboratory received the samples on March 8, 2005. The tests performed on the submitted sample were as follows:

- 1) Rigid Piston Driven Permeability (ASTM D5856)
- 2) Moisture Content (ASTM D2216)
- 3) Particle Size Analysis, Sieve Analysis to #200 (ASTM D422)
- 4) C-2, Density (ASTM D698-Mod)

The results of the above referenced testing are presented on the attached figure(s).

We appreciate the opportunity to be of service to you on this project and look forward to providing additional service, as needed, in the future.

Should you have any questions or require additional information, please contact our office at your convenience.

Very truly yours, Chad M. Walker

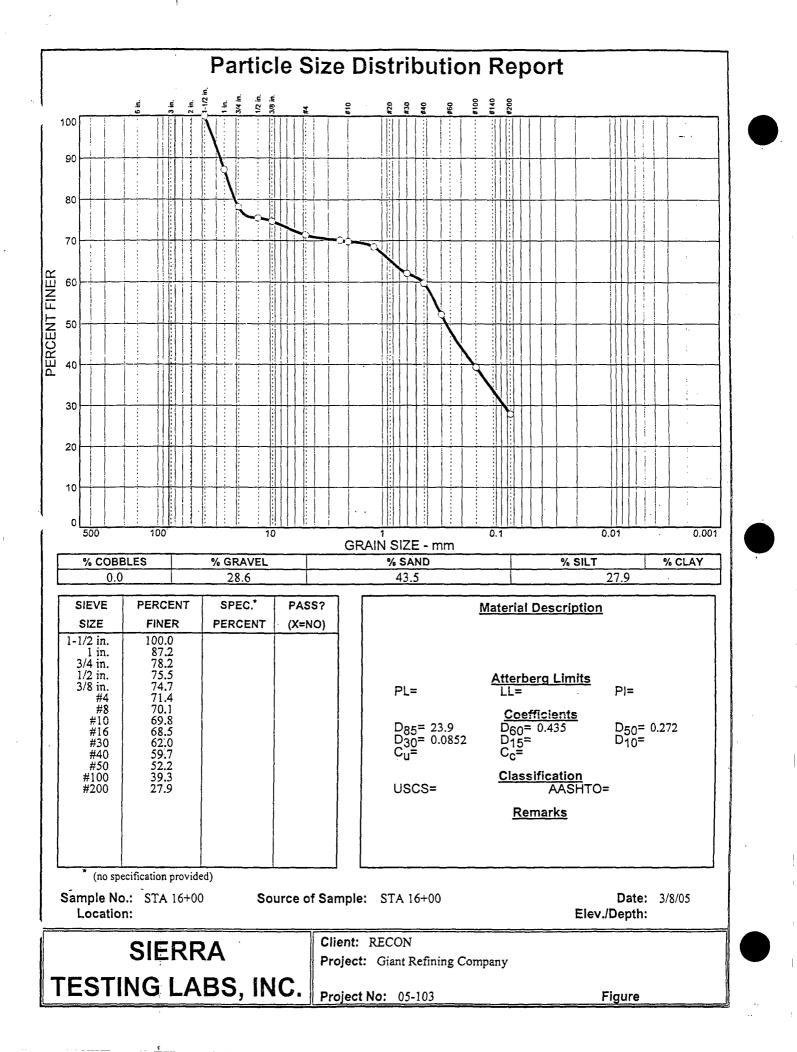
Chad M. Walker Project Manager

Enclosures ks

Sample		Wet Unit	Dry Unit	Moisture
<u>Identification</u>	Depth, ft.	Weight, lb/ft. <sup>3</sup>	Weight, lb/ft. <sup>3</sup>	Content, %
STA 16+00		123.3	99.8	23.5
STA 18+00		117.5	94.2	24.7
STA 20+00		121.5	99.1	22.7

Test Method: ASTM D2216, ASTM D2937

ROJECT NUMBER: 05-103	March 9, 2005	
		Giant Refinery Company
IERRA TESTING LABORATORI		
40 Robert J. Mathews Blvd., El Dorado Hills, CA	95762	
one: (916) 939-3460 FAX: (916) 939-3507		



## SAMPLE DATA

Sample Identification: STA 16+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### **TEST RESULTS**

Permeability, cm/sec.: 3.09E-08

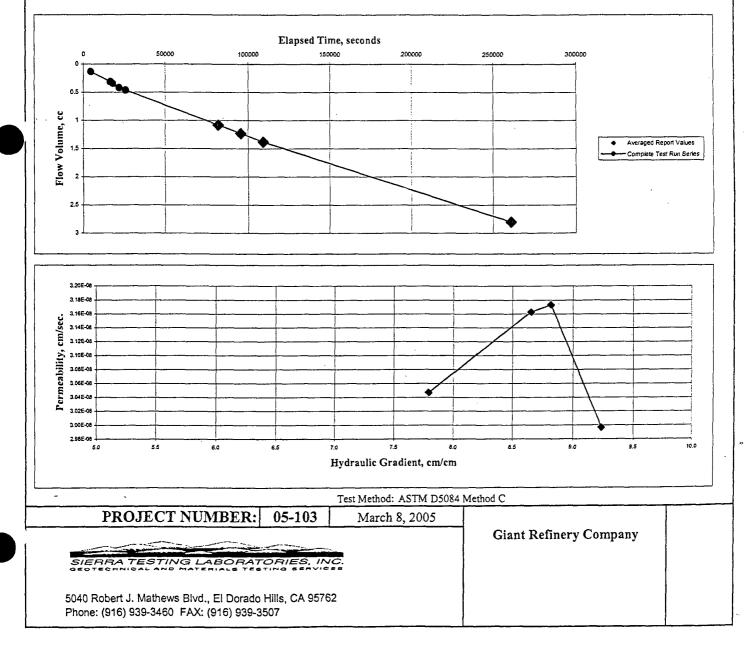
Average Hydraulic Gradient: 8.6

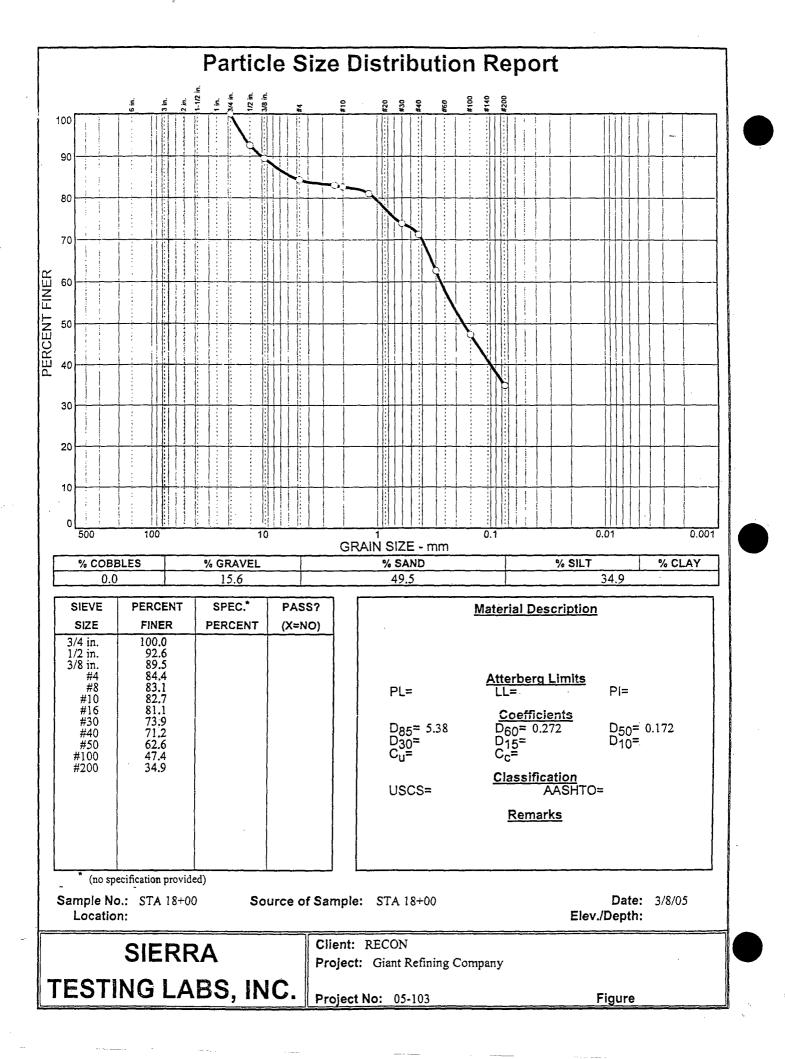
Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

#### **Before Test**

Specimen Height, cm: 6.96 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 90.4 Moisture Content, % 29.1 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 6.10 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 103.2 Moisture Content, % 22.8





## SAMPLE DATA

Sample Identification: STA 18+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

## TEST RESULTS

Permeability, cm/sec.: 3.62E-08

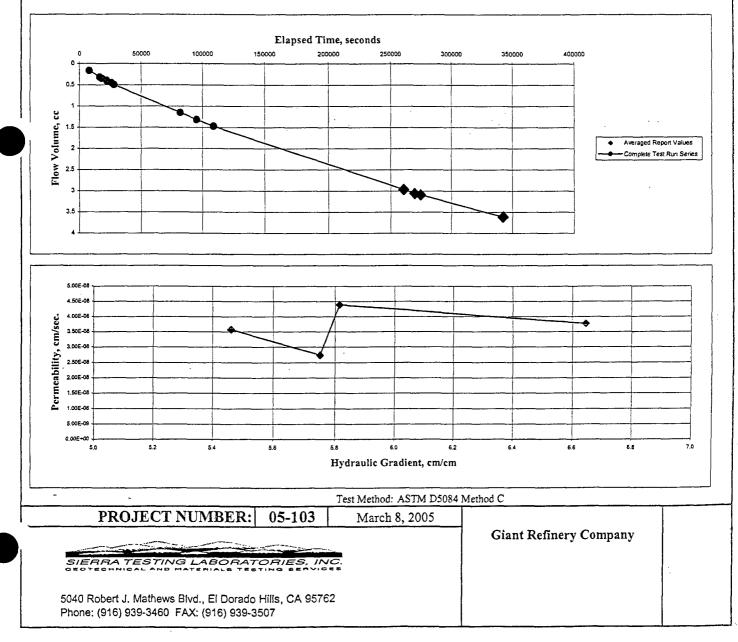
Average Hydraulic Gradient: 5.9

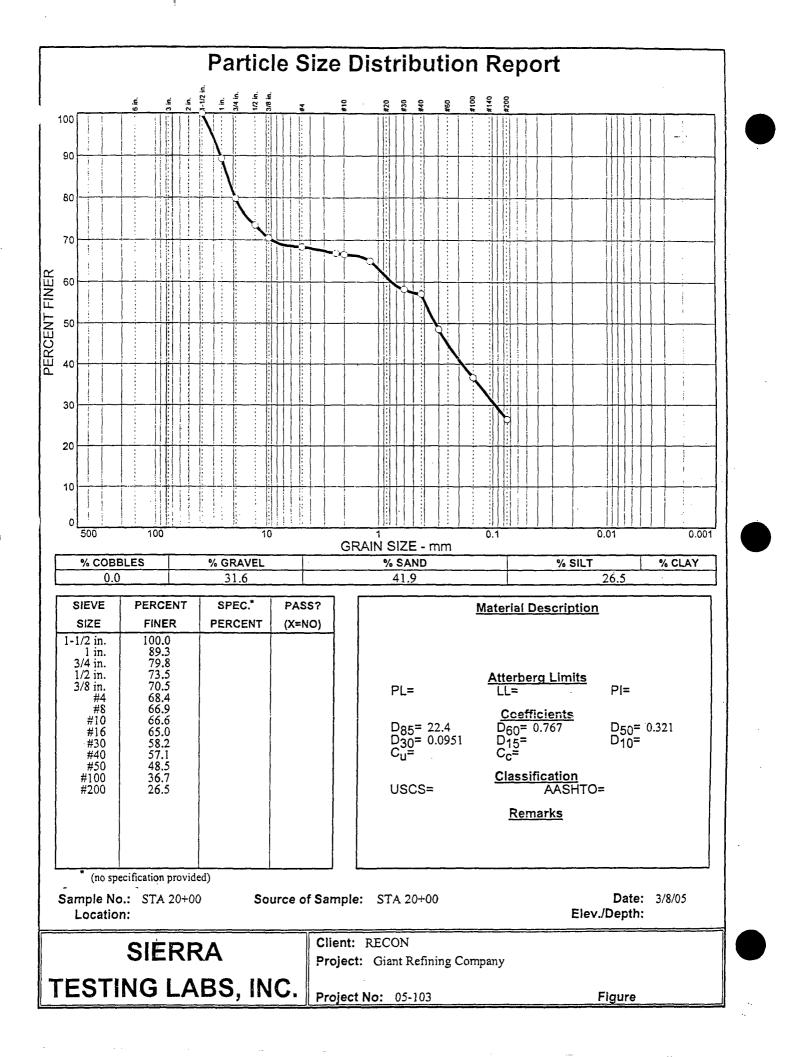
Effective Cell Pressure, psi: 5

#### **TEST SAMPLE DATA**

#### Before Test

Specimen Height, cm: 7.16 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 88.7 Moisture Content, % 31.5 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 6.38 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 99.6 Moisture Content, % 24.3





## SAMPLE DATA

Sample Identification: STA 20+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### **TEST RESULTS**

Permeability, cm/sec.: 4.58E-08

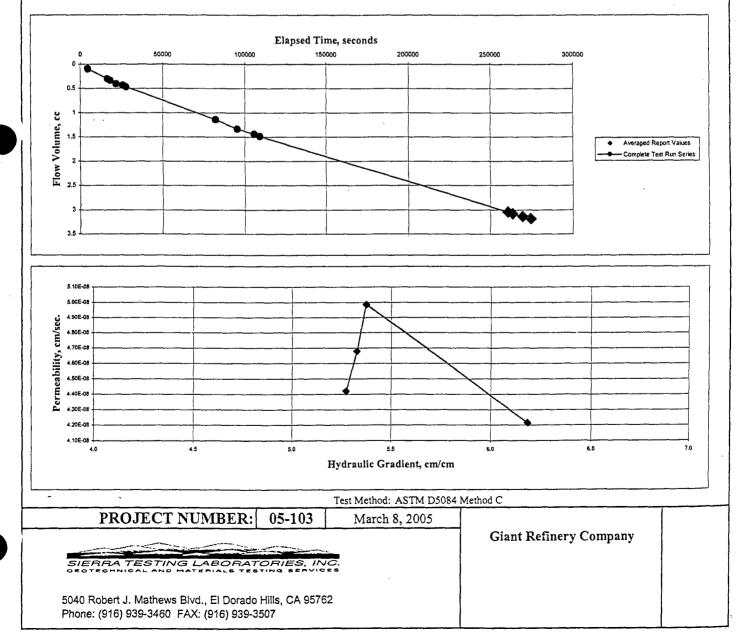
Average Hydraulic Gradient: 5.5

Effective Cell Pressure, psi: 5

#### **TEST SAMPLE DATA**

#### Before Test

Specimen Height, cm: 7.19 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 91.9 Moisture Content, % 29.5 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 6.53 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 101.2 Moisture Content, % 23.0





SIERRA TESTING LABORATORIES, INC. GEOTECHNICAL AND MATERIALS TESTING SERVICES

March 24, 2005

Remedial Construction Services Attn: Bob Carlson PO Box 690708 Houston TX 77269-0708

SLT Project No: 05-103 Subject: Giant Refining Company Farmington NM Project No.: 2-1780

#### LABORATORY TEST RESULTS

Dear Mr. Carlson:

As requested, Sierra Testing Laboratories, Inc. performed laboratory testing on three samples of material from the subject site. The samples were identified as: STA 22+00; STA 24+00; and STA 26+00. Our laboratory received the samples on March 15, 2005. The tests performed on the submitted samples were as follows:

- 1) Flexible Wall Permeability (ASTM D5084)
- 2) Moisture Content (ASTM D2216)
- 3) Particle Size Analysis, Sieve Analysis to #200 (ASTM D422)
- 4) C-2, Density (ASTM D698-Mod)

The results of the above referenced testing are presented on the attached figure(s).

We appreciate the opportunity to be of service to you on this project and look forward to providing additional service, as needed, in the future.

Should you have any questions or require additional information, please contact our office at your convenience.

Very truly yours Chad M. Walker

Chad M. Walker Project Manager

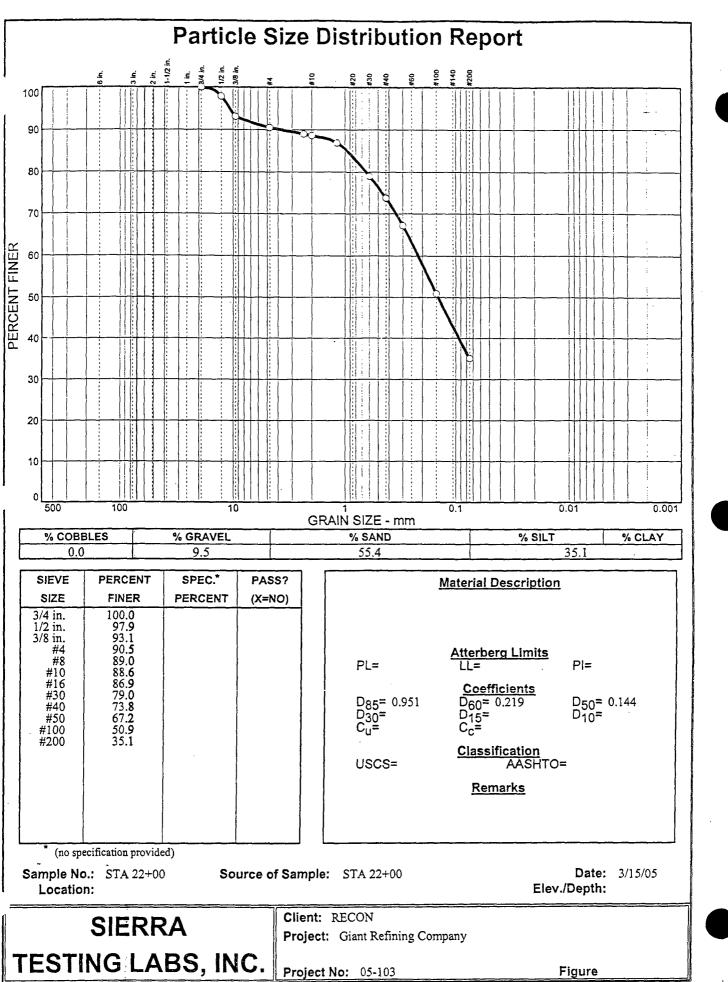
Enclosùres ks

Sample		Wet Unit	Dry Unit	Moisture
<b>Identification</b>	Depth, ft.	Weight, lb/ft. <sup>3</sup>	Weight, lb/ft. <sup>3</sup>	Content, %
STA 22+00		120.0	91.0	31.8
STA 24+00		118.0	89.0	32.5
STA 26+00		118.8	89.1	33.4

Sample		
<b>Identification</b>	Depth. ft.	Visual Classification
STA 22+00		0.0
STA 24+00		0.0
STA 26+00		0.0

Test Method: ASTM D2216, ASTM D2937, ASTM D2487

PROJECT NUMBER: 05-103 March 15, 2005	
	Giant Refining Company
SIERRA TESTING LABORATORIES, INC.	
5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762	
Phone: (916) 939-3460 FAX: (916) 939-3507	



## SAMPLE DATA

Sample Identification: STA 22+00 Visual Description: N/A Remarks:

Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### - -

Permeability, cm/sec.: 2.71E-08 Avera

Average Hydraulic Gradient: 7.7

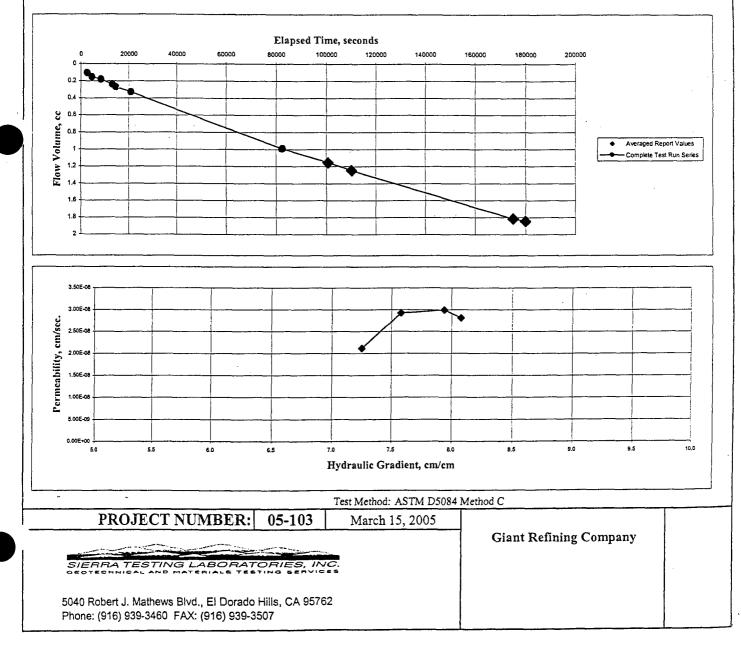
Effective Cell Pressure, psi: 5

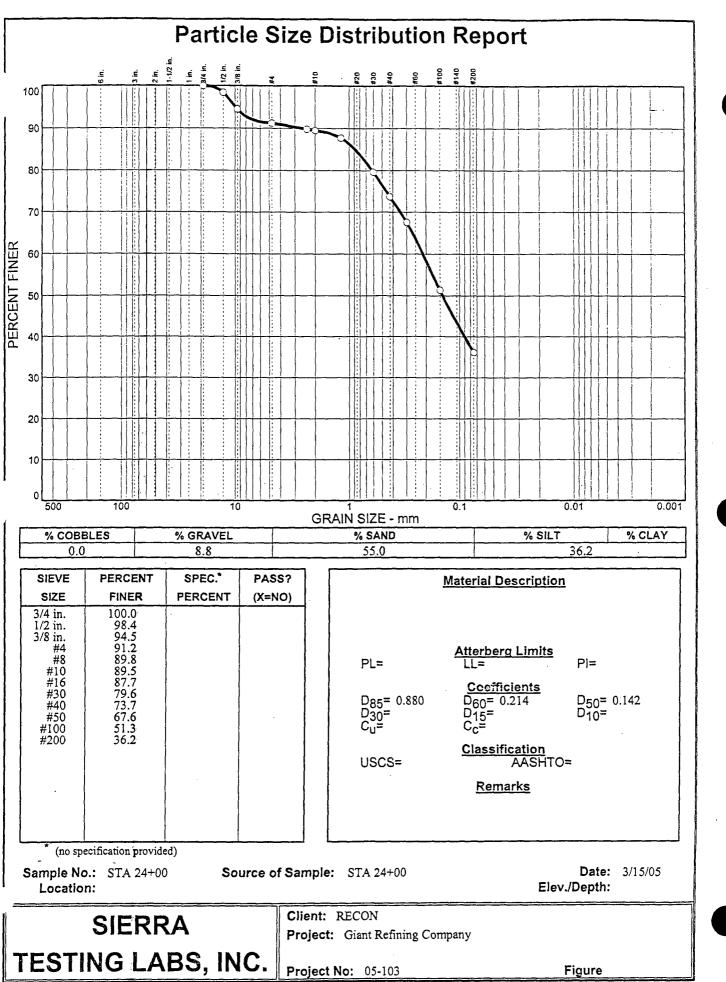
#### TEST SAMPLE DATA

**TEST RESULTS** 

#### Before Test

Specimen Height, cm: 7.06 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 83.1 Moisture Content, % 33.8 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 6.12 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 95.9 Moisture Content, % 27.0





# HYDRAULIC CONDUCTIVITY TEST REPORT

## SAMPLE DATA

Sample Identification: STA 24+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### **TEST RESULTS**

Permeability, cm/sec.: 2.72E-08

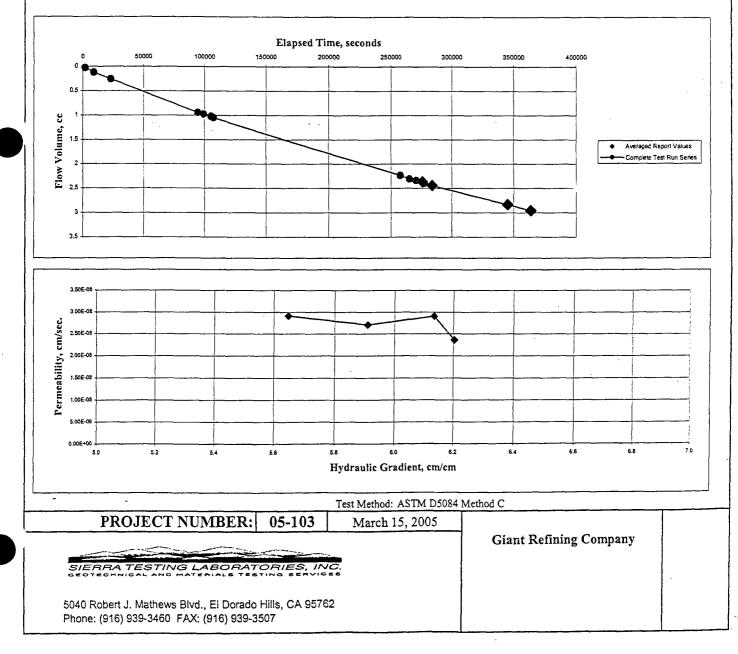
Average Hydraulic Gradient: 6.0

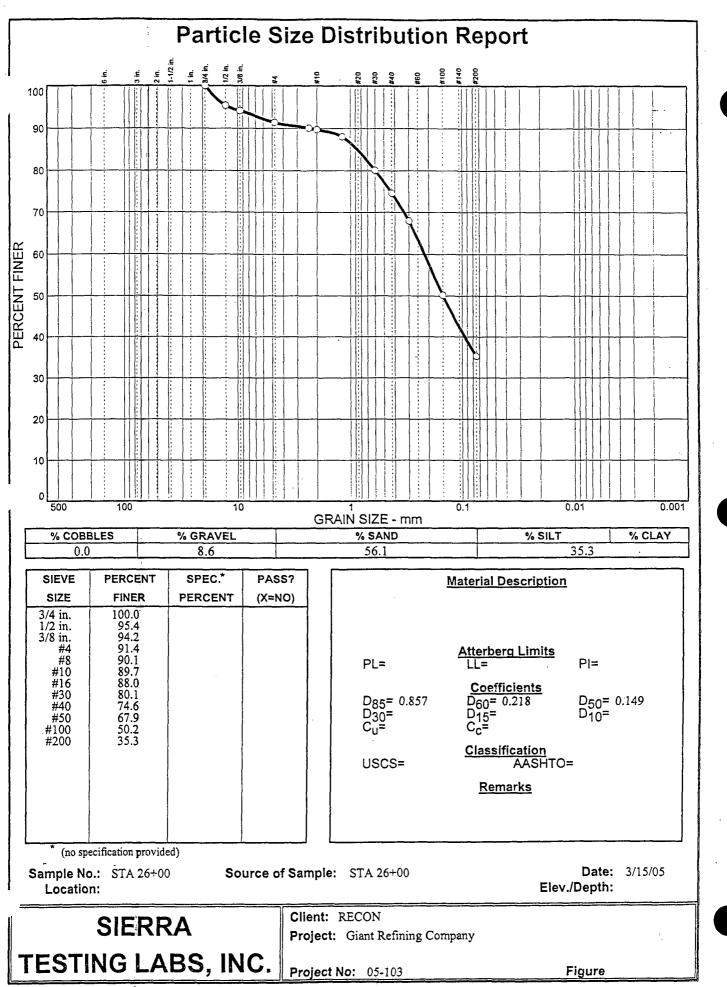
Effective Cell Pressure, psi: 5

#### **TEST SAMPLE DATA**

#### Before Test

Specimen Height, cm: 7.26 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 86.9 Moisture Content, % 33.7 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 6.48 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 97.5 Moisture Content, % 26.2





# HYDRAULIC CONDUCTIVITY TEST REPORT

## SAMPLE DATA

Sample Identification: STA 26+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### TEST RESULTS

Permeability, cm/sec.: 2.81E-08

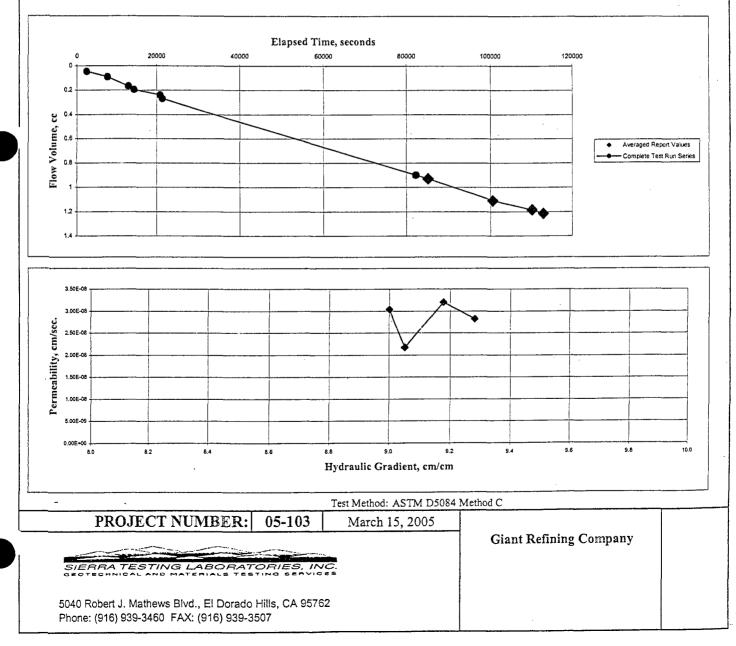
Average Hydraulic Gradient: 9.1

Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

#### Before Test

Specimen Height, cm: 7.62 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 86.4 Moisture Content, % 33.6 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 6.81 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 96.7 Moisture Content, % 26.7



# **APPENDIX C**

# Third Party Daily Inspection Report



ا م رسوید معرب

# DAILY INSPECTION REPORT

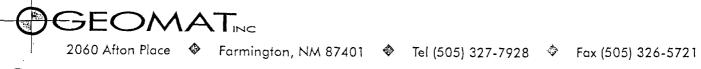
7

GEOMAT

2060 Afton Place Farmington, New Mexico USA 87401 Phone: (505) 327-7928 Fax: (505) 326-5721

. .

DATE: 213/2	
	west Rectany water wall
JOB NO: <u>51-0</u>	CLIENT: Francisco
WEATHER CONDITIC	DNS: Quer ant raining.
WORK IN PROGRES	s: Thuring Alaring & station Et 20
<u></u>	
EQUIPMENT ON SITE	E: Verale hoe
UNEXPECTED SITE	CONDITIONS: Muddy in the
	MV-L-T- 12-1
PERSON NOTIFIED:_	Mike & Jie (Pecon)
REMARKS: O	site at 11.48 a.M. 13 test sturra - fresh Altat sturra.
treach sland	
	ch requested in the at IDAM, 2/23/05:1
	5 1 7.5%
	· ·
NO. OF DENSITY TES	STS
SOILS	PASSFAILRETESTTOTAL
ASPHALT	PASSFAILRETESTTOTAL
CONCRETE	
TRAVEL TIME	2.75 - STANDBY / - RETEST TIME $2$ TEST TIME $1.75$
	TOTAL 2.5
REASON FOR STAND	DBY: NOAC
- <u></u>	
	/ / / /
GEOMAT TECHNICIA	IN: ALLES JAPON DATE: 2/13/33
CLIENT REPRESENT	
CONTRACTOR SUPE	ERINTENDENT: Michay Construct DATE: 2/18/05
AND/OR TESTED. THE SUBJECT TO REVIEW CONTROL OR AN ENG	NS INFORMATION RELATED TO THE REFERENCED PROJECT AND COVERS THE LOCATIONS OF THE WORK OBSERVED INFORMATION CONTAINED HEREIN IS PRELIMINARY. ALL TEST RESULTS OR OTHER DATA CONTAINED HEREIN ARE PRIOR TO INCLUSION IN OUR PROJECT REPORTS. THE INFORMATION PROVIDED DOES NOT CONSTITUTE PROJECT GINEERING EVALUATION OR OPINION REGARDING THE SUITABILITY OF THE SUBJECT WORK OR MATERIALS. IF STIONS OR REQUIRE CLARIFICATION, PLEASE CONTACT THIS OFFICE.
· · ·	



DAILY INSPECTIC							
				עם	ATE: February	/ 14, 2005	
JOB NUMBER: 51 PROJECT NAME: BI		efinery Slurry		ENT: Remedial	Construction §	Services, Inc.	
WEATHER CONDITIONS: Pa	artly cloudy, dry,	and calm.					
WORK IN PROGRESS:							
EQUIPMENT ON SITE: Tr	ackhoe, Excavat	tors .					
NEXPECTED SITE CONDITIONS: M	uddy.						·
PERSON NOTIFIED: M	ke and Joe (Rec	con)					
REMARKS: O	n site at 9:52 a.m	n. to be instru	cted by Mike	to perform slump	, vicousity, fill	trate, and weig	ht of slurr
, a.		nch north of th	he Giant Refi	nery. Technician	requested as		00 at 10.0
a. UMBER OF DENSITY TESTS	n.						
a. TUMBER OF DENSITY TESTS SOILS	n. P/	ASS	FAIL	RETI	EST _	TOT/	AL.
a. <i>UMBER OF DENSITY TESTS</i> SOILS ASPHALT	n. P/				EST _	тот,	AL.
a. IUMBER OF DENSITY TESTS SOILS ASPHALT	n. P/ P/	ASS	FAIL	RETI	EST _	тот,	AL.
a. IUMBER OF DENSITY TESTS SOILS ASPHALT CONCRETE	n. P/ P/	ASS ASS /LINDERS _	FAIL FAIL S	RETI	EST	тот, тот,	AL.
a. IUMBER OF DENSITY TESTS SOILS ASPHALT CONCRETE	n. P/ P/ CY ECY	ASS ASS /LINDERS _	FAIL FAIL S S	RETI	EST	тот, тот,	AL.
a. UMBER OF DENSITY TESTS SOILS ASPHALT ONCRETE ECHNICIAN TIME	n. P/ P/ CY ECY	ASS ASS /LINDERS STANDI	FAIL FAIL S S	RETI	EST	тот, тот,	AL.
a. UMBER OF DENSITY TESTS SOILS ASPHALT ONCRETE ECHNICIAN TIME TRAVEL TIMI REASON FOR STANDEY: - GEOMAT TECHNICIAN	n. P/ P/ CY CY T T James Simpso	ASS ASS /LINDERS STANDI FOTAL 20	FAIL FAIL S S	RETI	ESTAIR	TOT/ TOT/ ME75	AL AL
a. IUMBER OF DENSITY TESTS SOILS ASPHALT CONCRETE TRAVEL TIME TRAVEL TIME REASON FOR STANDEY:	n. P/ P/ CY CY T T James Simpso	ASS ASS /LINDERS STANDI FOTAL 20	FAIL FAIL S S	RETI	EST EST AIR TEST TI February 14	TOT/ TOT/ ME75	AL AL



2060 Afton Place 🗇 Farmington, NM 87401 🗢 Tel (505) 327-7928 🧇 Fax (505) 326-5721 Remedial Construction Services, Inc. 9720 Werrington Houston, TX 77064

GEOMAT Project No.: 51-0138

Attn: Bob Carlson

#### Project: Bloomfield Giant Refinery Slurry Wall Location: Bloomfield, New Mexico Date: 2/14/05

<u></u>		Soil Bentor	nite Slurry	Trench Cu	t Off Wall Quality Control Sheet
				Backfill D	
Station	Time	Unit Wt.	Slump	%>#200	Comments:
4+00	10:15 AM	117 lb/cu.ft	6"	·	
					-
					]

rench					Plant				
Station	Time	Depth	Unit Wt.	/ Visc.	Unit Wt.	Filtrate	Visc.	pH /	Time
4+40	10:15 AM	middle	82 lbs/cu.fť	56 sec.√	63 lb/cu.ft	16 ml 🖌	54 sec.∕	8 🗸	10:20 AN
								-	
									•

Reviewed By: <u>1.a. Maden</u>

DAILY INSPECTION REPORT  Prove (606) 327.7728  Prove (606) 326.5721  Prove (606) 326.572  Prove (606) 326.5721  Prove (606) 326.572  Prove (606) 326.57  Prove (606)			<b>4</b>	GEOMAT 2060 Afton Place Farmington, New Mexico USA 87401
COJECT NAME: <u>Grant Verture</u> B NO:	· · ·	DAILY INS	PECTION REPORT	Phone: (505) 327-7928
B NO:CLIENT: EATHER CONDITIONS: <u>Backhool Concerted on the sale</u> DORK IN PROGRESS:	ATE: 2/14/2005		Ŕ	
B NO:CLIENT: EATHER CONDITIONS: <u>Path</u> <u>Chill</u> , <u>dry 4 colm</u> DRK IN PROGRESS: DUIPMENT ON SITE: <u>drackhool/created-bys</u> NEXPECTED SITE CONDITIONS: <u>mult</u> INEXPECTED STATEST TOTAL ON OF DENSITY TESTS DILS <u>PASS</u> <u>FAIL</u> <u>RETEST</u> TOTAL SPHALT <u>PASS</u> <u>FAIL</u> <u>RETEST</u> TOTAL DNCRETE <u>D</u> CYLINDER <u>SLUMP</u> <u>B</u> AIR TOTAL <u>Z.5</u>	ROJECT NAME: Giro	+ Refinent		
DRK IN PROGRESS:	DB NO:	1		
DUIPMENT ON SITE: <u>Anackhoc/creatoris</u> REXPECTED SITE CONDITIONS: <u>multiple</u> RESON NOTIFIED: <u>Miked</u> , <u>The L</u> EMARKS: <u>Ondo at 9:52am</u> to be ustanted by Mike to reform Aumor description of the stand weight of stand which the b duit of Cont Referent Tech very state and weight of stand which the b duit of Cont Referent Tech very state and weight of stand which the b D. OF DENSITY TESTS DILS PASS FAIL RETEST TOTAL SPHALT PASS FAIL RETEST TOTAL DNCRETE <u>D</u> CYLINDER <u>A</u> SLUMP <u>AIR</u> RAVEL TIME <u>D. 15</u> O STANDBY O RETEST TIME <u>A</u> TEST TIME <u>1.15</u>	EATHER CONDITIONS:	12, Al, and, dry	4 calm	·
IEXPECTED SITE CONDITIONS:	ORK IN PROGRESS:	1 1 1		·
IEXPECTED SITE CONDITIONS:	•	<u></u>		
IEXPECTED SITE CONDITIONS:				
ERSON NOTIFIED: Mile A giszan to be instructed by Mile to melow MARKS: Quite at giszan to be instructed by Mile to melow Aunto description of the stand weight of stand of the bill of t		٤,	<u> </u>	
MARKS: <u>Ande at 9:52am to be instructed by Mike to inclum</u> <u>Aunio deservicionity</u> <u>Mitote and weight of storig istructure</u> <u>the h</u> <u>Aunio deservicionity</u> <u>Mitote and weight of storig istructure</u> <u>the h</u> <u>Aunio deservicionity</u> <u>Tech vignested equinor</u> <u>find witotan</u> . <u>O</u> OF DENSITY TESTS DILS <u>PASS</u> <u>FAIL</u> <u>RETEST</u> <u>TOTAL</u> <u>SPHALT</u> <u>PASS</u> <u>FAIL</u> <u>RETEST</u> <u>TOTAL</u> <u>DNCRETE</u> <u>D</u> <u>Cylinder</u> <u>D</u> <u>Slump</u> <u>D</u> <u>AIR</u> <u>RAVEL TIME</u> <u>DISTANDBY</u> <u>D</u> <u>RETEST TIME</u> <u>AIR</u> <u>TOTAL</u> <u>2.5</u>	NEXPECTED SITE CON	DITIONS: Wardd a	· · · · · · · · · · · · · · · · · · ·	
MARKS: <u>Ande at 9:52am to be instructed by Mike to inclum</u> <u>Aunio deservicionity</u> <u>Mitote and weight of storig istructure</u> <u>the h</u> <u>Aunio deservicionity</u> <u>Mitote and weight of storig istructure</u> <u>the h</u> <u>Aunio deservicionity</u> <u>Tech vignested equinor</u> <u>find witotan</u> . <u>O</u> OF DENSITY TESTS DILS <u>PASS</u> <u>FAIL</u> <u>RETEST</u> <u>TOTAL</u> <u>SPHALT</u> <u>PASS</u> <u>FAIL</u> <u>RETEST</u> <u>TOTAL</u> <u>DNCRETE</u> <u>D</u> <u>Cylinder</u> <u>D</u> <u>Slump</u> <u>D</u> <u>AIR</u> <u>RAVEL TIME</u> <u>DISTANDBY</u> <u>D</u> <u>RETEST TIME</u> <u>AIR</u> <u>TOTAL</u> <u>2.5</u>		Ken Tip Li		
Dump Jicate Vicustifity, Mitule and weight at story island with the back of the definition of the back of the definition of the back of the definition of the back of the definition of the back of the back of the definition of the back	2.0000 00 00 00 00 00 00 00 00 00 00 00 0	<u></u>		
Image: Angle	EMARKS: 2.10	at giszam to	be instructed	1 Mile 12 Milan
Image: Angle	Jump dias Vi	consisting, Miltinte an	I weight of st	und pland all the lin
DILS     PASS     FAIL     RETEST     TOTAL       SPHALT     PASS     FAIL     RETEST     TOTAL       ONCRETE     OCYLINDER     SLUMP     AIR       AVEL TIME     2.15     STANDBY / D     RETEST TIME     TEST TIME	the of Clart			- Jan Mit Dan.
DILS     PASS     FAIL     RETEST     TOTAL       SPHALT     PASS     FAIL     RETEST     TOTAL       ONCRETE     OCYLINDER     SLUMP     AIR       AVEL TIME     2.15     STANDBY / D     RETEST TIME     TEST TIME	)			
DILS     PASS     FAIL     RETEST     TOTAL       SPHALT     PASS     FAIL     RETEST     TOTAL       ONCRETE     OCYLINDER     SLUMP     AIR       AVEL TIME     2.15     STANDBY / D     RETEST TIME     TEST TIME			· · · · · · · · · · · · · · · · · · ·	
SPHALT    PASS    FAIL    RETEST    TOTAL       ONCRETE    OCYLINDER    SLUMP    AAIR       RAVEL TIME    OSTANDBY / □     RETEST TIME    ATEST TIME       TOTAL     TOTAL		<b>b100</b>	±∧11	
DNCRETE <u>D</u> CYLINDER <u>D</u> SLUMP <u>D</u> AIR RAVEL TIME <u>D'15</u> G STANDBY / G RETEST TIME <u>D</u> TEST TIME <u>15</u> TOTAL <u>2.5</u>	_			
AVEL TIME 2.75 G STANDBY / G RETEST TIME 2.5	-	<u> </u>		
AVEL TIME 2.75 G STANDBY / G RETEST TIME 2.5	ONCRETE		ک SLUMP	> AIR
	RAVEL TIME	ン·15 ロ STANDBY/		
ASON FOR STANDBY: JUNE		_		
	EASON FOR STANDBY:	NUNE		
		<u>.                                    </u>	·	·
				1 1
EOMAT TECHNICIAN: JAMES SPANISSI				1
		<u>_</u>	Cher-J	DATE:
DNTRACTOR SUPERINTENDENT:DATE:DATE:	ONTRACTOR SUPERIN	TENDENT:		DATE:
THIS REPORT CONTAINS INFORMATION RELATED TO THE REFERENCED PROJECT AND COVERS THE LOCATIONS OF THE WORK OBSERV AND/OR TESTED. THE INFORMATION CONTAINED HEREIN IS PRELIMINARY. ALL TEST RESULTS OR OTHER DATA CONTAINED HEREIN				
SUBJECT TO REVIEW PRIOR TO INCLUSION IN OUR PROJECT REPORTS. THE INFORMATION PROVIDED DOES NOT CONSTITUTE PROJI CONTROL OR AN ENGINEERING EVALUATION OR OPINION REGARDING THE SUITABILITY OF THE SUBJECT WORK OR MATERIALS	SUBJECT TO REVIEW PRIO	R TO INCLUSION IN OUR PROJECT	REPORTS. THE INFORMATION	PROVIDED DOES NOT CONSTITUTE PROJECT
YOU HAVE ANY QUESTIONS OR REQUIRE CLARIFICATION, PLEASE CONTACT THIS OFFICE.				

1

1 -

Ú

# 

2060 Afton Place 🗇 Farmington, NM 87401 🗇

#### Tel (505) 327-7928 🔅 Fax (505) 326-5721

. .

DAILY	INSF	PECTION	REPORT
-------	------	---------	--------

#### DATE: February 18, 2005

JOB NUMBER: 51-0138 PROJECT NAME: Bloomfield Giant Refinery Slurry Wall CLIENT: Remedial Construction Services, Inc.

WEATHER CONDITIONS: Overcast and rainy.

WORK IN PROGRESS: Placing slurry at station 8+20.

EQUIPMENT ON SITE: Trackhoe

UNEXPECTED SITE CONDITIONS: Very muddy.

PERSON NOTIFIED: Mike and Joe (Recon)

**REMARKS:** On site at 9:48 a.m. to test slurry-fresh/plant slurry, trench slurry, and backfill material. The sample was taken from station 8+20. Technician requested on site at 10:00 a.m. on 2/23/2005.

NUMBER OF DENSITY TESTS				
SOILS	PASS	FAIL	RETEST	TOTAL
ASPHALT	PASS	FAIL	RETEST	TOTAL
CONCRETE	<u></u>			
	CYLINDERS	SLUMP	All	र
TECHNICIAN TIME	- <u> </u>		<u></u>	
TRAVEL TIME	0.75STANE	BY	IE TEST T	IME <u>1.75</u>
	TOTAL	2.5		
REASON FOR STANDBY:				
- GEOMAT TECHNICIAN	James Simpson		DATE February 1	8, 2005
CLIENT REPRESENTATIVE			DATE	
CONTRACTOR SUPERINTENDENT	Michael Curuthers		DATE February 1	8, 2005
Reviewed by:	S. a. maden			



2060 Afton Place 🔹 Farmington, NM 87401 🔹 Tel (505) 327-7928 🔅 Fax (505) 326-5721 Remedial Construction Services, Inc. 9720 Werrington Houston, TX 77064

GEOMAT Project No.: 51-0138

Attn: Bob Carlson

Project: Bloomfield Giant Refinery Slurry Wall Location: Bloomfield, New Mexico 2/18/05 Date:

	<u> </u>	Soil Bentor	nite Slurry	/ Trench Cu	ut Off Wall Quality Control Sheet
				Backfill D	Pata Center
Station	Time	Unit Wt.	Slump	%>#200	Comments:
7+90	9:55 AM	112 lb/cu.ft	5.5"		]
					-
					]

Slurry Data Center									
French					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pН	Time
8+20	9:55 AM	middle	66 lbs/cu.ft	40 sec.	64.5 lb/cu.ft	18 ml	41 sec.	8	9:55 AM
8+20	9:55 AM	bottom	70 lbs/cu.ft	38 sec.					
									- <u> </u>
<u></u>									

Comments:

Reviewed By: <u>A. a. madui</u>

# 

#### GEOMAT

2060 Afton Place Farmington, New Mexico USA 87401 Phone: (505) 327-7928 Fax: (505) 326-5721

DAILY INSPECTION REPORT	Phone: (505) 327-7928 Fax: (505) 326-5721
-123/05	
NAME: Giant Refinery Slurry Wall	
51-0 CLIENT: Recon	
CONDITIONS: Overcast & wet	
PROGRESS: Magina slovery at station 11+30.	
NT ON SITE: Truckhoe	
TED SITE CONDITIONS: Muddy	
NOTIFIED: Joe + Mike	
: Chsite at 10:02 am. to test plant strend The sample was taken at station 11+30 3/3/05 at 10 am. No backfill material to had mechanical difficulty.	. tech vegvested
NSITY TESTS PASS FAIL RETER PASS FAIL RETER	
ECYLINDERSLUMP	<u>AIR</u>
ME STANDBY / D RETEST TIME	TEST TIME
OR STANDBY: Ubne	
ECHNICIAN: AMES SPAYDSON	DATE: 2/23/35
PRESENTATIVE Michael Caruthers	DATE: 2/22/05
	DATE:
OR TAINS INFORMATION RELATED TO THE REFERENCED PROJECT AND COVERS THE L THE INFORMATION CONTAINED HEREIN IS PRELIMINARY. ALL TEST RESULTS OR O TO REVIEW PRIOR TO INCLUSION IN OUR PROJECT REPORTS. THE INFORMATION PROVID L OR AN ENGINEERING EVALUATION OR OPINION REGARDING THE SUITABILITY OF THE 'E ANY QUESTIONS OR REQUIRE CLARIFICATION. PLEASE CONTACT THIS OFFICE.	THER DATA CONTAINED HEREINARE



DAILY INSPECTION REPORT

2060 Afton Place 🗇 Farmington, NM 87401 🕏 Tel (505) 327-7928 🗇 Fax (505) 326-5721

DATE:	February 23, 2005	i

JOB NUMBER: 51-0138 PROJECT NAME: Bloomfield Giant Refinery Slurry Wall CLIENT: Remedial Construction Services, Inc.

WEATHER CONDITIONS: Overcast and wet.

WORK IN PROGRESS: Placing slurry at station 11+30.

EQUIPMENT ON SITE: Trackhoe

UNEXPECTED SITE CONDITIONS: Muddy.

PERSON NOTIFIED: Mike and Joe (Recon)

**REMARKS:** On site at 10:02 a.m. to test plant and trench slurry and material. The sample was taken at station 11+30. Technician requested on site on 3/3/2005 at 10:00 a.m. No backfill material was tested because the contractor had mechanical difficulty.

NUMBER OF DENSITY TESTS					
SOILS	PASS	FAIL	RETEST	TOTAL	
ASPHALT	PASS	FAIL	RETEST	TOTAL	
CONCRETE					and a second second second second second second second second second second second second second second second
	CYLINDERS _	SLUMP	: 	AIR	
TECHNICIAN TIME	· · · ·				and and a second second second second second second second second second second second second second second se
TRAVEL TIME 0.75	STANDE	BY/RETEST TIN	ME TEST	TIME 1.5	
	TOTAL 2	.25			
REASON FOR STANDBY:					
- GEOMAT TECHNICIAN James Si	impson		DATE February	/ 23, 2005	
CLIENT REPRESENTATIVE Michael	DATE February	/ 23, 2005			
CONTRACTOR SUPERINTENDENT	DATE				
Reviewed by: 1. Q.	madel				
Distribution: Client (1)					



2060 Afton Place Starmington, NM 87401 Remedial Construction Services, Inc. 9720 Werrington Houston, TX 77064

## 2060 Afton Place & Farmington, NM 87401 & Tel (505) 327-7928 & Fax (505) 326-5721 nedial Construction Services, Inc. GEOMAT Project No.: 51-0138

Attn: Bob Carlson

Project:Bloomfield Giant Refinery Slurry WallLocation:Bloomfield, New MexicoDate:2/23/05

# Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

				Backfill D	ata Center
Station	Time	Unit Wt.	Slump	%>#200	Comments:
					No backfill due to equipment difficulties.
	·			1	}
				L	
				1	

				Slurry Da	ta Center				
Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pН	Time
11+30	10:00 AM	middle	70 lbs/cu.ft	40 sec.	65 lb/cu.ft	18 ml	43 sec.	8	10:00 AM
11+30	10:00 AM	bottom	72 lbs/cu.ft	1:22 sec.					

Comments

Reviewed By: <u>A. a. Machel</u>

				GEOMAT
GE		:		2060 Afton Place Farmington, New Mexico USA 87401
	[	DAILY INSPECTION RE	EPORT	Phone: (505) 327-7928 Fax: (505) 326-5721
DATE: 3/03/2	>>5			
PROJECT NAME:	Churt Ketine.	4 Sturing Wall	<u>.</u>	
JOB NO:		CLIEN	IT: Reisn	
·	,	cloudy drate calm	· • • • • • •	\ ( ) i.
WORK IN PROGRES		trenching and bac	Lefilling with	Slored how state
14760 10 15	<u> </u>		- <u></u>	
EQUIPMENT ON SIT	re: tracklise,			
	CONDITIONS:	»»<		
		<u> </u>		· · · · · · · · · · · · · · · · · · ·
PERSON NOTIFIED	: Mille & Jse 1	(Recur)		- / 
REMARKS:	le et a:sza	in to lest shur	M IN Middl	a la llan al draw
1-	iv. We him	· · · · · · · · · · · · · · · · · · ·		57 14460. The
A Hes is	llect from the		1	each view of statis
- HO Tell	n rejusted 1	pulle onsite on 3,	19/05 @ 130	<u>д</u> я.
: 	, <u>, , , , , , , , , , , , , , , , , , </u>	·····		
NO. OF DENSITY TE	ESTS	FAIL	/ RETEST	TOTAL
ASPHALT		FAIL	RETEST	
	~~~~		111	
CONCRETE		ider <u>&amp;</u> si		D AIR
TRAVEL TIME	<u>).75</u> 0 s	TANDBY / C RETEST T	· · · · · · · · · · · · · · · · · · ·	TEST TIME 1.75
REASON FOR STAN		TOTA	L_ <u>2.5</u>	: 
REASON FOR STAN	IDBT: <u>10 046</u>			
				3
GEOMAT TECHNICI	AN: Aurs	DIMPSOL	DA <sup>-</sup> DA	TE:
CLIENT REPRESEN		1	DA <sup>-</sup>	TE:
CONTRACTOR SUF	PERINTENDENT:	heline 1Craft	DA DA	TE: <u>3 - 3 - C S</u>
	·			·
AND/OR TESTED. TH	IE INFORMATION CONTAIN	ED TO THE REFERENCED PROJECT IED HEREIN IS PRELIMINARY, ALL	TEST RESULTS OR OTHER	DATA CONTAINED HEREINARE
CONTROL OR AN EI	NGINEERING EVALUATION	OUR PROJECT REPORTS. THE INFO OR OPINION REGARDING THE S	UITABILITY OF THE SUBJ	(
YOU HAVE ANY QUI	ESTIONS OR REQUIRE CLA	RIFICATION, PLEASE CONTACT T	HIS OFFICE.	



2060 Afton Place 🗇 Farmington, NM 87401 🗇 Tel (505) 327-7928 🚸 Fax (505) 326-5721

DAILY	INSPE	CTION	REPORT
-------	-------	-------	--------

DATE: March 3, 2005

JOB NUMBER: 51-0138 PROJECT NAME: Bloomfield Giant Refinery Slurry Wall CLIENT: Remedial Construction Services, Inc.

WEATHER CONDITIONS: Overcast, cloudy, dry, and calm.

WORK IN PROGRESS: Recon is trenching and backfilling with slurry from station 14+60 to 15+40.

**EQUIPMENT ON SITE: Trackhoe** 

UNEXPECTED SITE CONDITIONS: None.

PERSON NOTIFIED: Mike and Joe (Recon)

REMARKS: On site at 9:52 a.m. to test slurry in middle, bottom of trench, and plant mix. Technician has also tested backfill at station 14+60. The samples were collected from the bottom and middle of the trench at station 15+40. Technician requested on site on 3/9/05 at 10:00 a.m.

NUMBER OF DENSITY TESTS				
SOILS	PASS	FAIL	RETEST	TOTAL
ASPHALT	PASS	FAIL	_ RETEST	TOTAL
CONCRETE				· · · · · · · · · · · · · · · · · · ·
	CYLINDERS	SLUMP	AIAI	R
TECHNICIAN TIME			· · · ·	
TRAVEL TIME	0.75 STANDB		E TEST 7	<b>TIME</b> 1.75
	TOTAL	5		
REASON FOR STANDBY:				
GEOMAT TECHNICIAN	James Simpson		DATE March 3, 2	2005
CLIENT REPRESENTATIVE	· · · · · · · · · · · · · · · · · · ·		DATE	
	Michael Curuthers		DATE March 3, 2	2005
Reviewed by:	2.a. madent			



2060 Afton Place 🗇 Farmington, NM 87401 🗇 Tel (505) 327-7928 🗢 Fax (505) 326-5721

Remedial Construction Services, Inc. 9720 Werrington Houston, TX 77064

GEOMAT Project No.: 51-0138

Attn: Bob Carlson

Project: Bloomfield Giant Refinery Slurry Wall Location: Bloomfield, New Mexico 3/3/05 Date:

		Soil Bento	nite Slurry	Trench Cu	ut Off Wall Quality Control Sheet
<u></u>				Backfill D	ata Center
Station	Time	Unit Wt.	Slump	%>#200	Comments:
					No backfill due to equipment difficulties.
				ļ	
		l		ļ	

				Slurry Da	ata Center				
Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pН	Time
15+40	10:00 AM	Middle	72 lb/cu.ft.	46 sec	64 lb/cu.ft.	18.5 ml	41 sec	9	10:00 AN
15+40	10:00 AM	Bottom	70 lb/cu.ft.	54 sec					

Comments

Reviewed By: <u>A. Machiel</u>

# GEOMATING.

2060 Afton Place 🔶 Farmington, NM 87401 🔄 Tel (505) 327-7928 🔶 Fax (505) 326-5721

				DATE: N	larch 9, 2005	
JOB NUMBER: 51-013 PROJECT NAME: Bloom		ry Slurry Wa		<b>[:</b> Remedial Constr	uction Services	s, Inc.
WEATHER CONDITIONS: Clear,	dry, and calm.					
WORK IN PROGRESS: Backfi	illing at station 23+	-40.				
EQUIPMENT ON SITE: 3 Trac	ckhoes					
NEXPECTED SITE CONDITIONS: None.						
PERSON NOTIFIED: Mike a	and Joe (Recon)					
REMARKS: On sit		test slurry, l	out not slurry	was placed in the t	rench. Only the	e backfill materi
•						
sampi	led and tested at s	tation 23+4				
sampi	led and tested at s	tation 23+4				
sampi	led and tested at s	tation 23+4				
sampi	led and tested at s	tation 23+4				
JMBER OF DENSITY TESTS	led and tested at s	tation 23+4				
JMBER OF DENSITY TESTS		tation 23+4	0.	RETEST		TOTAL
JMBER OF DENSITY TESTS SOILS	PASS	tation 23+4	FAIL	RETEST		TOTAL
JMBER OF DENSITY TESTS		tation 23+4	0.	RETEST		TOTAL
JMBER OF DENSITY TESTS SOILS	PASS	tation 23+4	FAIL			
JMBER OF DENSITY TESTS SOILS ASPHALT	PASS		FAIL	RETEST		
JMBER OF DENSITY TESTS SOILS ASPHALT	PASS		FAIL	RETEST	  AIR	
JMBER OF DENSITY TESTS SOILS ASPHALT	PASS		FAIL	RETEST	AIR	
JMBER OF DENSITY TESTS SOILS ASPHALT DNCRETE	PASS PASS CYLIND	 	FAIL FAIL SLUM	RETEST		TOTAL
JMBER OF DENSITY TESTS SOILS ASPHALT DNCRETE	PASS PASS CYLIND	DERS	FAIL FAIL SLUM RETEST	MP		TOTAL
JMBER OF DENSITY TESTS SOILS ASPHALT DNCRETE	PASS PASS CYLIND	DERS	FAIL FAIL SLUM RETEST	MP		TOTAL
JMBER OF DENSITY TESTS SOILS ASPHALT DNCRETE	PASS PASS CYLIND	DERS	FAIL FAIL SLUM RETEST	MP		TOTAL
JMBER OF DENSITY TESTS SOILS ASPHALT DNCRETE	PASS PASS CYLIND	DERS	FAIL FAIL SLUM RETEST	MP		TOTAL
JMBER OF DENSITY TESTS SOILS ASPHALT DNCRETE TRAVEL TIME TRAVEL TIME REASON FOR STANDBY:	PASS PASS CYLIND	DERS	FAIL FAIL SLUM RETEST	RETEST	EST TIME 0.	TOTAL
JMBER OF DENSITY TESTS SOILS ASPHALT DNCRETE CHNICIAN TIME TRAVEL TIME REASON FOR STANDBY: GEOMAT TECHNICIAN Ja	PASS PASS CYLIND	DERS	FAIL FAIL SLUM RETEST	RETEST           MP           TIME         0.75           T	EST TIME 0.	TOTAL
JMBER OF DENSITY TESTS SOILS ASPHALT DNCRETE TRAVEL TIME TRAVEL TIME REASON FOR STANDBY:	PASS PASS CYLIND	DERS	FAIL FAIL SLUM RETEST	RETEST           MP           TIME         0.75         T           DATE         Marc           DATE         Marc	EST TIME 0.	TOTAL



2060 Afton Place 🗇 Farmington, NM 87401 🗇 Tel (505) 327-7928 🔶 Fax (505) 326-5721

GEOMAT Project No.: 51-0138

Remedial Construction Services, Inc. 9720 Werrington Houston, TX 77064

Attn: Bob Carlson

Project: Bloomfield Giant Refinery Slurry Wall Location: Bloomfield, New Mexico Date: 3/3/05

## Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

			-	Backfill D	ata Center	
Station	Time	Unit Wt.	Slump	%>#200	Comments:	
23+40	10:30 AM	130lbs/cu.ft	4.75"			
	1					
	1			1		
	1	1			1	

				Slurry D	ata Center				
Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	РН	Time
			[ · · · · · · · · · · · · · · · · · · ·						· .
					· ·				

Comments: No slurry was sampled today.

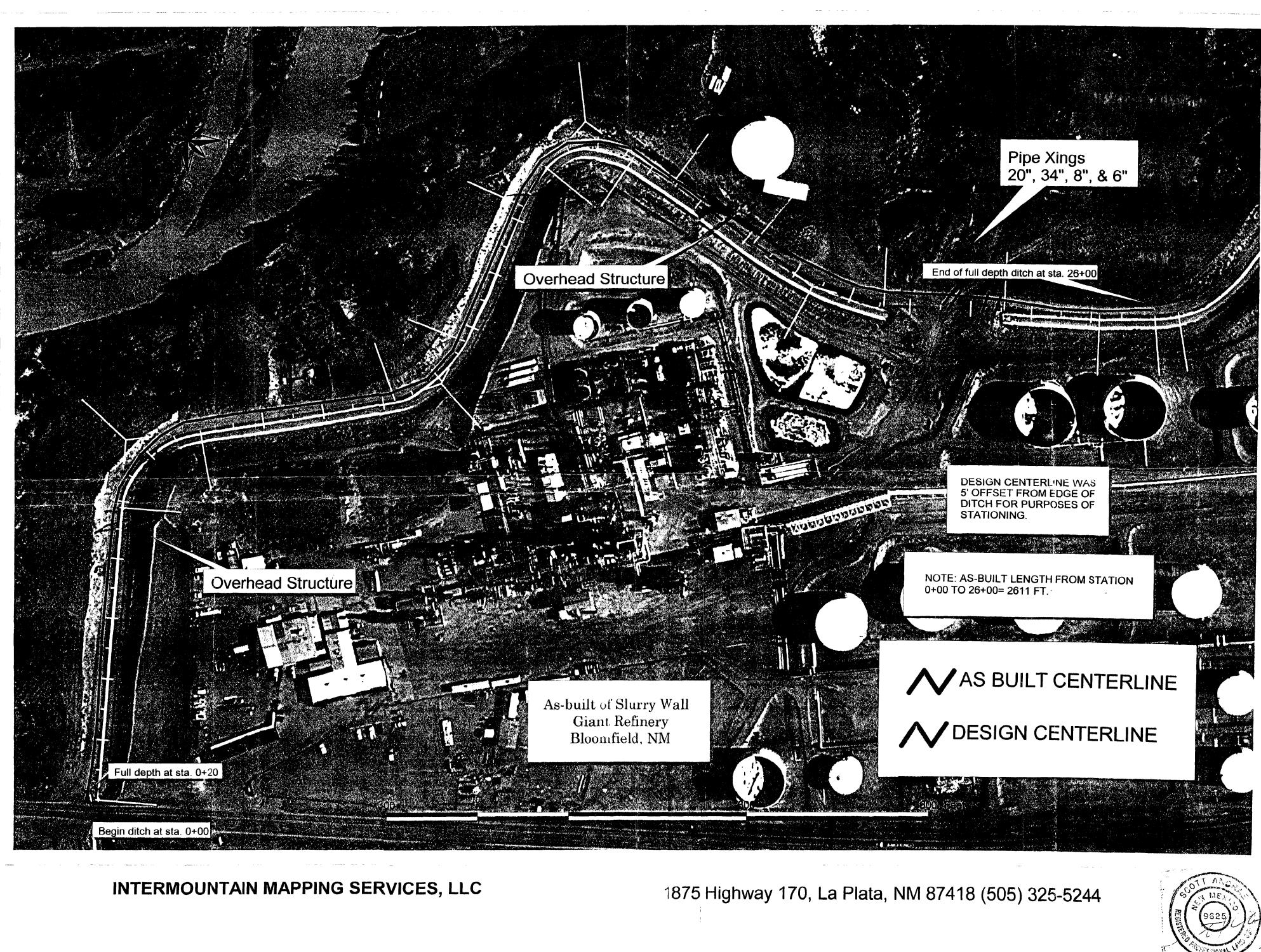
Reviewed By: <u>A.A. Machul</u>

# **APPENDIX D**

# As-Built Slurry Wall Drawing

(..\_\_\_\_\_\_\_\_

06-06-29-08-09-19 XEScan Reflection Plus 1-1-1 Build No 3-38.45.0 (Synergix Scan System - SA (Color) | scandpl 400 ; Auto: Line - Text: Normai - Xerox 510 Plotter - Rainbow Standard - 20 # Bond - plotdpi 400 - scaling - 100 % Color) | scandpi 400 | Auto: Line / Text/Normal | Xerox 510 Plotter - Rainbow Standard | 20 # Bond - plotdpi 400 | scaling - 100 % Synergix Scan System = 5A (Color) | scandpi 400 | Auto: Line / Text/Normal | Xerox 5+0 Plotter = Rainbow Standard + 20 # Bond + plotdpi 400 + scaling= 100 %



# **APPENDIX E**

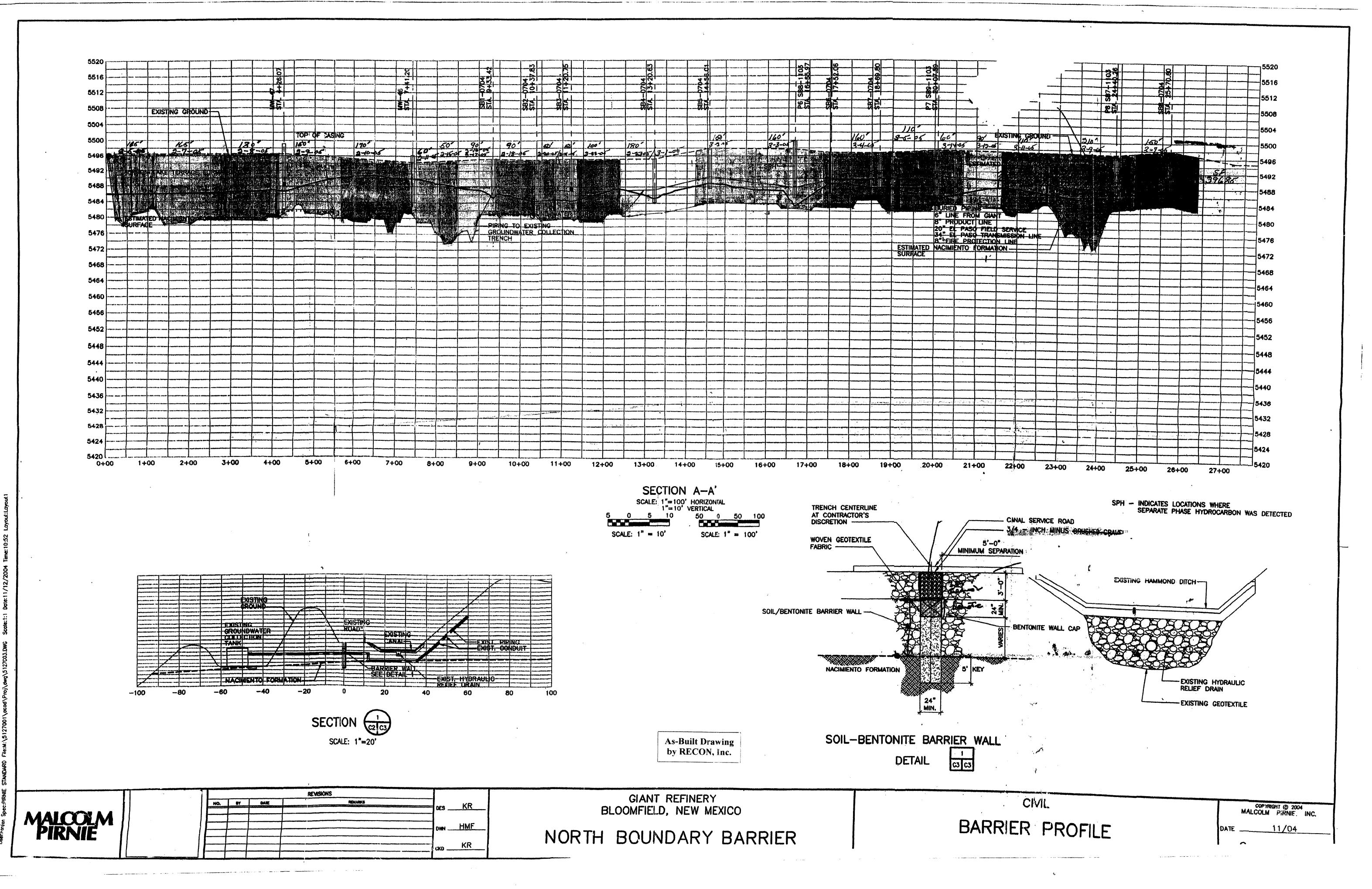
# **Barrier Profile - Actual**

1006-05 31 15:35:45 / XEScan Reflection Plus | 1.1.1 Build No 3.38.45.0 | Synergix Scan System SA (Color) | Scandpl 400 | Auto, Line / Text/Normal | Xerox 510 Plotter | Rainbow Standard 20 # Bond plotdpl 400 | scaling=100 %

2006-05-18 14:44:18 | XEScan Reflection Plus | 1.1.1 Build No 3.38.45.0 | Synergix Scan System - SA (Color) | scandpi 400 | Auto: Line / Text/Normal | Xerox 510 Plotter | Rainbow Standard | 20 # Bond | plotdpi 400 | scaling=100 %

2005-07-12 14:33:23 | XEScan Reflection Plus | 1.1.) Build No 3.38.45.0 | Synergix Scan System - SA (Color) | scandpi 400 | Auto: Line / Text/Normal | Xerox 510 Plotter | Rainbow Standard | 20 # Bond | plotdpi 400 | scaling=100 %

-----



# 001...prilips≥ -004 idbroid = bro8 # 05 = bisbrid2 wodnis8 = 1911019 012 xor9X ; IsmroV 1x9T = 9ni FrotuA | 004 idbrid2 | (10102) A2 = m912y2 ns22 xig19ny2 = 0.24.85.5 oV blid8 i 1 1 = zui9 not15919A Hisb23x = 15.54.80 P5 = 30 = 30

# **APPENDIX D**

# Weekly Reports by Malcolm Pirnie, Inc., Slurry Wall Construction

5127-002 Giant Refining Company

## WEEKLY STATUS REPORT 1/17/05 – 1/23/05

#### 1. ACTIVITIES

**General** 

I/21/05: A preconstruction conference was held on 1/21/05. Representatives of the Giant Refining Company (Giant), RECON, and Malcolm Pirnie participated. RECON is the contractor for the boundary barrier.

#### **Construction**

- $\Box$  1/19 1/21/05: RECON mobilized a construction crew and equipment to the site.
- $\Box$  1/19 1/22/05: Slurry trench alignment.
- $\Box$  1/19 1/22/05: Layed out the staging area arrangement.
- $\Box$  1/21 1/22/05: Started installation of storm water and erosion structures.

#### 2. PLANNED ACTIVITIES

- **u** Install remainder of storm water and erosion control structures.
- D Mobilize specialized equipment, piping, and bentonite.
- □ Set-up slurry mixing equipment, tanks, and piping.
- Pre-excavate at utility crossing locations.
- □ Mix bentonite slurry.

#### 3. SCHEDULE

**□** The current anticipated construction schedule is attached.

#### 4. CONSTRUCTION PHOTOGRAPHS

□ No construction pictures were taken during this period.

Bloomfield Refining North Boundary Barrier Giant Refining Company RCRA PERMIT No. NMD 089416416

WEEKLY STATUS REPORT 1/24/05 – 1/29/05

#### 1. ACTIVITIES

#### General

□ 1/28/05: On-site meeting with local pipeline excavation contractors for the excavation activities within the El Paso pipeline easement.

#### Construction

- □ 1/24 1/29: Continued installation of storm water and erosion control structures.
- □ 1/24 1/29: Set-up slurry mixing system and conveyance piping.
- I/24 I/29: Expand roadway access area along the north side of the Hammond Ditch to accommodate the staging area required for soil/bentonite mixing.

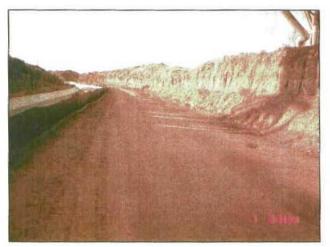
#### 2. PLANNED ACTIVITIES

- Pre-excavate at the El Paso utility crossing location.
- □ Start construction of the North Boundary Barrier at station 0+00 (Hwy 4990).

#### 3. SCHEDULE

□ Schedule has not been revised.

#### 4. CONSTRUCTION PHOTOGRAPHS



Silt fence installed along the north side of the Hammond Ditch. HDPE slurry piping runs along the barrier alignment. Roadway widened an additional 8 feet to accommodate soil/bentonite mixing area.



Slurry mixing system set-up. Water for mixing system supplied by the Giant Fire Water pipeline via a near-by hydrant connection.



# Bloomfield Refining North Boundary Barrier Giant Refining Company RCRA PERMIT No. NMD 089416416

WEEKLY STATUS REPORT 1/31/05 – 2/05/05

#### **1.** ACTIVITIES

#### General

□ 2/5/05: Construction of the North Boundary Barrier begins.

#### Construction

- $\square$  1/31 2/03: Pre-excavation of four (4) utility pipelines located between STA 21+50 and STA 24+00.
  - ✓ El Paso operates a 34-inch diameter natural gas pipeline.
  - ✓ Enterprise operates a 20-inch diameter natural gas pipeline that is currently not inservice.
  - ✓ Conoco-Phillips operates an 8-inch pipeline.
  - ✓ Giant operates a 6-inch fluid pipeline that is currently not in-service.
- □ 2/01: Applied a protective epoxy coating to the 34-inch El Paso pipeline, and a hottar patch on the 20-inch Enterprise pipeline.
- □ 2/01: Encased 16-inch Giant fire-water pipeline in concrete for protection during barrier construction activities.
- $\square$  2/2 2/4: Bentonite sacks (3,000 lbs each) spaced approximately 35 feet apart along the barrier alignment within the soil-bentonite mixing area.

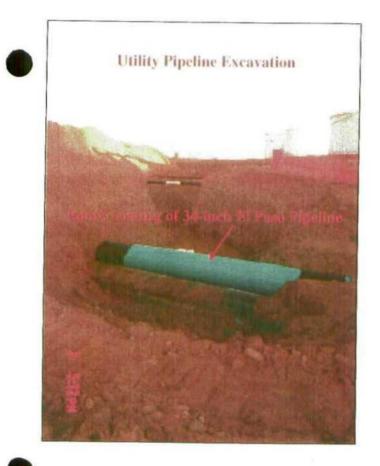
16

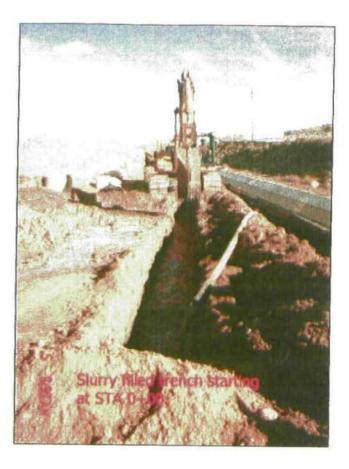
- $\Box$  2/5: Start construction of North Boundary Barrier at STA 0+00.
  - ✓ Trench excavation completed through STA 1+15
  - ✓ Approximately 1,700 linear square feet excavated.
  - ✓ Trench backfilled at a 1:8 slope, extending to STA 0+90.

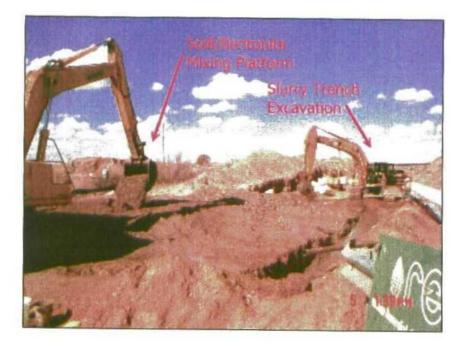
#### 2. PLANNED ACTIVITIES

- □ Continue construction of North Boundary Barrier at STA 1+15.
- **3.** Schedule
  - $\Box$  Schedule has not been revised.

#### 4. CONSTRUCTION PHOTOGRAPHS









Mon 1/3/05         Fri 4/15           Mon 1/3/05         Fri 4/15           Mon 1/3/05         Fri 1/17           Mon 1/3/05         Tue 1/17           Mon 1/3/05         Tue 1/17           Mon 1/3/05         Tue 1/17           Mon 1/3/05         Fri 1/14           Mon 1/3/05         Fri 1/14           Mon 1/20/05         Fri 1/14           Thu 1/20/05         Fri 1/21           Fri 1/21/05         Fri 1/21           Fri 1/21/05         Fri 1/28           Mon 1/31/05         Tue 2/1           Fri 1/21/05         Fri 3/28           Fri 1/28         Mon 2/21           Mon 3/27/05         Fri 3/18           Mon 3/27/05         Fri 3/28           Fri 3/28/05         Fri 3/29
Mon 1/3/05         Fri 415           Mon 1/3/05         Fri 415           Mon 1/3/05         Fri 415           Mon 1/3/05         Fri 1/14           Mon 1/20/05         Fri 1/14           Thu 1/20/05         Fri 1/28           Thu 1/20/05         Fri 1/28           Fri 1/21/05         Fri 1/28           Fri 1/28/05         Fri 1/28           Mon 1/21/05         Tue 2/19           Fri 1/28/05         Fri 3/18           Mon 3/21/05         Tue 2/19           Fri 2/18/05         Fri 3/18           Mon 3/21/05         Fri 3/29           Fri 3/25/05         Fri 3/29           Fri 3/25/05         Fri 3/29           Fri 3/25/05         Fri 4/1
(115) (124) (124) (124) (124) (124) (124) (124) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126) (126)(

# Bloomfield Refining North Boundary Barrier Giant Refining Company RCRA PERMIT No. NMD 089416416

WEEKLY STATUS REPORT 2/7/05 – 2/13/05

## **1.** ACTIVITIES

#### General

- $\Box$  2/7/05 2/13/05: Resume construction of the North Boundary Barrier at STA 1+20.
- □ Backfill mix design was submitted to OCD and NMED prior to the start of construction activities.
- □ Quality Control (QC) samples of the soil-bentonite backfill material were collected on Thursday (2/10/05) and submitted to an independent testing laboratory for analysis. Sample results will be distributed upon receipt from the laboratory.
- Daily QC samples are collected in accordance with the specifications.

#### **Construction**

- $\Box$  2/7/05: Resumed construction of the North Boundary Barrier at STA 1+20.
  - ✓ Trench excavation completed through STA 2+80.
  - ✓ Approximately 2,854 projected square feet excavated.
  - ✓ Slope of trench backfill extends from STA 1+70 to STA 2+60.
- $\Box$  2/8/05: Resumed construction of the North Boundary Barrier at STA 2+90.
  - $\checkmark$  Trench excavation completed through STA 4+10.
  - ✓ Approximately 2,195 projected square feet excavated.
  - ✓ Slope of trench backfill extends from STA 3+00 to STA 3+90.
- $\Box$  2/9/05: Resumed construction of the North Boundary Barrier at STA 4+20.
  - $\checkmark$  Trench excavation completed through STA 5+60.
  - ✓ Approximately 2,212 projected square feet excavated.
  - ✓ Slope of trench backfill extends from STA 4+20 to STA 5+10.
- $\Box$  2/10/05: Resumed construction of the North Boundary Barrier at STA 5+70.
  - ✓ Trench excavation completed through STA 7+30.
  - ✓ Approximately 2,622 projected square feet excavated.
  - ✓ Slope of trench backfill extends from STA 6+10 to STA 6+90.
- $\Box$  2/11/05: Resumed construction of the North Boundary Barrier at STA 7+40.
  - ✓ Trench excavation completed through STA 7+90.
  - ✓ In accordance with OCD and NMED requirements, the target key depth is five feet into the Nacimiento Formation. The key depth was extended beyond the target depth at the following stations based on field observations of excavated material.
    - Key depth extended an additional 3.5 feet at STA 7+40 to STA 7+50.

- Key depth extended an additional 1.5 feet at STA 7+60 to STA 7+70.
- Key depth extended an additional 4.5 feet at STA 7+80 to STA 7+90.
- ✓ Approximately 957 projected square feet excavated.
- ✓ Slope of trench backfill extends from STA 6+10 to STA 6+90. No additional backfilling activities conducted on 2/11/05.

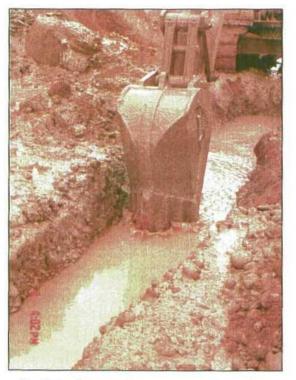
# 2. PLANNED ACTIVITIES

□ Resume construction of the North Boundary Barrier at STA 8+00.

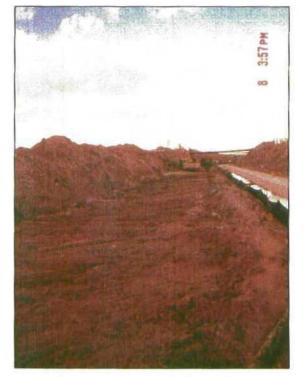
#### 3. SCHEDULE

□ A revised schedule is attached (revised 02/15/05). The project final completion date has not changed.

## 4. CONSTRUCTION PHOTOGRAPHS



Rock bucket used to excavate through the Nacimiento Formation.



Backfilled trench prior to installing trench cap.



# Bloomfield Refining North Boundary Barrier Giant Refining Company RCRA PERMIT No. NMD 089416416

WEEKLY STATUS REPORT 2/14/05 – 2/20/05

## 1. ACTIVITIES

#### General

- 2/14/05 2/20/05: Resumed construction of the North Boundary Barrier at STA 8+00.
- Quality Control (QC) samples of the soil-bentonite backfill material were collected by GeoMat (an independent testing laboratory) on Thursday, February 10<sup>th</sup>, 2005 and submitted to Sierra Testing Laboratories, Inc. for analysis. Sample results will be distributed upon receipt from the laboratory.
- Daily QC samples were collected and tested in general accordance with the specifications.

## Construction

- 2/14/05: Resumed construction of the North Boundary Barrier at STA 8+00.
  - $\checkmark$  The excavation of a full section of trench was not completed prior to the end of the day.
  - ✓ No backfilling activities were initiated.
- 2/15/05: Resumed construction of the North Boundary Barrier at STA 8+00.
  - ✓ Trench excavation completed through STA 8+40.
  - ✓ Approximately 997 1/2 projected square feet excavated.
  - ✓ Slope of trench backfill extends from STA 7+00 to STA 8+00.
  - ✓ Trench capping activities started at STA 0+00. Trench capped through STA 3+00.
- 2/16/05: Resumed construction of the North Boundary Barrier at STA 8+40.
  - ✓ The excavation of a full section of trench was not completed prior to the end of the day. Final depth of key must extend farther than the required 5 feet into the Nacimiento Formation in order to excavate below existing utility pipelines at the French Drain Collection System.
  - ✓ No backfilling activities were initiated.
  - ✓ Trench capping activities resumed at STA 3+00. Installation of trench cap completed through STA 7+00.
- 2/17/05: Resumed construction of the North Boundary Barrier at STA 8+40.
  - $\checkmark$  Trench excavation completed through STA 9+30.
  - ✓ Approximately 1,475 projected square feet excavated.
  - ✓ No backfilling activities were initiated.
- 2/18/05: Resumed construction of the North Boundary Barrier at STA 9+40.

- ✓ Trench excavation completed through STA 10+20.
- ✓ Approximately 1,270 projected square feet excavated.
- ✓ Slope of trench backfill extends from STA 8+40 to STA 9+20.
- 2/19/05: Resumed construction of North Boundary Barrier at STA 10+20.
  - The excavation of a full section of trench was not completed prior to the end of the day due to mechanical problems.
  - ✓ Slope of trench backfill extends from STA 8+60 to STA 10+20.
- 2/20/05: Resumed construction of North Boundary Barrier at STA 10+20.
  - ✓ Trench excavation completed through STA 10+70.
  - ✓ Approximately 757 1/2 projected square feet excavated.
- 2. PLANNED ACTIVITIES
  - Resume construction of the North Boundary Barrier at STA 10+70.
- 3. SCHEDULE
  - No revisions.
- 4. CONSTRUCTION PHOTOGRAPH



**Trench Capping Activities** – Approximately 3 feet of the trench backfill is removed for placement of the 7-1/2 foot wide woven geotextile material. Bank-Run fill is placed over the geotextile material and leveled using the backhoe bucket.

Bloomfield Refining North Boundary Barrier Giant Refining Company RCRA PERMIT No. NMD 089416416

WEEKLY STATUS REPORT 2/21/05 – 2/27/05

## **1.** ACTIVITIES

#### **General**

- 2/21/05 2/27/05: Resumed construction of the North Boundary Barrier at STA 10+70.
- Quality Control (QC) samples of the soil-bentonite backfill material were collected by RECON on Tuesday, February 23<sup>th</sup>, 2005 and Wednesday, February 24<sup>th</sup>, 2005. Both samples were sent to Sierra Testing Laboratories, Inc. for permeability analysis. Sample results will be distributed upon receipt from the laboratory.
- Daily QC samples were collected and tested in general accordance with the specifications.
- 2/23/05: A meeting was conducted with El Paso and Enterprise pipeline representatives regarding barrier construction within the utility pipeline easement. The pipeline representatives approved the design and construction approach that includes excavation into the Nacimiento Formation below and adjacent to the utility pipelines.
- 2/23/05: Site visit and tour of barrier construction area by OCD and NMED agency representatives.

#### **Construction**

- 2/21/05: Resumed construction of the North Boundary Barrier at STA 10+70.
  - $\checkmark$  Trench excavation completed through STA 11+20.
  - ✓ Approximately 757 1/2 projected square feet excavated.
  - $\checkmark$  Trench capping completed through 10+00
- 2/22/05: Resumed construction of the North Boundary Barrier at STA 11+20.
  - $\checkmark$  Trench excavation completed through STA 12+20.
  - ✓ Approximately 1525 projected square feet excavated.
  - ✓ Trench capping completed through 11+00
- 2/23/05: Resumed construction of the North Boundary Barrier at STA 12+20.
  - $\checkmark$  Trench excavation completed through STA 12+60.
  - ✓ No backfilling activities were initiated.
- 2/24/05 2/27/05: No additional excavation activities initiated.
  - $\checkmark$  Excavation activities scheduled to resume Monday, February 28<sup>th</sup>, 2005.

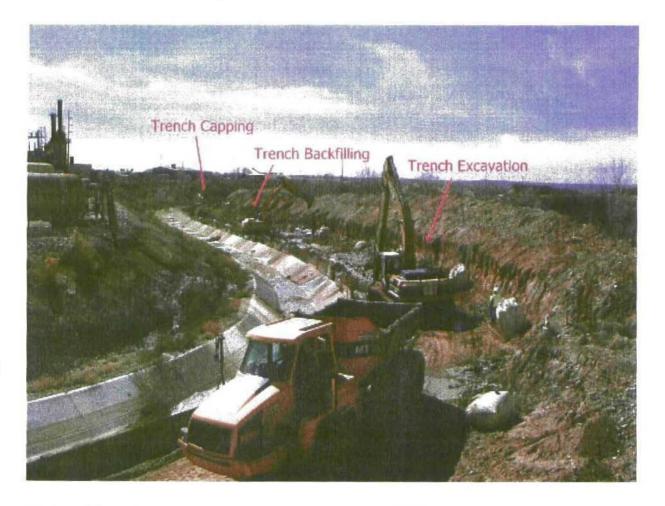
#### 2. PLANNED ACTIVITIES

• Resume construction of the North Boundary Barrier at STA 12+60.

# 3. SCHEDULE

No revisions.

# 4. CONSTRUCTION PHOTOGRAPH



The trench is continuously backfilled during excavation activities to maintain an approximate distance of 100 feet between the top of the backfill and the excavator. The trench is then capped once the backfill material has had time to dry and settle.

WEEKLY STATUS REPORT 2/28/05 – 3/06/05

### 1. ACTIVITIES

#### General

- 2/28/05 3/06/05: Resumed construction of the North Boundary Barrier at STA 12+60.
- A summary of the permeability analysis results of the backfill material collected along the barrier alignment are as follows:
  - ✓ STA 2+00 → Permeability =  $2.12 \times 10^{-8}$  cm/sec ✓ STA 4+00 → Permeability =  $6.93 \times 10^{-8}$  cm/sec ✓ STA 6+00 → Permeability =  $2.08 \times 10^{-8}$  cm/sec ✓ STA 8+00 → Permeability =  $2.01 \times 10^{-8}$  cm/sec ✓ STA 10+00 → Permeability =  $2.71 \times 10^{-8}$  cm/sec ✓ STA 12+00 → Permeability =  $4.06 \times 10^{-8}$  cm/sec

The laboratory reports are attached.

Daily QC samples were collected and tested in general accordance with the specifications.

### Construction

- 2/28/05: No excavation activities.
  - $\checkmark$  Excavation activities scheduled to resume Tuesday, March 1<sup>st</sup>, 2005.
- 3/1/05: Resumed construction of the North Boundary Barrier at STA 12+60.
  - ✓ Trench excavation completed through STA 14+00.
  - ✓ Approximately 2,535 projected square feet excavated.
  - ✓ Trench backfilling completed through STA 13+00.
  - ✓ Trench capping completed through STA 12+60.
- 3/2/05: Resumed construction of the North Boundary Barrier at STA 14+00.
  - ✓ Trench excavation completed through STA 15+50.
  - ✓ Approximately 2,085 projected square feet excavated.
  - $\checkmark$  Trench backfilling completed through STA 14+20.
  - ✓ Trench capping completed through STA 13+00.
- 3/3/05: Resumed construction of the North Boundary Barrier at STA 15+50.
  - ✓ Trench excavation completed through STA 17+10.
  - ✓ Approximately 2,320 projected square feet excavated.
  - $\checkmark$  Trench backfilling completed through STA 16+10.

### Bloomfield Refining North Boundary Barrier Giant Refining Company Page 2

- 3/4/05: Resumed construction of the North Boundary Barrier at STA 17+10.
  - ✓ Trench excavation completed through STA 18+70.
  - ✓ Approximately 2,135 projected square feet excavated.
  - ✓ Trench backfilling completed through STA 18+00.
- 3/5/05: Resumed construction of the North Boundary Barrier at STA 18-70.
  - ✓ Trench excavation completed through STA 19+80.
  - ✓ Approximately 1,635 projected square feet excavated.
  - ✓ Trench backfilling completed through 19+00.
  - ✓ Trench capping completed through 18+00.
- 3/6/05: No excavation activities.
  - Prepared area along the east side of the utility pipeline excavation for backfill placement.

#### 2. PLANNED ACTIVITIES

- Resume construction of the North Boundary Barrier at STA 24+60.
- 3. SCHEDULE
  - Revised schedule attached (Refer to 03/08/05 schedule).
- 4. CONSTRUCTION PHOTOGRAPH



Example of bottom of key material consistent along the barrier excavated during the week of Febraury 28th, 2005.

## SAMPLE DATA

Sample Identification: STA 2+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

1

#### **TEST RESULTS**

Permeability, cm/sec.: 2.12E-08

Average Hydraulic Gradient: 10.7

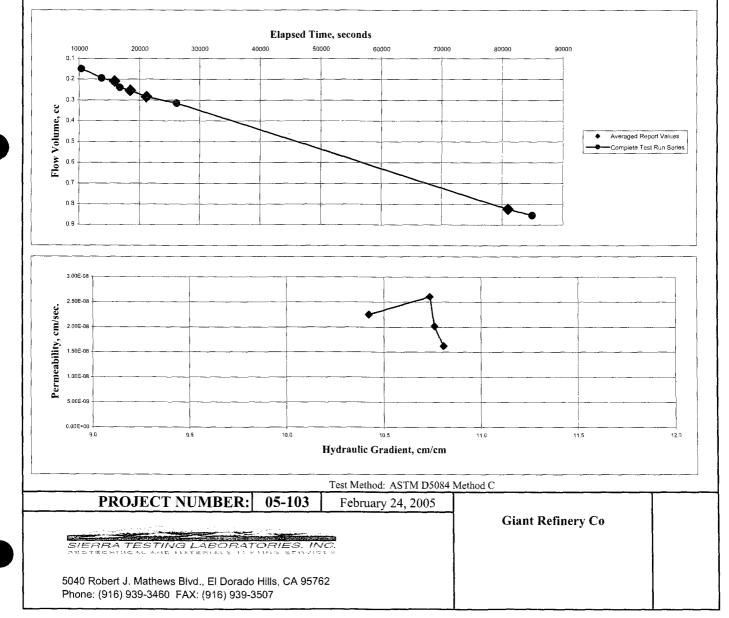
Effective Cell Pressure, psi: 5

#### **TEST SAMPLE DATA**

#### Before Test

- Specimen Height, cm: 7.37 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 73.3 Moisture Content, % 48.2
- Specific Gravity, Assumed
  - Percent Saturation:

<u>After Test</u> Specimen Height, cm: 6.38 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 84.7 Moisture Content, % 36.9



## SAMPLE DATA

Sample Identification: Sta 4+00, 2/10/05 Visual Description: N/A Remarks:

Sample Depth, ft.: N/A Sample Type: SB Backfill Material

**TEST RESULTS** 

Permeability, cm/sec.: 6.93E-08

Average Hydraulic Gradient: 8.4

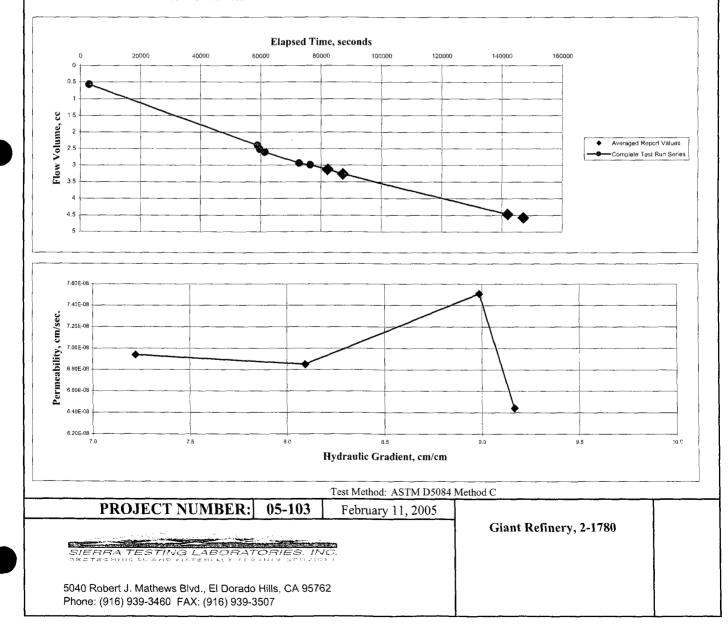
Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

#### **Before Test**

Specimen Height, cm: 5.84 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 80.3 Moisture Content, % 40.3 Specific Gravity, Assumed Percent Saturation:

After Test Specimen Height, cm: 4.98 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 94.2 Moisture Content, % 27.6



## SAMPLE DATA

Sample Identification: STA 6+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

## TEST RESULTS

Permeability, cm/sec.: 2.08E-08

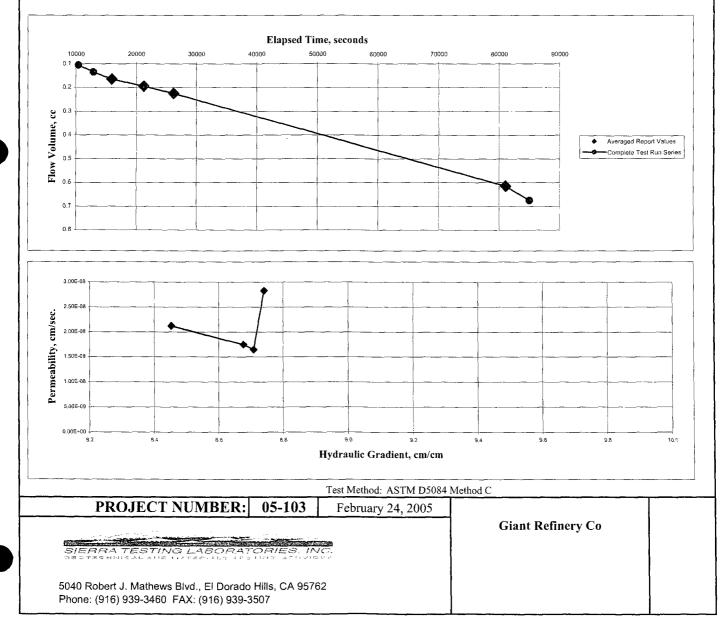
Average Hydraulic Gradient: 8.6

Effective Cell Pressure, psi: 5

#### **TEST SAMPLE DATA**

#### <u>Before Test</u>

Specimen Height, cm: 7.21 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 71.1 Moisture Content, % 49.4 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 6.27 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 81.8 Moisture Content, % 36.9



## SAMPLE DATA

Sample Identification: STA 8+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### **TEST RESULTS**

Permeability, cm/sec.: 2.01E-08

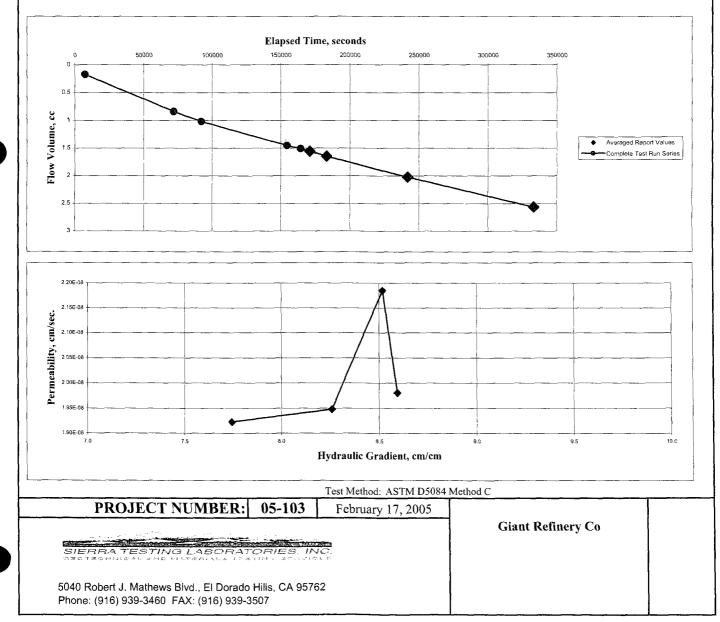
Average Hydraulic Gradient: 8.3

Effective Cell Pressure, psi: 5

#### **TEST SAMPLE DATA**

#### **Before Test**

Specimen Height, cm: 7.11 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 65.6 Moisture Content, % 55.2 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 5.94 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 78.5 Moisture Content, % 40.6



### SAMPLE DATA

Sample Identification: STA 10+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### **TEST RESULTS**

Permeability, cm/sec.: 2.71E-08

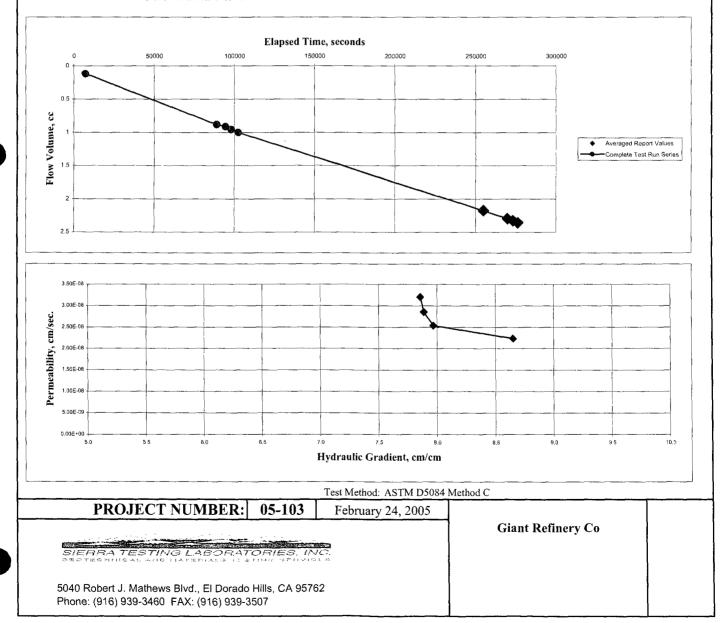
Average Hydraulic Gradient: 8.1

Effective Cell Pressure, psi: 5

### **TEST SAMPLE DATA**

#### Before Test

Specimen Height, cm: 7.49 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 70.2 Moisture Content, % 48.8 Specific Gravity, Assumed Percent Saturation: After Test Specimen Height, cm: 6.30 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 83.5 Moisture Content, % 35.4



### SAMPLE DATA

Sample Identification: STA 12+00 Visual Description: N/A Remarks: Sample Depth, ft.: N/A Sample Type: SB Backfill Material

#### **TEST RESULTS**

Permeability, cm/sec.: 4.06E-08

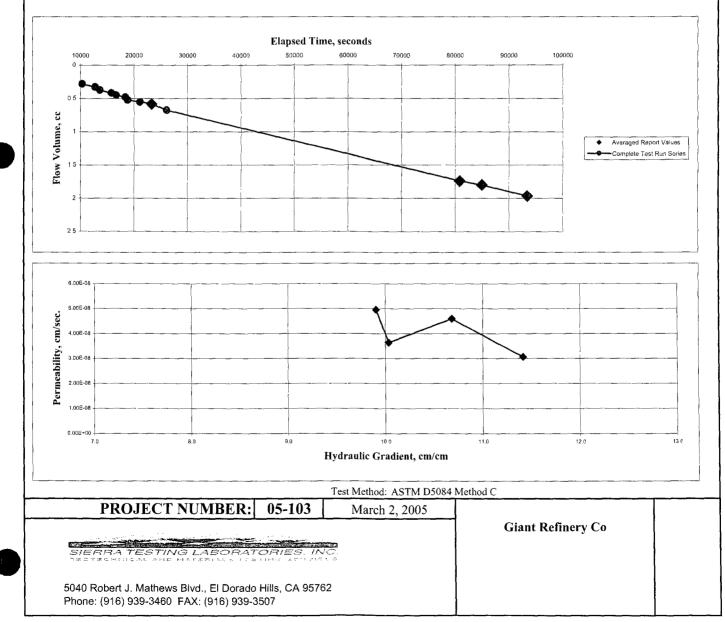
Average Hydraulic Gradient: 10.5

Effective Cell Pressure, psi: 5

#### **TEST SAMPLE DATA**

#### **Before Test**

Specimen Height, cm: 6.99 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 84.4 Moisture Content, % 27.6 Specific Gravity, Assumed Percent Saturation: <u>After Test</u> Specimen Height, cm: 5.79 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 101.8 Moisture Content, % 22.9



60 days         Mon 1/3(05)         T           5 days         Mon 1/10/05         W           2 days         Mon 1/10/05         T           2 days         Thu 1/20/05         W           2 days         Thu 1/20/05         W           5 days         Thu 1/20/05         W           5 days         Thu 1/20/05         W           5 days         Mon 1/12/05         W           5 days         Thu 1/20/05         W           5 days         Mon 1/2/05         W           5 days         Mon 1/2/05         W           5 days         Thu 1/2/065         W           6 days         Thu 1/2/055         W           5 days         Mon 1/2/055         M           6 days         Thu 1/2/055         M           6 days         Thu 1/2/055         M           6 days         Thu 1/2/055         M           6 days         Thu 1/2/055         M           6 days         Mon 2/1/055         M           6 days <t< th=""><th></th><th>Task Name Giant North Boundary Barrler Project Deadline</th><th>st Deadline</th><th>Duration 76 davs</th><th>Start Mon 1/3/05</th><th>Finish Fri 4/15/05</th><th>anuary February February March And April 1/23   1/23   1/20   2/6   2/13   2/20   2/27   3/6   3/13   3/20   3/27   4/3</th></t<>		Task Name Giant North Boundary Barrler Project Deadline	st Deadline	Duration 76 davs	Start Mon 1/3/05	Finish Fri 4/15/05	anuary February February March And April 1/23   1/23   1/20   2/6   2/13   2/20   2/27   3/6   3/13   3/20   3/27   4/3
Interfact         Open of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the cont				of the second	201011 1000	This search	
Nick         State         Nick         Nick         Nick         Nick           SC         200         Nick         200         Nick         Nick         Nick           SC         200         Nick         200         Nick         Nick         Nick           SC         200         Nick         200         Nick         Nick         Nick           Pincurrent         200         Nick         200         Nick         Nick         Nick           Nick         200         Nick         200         Nick         Nick         Nick         Nick           Nick         200         Nick         200         Nick         Nick         Nick         Nick         Nick           Nick         200         Nick         200         Nick				ou uays	CO/C/1 100W		
Antivitation         300         Montal 1000         Worl 12000         Montal 1200           p. Routement         300         kont 1000         Fri 11400         Fri 11400           p. Routement         300         kont 12000         Fri 11400         Fri 11400           p. Routement         200         kont 12000         Fri 11400         Fri 11400           and Explored         200         hu 12000         Fri 11400         Fri 11400           and Explored         200         hu 12000         Mont 12000         Mont 12000           and Explored         200         Fri 1200         Mont 12000         Mont 12000           and Explored         200         Fri 1200         Mont 12000         Mont 12000           and Explored         200         Mont 12000         Mont 12000         Mont 12000           and Explored         200         Mont 12000         Mont 12000         Mont 12000           and King Anes         200         Mont 12000         Mont 12000         Mont 12000           and King Anes         200         Mont 12000         Mont 12000         Mont 12000           and King Anes         200         Mont 12000         Mont 12000         Mont 12000           Constred         Mont 20		ontract		sápo c	CU/5/1 HOM	CU//// 11-1	
SC         24h8         6h/1006         Tat/100         Tat/100 <thtat 100<="" th=""> <thtat 100<="" th=""> <thtat 100<="" <="" td=""><td>Pre-Constructi</td><td>on Activities</td><td></td><td></td><td>Mon 1/10/05</td><td>Wed 1/26/05</td><td></td></thtat></thtat></thtat>	Pre-Constructi	on Activities			Mon 1/10/05	Wed 1/26/05	
protonumet         548         Mon 1008         F / 1108         F / 1108           meanish Tarific         249         Non 1008         1 / 1108         1 / 1108           meanish Tarific         249         Non 1008         1 / 1128         Non 1008           meanish Tarific         249         Non 1008         1 / 1128         Non 1008           meanish Tarific         249         Non 1008         1 / 1208         Non 1008           meanish Tarific         249         Non 1008         1 / 1208         Non 1008           meanish Tarific         249         Non 1008         1 / 1208         Non 1008           meanish Tarific         1 / 1208         Non 1008         1 / 1208         Non 1008           meanish Tarific         1 / 1208         Non 1008         1 / 1208         Non 1008           meanish Tarific         1 / 1208         Non 1008         Non 1008         Non 1008           meanish Tarific         1 / 1208         Non 1008         Non 1008         Non 1008           meanish Tarific         1 / 1208         Non 1008         Non 1008         Non 1008           meanish Tarific         1 / 1208         Non 1008         Non 1008         Non 1008           meanish Tarific         1		on S/C			Mon 1/10/05	Tue 1/11/05	
Int         2.000         In 12005         In 12005         In 12005         In 12005           Interaction Scheidle         2.001         Mon 12005         In 12000         Mon 12005         In 12000           Interaction Scheidle         2.005         In 12000         Mon 12005         In 12000         Mon 12005           Interaction Scheidle         2.005         In 12000         Mon 12005         In 12000         Mon 12005           Interaction Scheidle         2.005         In 12000         Mon 12005         In 12000         Mon 12005           Interaction Scheidle         2.005         Mon 12005         In 12000         Mon 12005         In 2000           Interaction Scheidle         2.005         Mon 12005         In 2000         Mon 12005         In 2000           Interaction Scheidle         2.005         Mon 12005         In 2000         Mon 12005         In 2000           Interaction Scheidle         2.005         Mon 12005         In 2000         Mon 12005         In 2000           Interaction Scheidle         2.005         Mon 12005         In 2000         Mon 12005         In 2000           Scheidle         2.005         Mon 22005         Mon 22005         Mon 22005         Mon 22005           Scheidle		tuip Procurement		5 days	Man 1/10/05	Fri 1/14/05	
wmeatury Terling         20ip         Monti 1000         Turi 2000         Monti 2000           Ayuu Generies         20ip         Thu 12000         Went 12160         Went 12160           Antur Generie         20ip         Thu 12000         Went 12160         Went 12160           Antur Generie         10ip         Turi 2000         Went 12160         Turi 2000           Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Antur Ant		Giant		2 days	Thu 1/20/05	Fri 1/21/05	
and Controls         2dis         Tar 1/200         Worl 1/2005           and Explorent         2 diss         11/2003         Werl 1/2003           and Explorent         2 diss         11/2003         Werl 1/2003           wild Explorent         2 diss         11/2003         Werl 1/2003           wild Explorent         2 diss         11/2003         Werl 1/2003           wild Explorent         2 diss         11/2003         Werl 1/2003           Alter Andre         2 diss         11/2003         Werl 1/2003           Alter Andre         2 diss         11/12003         11/12003           Alter Andre         2 diss         Werl 1/2003         1/12003           Alter Andre         2 diss         1/12013         1/12013           Alter Andre         2 diss         1/12013         1/12013           Alter Andre         2 diss         1/12013         1/12013           Alter A		/Permeability Testing			Mon 1/10/05	Tue 1/25/05	
clicition Schedule         2495         Fr. (12105         Mon (2405)           clicition Control         7 449         Tuu (2000)         Wei (12600)           ware Exciptionet         5 409         Tuu (2000)         Wei (12600)           ware Exciptionet         5 409         Tuu (2000)         Wei (12600)           Annot Exciptionet         5 409         Wei (12800)         Wei (12800)           Annot Exciptionet         5 409         Wei (12800)         Fi (12800)           Annot Construction         5 409         Woi (12800)         Fi (12800)           Annot Construction         5 409         Woi (12800)         Fi (12800)           Annot Construction         5 409         Woi (12800)         Mon (12800)           Annot Construction         5 409         Woi (12800)         Mon (12800)           Annot Construction         5 409         Woi (12800)         Mon (12800)           Ann		Layout/Controls			Tue 1/25/05	Wed 1/26/05	
data         5495         Turi 12800         Kei 12600           aud Edupent         5495         Turi 2005         Ki 12800           aud Edupent         5495         Turi 2005         Ki 12800           and Edupent         5495         Ki 12800         Ki 12800           domen Conciol         6495         Ki 12800         Ki 12800           and Edupent         5495         Ki 12800         Ki 12800           and Edupent         6495         Ki 12800         Ki 12800           and Edupent         6495         Ki 12800         Ki 12800           and Edupent         6495         Ki 12800         Ki 12800           benche Shun/Orgong         8649         Non 2706         Ki 12800           benche Shun/Orgong         2649         Non 2706         Ki 12800           Su 4400         5495         Non 2706         Ki 13100           Su 24-000 Su 24-00         5496         Non 2706         Ki 1480           Su 24-000 Su 24-00         1068         Non 2706         Ki 1880           Su 24-000 Su 24-00         1068         Non 2706         Ki 1880           Su 24-000 Su 24-00         1068         Non 2706         Ki 1880           Su 24-000 Su 24-00         1		instruction Schedule		2 days	Fri 1/21/05	Man 1/24/05	
ethe         7 data         Tu 12005         Fit 12605         Fit 12605           v val Esuprent         5 data         Tru 12005         Tru 12005         Val 12605           v val Esuprent         5 data         Tru 12005         Tru 12005         Val 12605           v mater Correta         8 data         Fit 127105         Tru 12705         Tru 12705           diment Correta         6 data         Fit 127105         Tru 12705         Fit 127105         Tru 12705           at Numer Correta         6 data         Mat 12706         Tru 12705         Fit 12705         Tru 12705           at Numer Correta         6 data         Mat 12706         Kat 12805         Mat 12706         Tru 2705           at Numer Correta         6 data         Mat 12705         Mat 12705         Mat 12705         Mat 12705           State Nota Chy Tachi Skat - 0(0.5 9-75         1 data         Mat 12705         Mat 12705         Mat 12705           State Nota Chy Tachi Skat - 0(0.5 9-75         1 data         Mat 12705         Mat 22005         Mat 12705           State Nota Chy Tachi Skat - 0(0.5 9-75         1 data         Mat 22005         Mat 12005           State Nota Chy Tachi Skat - 0(0.5 9-75         1 data         Mat 22005         Mat 12005           Sta				5 days	Тћи 12/9/04	Wed 12/15/04	Environ N
wund Edutiment         5 das         Thu 17005         Fi 172005         Fi 122005         Fi 12205		eadline		7 days	Thu 1/20/05	Fri 1/28/05	1
(Fereining A Mising Areas)         5 days         Min 12x106         Tri 12005         Min 12x106         Tri 22005           diment Control         6 days         Fri 12106         Tue 2703         Tue 2703           diment Control         6 days         Fri 12106         Tue 2703           diment Control         6 days         Tri 12106         Tue 2703           diment Control         8 days         Tu 12706         Fri 131060           diment Sinny-Oppoing         27 days         Min 12706         Min 12706           diment Sinny-Oppoing         27 days         Min 2706         Min 2706           diment Rise         11 days         Min 2706         Min 2706           diment Rise         11 days         Min 27106         Min 27106           Size 2 + 50 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 to 3+ 7 + 51 t		ew and Equipment			Thu 1/20/05	Wed 1/26/05	
data         Fr112105         Tr0         Tr0           at Mining Annes         6 days         Fr112105         Tr0         Tr0           at Mining Annes         6 days         Fr112105         Tr0         Tr0           at Mining Annes         6 days         Tr1/2105         Tr0         Tr0           at Mining Annes         6 days         Tr1/2105         Tr0         Tr0           at Mining Annes         8 days         Mu1/2705         Tr0         Mu1/2705         Tr0           at Horns Bu 0-00 to 9-50         16 days         Nard 2200         Mo1/2005         Mo1/2005         Mo1/2005           at horn Naru 0-00 to 9-50         16 days         Nard 22005         Mo1/2005         Tr0         Mo1/2005           at horn Naru 0-00 to 9-50         16 days         Mo1/2005         Tr0         Mo1/2005         Mo1/2005           at horn Naru 0-00 to 9-50         16 days         Mo1/2005         Mo1/2005         Mo1/2005         Mo1/2005           at horn Naru 0-00 to 9-50         16 days         Mo1/2005         Mo1/2005         Mo1/2005           at horn Naru 0-00 to 9-50         16 days         Mo1/2005         Mo1/2005         Mo1/2005           at horn Naru 0-00 to 9-50         16 days         Mo1/2005		te, Receiving & Mixing	Areas		Mon 1/24/05	Fri 1/28/05	
diment Control         6 days         Fri 1/21/05         Fri 1/22/05         Fri 1/21/05         Fri 1/21/05		-		8 days	Frl 1/21/05	Tue 2/1/05	
m & Marring Areas         5 datas         Wed 126005         Tue 27105         Fra 31800           n Construction         28 days         Mu 127705         Fra 31800         Mon 37705           n Entonnel Scimr-Ongoing         27 days         Mon 37705         Mon 37705         Mon 37705           exch From Sta 0-000 th Tei in @Sta 9-50 to 9+75         3 days         Mon 37705         Lue 21105         Mon 37705           exch From Sta 0-50 to 3475         3 days         Frai 2006         Mon 37705         Lue 21105         Mon 37705           exch From Sta 2+50 to 31 et 75         3 days         Frai 2006         Mon 37705         Mon 37705         Mon 37705           Sta 2+50 to 24+00         5 days         Mon 37705         Frai 31805         Mon 37705         Mon 37705           Sta 2+50 to 24+00         5 days         Mon 37405         Frai 31805         Mon 37405         Frai 31805           Cover         26 days         Mon 21405         Frai 31805         Mon 21405         Frai 31805           Cover         26 days         Mon 21405         Frai 31805         Mon 21405         Frai 31805           Cover         26 days         Frai 31805         Mon 21405         Frai 31805         Mon 21405         Frai 31805           Cover <t< td=""><td></td><td>Sediment Control</td><td></td><td></td><td>Fri 1/21/05</td><td>Fri 1/28/05</td><td></td></t<>		Sediment Control			Fri 1/21/05	Fri 1/28/05	
Construction         38 days         Thu 1/27/05         Fi 31800           15 Bentome Slumy-Chooling         27 days         Mon 1/3105         Mon 37105           seet From Sta 0-00 to 5+50         16 days         Wee 22/05         Mon 37105           Sta 9+60         16 days         Wee 22/05         Mon 37705           Sta 9+60         16 days         Wee 22/05         Mon 37705           Sta 9+60         1 days         Nun 22/105         Mon 37705           Trench From Sta 2+60 to Sta 2+50 to 3+75         1 days         Mon 37705           Sta 1-50 to 24+00         5 days         Mon 37705         Fin 371805           Bentome to Designated Elevation         26 days         Mon 271405         Fin 371805           Cover         26 days         Mon 271405         Fin 37105		orm & Mixing Areas			Wed 1/26/05	Tue 2/1/05	
1. Bentome Slumy-Orgony       27 days       Mon 131105       Mon 37105         1. Bentome Slumy-Orgony       15 days       Won 227105       Mon 327105         Sta 3+50       3. days       1/u 127105       1. days       1/u 127105         Sta 3+50       3. days       1/u 127105       1. days       1/u 127105         and Around Dry Terin @Sta 3+5010 9+75       3. days       1/u 227105       Mon 327105         and Around Dry Terin @Sta 3+5010 9+75       3. days       Mon 227105       Mon 37705         and Around Dry Terin @Sta 3+5010 9+75       3. days       Mon 227105       Mon 37705         and Around Dry Terin @Sta 3+5010 5+75       5. days       Mon 27105       Fi 3/1905         Own       28 days       Mon 271405       Fi 3/1805         Cover       28 days       Mon 271405       Fi 3/1805         Cover       28 days       Mon 271405       Fi 3/1805         Out Gravel to Designated Elevation       26 days       Mon 271405       Fi 3/1805         Out Gravel to Designated Elevation       26 days       Mon 271405       Fi 3/1805         Out Gravel to Designated Elevation       26 days       Mon 271405       Fi 3/1805         Out Gravel to Designated Elevation       26 days       Mon 27405       Fi 4/1705		nch Construction		38 days	Thu 1/27/05	Fri 3/18/05	
First From Sta 0-60 to 6-50         15 days         Wed 22:05         Mon 22:105         Wed 22:05         Mon 22:105           Sita 9-50         4 days         Thu 127/16         Lue 21:05         Mon 22:105         Mon 22:105           First Norund Dry Tielin @Sita 8-50 to 51-75         3 days         Fir 21:805         Mon 22:105         Mon 22:105           Trench From Sta 8-750 to Stat 21+50         11 days         Mon 22:105         Mon 22:105         Mon 22:105           Sta 21+50 to 24+00         0 days         Mon 22:105         Mon 27:105         Fir 3:1805           Sta 21+50 to 24+00         10 days         Mon 27:105         Fir 3:1805         Mon 37:05           Sta 21+50 to 24+00         10 days         Mon 21:405         Fir 3:1805           Cover         26 days         Mon 21:405         Fir 3:1805           Cover         26 days         Mon 21:405         Fir 3:1805           Un Greet to Grade         26 days         Mon 21:405         Fir 3:1805           Un Graet to Grade         26 days         Mon 21:405         Fir 3:1805           Un Graet to Grade         26 days         Mon 21:405         Fir 3:1805           Un Graet to Grade         26 days         Fir 3:2505         Tru 4:105           Mon 22:105 <td< td=""><td></td><td>tch Bentonite Slurry-O</td><td>Ingoing</td><td></td><td>Mon 1/31/05</td><td>Mon 3/7/05</td><td></td></td<>		tch Bentonite Slurry-O	Ingoing		Mon 1/31/05	Mon 3/7/05	
Sta 9-50       4 days       Thu 1/27/05       Lue 2/105       Mun 227105       Mun 27105       Mun 27105		rench From Sta 0+001	0.8+50		Wed 2/2/05	Mon 2/21/05	
ment Around Dy The In @Sia 9+50 to 9+75         3 days         Fr/21805         Mon 221/05           Trench From Sia 9+50 to 3+75         3 days         Mon 221/05         Mon 37/05           Sia 21+50 to 24+00         5 days         Mon 221/05         Mon 37/05           Sia 21+50 to 24+00         5 days         Mon 37/05         Fri 37/805           Sia 21+50 to 24+00         5 days         Mon 37/105         Fri 37/805           Sia 21+50 to 24+00         10 days         Mon 37/105         Fri 37/805           Bennorite to Designated Elevation         26 days         Mon 27/405         Fri 37/805           Other         26 days         Mon 27/405         Fri 37/805         Mon 27/405           Un Gravei to Designated Elevation         26 days         Mon 27/405         Fri 37/805           Un Gravei to Grade         26 days         Mon 27/405         Fri 37/805           Un Gravei to Grade         26 days         Mon 27/405         Fri 37/805           Un Gravei to Grade         26 days         Mon 23/105         Fri 37/805           Un Gravei to Grade         5 days         Mon 23/105         Fri 37/805           Diole-Soit Mix         5 days         Mon 23/105         Fri 37/105           Comple s & Equipment from Site         5 days		© Sta 9+50			Thu 1/27/05	Tue 2/1/05	
Trench From Sta 9+75 to Stat 21+50         11 days         Mon 37/05         Mon 37/05           Sta 21+50 to 24+00         5 days         Tue 37/105         Fri 37/805           Sta 21+50 to 24+00         5 days         Mon 37/05         Fri 37/805           Sta 21+50 to 24+00         10 days         Mon 37/05         Fri 37/805           Sta 21+50 to 24+00         26 days         Mon 37/05         Fri 37/805           State to Carde         26 days         Mon 27/1405         Fri 37/805           Cover         26 days         Mon 27/405         Fri 37/805           Cover         26 days         Mon 21/405         Fri 37/805           Mon Grevei to Grade         26 days         Mon 21/405         Fri 37/805           Mon Grevei to Grade         26 days         Mon 21/405         Fri 37/805           Mon Grevei to Grade         2 days         Fri 325/05         Tru 47/05           On Herber         5 days         Mon 32/165         Mon 32/165           Construct         2 days         Mon 32/165         Mon 32/165           Construct         5 days         Mon 32/165         Mon 32/165           Construct         5 days         Mon 32/165         Mon 32/165           Construct         5 days		rench Around Dry Tie-	In @Sta 9+50 to 9+75		Fri 2/18/05	Mon 2/21/05	
Stat 21+30 to 24+00         5 days         Tue 31/105         Kin 37/105         Ki		n Trench From Sta 9+3	75 to Stat 21+50		Mon 2/21/05	Mon 3/7/05	
Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet         Internet		@ Sta 21+50 to 24+00			Tue 3/1/05	Mon 3/7/05	
Cover         26 days         Mon 2/14/05         Fri 3/18/05           Rentomte to Designated Elevation         26 days         Mon 2/14/05         Fri 3/18/05           Run         Zintable         26 days         Mon 2/14/05         Fri 3/18/05           Run         Zintable         26 days         Mon 2/14/05         Fri 3/18/05           Run         Zintable         Zintable         En 3/18/05         Fri 3/18/05           Run         Grave         Zintable         Fri 3/18/05         Fri 3/18/05           Rome-Soil Mix         5 days         Fri 3/25/05         Fri 4/1/05           Rome-Soil Mix         5 days         Mon 3/21/05         Fri 4/1/05           Rome-Soil Mix         5 days         Mon 3/21/05         Fri 4/1/05           Rentoe Road         E days         Mon 4/4/05         Mon 4/4/05           Rentoe Road         E days         Mon 4/4/05         Mon 4/4/05           Rentoe Roupex & E quipment from site         2 days         Mon 4/4/05           Rentoe         Mon 4/4/05         Mon 4/4/05         Fri 4/1/05           Rentoe         Adays         Mon 4/4/05         Mon 4/4/05           Rentoe         Split         Split         Split		rench From Sta 24+00	1 to Sta 26+00		Mon 3/7/05	Fri 3/18/05	
Elemonie to Designated Elevation         26 days         Mon 2:1405         Fri 3:1805           ktile         26 days         Fri 3:25:05         Fri 4:1/05           ktile         5 days         Fri 3:25:05         Fri 4:1/05           ktile         5 days         Mon 3:28:05         Fri 4:1/05           kervice Road         5 days         Mon 4:4:05         Mon 4:4:05           kervice Road         1         Mon 4:4:05         Mon 4:4:05           kervice Road         1         Mon 4:4:05         Mon 4:4:05           kervice Road         Milestone         1         Mon 4:4:05           kervice Road         Milestone         Kerveral Milestone         Solite <t< td=""><td></td><td>5 Cover</td><td></td><td>26 days</td><td>Mon 2/14/05</td><td>Fri 3/18/05</td><td></td></t<>		5 Cover		26 days	Mon 2/14/05	Fri 3/18/05	
Mile         26 days         Mon 2/14/05         Fri 3/18/05         Fri 3/18/05           fun Gravei to Grade         26 days         Mon 2/14/05         Fri 3/18/05         Fri 3/18/05           fun Gravei to Grade         26 days         Mon 2/14/05         Fri 3/18/05         Fri 3/18/05           folder Soil Mix         5 days         Fri 3/16/05         Fri 3/1/05         Fri 3/1/05           ope Service Road         5 days         Fri 3/1/05         Tru 4/1/05         Mon 3/28/05           ec Complex & Equipment from site         2 days         Fri 4/1/05         Mon 4/4/05           ec Complex & Equipment from site         2 days         Fri 4/1/05         Mon 4/4/05           fite Clearup         4 days         Mon 4/4/05         Tru 4/7/05           fite Clearup         1 distone         External Miestone         Solite           Split         Solite         Solite         External Miestone		of Bentonite to Design.	ated Elevation		Mon 2/14/05	Fri 3/18/05	
Un Grade     26 days     Mon 2/14/05     Fin 3/18/05       folle-Soll Mix     6 days     Fin 3/18/05     Fin 4/1/05       ope Service Road     5 days     Fin 3/18/05     Fin 4/1/05       ope Service Road     5 days     Fin 3/1/05     Fin 4/1/05       ce Complex & Equipment from site     2 days     Fin 4/1/05     Mon 4/4/05       ce Complex & Equipment from site     2 days     Fin 4/1/05     Mon 4/4/05       file <cleanup< td="">     4 days     Ant 4/4/05     Mon 4/4/05       file     Mon 4/4/05     Mon 4/4/05     Mon 4/4/05       file     Solit     Mon 4/4/05     Mon 4/4/05       file     Mon 4/4/05     Mon 4/4/05     Mon 4/4/05</cleanup<>		extile			Mon 2/14/05	Fri 3/18/05	
6 days     Fri 3/25/05     Fri 4/1/05       pe Service Road     5 days     Fri 3/105       pe Service Road     5 days     Mon 3/28/05     Fri 4/1/05       se Complex & Equipment from site     2 days     Mon 3/28/05     Fri 4/1/05       se Complex & Equipment from site     2 days     Fri 4/1/05     Thu 4/7/05       re Complex & Equipment from site     2 days     Mon 4/4/05     Thu 4/7/05       re Cleanup     4 days     Mon 4/4/05     Thu 4/7/05       Task     Milestone     2 days     Mon 4/4/05       Process     Fri 4/1/05     Thu 4/7/05     Mon 4/4/05		Run Gravel to Grade			Mon 2/14/05	Fri 3/18/05	
Inter-Soli Mix     5 days     Fri 325,05     Thu 3/3105       ope Service Road     5 days     Mon 3/28/05     Fri 4/1/05       ope Service Road     5 days     Fri 4/1/05     Thu 4/7/05       complex & Equipment from site     2 days     Fri 4/1/05     Thu 4/7/05       ce Complex & Equipment from site     2 days     Fri 4/1/05     Thu 4/7/05       ce Complex & Equipment from site     2 days     Fri 4/1/05     Mon 4/4/05       ce Complex & Equipment from site     2 days     Mon 4/4/05     Mon 4/4/05       ce Complex & Equipment from site     2 days     Mon 4/4/05     Mon 4/4/05       ce Complex & Equipment from site     2 days     Mon 4/4/05     Mon 4/4/05       ce Complex & Equipment from site     2 days     Mon 4/4/05     Mon 4/4/05       ce Complex & Equipment from site     2 days     Mon 4/4/05     Mon 4/4/05       ce Complex & Equipment from site     2 days     Mon 4/4/05     Mon 4/4/05       file     Mitestone     2 days     Mon 4/4/05     Mon 4/4/05       file     Split     External Mitestone     External Mitestone       Protect Summary     Protect Summary     Dead/ine	Site Restoratio.	-		6 days	Fri 3/25/05	Fri 4/1/05	
Ope Service Road     5 days     Mon 3/28/05     Fri 4/1/05       ce Complex & Equipment from site     5 days     Fri 4/1/05     Thu 4/7/05       ce Complex & Equipment from site     2 days     Fri 4/1/05     Mon 4/4/05       ce Complex & Equipment from site     2 days     Fri 4/1/05     Mon 4/4/05       ce Complex & Equipment from site     2 days     Fri 4/1/05     Mon 4/4/05       Task     Milestone     A days     Mon 4/4/05     Thu 4/7/05       Split     Task     External Tasks     External Milestone       Protect Summary     Dead/ine     Dead/ine		intonite-Soil Mix			Fri 3/25/05	Thu 3/31/05	
6 days     Fri 41/06     Thu 47/06       ce Complex & Equipment from site     2 days     Fri 41/05     Mon 44/05       ite Cleanup     4 days     Mon 44/05     Thu 47/05       ite Cleanup     4 days     Mon 44/05     Thu 47/05       Task     Milestone     4 days     Mon 44/05       Split     Split     External Tasks       Process     Protect Summary     Dead/ine		Slope Service Road			Mon 3/28/05	Fni 4/1/05	
ee Complex & Equipment from site 2 days Fn 417/05 Mon 4/4/05 Mon 4/4/05 Inu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 477/05 Thu 4	Demobilization			5 days	Fri 4/1/05	Thu 4/7/05	
Ite Cleanup 4 days Mon 4/4/05 Thu 4/7/05 Task Milestone External Tasks Split Process Deadline Deadline		fice Complex & Equipn	nent from site		Fn 4/1/05	Mon 4/4/05	
Task     Milestone     External Tasks       Split     External Milestone       Protess     Protect Summary		Site Cleanup		4 days	Man 4/4/05	Thu 4/7/05	
Split Summary External Milestone Protect Summary Deadline		Task	The state of the	Milestone	•	Extr	
Project Summary	nt Construction Schedul		Filmon a conji a so e co	Summary		E	
function readers		Progress		Project Summary	any second	Det	dine

## Bloomfield Refining North Boundary Barrier Giant Refining Company RCRA PERMIT No. NMD 089416416

WEEKLY STATUS REPORT 3/07/05 – 3/13/05

### 1. ACTIVITIES

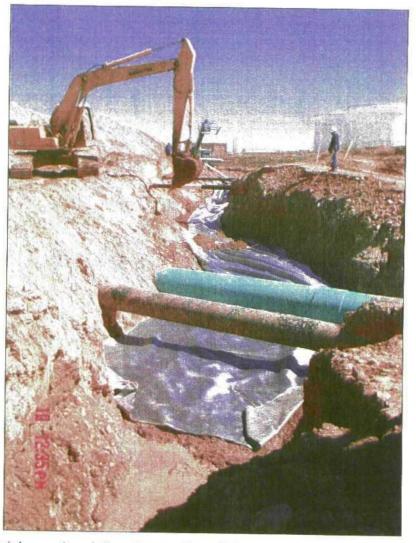
#### General

- 3/8/05 3/9/05: Resumed construction of the North Boundary Barrier at the utility pipeline area (STA 21+80 to STA 23+55).
- Daily QC samples were collected and tested in general accordance with the specifications.
- Completed construction of the North Boundary Barrier between STA 20+50 and STA 26+00.

### Construction

- 3/7/05: Resumed construction of the North Boundary Barrier at STA 24+60.
  - $\checkmark$  Trench excavation completed through STA 26+00.
  - ✓ Approximately 2,100 projected square feet excavated.
  - ✓ Trench backfilling completed from STA 24+60 through STA 25+80.
- 3/8/05: Resumed construction of the North Boundary Barrier at the utility pipeline area (STA 22+75 through 23+55).
  - ✓ Conducted in-place mixing of soil-bentonite backfill.
- 3/9/05: Resumed construction of the North Boundary Barrier at the utility pipeline area (STA 22+75 through 23+55).
- 3/10/05: Resumed construction of the North Boundary Barrier at the utility pipeline area (STA 22+75 through 23+55).
  - ✓ Trench backfilling initiated within the utility pipeline area. El Paso Pipeline representative were on-site during excavation to key and trench backfilling activities.
  - ✓ Trench capping completed from STA 24+60 through STA 25+80.
- 3/11/05: Resumed construction of the North Boundary Barrier at STA 21+40.
  - ✓ Trench excavation completed through STA 22+40.
  - ✓ Approximately 1,615 projected square feet excavated.
  - ✓ Trench backfilling completed through STA 22+00.
  - ✓ Trench capping completed through STA 25+90.
- 3/12/05: Resumed construction of the North Boundary Barrier at STA 20+50.
  - ✓ Trench excavation completed through STA 21+30.
  - ✓ Approximately 1,278 projected square feet excavated.
- 3/13/05: No excavation activities initiated.

- ✓ Prepared soil-bentonite mixing area adjacent to trench near STA 21+00.
- 2. PLANNED ACTIVITIES
  - Resume construction of the North Boundary Barrier at STA 19+90.
- 3. SCHEDULE
  - No revised schedule.
- 4. CONSTRUCTION PHOTOGRAPH



Geo-textile material was placed directly over the soil-bentonite backfill material and below the utility pipelines. Native material was placed over the trench cap to match existing grade. Imported sand was placed around each pipeline to protect the pipeline coating.



Example of key material along the east portion of the North Boundary Barrier.

## Bloomfield Refining North Boundary Barrier Giant Refining Company RCRA PERMIT No. NMD 089416416

WEEKLY STATUS REPORT 3/14/05 – 3/20/05

#### 1. ACTIVITIES

#### General

- 3/14/05: Resumed construction of the North Boundary Barrier at STA 19+90 through STA 20+40.
- Daily QC samples were not collected since no additional slurry was added to the trench during excavation activities.
- 3/15/05: Completed construction of North Boundary Barrier.
- 3/16/05 3/20/05: On-going final site clean-up and equipment demobilization.

#### **Construction**

- 3/14/05: Resumed construction of the North Boundary Barrier at STA 19+90.
  - $\checkmark$  Trench excavation completed through STA 20+40.
  - ✓ Approximately 812 projected square feet excavated.
  - ✓ Excavation activities completed for the North Boundary Barrier.
- 3/15/05: Completed construction of the North Boundary Barrier.
  - ✓ Trench capping completed for the North Boundary Barrier.
- 3/16/05 3/20/05: Final site clean-up and demobilization.
  - ✓ On-going clean-up of the job site and Hammond Ditch.
  - ✓ Final grading of the road along the north side of the Hammond Ditch.
  - ✓ Demobilization of contractor's equipment.

#### 2. PLANNED ACTIVITIES

- Final site clean-up and demobilization of construction equipment is expected to be completed by April 6th, 2005.
- Initiate Phase II of the Corrective Action Plan (dated November 17, 2004), which includes the installation of monitoring and fluids collection wells down gradient and up gradient of the slurry wall, respectively. Installation of the fluids collection and monitoring wells is scheduled to begin early April, 2005. Refer to the North Boundary Barrier Collection System Design and Monitoring Plan (dated March 7, 2005) for additional information.

### 3. SCHEDULE

• No revised schedule.

### 4. CONSTRUCTION PHOTOGRAPH

No construction photographs taken.

- h

a)



## **APPENDIX E**

## Agency Correspondence on Barrier Construction Activities



5127-002 Giant Refining Company

## Randy Schmaltz

From: ent: o: Cc: Subject:	Price, Wayne [WPrice@state.nm.us] Friday, February 11, 2005 9:37 AM 'Robinson, Kelly'; Price, Wayne; Foust, Denny; hope_monzeglio@nmenv.state.nm.us; wilkinson.robert@epa.gov cking@giant.com; dkirby@giant.com; rschmaltz@giant.com; eriege@giant.com; churtado@giant.com; Tucker, Dennis; jonbruton@san.rr.com RE: Weekly Status Report - North Boundary Barrier
ς.	
OCD has the follow	wing concerns:
Nacimiento format: excavation. 2. How are the shape of "L" at ea	assuring that the trench is actually 5 feet into the ion. It appears the trench is full of slurry during end points going to be handled. Will there be a hook ach end? d any contamination under or around the pipelines?
Sent: Wednesday, J To: wprice@state.n hope_monzeglio@nme Cc: cking@giant.co eriege@giant.com; jonbruton@san.rr.c	elly [mailto:KRobinson@PIRNIE.COM] February 09, 2005 8:50 PM nm.us; dfoust@state.nm.us; env.state.nm.us; wilkinson.robert@epa.gov om; dkirby@giant.com; rschmaltz@giant.com; churtado@giant.com; Tucker, Dennis;
Good Morning,	
summarizing const:	t Refining Company, attached is the Weekly Status Report ruction activities for the North Boundary Barrier during ry 31st through February 5th, 2005.
If you have any qu directly at (505)	uestions, please feel free to contact Randy Schmaltz 632-4171.
Sincerely,	
Kelly Robinson Field Engineer Malcolm Pirnie, In	nc.
	en scanned by the MessageLabs Email Security System. ion please visit http://www.messagelabs.com/email
intended recipient unauthorized revie provided under the intended recipient	otice: This e-mail, including all attachments is for the sole use of the t(s) and may contain confidential and privileged information. Any ew, use, disclosure or distribution is prohibited unless specifically e New Mexico Inspection of Public Records Act. If you are not the t, please contact the sender and destroy all copies of this message en scanned by the MessageLabs Email Security System.

#### Randy Schmaltz

From:	Randy Schmaltz
Sent:	Monday, February 14, 2005 12:54 PM
o:	Price, Wayne; 'Robinson, Kelly'; Foust, Denny; hope_monzeglio@nmenv.state.nm.us;
-	wilkinson.robert@epa.gov
Cc:	<ul> <li>Chad King; David Kirby; Randy Schmaltz; Ed Riege; Cindy Hurtado; Tucker, Dennis;</li> </ul>
	jonbruton@san.rr.com
Subject:	RE: Weekly Status Report - North Boundary Barrier

Responses to OCD's concerns:

1. The Field Engineer (Malcom Pirnie) examines the cuttings coming out of the excavation to determine when the excavation has entered the Nacimiento formation. The cuttings are distinctively different. Once the engineer has determined that the formation has been reached a depth measurement is taken and recorded. Excavation continues, as well as measurements until the five-foot key is achieved.

It should be noted that the digging in the upper portions of the excavation is distinctively different than the digging in the Naciemiento formation.

2. Giant will place a monitoring point at each end of the barrier wall. These monitoring points will be constructed to accommodate extraction if needed.

3. In the digging of the pipeline right-of-way we did not uncover any soil staining or hydrocarbon liquid, but we did accumulate a fair amount of water on the eastern end of the excavation.

----Original Message----From: Price, Wayne [mailto:WPrice@state.nm.us] Sent: Friday, February 11, 2005 9:37 AM O: 'Robinson, Kelly'; Price, Wayne; Foust, Denny; IOPe\_monzeglio@nmenv.state.nm.us; wilkinson.robert@epa.gov Cc: cking@giant.com; dkirby@giant.com; rschmaltz@giant.com; eriege@giant.com; churtado@giant.com; Tucker, Dennis; jonbruton@san.rr.com Subject: RE: Weekly Status Report - North Boundary Barrier

OCD has the following concerns:

 How are you assuring that the trench is actually 5 feet into the Nacimiento formation. It appears the trench is full of slurry during excavation.
 How are the end points going to be handled. Will there be a hook shape of "L" at each end?
 Did you find any contamination under or around the pipelines?

-----Original Message-----From: Robinson, Kelly [mailto:KRobinson@PIRNIE.COM] Sent: Wednesday, February 09, 2005 8:50 PM To: wprice@state.nm.us; dfoust@state.nm.us; hope\_monzeglio@nmenv.state.nm.us; wilkinson.robert@epa.gov Cc: cking@giant.com; dkirby@giant.com; rschmaltz@giant.com; eriege@giant.com; churtado@giant.com; Tucker, Dennis; jonbruton@san.rr.com Subject: Weekly Status Report - North Boundary Barrier

Good Morning,

In behalf of Giant Refining Company, attached is the Weekly Status Report summarizing construction activities for the North Boundary Barrier during the week of January 31st through February 5th, 2005. If you have any questions, please feel free to contact Randy Schmaltz directly at (505) 632-4171.

Sincerely,

Kelly Robinson Field Engineer Malcolm Pirnie, Inc.

This email has been scanned by the MessageLabs Email Security System. For more information please visit http://www.messagelabs.com/email

Confidentiality Notice: This e-mail, including all attachments is for the sole use of the intended recipient(s) and may contain confidential and privileged information. Any unauthorized review, use, disclosure or distribution is prohibited unless specifically provided under the New Mexico Inspection of Public Records Act. If you are not the intended recipient, please contact the sender and destroy all copies of this message. -- This email has been scanned by the MessageLabs Email Security System.

FW Key Depth Request - OCD Approval 02-24-05.txt From: Randy Schmaltz [rschmaltz@giant.com] Sent: Friday, February 25, 2005 7:19 AM To: Tucker, Dennis Subject: FW: Key Depth Request

----Original Message----From: Price, Wayne [mailto:WPrice@state.nm.us] Sent: Thursday, February 24, 2005 2:17 PM To: 'Randy Schmaltz'; Price, Wayne; Hope Monzeglio Cc: Ed Riege; Jon Bruton; Kelly Robinson Subject: RE: Key Depth Request

OCD hereby approves of your request with the following conditions:

 Ample number of representative bottom trench soil samples shall be maintained and preserved for future inspection and/or testing.
 All areas will be logged and permantely recorded.
 If the slurry trench specifications are showing that the sand build-up in the trench is not a problem, then the trench key shall go back to 5 feet.
 Giant shall now provide a weekly report with photos of the progress, soil samples to be maintained for District review.

Please be advised that NMOCD approval of this plan does not relieve (Giant) of liability should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve (Giant) of responsibility for compliance with any other federal, state, or local laws and/or regulations.

----Original Message----From: Randy Schmaltz [mailto:rschmaltz@giant.com] Sent: Thursday, February 24, 2005 11:53 AM To: Wayne Price; Hope Monzeglio Cc: Ed Riege; Jon Bruton; Kelly Robinson Subject: Key Depth Request

Thank you for your visit to observe construction of the North Boundary Barrier at the Giant Bloomfield Refinery on February 23, 2004. We hope the visit was informative of the approach, methods of construction, and soil and rock conditions observed during excavation for the bentonite-slurry wall.

Discussion of the key depth of the slurry wall was of particular note. Due to difficult excavation of consolidated rock, we are requesting that the required minimum key depth of 5 feet be modified to 3 feet where consolidated earth material (rock) is encountered within the Nacimiento Formation. The rock consists of argillaceous sandstone and siltstone.

Please note this request is only for those sections where rock is encountered. Where this material is not encountered, the key depth will be taken to 5 feet or deeper into the Nacimiento Formation.

where highly weathered rock was observed in the excavation, the key depth was extended to depths greater than 5 feet, along completed portions of the slurry wall. The extension of the key depth was based on observation of oxidization of sand immediately under laying the Jackson Lake Terrace.

The potential for transmittal of water through joints within the Nacimiento Formation was addressed in a letter-report prepared by Precision Engineering, Inc., dated November 11, 2004. This letter-report is included as Appendix A in the FW Key Depth Request - OCD Approval 02-24-05.txt Corrective Action Plan; Giant Bloomfield Refinery dated November 17, 2004. The formation was found to have a weakly defined joint pattern at the site. Some erosion along joints where exposed on the bluff face was noted. However, drilling in the area indicated that within a few feet of exposures the jointing is very tight and does not provide an avenue for water seepage.

Hydraulic conductivity tests, commonly referred to as permeability tests, were conducted on samples from the Nacimiento Formation. The tests results were included in the above-referenced letter-report by Precision Engineering. Test results show hydraulic conductivity ranges from approximately 6x10-7 centimeters per second (cm/sec) to 1.2x10-9 cm/sec.

The tests were conducted on samples with less cementation than the argillaceous sandstone and siltstone presently being encountered in the excavation. The argillaceous sandstone and siltstone would be expected to have lower hydraulic conductivity than the tested samples.

This request to reduce the key depth where rock is encountered is consistent with OCD's and NMED's conditions of approval of the Corrective Plan.

Thank you for considering this request to modify the required key depth in areas where rock is present. If you have questions please contact either myself at 505 632-4171 or Jon Bruton at 858 735-7763.

DISCLAIMER: The information contained in this e-mail message may be privileged, confidential and protected from disclosure. If you are not the intended recipient, any further disclosure, use, dissemination, distribution or copying of this message or any attachment is strictly prohibited. If you think you have received this e-mail message in error, please e-mail the sender at the above address and permanently delete the e-mail. Although this e-mail and any attachments are believed to be free of any virus or other defect that might affect any computer system into which they are received and opened, it is the responsibility of the recipient to ensure that they are virus free and no responsibility is accepted by Giant Industries, Inc. or its affiliates for any loss or damage arising in any way from their use.

This email has been scanned by the MessageLabs Email Security System. For more information please visit http://www.messagelabs.com/email

Confidentiality Notice: This e-mail, including all attachments is for the sole use of the intended recipient(s) and may contain confidential and privileged information. Any unauthorized review, use, disclosure or distribution is prohibited unless specifically provided under the New Mexico Inspection of Public Records Act. If you are not the intended recipient, please contact the sender and destroy all copies of this message. -- This email has been scanned by the MessageLabs Email Security System.

DISCLAIMER: The information contained in this e-mail message may be privileged, confidential and protected from disclosure. If you are not the intended recipient, any further disclosure, use, dissemination, distribution or copying of this message or any attachment is strictly prohibited. If you think you have received this e-mail message in error, please e-mail the sender at the above address and permanently delete the e-mail. Although this e-mail and any attachments are believed to be free of any virus or other defect that might affect any computer system into which they are received and opened, it is the responsibility of the recipient to ensure that they are virus free and no responsibility is accepted by Giant Industries, Inc. or its affiliates for any loss or damage arising in any way from their use.



BILL RICHARDSON GOVERNOR State of New Mexico ENVIRONMENT DEPARTMENT Hazardous Waste Bureau 2905 Rodeo Park Drive East, Building 1 Santa Fe, New Mexico 87505-6303 Telephone (505) 428-2500 Fax (505) 428-2567 www.nmenv.state.nm.us



RON CURRY SECRETARY

DERRITH WATCHMAN-MOORE DEPUTY SECRETARY

#### CERTIFIED MAIL RETURN RECEIPT REQUESTED

July 26, 2005

Mr. Randy Schmaltz Environmental Supervisor Giant Refining Company P.O. Box 159 Bloomfield, New Mexico 87413 Mr. Ed Riege Environmental Superintendent Giant Refining Company Route 3, Box 7 Gallup, New Mexico 87301

SUBJECT: CORRECTIVE MEASURES IMPLEMENTATION REPORT FOR THE BARRIER WALL AND RECOVERY SYSTEM INSTALLATIONS GIANT REFINING COMPANY, BLOOMFIELD REFINERY RCRA PERMIT NO. NMD 089416416 HWB-GRCB-05-004

Dear Mr. Schmaltz and Mr. Riege:

The New Mexico Environment Department (NMED) is requiring Giant Refining Company, Bloomfield Refinery (GRCB) to submit a Corrective Measures Implementation Report (CMI Report). The CMI Report must summarize all activities that have occurred to date concerning the barrier wall installation, including information on the design and installation of the recovery and observation wells and provide as-built drawings of the barrier wall, associated wells and ancillary equipment. The CMI Report must incorporate all correspondence to date between NMED and GRCB starting with the Corrective Action Plan dated November 16, 2004 submitted by GRCB to NMED.

GRCB must submit a CMI Report outline to NMED for approval prior to the submittal of the CMI Report. NMED requires that CMI outline be submitted by November 1, 2005. The CMI Report will be due 120 days after receipt of NMED approval of the CMI Report outline. GRCB must also submit a final copy of the CMI Report to the New Mexico Energy, Minerals and

Randy Schmaltz Giant Refining Company Bloomfield July 26, 2005 Page 2 of 2

Natural Resource Department Oil Conservation Division (NMEMNRD OCD) Santa Fe and Aztec offices; attention Wayne Price and Denny Foust, respectively and the U.S. Environmental Protection Agency (EPA); attention Bob Wilkinson.

The CMI Report must contain the following but is not limited to:

- 1. A site plan of the refinery identifying the barrier wall and current locations and names of all observation and recovery wells installed at the refinery including those constructed along the barrier wall. The site plan must contain pertinent site features, symbols, and abbreviations,
- 2. All collection and observation well construction diagrams and boring logs,
- 3. All analytical laboratory and quality control (QC) data reports,
- 4. Summary tables of all field measurements, water table elevations and the analytical data collected during and after system installation,
- S
- 5. Descriptions of the methods and instruments used to collect samples and measure field parameters.

If you have any questions regarding this letter please call me at (505) 428-2545.

Sincerely,

Hope Monzeptio

Hope Monzeglio Project Leader Hazardous Waste Bureau

HCM:hcm

cc: D. Cobrain, NMED HWB W. Price, OCD D. Foust, OCD Aztec Office B. Wilkinson, EPA

Reading File and GRCB 2005 File



MALCOLM PIRNIE, INC. INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS & CONSULTANTS

October 28, 2005

Ms. Hope Monzeglio State of New Mexico Environmental Department Hazardous Waste Bureau 2905 Rodeo Park Drive East, Building 1 Santa Fe, New Mexico 87505-6303

Re: Giant Bloomfield Refinery North Boundary Barrier Corrective Measures Implementation Report

Dear Ms. Monzeglio:

On behalf of Giant Refining Company Bloomfield (GRCB), Malcolin Pirnie, Inc. is pleased to submit for your review and approval the attached table of contents for the North Boundary Barrier Corrective Measures Implementation (CMI) Report. The CMI report will be submitted to the State of New Mexico Environmental Department (NMED) within 120 days upon receipt of approval, as requested in the NMED letter to GRCB dated July 26, 2005.

We are looking forward to receiving your approval of the outline for the North Boundary Barrier CMI Report. If you have any questions in this matter, please contact Randy Schmaltz at 505-632-4171.

Sincerely,

MALCOLM PIRNIE, INC.

is L. Jucke

Dennis Tucker, P.E. Senior Associate

Enclosure

Cc: Wayne Price – OCD Denny Foust - OCD Aztec Office Bob Wilkinson – EPA Ed Riege - Giant Randy Schmaltz – Giant Dave Cobrain - NMED

4646 E. VAN BUREN STREET SUITE 400 PHOENIX, AZ 85005-6945 602-241-1770 fax 602-231-0131 http://www.pirtie.com

## DRAFT CORRECTIVE MEASURES IMPLEMENTATION REPORT BLOOMFIELD REFINERY NORTH BOUNDARY BARRIER

## GIANT REFINING COMPANY

October 2005

Prepared for Giant Refining Company 50 Road 4990 Bloomfield, New Mexico 87413

Prepared by Malcolm Pirnie Inc. 4646 E. Van Buren Street, #400 Phoenix, AZ 85008 i,

## TABLE OF CONTENTS

1.0	INTRODUCTION	1
	PURPOSE 1.1 Purpose of North Boundary Barrier 1.2 Purpose of Fluids Collection System FACILITY DESCRIPTION BACKGROUND SUMMARY RELATIONSHIP OF PARTIES	1 1 1
2.0	NORTH BOUNDARY BARRIER CONSTRUCTION	2
	CONSTRUCTION MONITORING ACTIVITES, REPORTS, AND MEETINGS BARRIER CONSTRUCTION SEQUENCE	2 2 2 2
3.0	FLUIDS COLLECTION SYSTEM	3
3.1 3.2 <i>3</i> .	COLLECTION SYSTEM WORK PLAN WELL CONSTRUCTION AND INSTALLATION	3
3. 3.3 3.4	2.2 Observation Wells SURVEYING	3
••••	BASELINE MONITORING	3 3 3
3.6	Performance Monitoring Plan	3

### LIST OF FIGURES

Figures	Description	
1	Observation and Collection Well Location Map	
2	Fluids Profile along Barrier Alignment	

## LIST OF TABLES

Tables	Description
1	Observation and Collection Well Survey Information
2	Summary of Collection and Observation Well Fluid Levels
3	Summary of Groundwater Sampling Field Parameter Results
4	Summary of Groundwater Analytical Results
~	

5127-002 Giant Refining Company

,i i

Ľ,

## LIST OF APPENDICES

Appendix	Description
А	Corrective Action Plan and Agency Comments
В	Record Drawings – Barrier Alignment and Profile
С	RECON – Final Report and QC Test Data
D	Weekly Reports by Malcolm Pirnie, Inc., Slurry Wall Construction
Έ	Collection System Work Plan and Agency Comments
F	Observation and Collection Well Diagrams and Logs
G	Groundwater Analytical Laboratory Reports

5127-002 Giant Refining Company 3DRAFT Corrective Measures Implementation Report October 2005

11

5



BILL RICHARDSON GOVERNOR State of New Mexico ENVIRONMENT DEPARTMENT Hazardous Waste Bureau 2905 Rodeo Park Drive East, Building 1 Santa Fe, New Mexico 87505-6303 Telephone (505) 428-2500 Fax (505) 428-2567 www.nmenv.state.nm.us



RON CURRY SECRETARY

DERRITH WATCHMAN-MOORE DEPUTY SECRETARY

#### CERTIFIED MAIL RETURN RECEIPT REQUESTED

February 24, 2006

Mr. Randy Schmaltz Environmental Supervisor Giant Refining Company P.O. Box 159 Bloomfield, New Mexico 87413 Mr. Ed Riege Environmental Superintendent Giant Refining Company Route 3, Box 7 Gallup, New Mexico 87301

### SUBJECT: APPROVAL OF CORRECITVE MEASURES IMPLEMENTATION REPORT OUTLINE FOR THE BARRIER WALL AND RECOVERY SYSTEM INSTALLATIONS GIANT REFINING COMPANY, BLOOMFIELD REFINERY EPA NO. NMD 089416416 HWB-GRCB-05-004

Dear Mr. Schmaltz and Mr. Riege:

The New Mexico Environment Department (NMED) is in receipt of Giant Refining Company's, Bloomfield Refinery (GRCB) outline for the *North Boundary Corrective Measures Implementation Report* dated October 28, 2005. This report is considered an Interim Measures Implementation Report because the barrier wall may not be a final remedy at the site. NMED hereby approves the Interim Measures Implementation Report outline with the following conditions:

- 1. Appendix B must include as-built illustrations of the barrier wall, including crosssections and also identification of the lithologic unit to which the barrier wall is anchored,
- 2. Provide an appendix that describes the management of investigative derived waste (IDW), and

Randy Schmaltz Giant Refining Company Bloomfield February 24, 2006 Page 2 of 2

3. Provide an appendix that provides descriptions of all methods used to monitor and sample the installation of the barrier wall. This information must include, but is not limited to; instrument calibration and use, field parameters and methods, and laboratory methods.

The above information must be included this report. GRCB shall submit the Interim Measures Implementation Report to NMED on or before July 3, 2006.

If you have any questions regarding this letter please call me at (505) 428-2545.

Sincerely,

Hope Manzelto

Hope Monzeglio Project Leader Hazardous Waste Bureau

#### HM

cc: J. Bearzi, NMED, HWB
\*D. Cobrain, NMED HWB
W. Price, OCD Santa Fe Office
C. Chavez, OCD Santa Fe Office
D. Foust, OCD Aztec Office
B. Wilkinson, EPA

Reading File and GRCB 2006 File \*denotes electronic copy

## **APPENDIX F**

## Investigative Derived Waste Management and Analytical Results

5127-002 Giant Refining Company Interim Measures Implementation Report June 2005

#### **IDW MANAGEMENT and ANALYTICAL RESULTS**

Soil samples were collected from each of the spoils stock-pile areas. A total of eight samples were collected from the stock-piles in the former raw water ponds. The samples were collected periodically during the placement of those spoils. A sample ID was assigned to each soil sample corresponding to the approximate survey station along the trench from which the soil was excavated. The soil samples were submitted to the laboratory and analyzed for the following parameters:

- Total Petroleum Hydrocarbons Gasoline Range Organics (GRO) by EPA Modified Method 8015B
- Total Petroleum Hydrocarbons Diesel Range Organics (DRO) and Motor Oil Range Organics (MRO) by EPA Modified Method 8015B
- Petroleum Hydrocarbons TPH by EPA Method 418.1
- Volatile Organics Compounds BTEX and MTBE by EPA Method 8021B

Following completion of excavation activities, one composite sample was collected of the visually hydrocarbon-stained soil. The sample was submitted to the laboratory and analyzed for the following parameters.

- Total Petroleum Hydrocarbons Gasoline Range Organics (GRO) by EPA Modified Method 8015B
- Total Petroleum Hydrocarbons Diesel Range Organics (DRO) by EPA Modified Method 8015B
- Petroleum Hydrocarbons TPH by EPA Method 418.1
- Volatile Organics Compounds BTEX by EPA Method 8021B

Table 1 of this IM Implementation Report summarizes the trench spoils analytical results. A copy of the analytical reports is also provided. Appendix J summarizes sample collection and handling procedures.

The analytical results were compared to the New Mexico Soil Screening Levels for industrial exposure (NMED, 2005). The NMED Soils Screening Levels (SSLs) for volatile organic compounds (VOCs) are based on a one-in-ten-thousand industrial target risk for carcinogens or a hazard quotient of 1 for non-carcinogens and considers incidental ingestion of soil, inhalation of volatiles or particulate emissions from impacted soil, and dermal contact with soil. The NMED SSLs listed on Table 1 for total petroleum hydrocarbons (DRO and MRO) are based on direct exposure for industrial workers in compliance with the NMED TPH screening guidelines for industrial exposure (NMED,

2005b). The detected concentrations from the nine soil samples were below the NMED SSLs for industrial exposure.

Trench Spoils Analytical Laboratory Reports



### COVER LETTER

February 16, 2005

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

RE: Stockpile

Order No.: 0502121

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 3 samples on 2/11/2005 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



49D1 Hawkins NE = Suite D = Albuquerque, NM 87109 505.345.3975 ■ Fax 505.345.4107 www.hallenvironmental.com

Hall Envir	Hall Environmental Analysis Laborator			y Date: 16-Feb-05			
CLIENT:	San Juan Refining			Client Sar	nple ID: 0'-300'	· · · · · · · · · · · · · · · · · · ·	
Lab Order:	0502121			Collec	tion Date: 2/9/20	005 3:50:00 PM	
Project:	Stockpile			.*			
Lab ID:	0502121-01				Matrix: SOIL		
Analyses		Result	PQL	Qual Units	DF	Date Analyzed	
EPA METHOD	8015B: DIESEL RANGE O	RGANICS				Analyst: SCC	
Diesel Range C	Irganics (DRO)		10	тg/Kg	1	2/14/2005 8:11:24 PM	
Motor Oll Range	e Organics (MRO)	ND	50	mg/Kg	1	2/14/2005 8:11:24 PM	
Surr. DNOP		103	60-124	%REC	1	2/14/2005 8:11:24 PM	
EPA METHOD	80158: GASOLINE RANGI	E				Analyst: NSB	
Gasoline Range	e Organics (GRO)	260	50	mg/Kg	10	2/14/2005 5:37:34 PM	
Surf. BFB		118	78.3-120	%REC	10	2/14/2005 5:37:34 PM	

Qualifiers:

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

1/6

Page 1 of 3

Hall Environmental Analysis Labor			tory		Date:	16-Feb-05	
CLIENT:	San Juan Refining			Client Sam	ple ID: 3(	)0'-60	0'
Lab Order:	0502121			Collecti	on Date:	2/10/2	2005 2:00:00 PM
Project:	Stockpile						
Lab ID:	0502121-02				Matrix:	SOIL	
Analyses		Result	PQL	Qual Units		df	Date Analyzed
EPA METHOD	8015B: DIESEL RANGE OR						Analyst: SCC
Diesel Range C	Organics (DRO)	68	10	mg/Kg		1	2/14/2005 8:41:00 PM
Motor Oil Rang	e Organics (MRO)	ND	50	mg/Kg		1	2/14/2005 8:41:00 PM
Surr: DNOP		105	60-124	%REC		1	2/14/2005 8:41:00 PM
EPA METHOD	8015B: GASOLINE RANGE						Analyst: NSB
Gasoline Range	e Organics (GRO)	350	100	mg/Kg		20	2/14/2005 6:07:31 PM
Surr: BFB		113	78.3-120	%REC		20	2/14/2005 6:07:31 PM

Qua	lifiers	:
-----	---------	---

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 2 / 6

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Page 2 of 3

CLIENT:	San Juan Refining	`•		Client S	ample ID:	600'-900	,
Lab Order:	0502121			Coll	ection Date:	2/10/20	005 2:15:00 PM
Project:	Stockpile						х.
Lab ID:	0502121-03				Matrix:	SOIL	
Analyses		Result	PQL	Qual Un	its	DF	Date Analyzed
EPA METHOD	80158: DIESEL RANGE	ORGANICS					Analyst: SCC
Diesel Range C	Organics (DRO)	150	10	mg/	Kg	1	2/14/2005 9:11:20 PM
Motor Oil Range	e Organics (MRO)	ND	50	mg/	Kg	1	2/14/2005 9:11:20 PM
Surr: DNOP		104	60-124	%R	EC	1	2/14/2005 9:11:20 PM
EPA METHOD	8015B: GASOLINE RAN						Analyst: NSB
Gasoline Range	organics (GRO)	78	25	mg/	Kg	5	2/15/2005 9:58:39 AM
Surr: BFB		114	78.3-120	%R	EC	5	2/15/2005 9:58:39 AM

Hall Environmental Analysis Laboratory

Date: 16-Feb-05

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

3/6





ULLENT: Work Order:	San Juan Ketining 0502121	etung							QC SUMMARY REPORT	<b>IMAR</b>	Y REPC	LY C
Project:				l							Method Blank	Slan
Sample ID MB-7412	7412	Batch ID: 7412	Test Code: SW8015	SW8015	Units: mg/Kg		Analysis	Date 2/14/	Analysis Date 2/14/2005 12:11:43 PM		Prep Date 2/14/2005	10
Client (D:			Run ID:	FID(17A) 2_050214A	150214A		SeqNo:	339696	ġ	÷	·,	
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO) Motor Oli Range Organics (MF Surr: DNOP	Diesel Range Organics (DRO) Motor Oli Range Organics (MRO) Surr: DNOP	UN UN 1887.9	0 0 0	0	0	7.78	60	124	0			
Sample ID MB-7411		Batch ID: 7411	Test Code: SW8015	SW8015	Units: ma/Ka		Analvsis	Date 2/14/	Analvsis Date 2/14/2005 3:37:41 PM	Prep Da	Prep Dale 2/11/2005	6
Cilent ID:	·		Run ID:	PIDFID_050214A	214A		SeqNo:	339601	5	-		
Analyte		Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Surr: BFB	Gasoline Range Organics (GRO) Surr: BFB	ND 1042	50	1000		104	78.3	120	0		:	
					7							
Qualifiers:	ND - Not Deter	ND - Not Detected at the Reporting Limit		0	r r		1: 14		-			
					S - Spike Kecovery ouiside becepted recovery limits	ic accepted fel	covery Jumits		B - Analyte detected in the associated Method Blank	d in the assoc	Internation of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of t	i

CLIENT: San Juan Refining Work Order: 0502121	Refining				•			QC SUM Laboratory C	QC SUMMARY REPORT Laboratory Control Spike - generic	<b>ORT</b> sneric
Sample (D LCS-7412 Cilent ID:	Batch ID: 7412	Test Code: SW8015 Dive ID: EID147A1	SW8015 Units	Units: mg/Kg		Analysis SeoNor	Date 2/14/20 319607	Analysis Date 2/14/2005 12:42:24 PM Searkin: 339607	Prep Date 2/14/2005	05
Analyte	Result	POL.	SPK value	SPK Ref Val	%REC	Jaquo. LawLimit	HighLimit	LowLimit HighLimit RPD Ref Val	%RPD RPDLimit	Qual
Diesel Range Organics (DRO)	54.31	9	50	0.	109	67.4	117	0		
Sample ID LCSD-7412 Client ID:	Batch ID: 7412	Test Code: SWB015 Run ID: FID(17A)	SW8015 Units: FID(17A) 2_050214A	Units: mg/Kg 50214A		Analysis SeqNo:	Date 2/14/20 339699	Analysis Date   2/14/2005  1:12:18 PM SeqNo:	Prep Date 2/14/2005	05
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	LowLimit HighLimit RPD Ref Val	%RPD RPDLimit	Qual
Diesel Range Organics (DRO)	45.33	10	50	0	90.7	67.4	117	54,31	18,0 20	
Sample ID LCS-7411 Client ID:	Batch ID: 7411	Test Code: SW8015 Run ID: PIDF10_0	SW8015 U PIDFID_050214A	Units: mg/Kg 14A		Analysis SeqNo:	: Date 2/14/20 339602	Analysis Date   2/14/2005 4:07:36 PM SeqNo:	Prep Date 2/11/2005	65
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimlt	LowLimit HighLimit RPD Ref Val	%RPD RPDLimit	Qual
Gasoline Range Organics (GRO)	) 28.01	C)	25	0	112	æ	120	0		
Sample ID GRO std 2.5ug Client ID:	Batch ID: 7411	Test Code: SW8015 Run ID: PIDFID_I	SW8015 U	Units: mg/Kg 15A		Analysis SeqNo:	s Date 2/15/20 340005	Analysis Date  2/15/2005 10:28:29 AM SeqNo:	Prep Date	
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	LowLimit HighLimit RPD Ref Val	%RPD RPDLimit	Qual
Gasoline Range Organics (GRO)	) 23.77	<del>س</del>	23	o	95.1	84	120	0		

•

5/6

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

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

Qualifiers:

B - Analyte detected in the associated Method Blank

~

J

I

ļ

ł

ļ

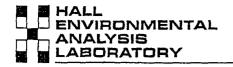
	Sample	Rece	eipt Ch	lecklist			
Cilent Name SJR				Dale and Time	Received:	2/1	1/2005
Work Order Number 0502121				Received by	AT		
Charlini annalaiad hu							
Checklist completed by			Date				
Matrix	Carrier name	UPS					
Shipping container/cooler in good condition?		Yes	V	No 🗔	Not Present		
Custody seals intact on shipping container/coole	r? .	Yes		No 🗌	Not Present	Not Shipped	$\checkmark$
Custody seals intact on sample bottles?		Yes	$\checkmark$	No 🗔	N/A		
Chain of custody present?		Yes	$\checkmark$	No 🗔			
Chain of custody signed when relinquished and	received?	Yes	$\mathbf{\Sigma}$	No 🗖			
Chain of custody agrees with sample labels?		Yes					
Samples in proper container/bottle?		Yes		No 🗔			
Sample containers intact?		Yes					
Sufficient sample volume for indicated test?		Yes	$\mathbf{V}$	No 🗖			
All samples received within holding time?		Yes	$\mathbf{\Sigma}$				
Water - VOA vials have zero headspace?	No VOA vials subπ	nilted		Yes 🗆	No 🗆		
Water - pH acceptable upon receipt?		Yes		No 🗖	N/A 🗹		
Container/Temp Blank temperature?				4° C ± 2 Accepia	ble		
				If given sufficient	time to cool.		
COMMENTS:							
Client contacled	Date contacted:			Perso	on contacted	 	
Contacted by:	Regarding			a a star a star a star a star a star a star a star a star a star a star a star a star a star a star a star a st		 	
Comments:							
Corrective Action							

6/6

M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         M.M.         Diff.         Dift.         Diff.         Diff. <th< th=""></th<>
Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample:         Cample: <t< th=""></t<>
Preservative         Humber/Volume           Humber/Volume         Heservative           Humber/Volume         Humber/Volume           H
1-4~7 562pt X 1-1 - 2 X2 - 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X1 2 X2 X1 2 X2 X1 2 X2 X1 2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X2 X
Parmarks:
Parmarks:
Recarited By (Signature)
Received By (Signature)
Received By (Signature)
Received By (Signature)
Recaived By (Signature)
Received By (Signature)
Received By (Signature) Z//9/27
Received By (Signature) Z//9/27
Received By (Signature) Z//9/25

. |

. •



#### COVER LETTER

March 04, 2005

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

RE: Stockpile

Order No.: 0502235

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 1 sample on 2/24/2005 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



4901 Hawkins NE∎ Suite D∎ Albuquerque, NM 87109 505.345.3975∎ Fax 505.345.4107 www.hallenvironmental.com

Date:	04-Mar-05	5
-------	-----------	---

1

2/28/2005 10:52:08 PM

Client Sample ID: 900'-1200' CLIENT: San Juan Refining Lab Order: 0502235 Collection Date: 2/22/2005 2:45:00 PM **Project:** Stockpile Matrix: SOIL Lab ID: 0502235-01 Result PQL Qual Units DF Analyses **Date Analyzed** EPA METHOD 8015B: DIESEL RANGE ORGANICS Analyst: SCC Diesel Range Organics (DRO) 10 mg/Kg 1 3/3/2005 3:39:53 AM 5112 ND Motor Oil Range Organics (MRO) 50 mg/Kg 1 3/3/2005 3:39:53 AM Surr: DNOP 109 60-124 %REC 3/3/2005 3:39:53 AM 1 EPA METHOD 8015B: GASOLINE RANGE Analyst: NSB Gasoline Range Organics (GRO) 5.0 mg/Kg 2/28/2005 10:52:08 PM **40** 1 Surr: BFB 119 78.3-120 %REC 2/28/2005 10:52:08 PM 1 EPA METHOD 8021B: VOLATILES Analyst: NSB 2/28/2005 10:52:08 PM Benzene ND 0.025 mg/Kg 1 Toluene ND 0.025 2/28/2005 10:52:08 PM mg/Kg 1 Ethylbanzene ND 0.025 mg/Kg 1 2/28/2005 10:52:08 PM 0.50 0.025 Xylenes, Total mg/Kg 1 2/28/2005 10:52:08 PM

87.4-116

1/4

%REC

93.8

Qualifiers:

Surr: 4-Bromofluorobenzene

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

Page 1 of 1



Batch ID: 7480     Test Code:       Batch ID: 7480     Test Code:       Run ID:     Run ID:       Run ID:     9.539       ND     9.539       ND     9.539       Batch ID: 7477     Test Code:       Run ID:     7477       Run ID:     7477       Run ID:     Run ID:       Run ID:     84ch ID: 7477       Run ID:     7476       Run ID:     84ch ID: 7477       Run ID:     977.6       ND     977.6       ND     0.1       Run ID:     84ch ID: 7477       Run ID:     84ch ID: 7477       Run ID:     84ch ID: 7477       Run ID:     9.75       ND     0.025				QC SUM	OC SUMMARY REPORT	RT
3-7480       Batch ID: 7480       Test Code:         Run ID:       Run ID:         Drganics (DRO)       ND       10         Drganics (DRO)       ND       50         Drganics (DRO)       9.539       0         Batch ID: 7477       Batch ID: 7477       768 Code:         3-7477       Batch ID: 7477       768 Code:         8-7477       Batch ID: 7477       768 Code:         9-7477       Batch ID: 7477       700         9-7477       800       0.025         9-7478       0.01       0.025         9-7479       0.0725       0.025         9-7755       0       0.025<				,	Method Blank	llank
Run ID:         Run ID:           Result         PQL           ND         ND         10           ND         9.539         0           QD         9.539         0           Batch ID:         7477         Test Code:           Run ID:         Run ID:         Run ID:           Robit         977.6         0           QD         977.6         0           Run ID:         Run ID:         Run ID:           Robit         ND         0           Robit         Run ID:         Run ID:           Robit         0         0           Robit         Run ID:         Run ID:           Robit         Run ID:         Run ID:           Robit         Robit         0.01           ND         0.01         0.025           ND         0.0755         0           Soute         0.0255         0	Units: mg/Kg		nalysis Date 2/25	Analysis Date 2/25/2005 8:20:27 AM	Prep Date 2/24/2005	
Result         PQL           ND         ND         10           ND         9.539         0           9.539         9.539         0           Batch ID: 7477         Test Code:         Run ID:           Result         Test Code:         Run ID:           PQL         ND         977.6         0           PQL         ND         977.6         0           Ratch ID: 7477         Test Code:         Run ID:           Robit         ND         0         0           PQL         ND         0         0           Ratch ID: 7477         Test Code:         Run ID:           Result         ND         0.1         0.1           ND         ND         0.025         ND           ND         0.0755         ND         0.0255           ND         0.0755         0         0.0255	FID(17A) 2_050225A		SaqNo: 341574	174		
ND     ND     10       ND     9.539     0       Batch ID: 7477     Test Code:       Run ID:     Run ID:       Result     P.O.L       P.O.L     977.6     0       Batch ID: 7477     Test Code:     10       Run ID:     ND     5     0       P.O.L     ND     0.0     5       Run ID:     Run ID:     Run ID:       Result     ND     0.025       ND     ND     0.025       ND     0.0755     0.0255       ND     0.0755     0.0255	SPK Ref Val	%REC Lov	LowLimit HighLimit	HighLimit RPD Ref Val	%RPD RPDLimit	Qual
3-7477       Batch ID: 7477       Test Code:         Run ID:       Run ID:         Result       PQL         Result       PQL         977.6       0         977.6       0         977.6       0         977.6       0         977.6       0         977.6       0         977.6       0         9.7477       Batch ID: 7477         Run ID:       Run ID:         Run ID:       Run ID:         Vi ether (MTBE)       ND       0.1         Vi ether (MTBE)       ND       0.025         ND       0.025       ND       0.025         ND       0.0755       ND       0.025         ND       0.0755       ND       0.0255         ND       0.0725       0.0255         ND       0.0755       0         ND       0.0755       0	10 0	95.4	60 124	σ		:
Run ID:         Result       PQL         Result       PQL         PQL       ND       5         977.6       ND       5         9.7477       Batch ID: 7477       7est Code:         Run ID:       Run ID:       Run ID:         PQL       Result       PQL         9.7477       Batch ID: 7477       Test Code:         PQL       Result       PQL         VI ather (MTBE)       ND       0.1         VI ather (MTBE)       ND       0.025         ND       ND       0.025         ND       ND       0.025         ND       0.0755       0.025         ND       0.0755       0.0255         ND       0.0755       0.0255         ND       0.0755       0.0255         ND       0.0755       0.0255	Units: mg/Kg		vnalysis Date 2/26	Analysis Date 2/28/2005 8:22:47 PM	Prep Dale 2/24/2005	
Result         PQL           Ie Organics (GRO)         ND         5           977.6         977.6         0           9.7417         Batch ID: 7417         Test Code:           Run ID:         Run ID:         Run ID:           9.1417         Batch ID: 7477         Test Code:           9.1417         Batch ID: 7477         Run ID:           9.141         Batch ID: 7477         Run ID:           9.141         Result         PoL           9.1         ND         0.1           9.1         ND         0.025           9.1         ND         0.025           9.1         ND         0.025           9.1         ND         0.025           9.1         0.0725         0	<b>J50228A</b>		SeqNo: 341948	148		
Ie Organics (GRO)     ND     5       977.6     977.6     0       3-7477     Batch ID: 7477     Test Code:       Run ID:     Run ID:     PQL       Ye uther (MTBE)     ND     0.1       Vi ether (MTBE)     ND     0.025       ND     0.025     ND     0.025       ND     0.0755     ND     0.025       ND     0.0755     ND     0.025       ND     0.0755     ND     0.025       ND     0.0755     ND     0.025	SPK Ref Val	WREC LON	LowLimit HighLimit	HighLimit RPD Ref Val	%RPD RPDLimit	Qual
3-7477     Batch ID: 7477     Test Code: Run ID:       Run ID:     Run ID:       Ye ther (MTBE)     ND     0.1       Vi ether (MTBE)     ND     0.025       ND     0.025     ND     0.025       ND     0.025     ND     0.025       ND     0.075     ND     0.025       ND     0.075     ND     0.025       ND     0.0755     ND     0.025       ND     0.0755     ND     0.025	1000 0	97.8	78.3 120	0		ł
Run ID:           Run ID:           Result         PQL           v <sup>I</sup> ather (MTBE)         ND         0.1           ND         0.025         ND         0.025           ND         0.075         ND         0.025           ND         0.075         ND         0.025           ND         0.0755         ND         0.025           ND         0.0725         ND         0.025	Unlts: mg/Kg		Inalysis Date 2/26	Analysis Date 2/28/2005 8:22:47 PM	Prep Date 2/24/2005	
Result     PQL       vl ether (MTBE)     ND     0.1       ND     0.025	350228A	.,	SeqNo: 341961	<b>)61</b>		
yl ather (MTBE) ND ND ND ND ND ND ND ND ND	SPK Ref Val	%REC Lov	LowLimit HighLimit	HighLimit RPD Ref Val	%RPD RPDLimit	Qual
ND 10fluorobenzene 0.9725						2
	0	<b>97.2</b>	87.4 116	•		

2/4

Hall Environmental Analysis Laboratory	Analysis Laborat	ory							Date: 04-Mar-05	i	
	San Juan Refining							QC SUMMARY REPORT	MAR	V REPO	RT
Work Order: 0502235 Project: Stockpile		t						Laboratory Control Spike - generic	Control S	spike - gei	neric
Sample ID LCS-7480	Batch ID: 7480	Test Code: SW8015	SW8015	Units: mg/Kg		Analysis	Dale 2/25/2(	Analysis Date 2/25/2005 8:51:03 AM	Prep Da	Prep Date 2/24/2005	
Client ID:		Run ID:	FID(17A) 2_050225A	50225 <b>A</b>		SeqNo:	341581				
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	52.98	9	50	•	106	67.4	117	D			
Sample ID LCSD-7480	Batch ID: 7480	Test Code:	SW8015	Units: mg/Kg		Analysis	: Date 2/25/2(	Analysis Date 2/25/2005 9:20:39 AM	Prep Da	Prep Date 2/24/2005	
Client ID:		Run ID:	FID(17A) 2_050225A	50225A		SeqNo:	341585	10			
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit F	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	53.28	10	50	0	107	67.4	117	52.98	0.561	17.4	
Sample ID LCS-7477	Batch ID: 7477	Test Code:	: SW8015	Units: mg/Kg		Analysis	i Date 2/28/2	Analysis Date 2/28/2005 8:52:42 PM	Prep Da	Prep Date 2/24/2005	
Client ID:		Run ID:	PIDFID_050228A	128A		SeqNo:	341949	¢			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	0) 24.7	5	25	0	98.8	84	120	0			•
Sample ID LCS-7477	Batch ID: 7477	Test Code: SW8021	: SW8021	Units: mg/Kg		Analysi	i Date 2/28/2	Analysis Date 2/28/2005 8:52:42 PM	Prep Da	Prep Date 2/24/2005	
Client ID:		Run (D:	PIDFID_050228A	128 <b>A</b>		SeqNo:	341962	2			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit F	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	0.3979	0.025	0.41	0	97.1	83.4	113	0			
Toluena	1.986	0.025	1.9		105	86.3	118	0			
Ethylbenzene	0.3774	0.025	0.4	0	94.3	81.7	113	0			
Xylenes, Total	1.991	0,025	1.9	o	105	86.9	112	a			
Qualifiers: ND - Not D J - Analyte	ND - Not Detected at the Reporting Limit J - Analyte detected below quantitation limits	mits	S - Sp R - RU	<ul> <li>S - Spike Recovery outside accepted recovery limits</li> <li>R - RPD outside accepted recovery limits</li> </ul>	accepted rec ecovery limit	overy limits		B - Analyte detected in the associated Method Blank	in the assoc	iated Method I	3lank 1

3/4

	Sample Receipt Checklist		
Client Name SJR	Date and T	Time Received:	2/24/2005
Work Order Number 0502235	Received	d by AT	
	= 2/24/	·	
Checklist completed by	Date		
Matrix Carr	rname <u>UPS</u>		
Shipping container/cooler in good condition?	Yes 🗹 No 🗌	Not Present	
Cuslody seals intact on shipping container/cooler?	Yes 🗋 No 🗔	Not Present 🗹	Not Shipped
Custody seals intact on sample bottles?	Yes 🗹 No 🗌	N/A	
Chain of custody present?	Yes 🗹 No 🗔		
Chain of custody signed when relinquished and received?	Yes 🗹 No 🗌		
Chain of custody agrees with sample labels?	Yes 🗹 No 🗆		
Samples in proper container/bottle?	Yes 🗹 No 🗖		
Sample containers intact?	Yes 🗹 No 🗔		
Sufficient sample volume for indicated test?	Yes 🗹 No 🗆		
All samples received within holding time?	Yes 🗹 No 🗔		
Water - VOA vials have zero headspace? No VOA	ials submitted 🗹 🛛 Yes 🗋		
Water - pH acceptable upon receipt?	Yes 🗌 No 🗌	N/A 🔽	
Container/Temp Blank lemperature?	2° 4° C ± 2 Acc If given suffic	eplable sient time to cool.	
COMMENTS:			
Client contacted Date conta	led: F	Person contacted	
Contacted by: Regarding			
Comments:			
	· · · · · · · · · · · · · · · · · · ·		
Corrective Action			
			······································

4/4

1 ĥ

1

		(V or V) e	oeqebseH	no selddug	niA						
HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D Albuquerque, New Mexico 87109 Tel. 505.345.3975 Fax 505.345.4107 www.hallenvironmental.com											
HALL ENVIRONMENTAL ANALYSIS LABORATOR 4901 Hawkins NE, Suite D Albuquerque, New Mexico 87109 Tel. 505.345.3975 Fax 505.345. Www.hallenvironmental.com	10		(AD	V-ime2) 01	28			┼╌┼			
HALL ENVIRONMER ANALYSIS LABORA 4901 Hawkins NE, Suite D Albuquerque, New Mexico B Tel. 505.345.3975 Fax 50 www.hallenvironmental.com	REQUEST			(AOV) 808							
HALL ENVIRO ANALYSIS LAI 4901 Hawkins NE, 5 Albuquerque, New M Tel. 505.345.3975 www.hallenvironmeni				A Pesticid Presticid			 	$\left  \right $	 		
<b>FN</b> Awkin rque, 1345.	515			IBJSM 8 AF			 	┼╌┼		+	
ALL NO1 H Duque ww.ha	ANALYSIS			no AN9) 01				+-+	 ╞╼╌┼╼╴	++	
<b>T 4</b> 77 E E M	AN		(1208	bortaM) (	EDI						
				Poursian P			 		 		
		[ 959 []/5		3 bortseM + bortseM) +			 	┝╌┼╸			
	. [/	vinO enilozet			<u> </u>	$\left  \right $	 	┟╼╌┠╸			
	.]	e (8021)	18MT + 3	IBTM + X	118 7						Remarks:
GA/ GC Package: Std D Level 4 D :: Pock P//e		enger: Civilin Hurtulio	Sampler: Randy Schmaltz Sample Temperature:	chume HEAL No.	HIGUINDIA MORA						Received By: (Signature) 2/24/05 Received By: (Signature)
Other: Project Name: S74	Project #:	Project Manager	Sampler: Sample Ter	Number/Yolume	1-40						
CHAIN-OF-CUSTODY RECORD	CR 4990 Gild NM 83413		1(e 1 3	Sample I.D. No.	900'-1200'						Relinquished By: (Signature) Relinquished By: (Signature)
			Phone #:505-632-4161 Fax #: 505-1037 - 2911	Matrix	1:05-						Relinquishe
CHAIN-DF-CU Gient:SAN Juan	Address: #50		505-11 SDS-11		245-		     				Time: 35 A
	Address:		Phone # Fax #:	Date	2/22/02						2/23/05 Date:



HALL ENVIRONMENTAL ANALYSIS LABORATORY

#### COVER LETTER

March 17, 2005

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

RE: Stockpile

Order No.: 0503084

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 3 samples on 3/8/2005 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 Preeman, Business Mahager Nancy McDuffie, Laboratory Manager



4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109 505.345.3975 ■ Fax 505.345.4107 www.hallenvironmental.com

Date: 17-Mar-05

CLIENT:San Juan RefiningProject:StockpileLab Order:0503084

## CASE NARRATIVE

Analytical Comments for METHOD 8021BTEX\_S, SAMPLE 0503084-01a: Elevated surrogate due to matrix interference. Analytical Comments for METHOD 8015GRO\_S, SAMPLE 0503084-01a: Elevated surrogate due to matrix interference. Analytical Comments for METHOD 8021BTEX\_S, SAMPLE 0503084-03a: Elevated surrogate due to matrix interference.



Hall Envir	onmental Analys	is Labora	tory		······	Date:	17-Ma	r-05
CLIENT:	San Juan Refining			Cli	ent Sampl	e ID: 1	500-18	00
Lab Order:	0503084				Collection	1 Date:	3/5/200	05 2:20:00 PM
Project:	Stockpile							
Lab ID:	0503084-01				М	latrix:	SOIL	
Analyses		Result	PQL	Qual	Units		DF	Date Analyzed
EPA METHOD	8015B: DIESEL RANGE	ORGANICS						Analyst: SC
Diesel Range O	rganics (DRO)	15	10		mg/Kg		1	3/15/2005 1:36:38 PM
Motor Oil Range	e Organics (MRO)	ND	50		mg/Kg		1	3/15/2005 1:36:38 PM
Sur: DNOP		118	60-124		%REC		1	3/15/2005 1:36:38 PM
EPA METHOD	8015B: GASOLINE RAN	GE						Analyst NSI
Gasoline Range	e Organics (GRO)	120	5.0		mg/Kg		1	3/10/2005 5:01:45 PM
Surr: BFB		131	78.3-120	S	%REC		1	3/10/2005 5:01:45 PM
EPA METHOD	8021B: VOLATILES							Analyst: NSI
Benzene		0.12	0.025		mg/Kg		1	3/10/2005 5:01:45 PM
Toluene		0.29	0.025		mg/Kg		1	3/10/2005 5:01:45 PM
Ethylbenzene		0.92	0.025		mg/Kg		1	3/10/2005 5:01:45 PM
Xylenes, Total		6.2	0.025		mg/Kg		1	3/10/2005 5:01:45 PM

87.4-116

S

%REC

1

3/10/2005 5:01:45 PM

123

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

Page 1 of 3

2/8

----

Surr: 4-Bromofluorobenzene

Ì

CLIENT:	San Juan Refining			Clie	ent Samj	ple ID:	800-2	100
Lab Order:	0503084				Collecti	on Date:	3/6/20	005 2:30:00 PM
Project:	Stockpile							
Lab ID:	0503084-02					Matrix:	SOIL	
Analyses		Result	PQL	Qual	Units		DF	Date Analyzed
EPA METHOD	8015B: DIESEL RANGE	ORGANICS						Analyst: SCC
Diesel Range C	)rganics (DRO)	ND	10		mg/Kg		1	3/15/2005 3:41:47 PM
Motor Oil Rang	e Organics (MRO)	ND	50		mg/Kg		1	3/15/2005 3:41:47 PM
Sur: DNOP		113	60-124		%REC		1	3/15/2005 3:41:47 PM
EPA METHOD	80158: GASOLINE RAN	GE						Analyst: NSB
Gasoline Rangi	e Organics (GRO)	130	5.0		mg/Kg		1	3/10/2005 5:32:00 PM
Sur: BFB		120	78.3-120		%REC		1	3/10/2005 5:32:00 PM
EPA METHOD	8021B: VOLATILES							Analyst: NSB
Benzene		0.36	0.025		mg/Kg		1	3/10/2005 5:32:00 PM
Toluene		0.33	0.025		mg/Kg		1	3/10/2005 5:32:00 PM
Ethylbenzene		1.7	0.025		mg/Kg		1	3/10/2005 5:32:00 PM
Xylenes, Total		8.0	0.025		mg/Kg		1	3/10/2005 5:32:00 PM
Surr: 4-Brom	ofluorobenzene	116	87.4-116		%REC		1	3/10/2005 5:32:00 PM

Date: 17-Mar-05

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

3/8

Page 2 of 3





Date: 17-Mar-05

CLIENT:	San Juan Refining			Client Sam	ple ID: 2300-260	00
Lab Order:	0503084			Collect	ion Date: 3/6/200	05 2:00:00 PM
Project:	Stockpile					
Lab ID:	0503084-03				Matrix: SOIL	
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	8015B: DIESEL RANGE	ORGANICS				Analyst: SCC
Diesel Range C	Drganics (DRO)	ND	10	mg/Kg	1	3/15/2005 4:13:05 PM
Motor Oil Rang	e Organics (MRO)	ND	50	mg/Kg	1	3/15/2005 4:13:05 PM
Surr: DNOP		110	60-124	%REC	1	3/15/2005 4:13:05 PM
EPA METHOD	8015B: GASOLINE RAN	GE				Analyst: NSE
Gasoline Range	e Organics (GRO)	7.4	5.0	mg/Kg	1	3/10/2005 6:02:12 PM
Surr: BFB		103	78.3-120	%REC	1	3/10/2005 6:02:12 PM
EPA METHOD	8021B: VOLATILES					Analyst: NSE
Benzene		ND	0.025	mg/Kg	1	3/10/2005 6:02:12 PM
Toluene		ND	0.025	mg/Kg	1	3/10/2005 6:02:12 PM
Ethylbenzene		ND	0.025	mg/Kg	1	3/10/2005 6:02:12 PM
Xyienes, Total		0.079	0.025	mg/Kg	1	3/10/2005 6:02:12 PM
Sure A.Brom	ofluorobenzene	113	87.4-116	%REC	+	3/10/2005 6:02:12 PM



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

4/8

Page 3 of 3

CLIENT: San Juan Refinine	efinine							TAUATA VALANTA DO			, La
ler:	3							ころう		Method Blank	Slank
Sample ID MB-7553	Batch ID: 7553	Test Code: SW8015	SW8015	Units: mg/Kg		Analysis	Date 3/11	Analysis Date 3/11/2005 7:12:31 PM	Prep Da	Prep Date 3/10/2005	ŝ
Client ID:		Run ID:	FID(17A) 2_050310A	50310A		SeqNa:	34498	98			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO) Motor Oli Range Organics (MRO)	QN N	5 5 2					-				
Surr: DNOP	9.977	D	10	0	99.8	60	124	a			
Sample ID MB-7545	Batch ID: 7545	Test Code: SW8015	: SW8015	Units: mg/Kg		Analysis	5 Date 3/10	Analysis Date 3/10/2005 3:30:27 PM	Prep Da	Prep Date 3/9/2005	
Client ID:		Run ID:	PIDFID_050310A	10 <b>A</b>		SeqNo:	343992	92			
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LawLimit	HighLimlt	HighLimlt RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	Q	20									ĺ
Surr: BFB	946.3	G	1000	0	94.6	78.3	120	0			
Sample ID MB-7545	Batch ID: 7545	Test Code: SWB021	: SW8021	Units: mg/Kg		Analysis	s Date 3/10	Analysis Date 3/10/2005 3:30:27 PM	Prep Di	Prep Date 3/9/2005	
Client ID:		Run ID:	PIDFID_050310A	toA		SeqNo:	343960	60			
Anaiyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	048%	RPDLimit	Qual
Benzene	QN	0.025								; ;	
Toluene	ON	0.025									
E(hylbenzene	QN	0.025									
Xylenes, Total	QN	0.025									
Surr: 4-Bramolluarobenzene	0.9907	٥	-	٥	99.1	87.4	116	0			
Qualifiers: ND - Not Deter	ND - Not Detected at the Reporting Limit		S - 5	S - Spike Recovery outside accepted recovery limits	accepted rec	overy limits		B - Analyte detected in the associated Method Blank	in the assoc	iated Method	Blank
f - Aminde Jat											

5/8

Actunuts       Test Code:       SW8015       Units:       mg/Kg         Batch ID:       7553       Test Code:       SW8015       Units:       mg/Kg         Run ID:       FID(17A)       2.050310A       SPK Ref Val       0         Batch ID:       7553       Test Code:       SW8015       Units:       mg/Kg         Batch ID:       7553       Test Code:       SW8015       Units:       mg/Kg         Batch ID:       7553       Test Code:       SW8015       Units:       mg/Kg         Batch ID:       7553       Test Code:       SPK value       SPK Ref Val         Datch ID:       7545       Test Code:       SPK value       SPK Ref Val         Do       57.01       10       50       0         Batch ID:       7545       Test Code:       SPK value       SPK Ref Val         Do       24.13       5       25       0         Do       24.13       5       Units:       mg/Kg         Batch ID:       7545       Units:       Mg/Kg       0         Do       24.13       5       0       0       0         Batch ID:       745       SPK value       SPK value       SPK Ref Val	QC SUMIN Laboratory Co Analysis Data 3/11/2005 7:42:07 PM	
LCS-7553         Batch ID: 7533         Test Code::         SWB015         Undis::         mg/Kg           Run ID:         FID (17A) 2_050310A         Run ID:         FID (17A) 2_050310A         Red           ge Organics (DRO)         51.43         10         50         0           ge Organics (DRO)         51.43         10         50         0           Je Organics (DRO)         51.43         Test Code:         SWB015         Undis:         mg/Kg           Je Organics (DRO)         57.01         10         50         0         0           Je Organics (DRO)         24.13         701         50         0         0           Je Organics (GRO)         24.13         701         245         Jetit ID_050310A           Je Organics (GRO)         24.13         725         0         0           Je Organics (	Analysis Date 3/11/2005 7:42:07 PM	Spike - generi
Result         PQL         SPK value         SPK Ref Val           51.43         10         50         0           51.43         10         50         0           Batch ID: 7553         Test Code:         SWB015         Units: mg/Kg           Run ID:         FID(17A) 2_050315A         0         0           Front         PQL         SPK value         SPK Ref Val           57.01         10         50         0           57.01         10         50         0           Batch ID: 7545         Test Code:         SWB015         Units: mg/Kg           Run ID:         Test Code:         SWB015         Units: mg/Kg           O)         24.13         5         25         0           Batch ID: 7545         Test Code:         SPK value         SPK Ref Val           O)         24.13         5         25         0           Batch ID: 7545         Test Code:         SPK value         SPK Val           O)         24.13         5         25         0           Batch ID: 7545         Run ID:         PIDFID_050310A         0           Datch ID: 7545         SPK value         SPK val         0		Prep Date 3/10/2005
51.43       10       50       0         Batch ID: 7553       Test Code: SWB015       Units: mg/Kg         Run ID:       Run ID:       FID(17A) 2_050315A         Result       PQL       SPK value       SPK Ref Val         57.01       10       50       0         Batch ID: 7545       Test Code:       SPK value       SPK Ref Val         Batch ID: 7545       Test Code:       SPK value       SPK Ref Val         0       24.13       5       25       0         0)       24.13       5       25       0         Batch ID: 7545       Test Code:       SPK value       SPK Ref Val         0)       24.13       5       25       0         0)       24.13       5       25       0         Batch ID: 7545       Test Code:       SPK value       SPK Ref Val         0       8atch ID: 7545       Run ID:       PIDFID_050310A         8atch ID: 7545       7       25       0         0       SPK value       SPK Ref Val       0         0       24.91       SPK value       SPK Ref Val	Sagroo: 344499 %REC LowLimit HighLimit RPD Ref Val %RPD	RPDLimit Qual
LCSD-7553       Batch ID: 7553       Test Code:       SWB015       Units:       mg/Kg         Run ID:       FID(17A) 2_050315A       Run ID:       FID(17A) 2_050315A         Be Organics (DRO)       57.01       PCiL       SPK value       SPK Ref Val         Be Organics (DRO)       57.01       10       50       0         ULCS-7545       Batch ID: 7545       Test Code:       SPK value       SPK Ref Val         Ange Organics (GRO)       24.13       5       25       0         LCSD-7545       Batch ID: 7545       Test Code:       SPK value       SPK Ref Val         ange Organics (GRO)       24.13       5       25       0       0         LCSD-7545       Batch ID: 7545       Test Code:       SPK value       SPK Ref Val         ange Organics (GRO)       24.13       5       25       0       0         LCSD-7545       Batch ID: 7545       Run ID:       PIDFID_050310A       1       1         ange Organics (GRO)       24.81       PCIL       SPK value       SPK Ref Val         ange Organics (GRO)       24.81       PCIL       SPK value       SPK Ref Val	103 67.4 117 0	
Run ID:       FID (17Å) 2_050315A         Result       PQL       SPK value       SPK Ref Val         Inge Organics (DRO)       57.01       10       50       0         D LCS-7545       Batch ID: 7545       Test Code:       SW8015       Units: mg/Kg         Run ID:       Run ID:       PIDFID_050310A       N       N         Range Organics (GRO)       24.13       5       25       0         D LCS-7545       Batch ID: 7545       Test Code:       SW8015       Units: mg/Kg         Range Organics (GRO)       24.13       5       25       0         D LCSD-7545       Batch ID: 7545       Test Code:       SW8015       Units: mg/Kg         Range Organics (GRO)       24.13       Fost Code:       SPK value       SPK Ref Val         Range Organics (GRO)       24.31       Fost Code:       SPK value       SPK Ref Val         Range Organics (GRO)       24.31       Fost Code:       SPK value       SPK Ref Val	Arralysis Date 3/15/2005 1:05:20 PM	Prep Date 3/10/2005
Inge Organics (DRO)         57.01         10         50         0           0         LCS-7545         Batch ID: 7545         Test Code: SWB015         Units: mg/Kg           7         Run ID:         PDF ID_050310A         Nits: mg/Kg           Range Organics (GRO)         24.13         5         25         0           0         LCSD-7545         Batch ID: 7545         Test Code: SWB015         Units: mg/Kg           Range Organics (GRO)         24.13         5         25         0           0         LCSD-7545         Batch ID: 7545         Test Code: SWB015         Units: mg/Kg           1         CSD-7545         Batch ID: 7545         Test Code: SWB015         Units: mg/Kg           1         Range Organics (GRO)         24.37         7         25         0           1         Range Organics (GRO)         24.37         5         25         0	SeqNo: 344580 %REC LowLimit HighLimit RPD Ref Val %RPD	n RPDLimit Qual
D         LCS-7545         Batch ID: 7545         Test Code: SWB015         Units: mg/Kg           Run ID:         PIDFID_050310A         Run ID:         PIDFID_050310A           Range Organics (GRO)         24.13         5         25         0           D <lcsd-7545< td="">         Batch ID: 7545         Test Code: SWB015         Units: mg/Kg           Range Organics (GRO)         24.13         5         25         0           D<lcsd-7545< td="">         Batch ID: 7545         Test Code: SWB015         Units: mg/Kg           Range Organics (GRO)         24.37         7         5         25         0           Range Organics (GRO)         24.37         5         25         0         0</lcsd-7545<></lcsd-7545<>	114 67.4 117 51.43 10.3	17.4
Result     PCL     SPK value     SPK Ref Val       e Range Organics (GRO)     24.13     5     25     0       ID     LCSD-7545     Batch ID: 7545     Tesl Code:     SW8015     Unlis: mg/Kg       D:     LCSD-7545     Batch ID: 7545     Tesl Code:     SW8015     Unlis: mg/Kg       D:     LCSD-7545     Batch ID: 7545     Tesl Code:     SW8015     Unlis: mg/Kg       D:     Run ID:     PIDFID_050310A     Run ID:     PIDFID_050310A       e Range Organics (GRO)     24.97     5     25     0	Analysis Date   3/10/2005 4:00:50 PM SeqNo:	Prep Dale 3/9/2005
24.13     5     25     0       Batch ID: 7545     Test Code: SW8015     Units: mg/Kg       Run ID:     PIDFID_050310A       Result     PQL     SPK value       24.97     5     25     0	%REC LowLimit HighLimit RPD Ref Val %RPD	RPDLimit Qual
Batch ID: 7545 Test Code: SW8015 Units: mg/Kg Run ID: PIDFID_050310A Result PQL SPK value SPK Ref Val 24.97 5 25 0	96.5 84 120 0	
Result PQL SPK value SPK Ref Val 24.97 5 25 0	Analysis Date 3/10/2005 4:31:17 PM SeqNo: 343994	Prep Date 3/9/2005
24.97 5 25 0	%REC LowLimit HighLimit RPD Ref Vai %RPD	RPDLimit Qual
	99.9 84 120 24.13 3.42	11.6
oampre iu GRU ics 2.5ug baich ID: 7545 Test Code: SW8015 Units: mg/Kg Client ID: Run ID: PIDFID_050311A	Analysis Date 3/11/2005 3:53:36 PM Prep Date SeqNo: 34199	Date
Analyte PCL SPK value SPK Ref Val %REC	%REC LowLimit HighLimit RPD Ref Val %RPD	D RPDLimit Qual
Gasoline Range Organics (GRO) 22.54 5 25 0 90.	B0.2 B4 120 0	
Qualificrs: ND - Not Detected at the Reporting Limit S - Soike Recovery outside accepted recovery limits	side accepted recovery limits B - Analyte detected in the associated Method Blank	pciated Method Blank

6/8

Sample ID LCS-7545 Batch ID: 7545 Tesi Client ID: Restrict ID: 7545 Run							Laboratory Control Spike - generic	control S	aboratory Control Spike - generic	neric
	Test Code: SW8021	N8021	Units: mg/Kg		Anaiysis	: Date 3/10/2	Analysis Date 3/10/2005 4:00:50 PM	Prep Da	Prep Date 3/9/2005	
	Run ID: PI	PIDFID_050310A	DA		SeqNo:	343962	8			
Analyte	Par	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Banzene 0.4062	0.025	0.42	0	96.7	83.4	113	0		17 111 HIVER PRIME A THE R	•
	0.025	1.8	0	110	86.3	118	0			
Ethylbenzene 0.3847 Xvlenes, Total 2.005	0.025 0.025	0.41 1.9	0 0	93.8 106	81.7 86.9	113 112	<u>a</u> a			
	Test Code: SW8021		Units: ma/Ka		Analysis	s Date 3/10/2	Analysis Date 3/10/2005 4:31:17 PM	Prep Da	Prep Date 3/9/2005	
	Run ID: P	PIDFID_050310A	0 <b>A</b>		SeqNo:	343969	6			
Analyte Result	Pol	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene 0.3958	0.025	0.42	0	94.2	83.4	113	0.4062	2.59	27	:
Toluene 2.015	0.025	1.9	0	106	86.3	118	2.083	3.35	19	
Elhylbenzene 0.384	0.025	0.41	0	93.7	81.7	113	0.3847	0.167	10	
Xylenes, Total 1.967	0.025	1,9	Ð	104	86.9	112	2.005	1.89	13	
Sample ID BTEX Ics 100ng Batch ID: 7545 Tes	Test Code: SW8021	W8021	Units: mg/Kg		Anafysli	5 Date 3/11/	Analysis Date 3/11/2005 4:23:49 PM	Prep Date	ale	
Client ID: Rur	Run (D; P	PIDFID_050311A	1A		SeqNo:	344196	9			
Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene 1.013	0.025		a	101	83.4	113	0			
Toluene 1.023	0.025	-	0	102	86.3	118	0			
Ethylbenzene 1.011	0.025	-	0	101	81.7	113	0			
Xylenes, Total 3.033	0.025	ų	a	101	86.9	112	G			

4

7/8

2

B - Analyte detected in the associated Method Blank

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

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

Qualificres

, ε

H

111

ľ

	Sample Rece	ipt Cheo	cklist		
Ctlent Name SJR			Date and Time I	Received:	3/8/2005
Work Order Number 0503084	$\land$		Received by	AT	,
Checklist completed by		Dele	31810		
Matrix	Carrier name <u>Clien</u>	<u>l drop-olf</u>			
Shipping container/cooler in good condition?	Yes	V	No 🗌	Not Present	
Custody seals intact on shipping container/cooler	? Yes			Not Present	🗋 Not Shipped 🗹
Custody seals intact on sample bottles?	Yes		No 🗹	N/A	
Chain of custody present?	Yes	$\checkmark$	No 🗔		
Chain of custody signed when relinquished and r	eceived? Yes	$\checkmark$	No 🗆		
Chain of custody agrees with sample labels?	Yes	V			
Samples in proper container/bottle?	Yes				
Sample containers intact?	Yes		No 🗔		
Sufficient sample volume for indicated test?	Yes	$\checkmark$	No 🗆		
All samples received within holding time?	Yes	$\checkmark$	No 🗖		
Water - VOA vials have zero headspace?	No VOA vials submitted		Yes 🗹	No 🗋	
Water - pH acceptable upon receipt?	Yes			N/A 🗹	
Container/Temp Blank temperature?	3		" C ± 2 Acceptabl given sufficient li		
COMMENTS:					
			=====		-
Client contacted	Date contacted:		Persor	contacted	······
Contacted by:	Regarding				
Comments:					,
······································					
				<u> </u>	
			• <u> </u>		
Corrective Acilon					

;



ANALL ANALYSIS LABORATORY

#### COVER LETTER

March 24, 2005

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

RE: Stockpile

Order No.: 0503184

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 1 sample on 3/18/2005 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



4901 Hawkins NE■ Suite D■ Albuquerque, NM 87109 505.345.3975 ■ Fax 505.345.4107 www.hallenvironmental.com

CLIENT:	San Juan Refining			Client Sam	ple ID: 2100'-2	300'
Lab Order:	0503184			Collecti	on Date: 3/16/2	2005 9:00:00 AM
Project:	Stockpile					.*
Lab ID:	0503184-01				Matrix: SOIL	
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	418.1: TPH					Analyst: JT
Petroleum Hydr	rocarbons, TR	ND	20	mg/Kg	1	3/21/2005
EPA METHOD	8021B: VOLATILES					Analyst: NSE
Methyl tert-buty	l elher (MTBE)	ND	0.10	mg/Kg	1	3/23/2005 8:13:18 PM
Benzene		ND	0.025	mg/Kg	1	3/23/2005 8:13:18 PM
Toluene	r	ND	0.025	mg/Kg	1	3/23/2005 8:13:18 PM
Elhylbenzene		ND	0.025	mg/Kg	1	3/23/2005 8:13:18 PM
Xylenes, Total		ND	0.025	mg/Kg	1	3/23/2005 8:13:18 PM
Surr: 4-Brom	ofluorobenzene	110	87.4-116	%REC	1	3/23/2005 8:13:18 PM

Date: 24-Mar-05

Qualifiers: ND - Not I

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 1/4

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Page 1 of 1



CLUENT:	San Iuan Refining	Refinino										ļ
Work Order:		9							QC SUMIMAKY KEPUKT Method Blank		Y KEPOKI Method Blank	) K Man
Project:	Stockpile											
Sample ID ME	MB-7613	Batch (D: 7613	Test Code: E418.1	E418.1	Units: mg/Kg		Anaiysis	Analysis Date 3/21/2005	2005	Prep Da	Prep Date 3/21/2005	5
Client ID:			Run 1D:	BUCK IR_050321A	0321 <b>A</b>		SeqNo:	346101	н			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
Pelroleum Hydrocarbons, TR	rocarbons, TR	QN	20							and a second second second second second second second second second second second second second second second		:
Sample ID MB-7609	3-7609	Batch ID: 7609	Test Code: SW8021	SW8021	Units: .mg/Kg		Analysis	Date 3/23/:	Analysis Date 3/23/2005 10:42:54 AM	Prep Da	Prep Date 3/21/2005	50
Cllent ID:			Run ID:	PIDFID_050323A	123A		SeqNo:	346735	35			
Analyte		Result	POL	SPK value	SPK Ref Val	%REC	LowLimit		HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-buty Benzene	Methyl tert-butyl ether (MTBE) Benzene	N N	0.1 0.025								:	•
Ethylbenzene			0.025 0.025									
Xylenes, Total		QN	0.025							•		
Surr. 4-Bron	Surr: 4-Bromoîluorabenzene	1.03	o	-	0	103	87.4	116	O			
						•						
										÷	•	
Qualifiers:	ND - Not De	ND - Not Detected at the Reporting Limit		is - s	S - Spike Recovery outside accepted recovery limits	: accepted rec	avery limits		B - Analyte detected in the associated Method Blank	n the associ	ated Method	Blan
	h andana - I	1 Amelia detect to the second to the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second se										

١

ļ

ļ

Hall Environmental Analysis Laboratory	Analysis Laborat	tory			•				Date: 24-Mar-05	far-05	
CLJENT: San Juan Work Order: 0503184 Project: Stockpile	San Juan Refining 0503184 Stockpile							QC SUMMARY REPORT Laboratory Control Spike - generic	MARY ontrol Sp	REPO ike - ger	<b>RT</b> neric
Sample ID L.CS-7613 Client ID: Analvte	Batch ID: 7613 Result	Test Code: E418.1 Run ID: BUCK POI SPK	E418.1 Uni BUCK IR_050321A SPK value SPK	Units: mg/Kg 1321A SPK Ref Val	KEC	Analysis SeqNo: LowLimit		Date 3/21/2005 346102 HichLmit RPD Ref Vai	Prep Date %RPD R	Prep Date 3/21/2005 6RPD RPDLimit	Oual
Petroleum Hydrocarbons, TR	10000L	3 2	100		82.0	83	114	0			
Sample ID LCSD-7613 Citent ID:	Batch ID: 7613	Test Code: E418.1 Run ID: BUCK	E418.1 Unit BUCK IR_050321A	Units: mg/Kg 3321A		Analysis SeqNo:	Analysis Date 3/21/2005 SeqNo: 346105	2005 )5	Prep Date	Prep Date 3/21/2005	
Analyte Petroleum Hvdrocarhons TR	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit 114	LowLimit HighLimit RPD Ref Val R2 114 92	%RPD R	RPDLimit	Qual
Sample ID LCS-7609 Client ID:	Batch ID: 7609	Test Cade: SW8021 Run ID: PIDFID	SW8021 U	Units: mg/Kg 23A		Analysis SeqNo:	s Date 3/23/20 346735	Analysis Date   3/23/2005 11:12:58 AM SeqNo:	Prep Date	Prep Date 3/21/2005	
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit		HighLimit RPD Ref Val	%RPD F	RPDLimit	Qual
Benzene Toluene Ethylbenzene Xylenes, Tolal	0.4093 2.071 0.4053 1.998	0.025 0.025 0.025	0.42 1.9 1.9 1.9	0000	97.5 109 98.9 105	83.4 86.3 86.9 86.9	113 113 112	0000		· ·	:
Qualifiers: ND - Not D J - Analyte	ND - Not Detected at the Reporting Limit J - Analyte detected below quantitation limits	l mits	S - SF R - R	<ul> <li>S - Spike Recovery outside accepted recovery limits</li> <li>R - RPD outside accepted recovery limits</li> </ul>	accepted rec ecovery limi	overy limits ts		B - Analyte detected in the associated Method Blank I	in the associat	ed Method B	Jank 1

3/4

۲,

	Sample	Rece	eipt Ch	ecklist				
Client Name SJR			·	Date and Time	Received:		3/	18/2005
Work Order Number 0503184				Received by	AT			
Checklist completed by	Alter		Dale	3(18	105			
Matrix	Carrier name	UPS						
Shipping container/cooler in good condition?		Yes			Not Present			
Custody seals intact on shipping container/cool	er?	Yes		No 🗹	Not Present		Not Shipped	
Custody seals intact on sample bottles?		Yes			N/A			
Chain of custody present?		Yes	V					
Chain of custody signed when relinquished and	received?	Yes	V	No 🗖				
Chain of custody agrees with sample labels?		Yes						
Samples in proper container/bottle?		Yes	V					
Sample containers intact?		Yes		No 🗖				
Sufficient sample volume for indicated test?		Yes		No 🗔				
All samples received within holding time?		Yes	$\checkmark$					
Water - VOA vials have zero headspace?	No VOA vials subr	nitted		Yes 🗌				
Water - pH acceptable upon receipt?		Yes		No 🗔	N/A 🗹			
Container/Temp Blank temperature?			1°	4° C ± 2 Acceptal If given sufficient				
COMMENTS:								
Client contacted	Date contacted:			Perso	n contacted			
Contacted by:	Regarding					<u></u>		
Comments:								
Corrective Action								
							·	
			_					

4/4

J İ

įį,

1 . 1

2 1		· ·
	Air Bubbles or Headspace (Y or W)	
2		╺╋╍╌┼╍╌┼╍┼╍┼╶┼╶┼╶┼
<b>MMENTAL</b> <b>SCRATORY</b> Jite D Exico 87109 Fax 505.345,4107 al.com		
HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D Albuquerque, New Mexico 87109 Tel. 505.345.3975 Fax 505.345.4 www.hallenvironmental.com		
<b>AEN</b> B B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C S C B C C S C B C C S C B C C S C S C S C S C S C S C S C S	(ADV-im92) 0758	
<b>VIRONME s LABOR.</b> s NE, Suite D New Mexico E B975 Fax 5 anmental.con <b>H</b> 2011 551	(AOV) 80858	
HALL ENVIRONMENTA ANALYSIS LABORATOI 4901 Hawkins NE, Suite D Albuquerque, New Mexico B7109 Tel. 505.345.3975 Fax 505.34 www.hallenvironmental.com	8081 Pesticides / PCB's (8082)	
ENV VSI: VSI: VSI: VSI: VSI: VSI: VSI: VSI	RCRA 8 Matals Anions (F, Cl, NO <sub>3</sub> , NO <sub>2</sub> , PO <sub>4</sub> , SO <sub>4</sub> )	
ALL J1 HE 505. w.hall	(HA9 no AV9) 01/28	
HALL EN ANALYSI 4901 Hawkir 4901 Hawkir 281. 505.345 Tel. 505.345 Www.hallenvi	EDC (Mechod 8021)	<u>∽<u></u>{}{·······}{······}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{·····}{······</u>
	(1.402 botheM) 803	
	(г.8гь болам) нят	
	TPH Method 80158 (Gas/Diesel)	
	BTEX + MTBE + T <del>MB's (G</del> asoline Only) BTEX + MTBE + T <del>MB's (G</del> asoline Only)	
9A/9C Package: Std D Level 4 D Other: Project Name: <i>Stock P, K</i>	Project. Manager: Sampler: Conclust Alur Taclo Sample Temperature: Preservative Number/Volume Preservative HEAL No.	1-4007 1-4007 Received By: (Signeture) Received By: (Signeture)
CHAIN-OF-CUSTODY RECORD Client: SAN Juan Rehining Address: # 50 Rd (1991)	Bloomfuld, NW BP413 505-632-4161 505-632-3911 Time Metrix Sample1.D. No.	Seil 2 (00-2300) Refractioned By: (Signature) in Maturel Refinquished By: (Signature) Refinquished By: (Signature)
HAIN-OF	Bibmyfield, NW BP413 Phone #505- 632-416 Fax #: 505-632-391 Data Time Matrix	3/16/05 9AM Date: Tinge: Date: Time:

Į

i I

## **APPENDIX G**

## North Boundary Barrier Collection System Design and Monitoring Plan and Agency Correspondence

5127-002 Giant Refining Company



March 7, 2005

Mr. Wayne Price New Mexico Oil Conservation Division 1220 S. Saint Francis Drive Santa Fe, New Mexico 87505

Re: Giant Bloomfield Refinery North Boundary Barrier Collection System Design and Monitoring Plan

Dear Mr. Price:

Giant Refining Company Bloomfield (GRCB) is submitting for your review and approval the design of a collection and monitoring system to be installed along the north boundary barrier at the Giant Refinery in Bloomfield, New Mexico. GRCB received OCD's conditional approval (dated December 17, 2004) of the November 17, 2004 *Corrective Action Plan* (CAP) submitted by GRCB. The CAP describes the voluntary corrective measures to be implemented by GRCB at the Bloomfield refinery. Included in the CAP are a layout of the barrier wall and a conceptual description of a fluid collection system. The purpose of this letter is to submit the design of a collection and monitoring system and an estimated schedule for installation of the selected system.

Giant entered into a contract with Remedial Construction Services, L.P. (RECON) to construct the north boundary barrier. RECON mobilized to the Bloomfield refinery the week of January 17, 2005. The barrier construction began January 31, 2005 at the west end of the alignment and is proceeding easterly. As of February 25, 2005, approximately 1,100 feet of the barrier had been constructed. Construction is anticipated to be completed in early April 2005.

Based on the hydraulic properties and limited saturation of the shallow soils (i.e., Jackson

#### Design Concept for Collection and Monitoring System

Lake Terrace (JLT) deposits), the amount of fluids accumulation behind the barrier wall (along its total length) is estimated to be below 10 gallons per minute, or less than 14,000 gallons per day. In the perched-water flow regime that exists on the top of the Nacimiento

PHONE 505-632-8013 FAX 505-632-3911 SO ROAD 4990 P.O. BOX 159 BLOOMFIELD NEW MEXICO 87413

Mr. Wayne Price March 7, 2005

Formation, the fluids will tend to accumulate in the depressions or troughs of the Nacimiento Formation, resulting in groundwater movement from the higher elevations of the formation to the lower depressions. As such, fluids collection points will be located in the significant formation depressions (as logged in the field during barrier construction). Fluids accumulation along portions of the barrier between those depressions is expected to be limited. However, observation wells will be installed at appropriate intervals between collection points to assess fluids behavior along the barrier.

Two types of systems were considered to collect and remove fluids that accumulate behind the barrier: 1) collection trenches, and 2) conventional vertical wells.

Collection trenches are typically used in soil conditions where an area of increased permeability is required to allow fluids to accumulate for subsequent removal. Since the JLT deposit (which overlies the Nacimiento Formation) has a high permeability, an engineered collection trench would not offer a benefit over the natural granular soil adjacent to the barrier. Further, there is limited construction space available between the barrier wall and the Hammond Ditch concrete liner (i.e., only 5 to 6 feet). Therefore, GRBC proposes to install vertical collection wells to collect and remove fluids. Initially, wells will be located at significant troughs (as identified in the field during barrier construction) in the Nacimiento Formation. Additional collection wells may be added along the barrier (if necessary) as operational experience is gained.

Each collection well will have a corresponding observation well located on the river side of the barrier. The observation wells will be monitored periodically to assess that the barrier is preventing fluids from migrating toward the river bluff. Additional pairs of observation wells will be installed along the barrier (i.e., between collection points) as necessary to limit the maximum spacing of observation locations to approximately 300 feet.

The installation of the collection and observation wells will be completed in two phases:

- Phase I will involve the installation of collection wells along the western half of the barrier (i.e., the portion constructed to date) and at the pipeline ROW crossing. A total of 11 collection wells will be installed during Phase I. GRBC plans to initiate Phase I during the week of March 28, 2005.
- Phase II will be implemented within 30 days after the barrier wall construction is completed. This will include installing collection wells along the remainder of the barrier wall alignment. The location of these collection wells will be determined based on logging of the top of the Nacimiento Formation during the remainder of the barrier construction. Phase II will also include the installation of the observation wells on the river side of the barrier and any additional observation well pairs in between collection points.

#### **Collection System Design**

#### 1. Collection Well Design

The collection wells will be installed using the hollow stem auger drilling method. The wells will consist of a six-inch diameter PVC well casing and machine-slotted screen. The diameter of the borehole will be approximately 13-inches. Based on review of sieve analyses performed on the JLT deposits, the well screen slot size will be 0.040 inch. The depth of each well will be dependent on the depth to the top of the Nacimiento Formation at each location. The bottom of each well will extend approximately one to two-feet into the Nacimiento Formation. The screened interval will extend from the Nacimiento Formation at the bottom, up to the top of the barrier wall, or to a maximum 10-foot screen length, which ever is less.

A permeable filter pack will be placed around the well screen. Based on sieve analyses as described above, the filter pack material will consist of Colorado # 10 X 20 silica sand. The filter pack size was selected to minimize the movement of formational fine-grained soils through the screen openings, but to also provide a moderate permeability for fluid movement into the well.

The well surface completion will include a flush-mounted, traffic-rated box. A generalized well construction diagram is shown on Figure 1.

#### 2. Collection Well Spacing

Based on the hydraulic properties of the JLT deposits, which includes an estimated hydraulic conductivity of 100 to150 ft/day, it is estimated that a maximum effective well spacing is approximately 300 feet. Each six-inch well could potentially produce 20 to 50 gallons per minute, if required, although the JLT will likely produce less. The actual spacing of the wells will be governed by the locations of the troughs in the Nacimiento Formation.

#### 3. Collection Well Locations

- - -- - The proposed locations of the Phase I wells are shown on Figure 2. The locations correspond to the troughs in the Nacimiento Formation as shown on the barrier profile (Figure 3). The profile shows the elevation of the top of the Nacimiento Formation (in the western portion of the alignment), as determined during construction of the barrier wall. As shown on Figure 2, the proposed collection well locations for Phase I are located only along the western portion of the barrier alignment and at the pipeline ROW crossing. The proposed locations for Phase II collection wells will be submitted to NMED and OCD for approval at the end of barrier construction.

ŝ

Mr. Wayne Price March 7, 2005

#### 4. Fluid Removal Methods

Fluids will be removed from the collection wells using a vacuum truck when necessary based on fluid level monitoring results. Collected fluids will be delivered to the existing French Drain collection tank. If required based on operational experience, permanent collection pumps may be installed in certain collection wells at a later date.

#### **Monitoring Plan**

A monitoring plan will be implemented to monitor fluid levels on both sides of the barrier. The plan includes the installation of observation wells on the river side of the barrier, and monitoring of fluid levels in the collection and observation wells.

1. Observation Well Design:

All observation wells will be installed during Phase II. The observation wells will consist of 2-inch diameter PVC well casing and machine-slotted screen. The wells depths and screened intervals will be similar to the collection wells described above. The wells will extend slightly into the Nacimiento Formation. The screened interval will extend from the Nacimiento Formation at the bottom, up to the top of the barrier wall, or to a maximum 10-foot screen length, which ever is less. A typical observation well construction diagram is shown on Figure 4.

2. Observation Well Locations:

Observation wells will be installed on the opposite side of the barrier from each collection well. The observation wells will be located approximately 10 feet away from the barrier wall so as not to encroach on the Hammond Ditch service road. Additional pairs of observation wells will be installed along the barrier (i.e., between collection points) as necessary to limit the maximum spacing of observation locations to approximately 300 feet. A pair of observation wells will also be installed at each end of the barrier.

3. Proposed Monitoring Schedule:

, ... , .. Fluid levels in the Phase I collection wells will be monitored twice weekly for the first 30 days following their installation. The Phase II collection and observation wells will also be monitored twice weekly for the first 30 days following their installation. In each case, if field observations indicate conditions are stabilizing during the initial 30-day period, GRBC proposes to change to a weekly monitoring interval thereafter. GRBC will propose a long-term monitoring schedule to NMED and OCD 60 days after installation of the Phase II wells.

4. Reporting

Initially, a summary of the fluid level monitoring activities described in Item 3 will be submitted to NMED and OCD on a monthly basis. Any modifications to the reporting schedule will be proposed the agencies as part of the long-term monitoring plan.

We are looking forward to receiving your approval of this collection system design and monitoring plan. If you have any questions in this matter, please contact me at 505-632-4171.

Sincerely,

· ...

GIANT REFINING COMPANY

James R. Schmaltz Environmental Manager

cc: Denny Foust - OCD Aztec Office Hope Monzeglio – NMED Hazardous Waste Bureau Bob Wilkinson – EPA Ed Riege Chad King



BILL RICHARDSON GOVERNOR

## State of New Mexico ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau 2905 Rodeo Park Drive East, Building 1 Santa Fe, New Mexico 87505-6303 Telephone (505) 428-2500 Fax (505) 428-2567 www.nmenv.state.nm.us



RON CURRY SECRETARY

DERRITH WATCHMAN-MOORE DEPUTY SECRETARY

### CERTIFIED MAIL RETURN RECEIPT REQUESTED

March 25, 2005

Randy Schmaltz Environmental Supervisor Giant Refining Company P.O. Box 159 Bloomfield, New Mexico 87413 Ed Riege Environmental Superintendent Giant Refining Company Route 3, Box 7 Gallup, New Mexico 87301



### Subject: APPROVAL WITH CONDITIONS NORTH BOUNDARY BARRIER COLLECTION SYSTEM DESIGN AND MONITORING PLAN RCRA PERMIT NO. NMDD 089416416 HWB-GRCB-04-005

Dear Messrs. Schmaltz and Riege:

The New Mexico Environment Department (NMED) has completed the review of the *North Boundary Barrier Collection System Design and Monitoring Plan* (NBBCSD) dated March 7, 2005, submitted on behalf of Giant Refining Company Bloomfield Refinery (GRCB). NMED hereby approves the NBBCSD with the conditions listed below:

- 1. All collection and observation well screens must intersect the water table. Depending on the known water table fluctuation, the well screen must extend approximately two feet above the water table or more to account for any fluctuation in the water Table.
- Page 3, #2 Collection Well Spacing states "an estimated hydraulic conductivity of 100 to 150 ft/day, it is estimated that a maximum effective well spacing is approximately 300 feet." GRCB must provide justification how this spacing was estimated or determined and provide any calculations applied.





Messrs. Schmaltz and Riege Giant Refining Company Bloomfield March 25, 2005 Page 2 of 2

Should you have any questions, please contact Hope Monzeglio of my staff at 505-428-2545.

Sincerely,

James P. Bearzi Chief Hazardous Waste Bureau

JPB:hcm

cc: H. Monzeglio, NMED HWB
J. Kieling, NMED HWB
D. Cobrain, NMED HWB
W. Price, OCD
D. Foust, OCD Aztec Office
B. Wilkinson, EPA

Reading File and GRCB 2005 File



#### CERTIFIED MAIL # 7099 3220 0010 2242 4757

April 7, 2005

Mr. Wayne Price New Mexico Oil Conservation Division 1220 S. Saint Francis Drive Santa Fe, New Mexico 87505

Re: Giant Bloomfield Refinery North Boundary Barrier Collection System Design and Monitoring Plan

Dear Mr. Price:

Giant Refining Company Bloomfield (GRCB) is submitting for your review and approval the attached two exhibits (Figures 2 and 3) depicting the locations of the collection and observation wells to be installed along the north boundary barrier at the Giant Refinery in Bloomfield, New Mexico. These exhibits include the Phase II wells described in the March 7, 2004 North Boundary Collection System Design and Monitoring Plan submitted to OCD.

All wells will be installed as described in the March 7, 2005 plan, with the exception that the collection well filter pack has changed to a 8 X 12 Colorado silica sand from the 10 X 40 Colorado silica sand stated in the March 7, 2005 plan. All other aspects of the plan remain the same.

We are looking forward to receiving your approval of the Phase II collection system design. If you have any questions in this matter, please contact me at 505-632-4171.

Sincerely,

GIANT REFINING COMP Jámes R. Schmaltz Environmental Manager

cc: Denny Foust - OCD Aztec Office Hope Monzeglio – NMED Hazardous Waste Bureau Bob Wilkinson – EPA Ed Riege Chad King

PHONE 505-632-8013 FAX 505-632-3911 50 ROAD 4990 P.O. BOX 159 BLOOMFIELD NEW MEXICO 87413



REFINING COMPANY CERTIFIED MAIL # 7099 3220 0010 2242 4740

April 7, 2005

GIANT

Ms. Hope Monzeglio State of New Mexico Environmental Department Hazardous Waste Bureau 2905 Rodeo Park Drive East, Building 1 Santa Fe, New Mexico 87505-6303

Re: Giant Bloomfield Refinery – NMED Approval with Conditions North Boundary Collection System Design and Monitoring Plan RCRA Permit No. NMD 089416416 HWB-GRCB-04-005

Dear Ms. Monzeglio:

Giant Refining Company Bloomfield (GRCB) received the March 25, 2005 letter from the New Mexico Environmental Department (NMED) stating NMED's conditional approval of the North Boundary Collection System Design and Monitoring Plan. The plan was submitted by GRCB to NMED on March 7, 2005. The North Boundary Collection System Design and Monitoring Plan describes the design of the collection and monitoring well system to be implemented by GRCB at the Bloomfield refinery. The purpose of this letter is to the respond to the two conditions stated in NMED's March 25<sup>th</sup> letter regarding justification for the collection well spacing. In addition, GRCB is including the collection well system spacing for the eastern portion (i.e., Phase II Wells) of the north boundary barrier for your approval.

#### **Response to NMED Conditions of Approval**

The following responses correspond to the conditions in NMED's March 25, 2005 approval letter.

1. Condition accepted by Giant that all well screens will be screened across the water table.

2. The hydraulic conductivities of 100 to 150 ft/day estimated for the Jackson Lake terrace deposits were derived from aquifer test and slug test results that were presented in

50 ROAD 4990 P.O. BOX 159 BLOOMFIELD NEW MEXICO 87413

PHONE 505-632-8013 FAX 505-632-3911 Ms. Hope Monzeglio April 7, 2005

the Corrective Action Plan (CAP, page 11). Please refer to this report for technical details.

As described in the March 7, 2005 plan, the well screen and spacing design for the collection wells include the design of a filter pack and the screen open area to accommodate dewatering of the subsurface. The collection well filter pack material has been revised to a "8 X 12" Colorado Silica filter pack. This has changed from the March 7, 2005 plan because the larger filter pack will provide a higher hydraulic conductivity than that originally specified. To maximize the amount of groundwater extraction from the Jackson Lake Terrace Deposits. a screen slot size of 0.040-inches was selected in order to provide approximately 10 gallons per minute (gpm) flow *per foot of screen*.

The spacing of the collection wells was selected to adequately intercept and dewater the shallow perched water. Note that the estimated quantity of groundwater flow beneath the facility to the barrier (total flow across the entire length) has been estimated to be on the order of 10 gpm (see CAP), which is minor compared to the extraction design capacity of each well. Although each well has more than adequate capacity, the barrier wall is approximately 2,600 feet in length and therefore a number of collection wells will be required and must be spaced accordingly to intercept and extract the groundwater moving to and accumulating against the barrier.

An analytical model was used to evaluate dewatering rates and assess adequate spacing between wells. The Theis Well equation was used to solve for drawdown in the extraction well and to estimate drawdown in adjacent extraction wells with one well pumping. The Theis equation is as follows:

$$s = \frac{Q}{4\pi T} W(u)$$

s = drawdown, in feet Q = gpm T = transmissivity ( k x b), ft/day W(u) = well function

The following parameters were used as inputs for the model:

Hydraulic Conductivity (k) 100- 150 feet per day (ft/d) Specific yield 0.16 Aquifer Saturated Thickness (b) = 7 to 10 feet (ft) Pumping Rate 10 to 50 gallons per minute (gpm) Duration of pumping 1 to14 days

The model output provided groundwater elevation drawdown for multiple distances from the pumping well. As the distance from the pumping well increases, the relative percent drawdown away from the pumping decreases. A minimum 10% relative drawdown was targeted for the maximum distance between pumping wells. The results of the model Ms. Hope Monzeglio April 7, 2005

indicated that approximately 15% relative drawdown can be achieved 300 feet from the pumping well with only one well pumping. The results indicate that a minimum 300 foot spacing between collection system pumping wells will adequately dewater the subsurface. Note that most wells are positioned along the barrier wall at distances less than 300 feet between wells, therefore the percent drawdown will increase. The actual pumping rates from each well (<5 gpm) and the saturated thickness (less than 2 feet) are anticipated to be significantly less than modeled above.

#### Phase II Collection Wells

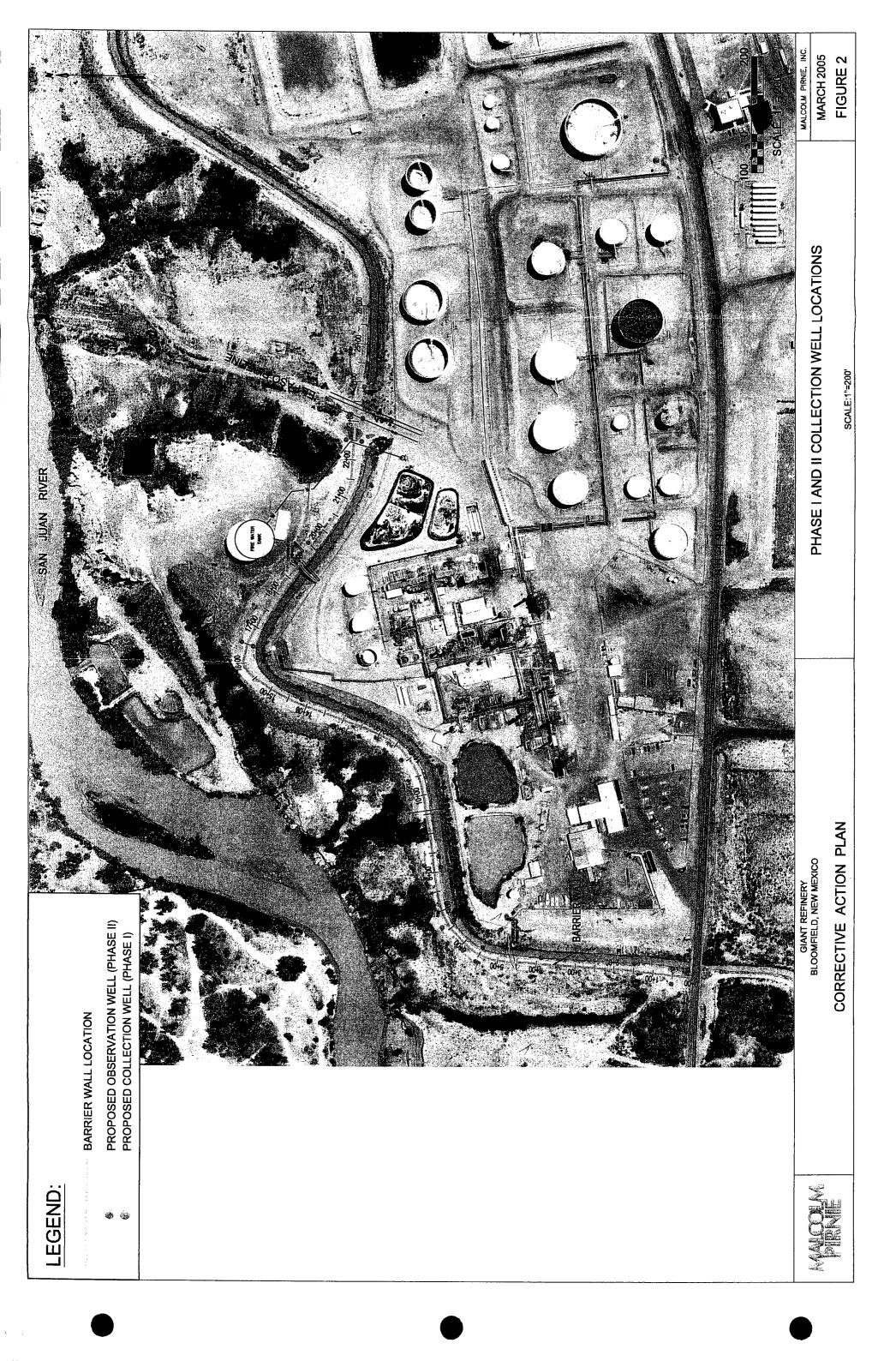
The location of all collection wells, including the proposed location of the Phase II Collection wells along the eastern portion of the barrier, are shown on Figures 2 and 3. These figures supersede those included with the March 7. 2005 plan. The wells will be installed as described in the March 7, 2005 plan, with the exception that the filter pack design has changed as described above. The wells will be drilled into the Nacimiento formation and will be screened across the water table. Each collection well will have a corresponding observation well located on the river side of the barrier. Monitoring activities will follow the schedule outlined in the March 7, 2005 letter.

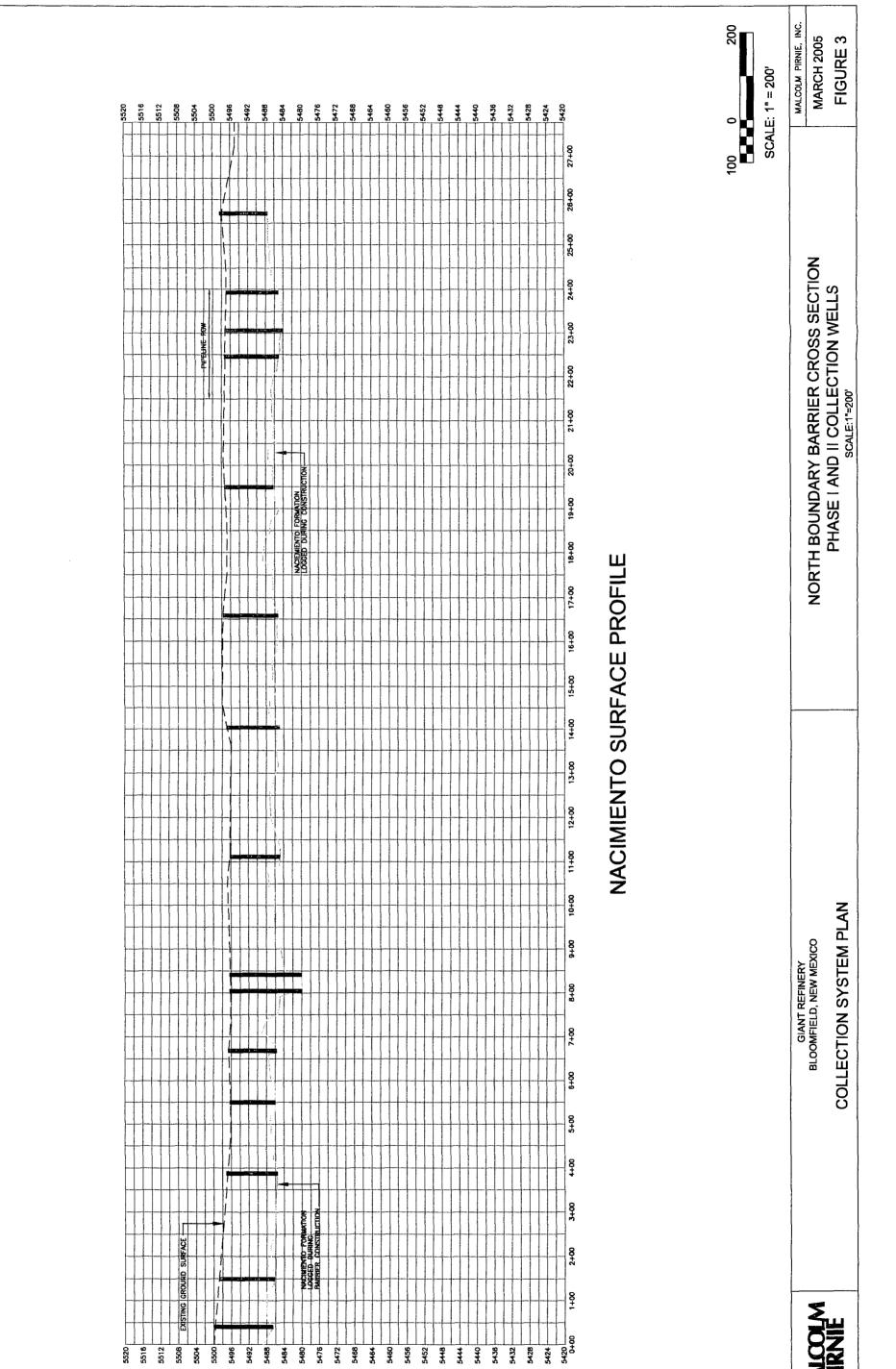
We are looking forward to receiving your approval of the Phase II collection system design and your acceptance of the well spacing rationale. If you have any questions in this matter, please contact me at 505-632-4171.

Sincerely,

GIANT REFINING COMPAN

- James R. Schmaltz Environmental Manager
- Cc: Denny Foust OCD Aztec Office Wayne Price - OCD Bob Wilkinson – EPA Ed Riege Chad King









BILL RICHARDSON GOVERNOR

## State of New Mexico ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau 2905 Rodeo Park Drive East, Building 1 Santa Fe, New Mexico 87505-6303 Telephone (505). 428-2500 Fax (505) 428-2567 www.nmenv.state.nm.us



RON CURRY SECRETARY

DERRITH WATCHMAN-MOORE DEPUTY SECRETARY

## CERTIFIED MAIL RETURN RECEIPT REQUESTED

May 9, 2005

Randy Schmaltz Environmental Supervisor Giant Refining Company P.O. Box 159 Bloomfield, New Mexico 87413 Ed Riege Environmental Superintendent Giant Refining Company Route 3, Box 7 Gallup, New Mexico 87301

## Subject: APPROVAL WITH CONDITIONS NORTH BOUNDARY BARRIER COLLECTION SYSTEM DESIGN AND MONITORING PLAN PHASE II RCRA PERMIT NO. NMDD 089416416 HWB-GRCB-04-005

Dear Messrs. Schmaltz and Riege:

The New Mexico Environment Department (NMED) has completed the review of the *North Boundary Barrier Collection System Design and Monitoring Plan Phase II* (NBBCSD) dated April 7, 2005, submitted on behalf of Giant Refining Company, Bloomfield Refinery (GRCB). NMED hereby approves the NBBCSD with the conditions listed below:

- 1. Upon completion of observation and collection well installations, GRCB must collect depth to water (DTW) and depth to product (DTP) measurements from all observation and collection wells in accordance with the following schedule:
  - Month one DTW and DTP measurements shall be collected two times a week.
  - Month two DTW and DTP measurements shall be collected once a week.

Messrs. Schmaltz and Riege Giant Refining Company Bloomfield May 9, 2005 Page 2

- Month three –DTW and DTP measurements shall be collected every other week (biweekly).
- Month four and there after DTW and DTP measurements shall be collected once a month unless otherwise specified by NMED.
- 2. GRCB must collect initial groundwater samples from all observation and collection wells that do not contain separate phase hydrocarbons (SPH) within 30 days, but no later than July 1, 2005, after the wells have been installed and developed. The samples must be analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA Method 8021B, RCRA metals, total dissolved solids (TDS), and general chemistry parameters using EPA Method 300. During sampling, GRCB must collect the following field measurements: conductivity, temperature, dissolved oxygen, and pH. If pH and TDS are collected using field equipment, they do not need to be analyzed at the laboratory. The collected data will establish a baseline identifying what contaminant concentrations are present and help determine the effectiveness of the slurry wall.

GRCB must complete a second round of sampling following the same conditions as stated above in conjunction with the next groundwater monitoring event.

- 3. In accordance with the schedule stated in comment one, GRCB must also collect DTW and DTP measurements from the following monitoring and recovery wells: MW-11, MW-12, MW-20, MW-21, MW-24, MW-39 MW-45, MW-46, MW-47, RW-1, RW-9, RW-22, RW-23, and RW-28. Measurements shall only be collected from inactive recovery wells.
- 4. GRCB must submit draft results of all collected data to NMED within 30 days of acquisition. The results of baseline groundwater monitoring and sampling must be included in Giant's subsequent groundwater monitoring report.

Messrs. Schmaltz and Riege Giant Refining Company Bloomfield May 9, 2005 Page 3

Should you have any questions regarding this letter, please call me at 505-428-2545.

Sincerely,

Hope Marzey lio

Hope Monzeglio Project Leader Hazardous Waste Bureau

HM:hcm

cc: J. Bearzi, NMED HWB J. Kieling, NMED HWB D. Cobrain, NMED HWB W. Price, OCD D. Foust, OCD Aztec Office B. Wilkinson, EPA

Reading File and GRCB 2005 File



Hope Monzeglio New Mexico Environmental Department Hazardous Waste Bureau 2905 Rodeo Park Drive East Bldg 1 Santa Fe, NM 87505

Certified Mail: 7001 1140 0000 4022 0835

June 17, 2005

#### RE: Giant Refining Company, Bloomfield Refinery EPA ID# NMD089416416

Dear Ms. Monzeglio,

Please find attached draft results of all analytical and collected data requested by NMED as a condition of approval for the North Boundary Barrier Collection System Design and Monitoring Plan Phase II.

Please note that RW #1, RW #9, RW #22, RW #23, and RW #28 are active recovery wells and were not measured. MW #24 was designed for air sparging activities and does not accommodate monitoring.

ORIGINAL DOCUMENT LOCATED IN BARRIER WAR COLLECTION SYSTEM FILE

If you need additional information, please contact me at (505) 632-4161.

Sincerely. indy Hurtado

Cindy Hurtado Environmental Coordinator Giant Refining – Bloomfield

Cc: Ed Riege – Environmental Superintendent – Giant Refining Randy Schmaltz – Environmental Manager – Giant Refining

50 ROAD 4990 P.O. BOX 159 BLOOMFIELD NEW MEXICO

PHONE 505-632-8013 FAX

### Robinson, Kelly

From: Cindy Hurtado [churtado@giant.com]

Sent: Monday, June 26, 2006 8:22 AM To: Robinson, Kelly

To:Robinson, KellySubject:RE: Letter to NMED

Attachments: SKMBT 60006062708110.pdf

Kelly,

This is the letter that I sent out. It had the well data, etc. added to it. You will notice that Randy indicated on the bottom of the letter that the original is in another file. I don't believe we can find the original at this point in time. I know that Hope did not like my submittal and I had to resubmit data (I think) by September 2005. She didn't like the way the tables were set up – you know there were zeroes in there!! Cindy

From: Robinson, Kelly [mailto:KRobinson@PIRNIE.COM] Sent: Sunday, June 25, 2006 4:01 PM To: Cindy Hurtado Subject: Letter to NMED

Cindy,

Do you have a letter that was sent to NMED dated June 17, 2005? This letter would have included well data, general chemistry parameters, and analytical results for the collection system.

If you have a signed version of that letter, could you either fax a copy or send it to me electronically?

Thanks!

Kelly Robinson Engineer

Malcolm Pirnie, Inc. 4646 E. Van Buren, Suite 400 Phoenix, AZ 85008

Fax: 602-231-0131 Direct: 602-797-4628 E-Mail: <u>krobinson@pirnie.com</u>



BILL RICHARDSON GOVERNOR State of New Mexico ENVIRONMENT DEPARTMENT Hazardous Waste Bureau 2905 Rodeo Park Drive East, Building 1 Santa Fe, New Mexico 87505-6303 Telephone (505) 428-2500 Fax (505) 428-2567

www.umenv.state.nm.us

### CERTIFIED MAIL RETURN RECEIPT REQUESTED



RON CURRY SECRETARY

DERRITH WATCHMAN-MOORE DEPUTY SECRETARY

GILANT W/ Respond

July 26, 2005

Randy Schmaltz Environmental Supervisor Giant Refining Company P.O. Box 159 Bloomfield, New Mexico 87413 Ed Riege Environmental Superintendent Giant Refining Company Route 3, Box 7 Gallup, New Mexico 87301

Subject: REQUEST FOR ADDITIONAL INFORMATION AND CHANGES TO THE NORTH BOUNDARY BARRIER COLLECTION SYSTEM DESIGN AND MONITORING PLAN PHASE II GIANT REFINING COMPANY, BLOOMFIELD REFINERY RCRA PERMIT NO. NMDD 089416416 HWB-GRCB-04-005

Dear Messrs. Schmaltz and Riege:

The New Mexico Environment Department (NMED) is in receipt of the June 17, 2005 letter submitted on behalf of Giant Refining Company, Bloomfield Refinery (GRCB) regarding well data, general chemistry parameters and analytical results. The information submitted was required as a condition for approval of the North Boundary Barrier Collection System Design and Monitoring Plan Phase II. NMED is requesting additional information:

- 1. GRCB must provide an updated map identifying the current locations and names assigned to all observation and recovery wells. GRCB must also provide the well construction diagrams for all observation and recovery wells.
- 2. GRCB must provide a copy of the analytical laboratory reports that are the source of the data provided in the summary tables included in the June 17, 2005 letter.

Messrs. Schmaltz and Riege Giant Refining Company Bloomfield July 26, 2005 Page 2

- 3. NMED questions the dissolved oxygen (DO) data presented in the tables that indicate DO levels greater than 9.8 milligrams per liter (mg/L). DO in water under saturated conditions at atmospheric pressure at sea level will not exceed a concentration of 9.8 milligrams per liter (mg/L). Therefore, the results provided in the table indicate the instrument was not properly calibrated, as the results cannot be greater than 9.8 mg/L at an elevation higher than sea level. GRCB must describe how the dissolved oxygen (DO) measurements were collected and include the type of instrument used and describe the instrument calibration procedures. GRCB must remeasure DO in the wells and submit a revised table presenting the new DO data.
- 4. NMED questions the electrical conductivity values presented in the tables because the units indicate mg/L and typically the unit of measure for electrical conductivity is either milliSiemens per centimeter (ms/cm) or microSiemens per centimeter (μS/cm). GRCB must explain this discrepancy. GRCB must revise the tables to include the correct values, if different than those submitted, and include the correct units.
- 5. GRCB must identify the instruments used to collect the field data presented in the tables included with the June 17 letter. GRCB must also describe the collection and calibration procedures and methods applied when collecting this data.

The required information must be submitted to NMED on or before September 20, 2005. Should you have any questions regarding this letter, please call me at 505-428-2545.

Sincerely,

Hope Monseptio

Hope Monzeglio Project Leader Hazardous Waste Bureau

HM:hcm

cc: D. Cobrain, NMED HWB W. Price, OCD D. Foust, OCD Aztec Office B. Wilkinson, EPA

Reading File and GRCB 2005 File



Hope Monzeglio New Mexico Environmental Department Hazardous Waste Bureau 2905 Rodeo Park Drive East Bldg 1 Santa Fe, NM 87505

### Certified Mail: 7004 2510 0005 1641 4552

September 19, 2005

RE: Giant Refining Company, Bloomfield Refinery Request for Additional Information and Changes to the North Boundary Barrier Collection System Design and Monitoring Plan Phase II EPA # NMD089416416

Dear Ms. Monzeglio,

Giant Refining Company Bloomfield (GRCB) received the July 26, 2005 letter from the New Mexico Environmental Department (NMED) requesting additional information regarding well data, general chemistry parameters and analytical results for the North Boundary Barrier Collection System Design and Monitoring Plan Phase II. The purpose of this letter is to provide NMED with the requested additional information.

- 1. An updated map is in Attachment A. Well construction diagrams are in Attachment B.
- 2. Analytical laboratory reports are in Attachment C.
- 3. The Hach Spectrophotometer DR/2010 is used in conjunction with the Hach High Range Dissolved Oxygen AccuVac method to determine dissolved oxygen. The High Range Dissolved Oxygen Accuvac Ampul contains reagent vacuum-sealed in a 12-mL ampul. When the Accuvac ampul is broken open in a sample containing dissolved oxygen, it forms a yellow color, which turns purple. The purple color development is

PHONE 505-632-8013 FAX 505-632-3911 50 ROAD 4990 P.O. BOX 159 BLOOMFIELD NEW MEXICO 87413 proportional to the concentration of dissolved oxygen. The Hach Spectrophotometer DR/2010 has been factory calibrated. This is a colormetric method therefore the sample is filtered and used to zero the instrument before adding the reagent.

Sample collection takes place after the well is sufficiently purged. Organic compounds or salts present in our groundwater possibly cause enough interference to skew the results. Groundwater color may also affect the results. The wells were remeasured during the Annual Sampling event with similar results as the last sampling event. These results will be included in the Annual Report.

4. The discrepancy occurred due to a typographical error. The Ultrameter 6P reads electrical conductance in micromhos per centimeter. The tables have been revised to include the correct units.

## 5. Collection Methods

At least three well volumes are purged from the well. Purge volumes are determined using the following equation:

Well Depth – Casing Height – Depth to Liquid X Conversion Factor X Three.

The conversion factor is determined by the diameter of the well casing. Casing Conversion Factor

1.50 gal/ft
1.02 gal/ft
0.74 gal/ft
0.367 gal/ft
0.163 gal/ft

Typically disposable bailers are used for purging and sampling. Each bailer holds one liter of liquid. Three well volumes can be calculated by counting the number of times a well is bailed.

#### Well Sampling and Sample Handling Procedure

Equipment and supplies needed for collecting representative groundwater samples include:

• Interface Meter

• Ultrameter 6P

Distilled Water

Disposable Latex Gloves

- Disposable Bailers
- String/Twine
- Cooler with Ice



- Bottle kits with Preservatives (provided by the contract laboratory)
- Disposable 0.45 micron Field Filters and Syringes
- Glass Jar (usually 4 oz.)
- Sharpie Permanent Marker
- Field Paperwork/Logsheet
- Two 5-gallon buckets
- Trash container (plastic garbage bag)
- Ziploc Bags
- Paper towels

The Ultrameter 6P is calibrated daily using a pH 7 standard and 3000 ppm conductivity standard. Water quality parameters, pH, electrical conductance, and temperature are monitored during purging using the Ultrameter 6P. Sampling occurs after the pH, conductivity, and temperature values do not vary more than 10% for at least three measurements, and at least three well casing volumes have been removed from the well. Samples are collected with the bailer and poured into the appropriate sample containers. Two people are usually utilized for sampling. Sampling takes place over a bucket to insure that spills are contained

For dissolved metals, sample water is poured into a jar and then extracted with a syringe. The syringe is then used to push water through a field filter into the proper sample bottle to collect the dissolved metals sample. Volatile organic analysis samples are collected as to allow no head space in the container.

Samples are labeled immediately with location, date, time, analysis, preservative, and sampler. Then they are put in a Ziploc and placed in a cooler holding sufficient ice to keep them cool. The field logsheet is reviewed to verify all entries.

#### Purge and Decontamination Water Disposal

The Ultrameter 6P and the interface probe are rinsed with distilled water after every well. The rinse procedure takes place over a bucket to insure that spills are contained.

All rinse and purge water is contained and then disposed of through the refinery wastewater system.

If you need additional information, please call me at (505) 632-4161.

Sincerely, ma

Cindy Hurtado Environmental Coordinator – Giant Refining – Bloomfield

Cc: Randy Schmaltz – Environmental Manager – Giant Refining – Bloomfield



BILL RICHARDSON GOVERNOR

## State of New Mexico ENVIRONMENT DEPARTMENT

Hazardous Waste Bureau 2905 Rodeo Park Drive East, Building 1 Santa Fe, New Mexico 87505-6303 Telephone (505) 428-2500 Fax (505) 428-2567 www.nmenv.state.nm.us



RON CURRY SECRETARY

DERRITH WATCHMAN-MOORE DEPUTY SECRETARY

### CERTIFIED MAIL RETURN RECEIPT REQUESTED

November 1, 2005

Randy Schmaltz Environmental Supervisor Giant Refining Company P.O. Box 159 Bloomfield, New Mexico 87413 Ed Riege Environmental Superintendent Giant Refining Company Route 3, Box 7 Gallup, New Mexico 87301

Subject: RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION AND CHANGES TO THE NORTH BOUNDARY BARRIER COLLECTION SYSTEM DESIGN AND MONITORING PLAN PHASE II GIANT REFINING COMPANY, BLOOMFIELD REFINERY RCRA PERMIT NO. NMDD 089416416 HWB-GRCB-04-005

Dear Messrs. Schmaltz and Riege:

The New Mexico Environment Department (NMED) is in receipt of the September 19, 2005 document submitted on behalf of Giant Refining Company, Bloomfield Refinery (GRCB) regarding the *Request for Additional Information and Changes to the North Boundary Barrier Collection System Design and Monitoring Plan Phase II*. The following comments address the additional information presented in the September 19, 2005 document. GRCB must adhere to the following requirements:

1. In reference to comment No. 3 of the 9/19/05 letter addressing dissolved oxygen (DO): based on the information provided, the Hach High Range Dissolved Oxygen Accuvac Ampul method provides high measurement readings resulting from interference. The skewed results may also be a consequence of improper method application. The method is intended for aquiculture use and not groundwater testing. NMED is requiring GRCB to find an alternate instrument that accurately measures DO in groundwater samples. Messrs. Schmaltz and Riege Giant Refining Company Bloomfield November 1, 2005 Page 2

NMED recommends utilizing a down hole instrument with an application that applies to groundwater. NMED can recommend alternate instruments upon request.

- 2. GRCB must submit a System Start-up Six-Month Report that includes all data gathered from the observation and collection wells for the first 6 months after the barrier installation (May 2005 through October 2005). The tables submitted in the June 17, 2005 and July 15, 2005 letters can be utilized but must be revised to include the following:
  - Add a "Measuring Point Elevation" column that indicates the elevation from which GRCB measures the depth to water (DTW) and depth to product (DTP) (i.e the surveyed well casing elevation),
  - Add a "Corrected Groundwater Elevation" column,
  - Footnotes providing the calculation to determine the corrected groundwater elevations if separate phase hydrocarbon (SPH) is present. The footnotes must also include any other calculations that were used in generating the data tables,
  - The tables must apply an acronym to each separate cell of a row or column for the wells not sampled due to the presence of (SPH); the well was dry, or other reason a well was not sampled (e.g. not analyzed (NA); not sampled (NS), dry, contains SPH (SPH)). The acronym must be defined at the bottom of a table in a key or as a footnote, and
  - Provide a divider that separates the data for each month. Include a section that addresses fluids recovered from the observation and collection wells and the frequency of fluids removal.
- 3. GRCB must also submit an Annual System Monitoring Report that summarizes the previous years monitoring data (May 2005 through April 2006). The Annual Report must adhere to the requirements established in comment No. 2, in addition to the following:
  - All groundwater sampling data for the observation and collection wells that has occurred to date (e.g. the initial groundwater sampling results and the results from the groundwater monitoring event as addressed in the May 9, 2005 letter, and any other sampling that occurs before April 2006). The data presented in tables must incorporate the month the sampling data was collected (e.g. June 17, 2005 letter), and
  - An appendix that includes all the analytical laboratory results. The laboratory results must be separated by month.

Messrs. Schmaltz and Riege Giant Refining Company Bloomfield November 1, 2005 Page 3

4. Tables in the June 17, 2005 letter indicate wells not sampled due to the presence of hydrocarbons. Be aware the presence of hydrocarbons is unknown until the laboratory analyzes the sample; however, a well may not be sampled due to the presence of SPH. GRCB must revise the tables titled PHASE II Monitoring – 2005 General Chemistry – Observation Wells, PHASE II Monitoring – 2005 General Chemistry – Collection Wells, PHASE II Monitoring – 2005 BTEX & Total Metals – Observation Wells, PHASE II Monitoring – 2005 BTEX & Total Metals – Observation Wells, PHASE II Monitoring – 2005 BTEX & Total Metals – Collection Wells included in the June 17, 2005 letter in accordance with applicable bullets in comments No. 2 and 3.

The System Start-up Six-Month Report must be submitted to NMED on or before December 31, 2005. The Annual System Monitoring Report must be submitted on or before June 30, 2006. Should you have any questions regarding this letter, please call me at 505-428-2545.

Sincerely,

1doper Maryolis

Hope Monzeglio Project Leader Hazardous Waste Bureau

HM

cc: \*D. Cobrain, NMED HWB W. Price, OCD D. Foust, OCD Aztec Office B. Wilkinson, EPA

> \* Denotes electronic copy Reading File and GRCB 2005 File



## **APPENDIX H**

## **Observation and Collection Well Diagrams and Observation Well Logs**

5127-002 Giant Refining Company



Monitoring Well No. <u>CW 0+60</u>

Elevation Steel Vault - Flush Mount Reference  $\Lambda \Lambda \Lambda$  $\Lambda \wedge \Lambda$ Concrete Concrete: 0.0\_\_\_\_ft. Sand Grout: 0.0 ft. Top of Bentonite 1.5 Bentonite Plug:\_\_\_\_ft. Top of Sand Pack 2.5 Top of Screen 4.0' Sand Plack: Screen: Top of Nacimiento 10.0 ft. 11.5\_\_\_ft. 12.0\_\_\_Ft. 14.0' Bottom of Screen 14.0′ Piezometer Tip 14.0' Bottom of Boring Boring Diameter:\_\_\_\_13 " Sand Type: 10-20 Silica Bollards, Type/Size: NA Screen Type/Size: 6" PVC Sch. 40, 0.40" Slotted Bentonite: 3/8" Chips Riser Type/Size: 6" PVC Sch. 40 Cement/Grout: NA Water: Potable Locking Expandable Casing Plug? Yes Site Northing: TBS Bottom Cap Used?\_\_\_Yes\_\_\_Site Easting:\_\_TBS\_\_\_ Other:\_\_\_\_\_ Project #: 05-038 Project Nome: Bloomfield Refinery Elevation: TBS



Monitoring Well No. <u>CW 1+50</u>

Elevation Reference · Steel Vault - Flush Mount Concrete Concrete: \_\_\_\_\_\_ft. Sand -Grout: \_\_\_\_\_ft. Top of Bentonite 1.0 Bentonite Plug:\_\_\_\_ft. Top of Sand Pack 2.0 Top of Screen 3.0' Screen: sand Pack: Top of Nacimiento <u>11.0</u>\_\_\_\_ft. 10.0 ft. 11.0 Ft. 13.0' Bottom of Screen 13.0' Piezometer Tip 13.0' Bottom of Boring Boring Diameter:\_\_\_\_\_ Sand Type. 10-20 Silica Bollards, Type/Size: NA Screen Type/Size: 6" PVC Sch. 40, 0.40" Slotted Bentonite: \_\_\_\_\_\_ Chips Cement/Grout: NA Riser Type/Size: 6" PVC Sch. 40 Water: Potable Locking Expandable Casing Plug? Yes Site Northing: TBS Bottom Cap Used?\_\_\_\_Yes\_\_\_\_Site Easting:\_\_\_TBS\_\_\_ Other:\_\_\_\_\_ Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS

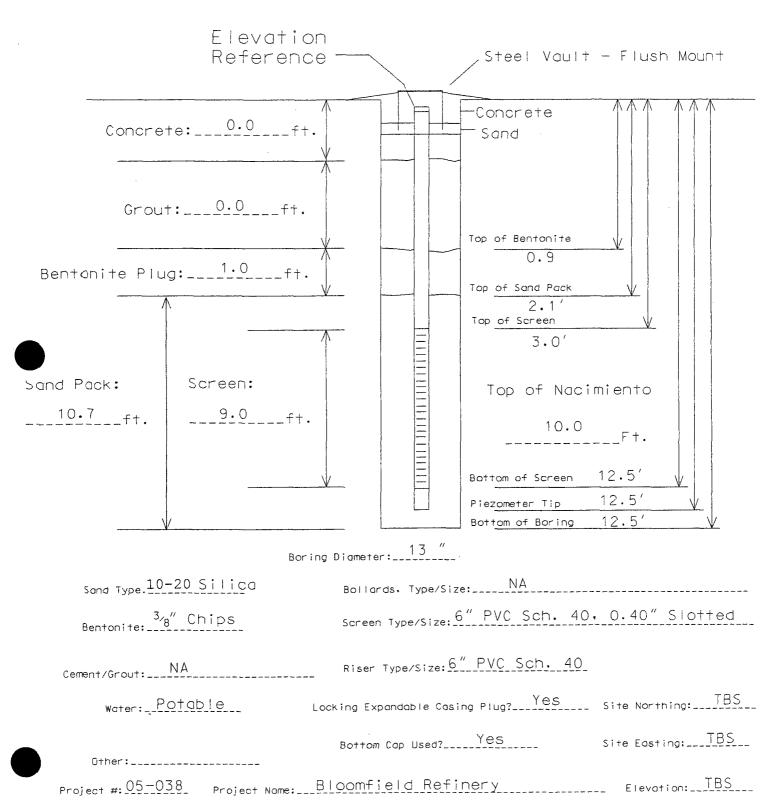


Monitoring Well No. <u>CW 3+85</u>

Elevation Reference Steel Vault - Flush Mount Concrete Concrete: \_\_\_\_\_ft. Sand -Grout:\_\_\_\_0.0\_\_\_\_ft. Top of Bentonite 0.9 Bentonite Plug:\_\_\_\_ft. Top of Sand Pack 1.9' Top of Screen 3.5' Sand Plack: Screen: Top of Nacimiento 1<u>1.6</u>\_\_\_ft. <u> 10.0</u> ft. 11.0 Ft. 13.5′ Bottom of Screen 13.5' Piezometer Tip 13.5' Bottom of Boring Boring Diameter:\_\_\_\_\_13 " Sand Type: 10-20Silica Bollards, Type/Size: NA Screen Type/Size: 6" PVC Sch. 40, 0.40" Slotted Bentonite: 3'8" Chips Cement/Grout: NA Riser Type/Size: 6" PVC Sch. 40 Water: Potable Locking Expandable Casing Plug? Yes Site Northing: TBS Bottom Cap Used? Yes Site Easting: TBS Other:\_\_\_\_\_ Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS



Monitoring Well No. <u>CW 5+50</u>





Monitoring Well No. <u>CW 6+70</u>

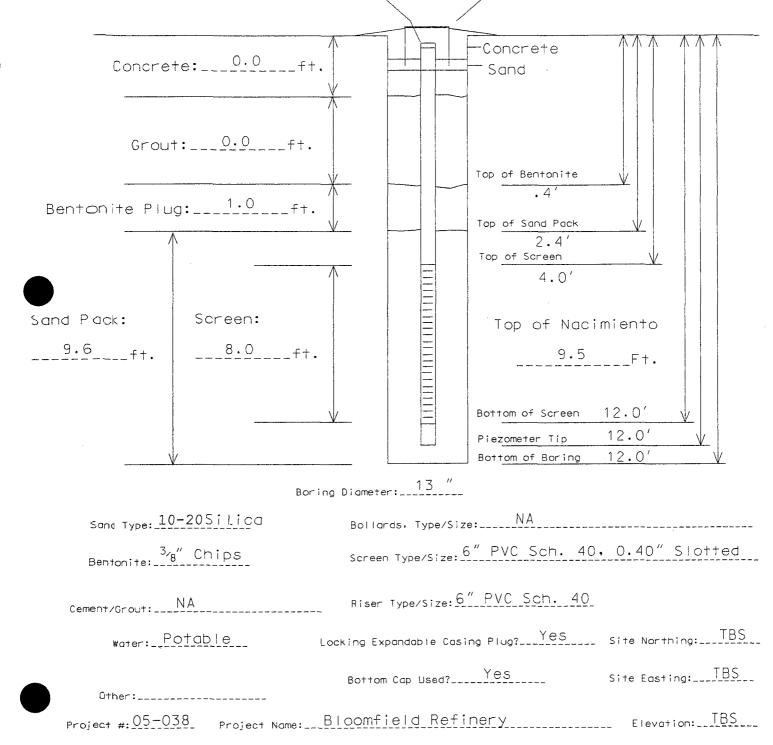
Elevation Reference Steel Vault - Flush Mount Concrete Concrete: 0.0\_\_\_\_ft. Sand Grout: \_\_\_\_\_\_\_ft. Top of Bentonite 1.5 Bentonite Plug:\_\_\_\_ft. Top of Sand Pack 2.5' Top of Screen 4.0' Screen: Sand Pack: Top of Nacimiento <u> 8.0</u> ft. 9.5\_\_\_ft. 9.0 Ft. Bottom of Screen 12.0' 12.0′ Piezometer Tip 12.0' Bottom of Boring Boring Diameter:\_\_\_\_13 " Sand Type: 10-20 Silica Bollards, Type/Size: NA Screen Type/Size: 6" PVC Sch. 40, 0.40" Slotted Bentonite: 3/8" Chips Cement/Grout: NA Riser Type/Size: 6" PVC Sch. 40 Water: Potable Locking Expandable Casing Plug? Yes Site Northing: TBS Bottom Cap Used?\_\_\_Yes \_\_\_Site Easting:\_\_TBS\_\_\_ Other:\_\_\_\_\_ Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS



Monitoring Well No. CW 8+10

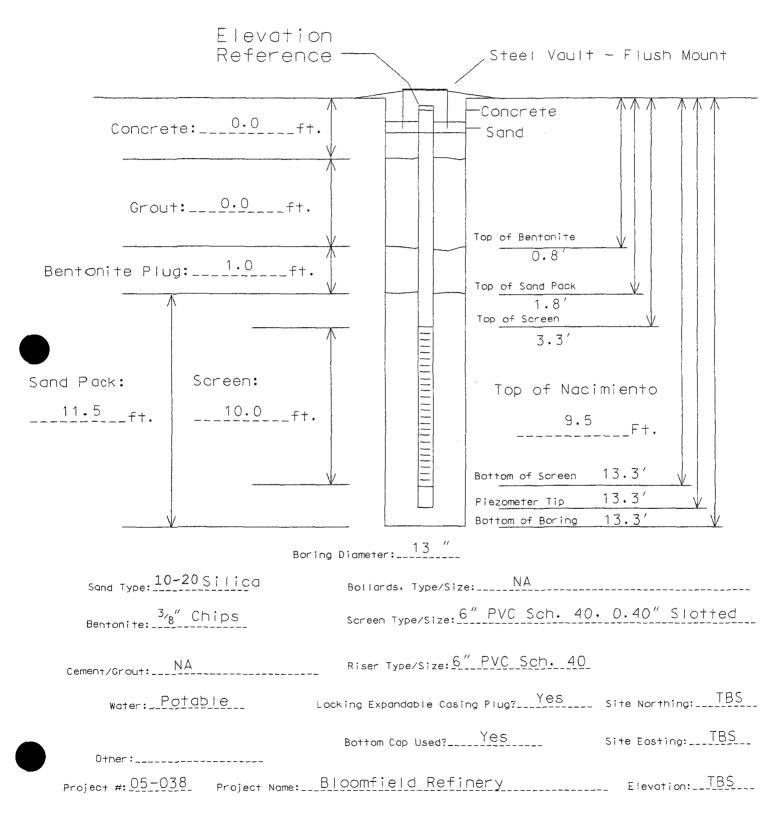
Elevation Reference

Steel Vault - Flush Mount



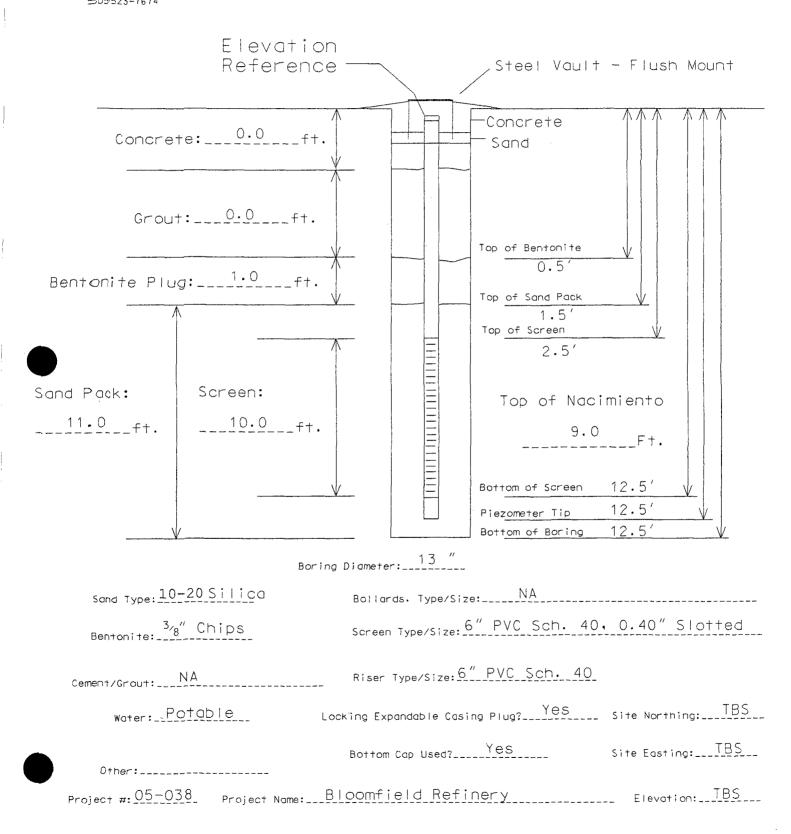


Monitoring Well No. CW 8+45





Monitoring Well No. <u>CW 11+15</u>



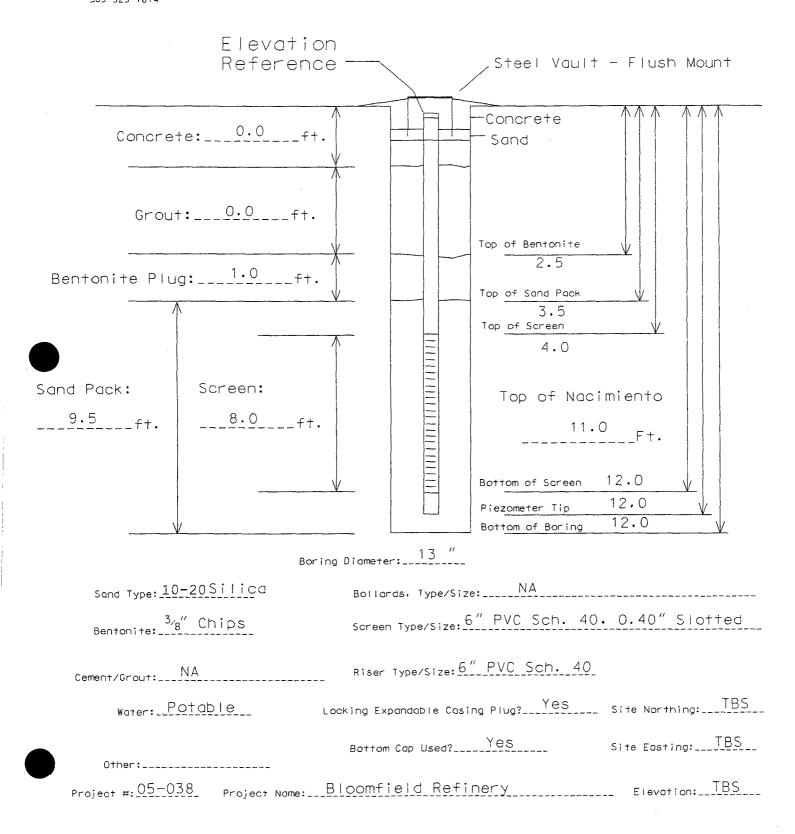


Monitoring Well No. <u>CW 14+10</u>

Elevation Reference Steel Vault - Flush Mount Concrete Concrete: 0.0\_\_\_\_ft. Sand Grout: \_\_\_\_ft. Top of Bentonite 1.0'Bentonite Plug:\_\_\_\_ft. Top of Sand Pack 2.0' Top of Screen 3.5' Screen: Sand Pack: Top of Nacimiento 11.5 ft. 10.0 ft. 9.5 \_\_\_\_Ft. 13.5' Bottom of Screen 13.5' Piezometer Tip 13.5' Bottom of Boring Boring Diameter:\_\_\_\_\_ Sand Type: 10-20 Silica Bollards. Type/Size: NA Screen Type/Size: 6" PVC Sch. 40, 0.40" Slotted Bentonite: 3/8" Chips Riser Type/Size: 6" PVC Sch. 40 Cement/Grout: NA Water: Potable Locking Expandable Casing Plug? Yes Site Northing: TBS Bottom Cop Used? Yes Site Easting: TBS Other:\_\_\_\_\_ Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS

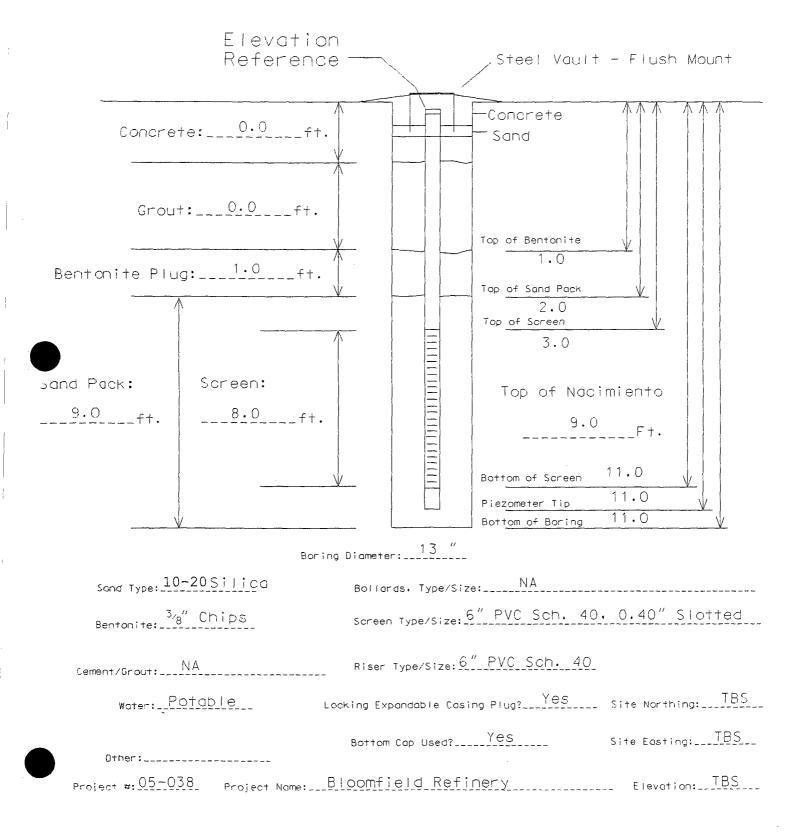


Monitoring Well No. <u>CW 23+90</u>





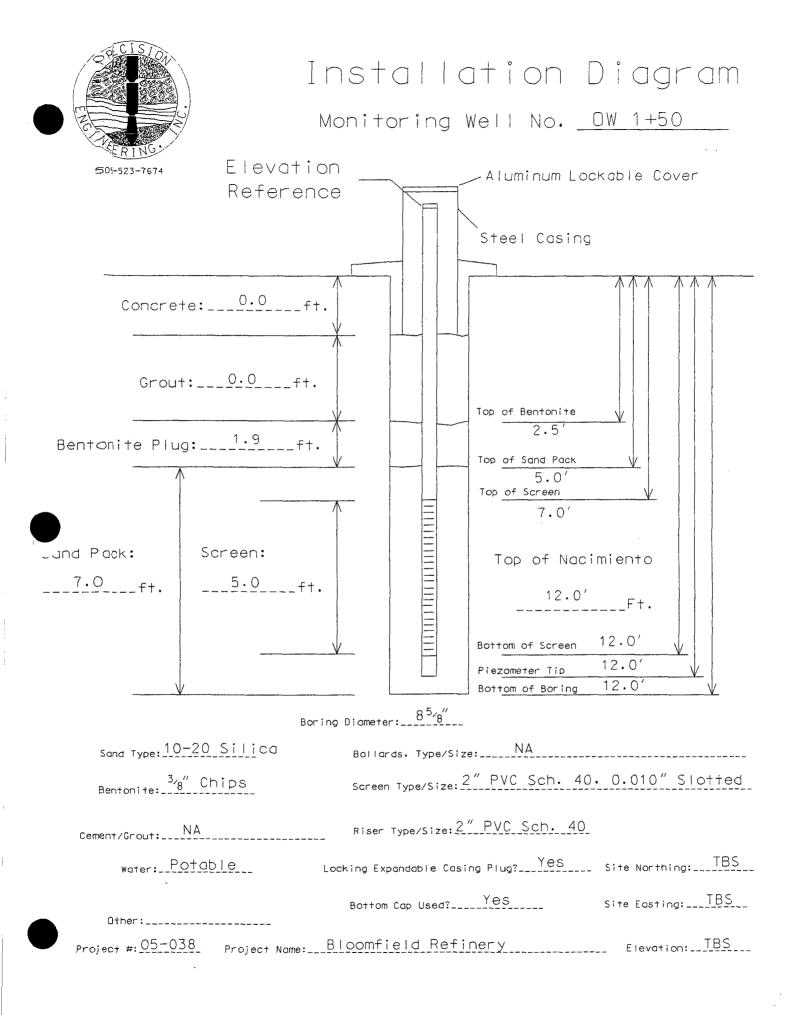
Monitoring Well No. <u>CW 25+95</u>

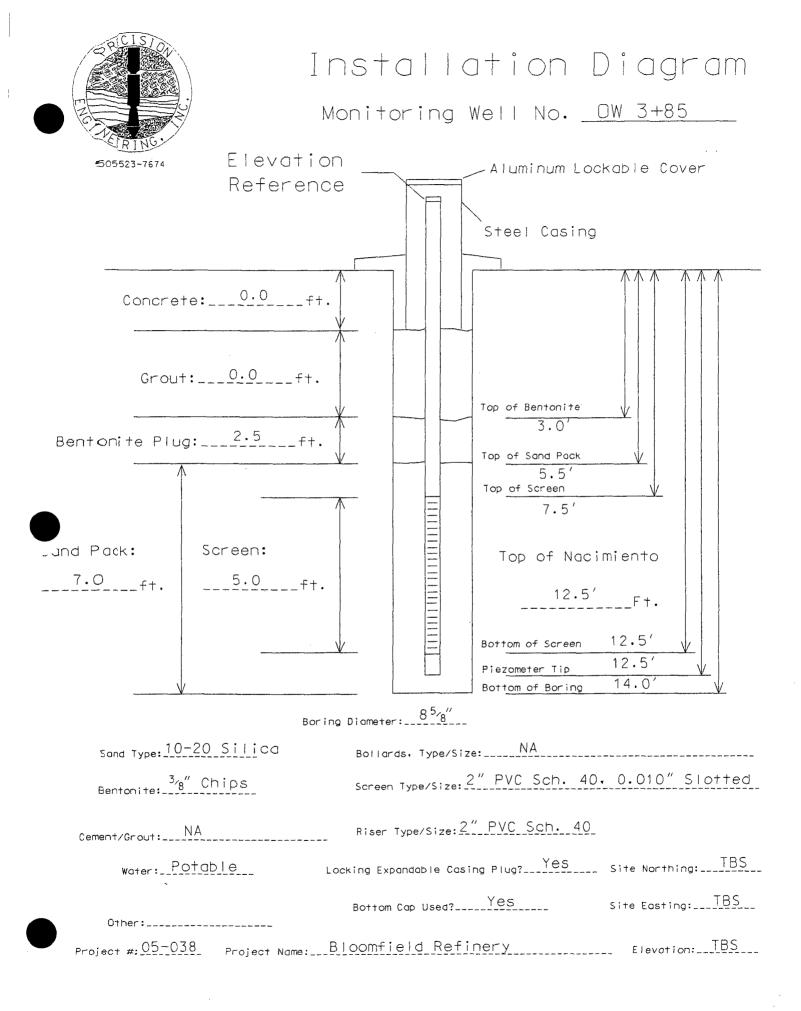


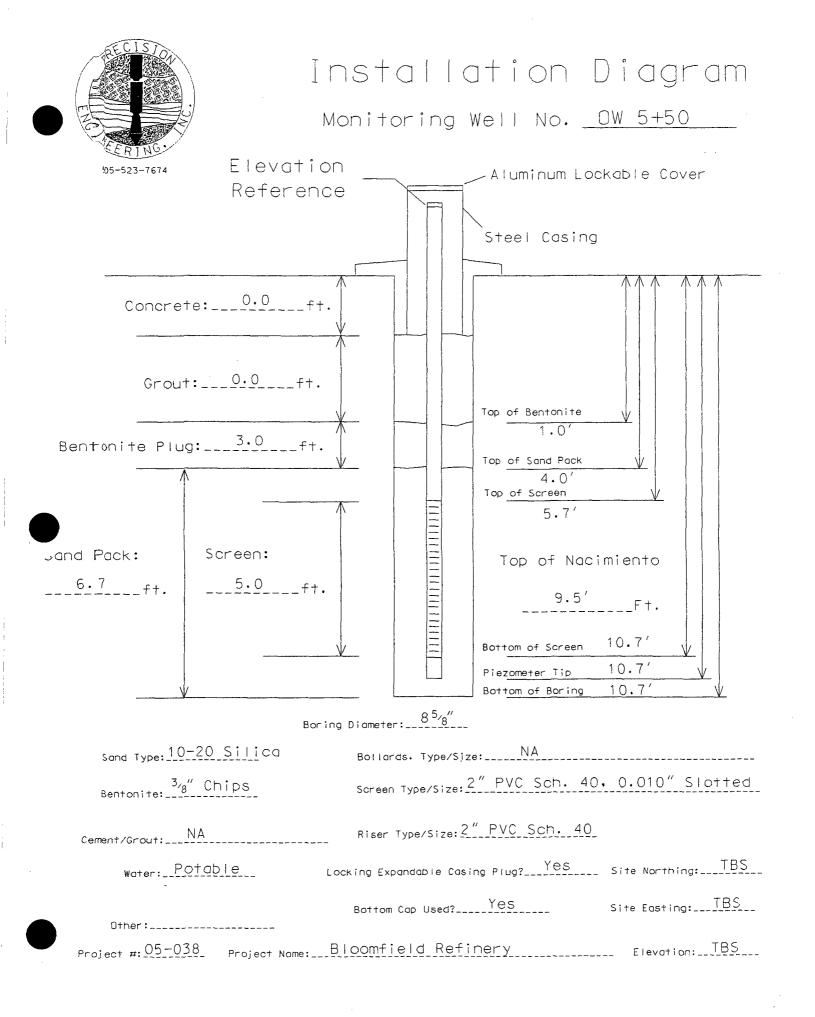


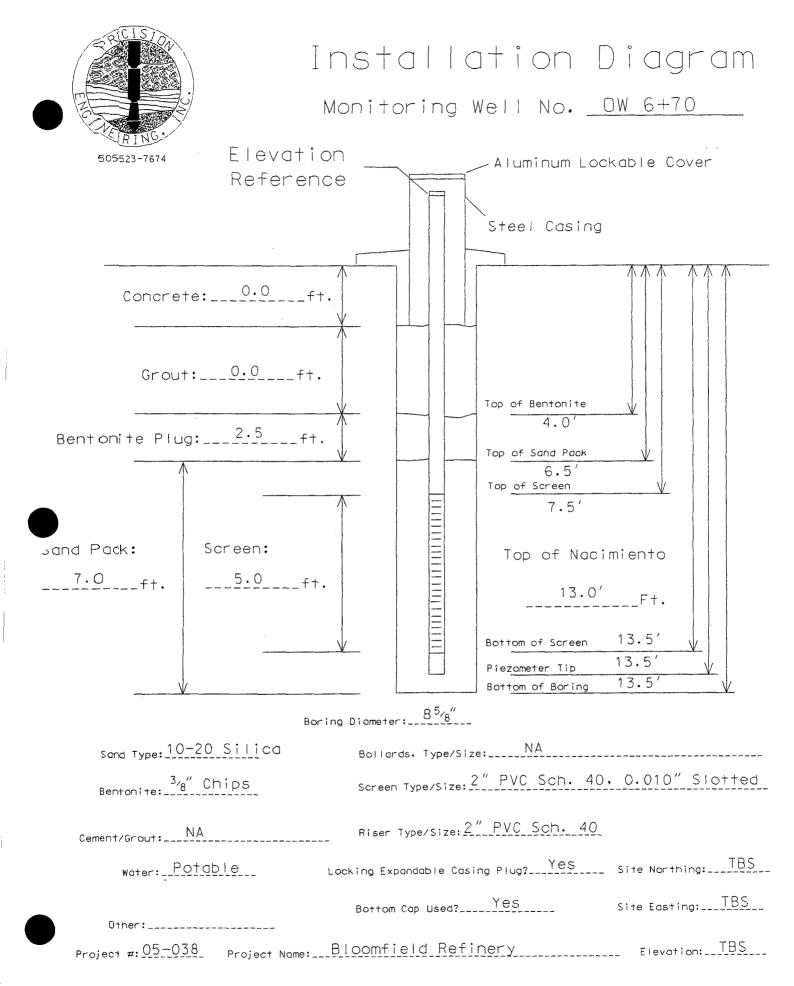
Monitoring Well No. <u>OW 0+60</u>

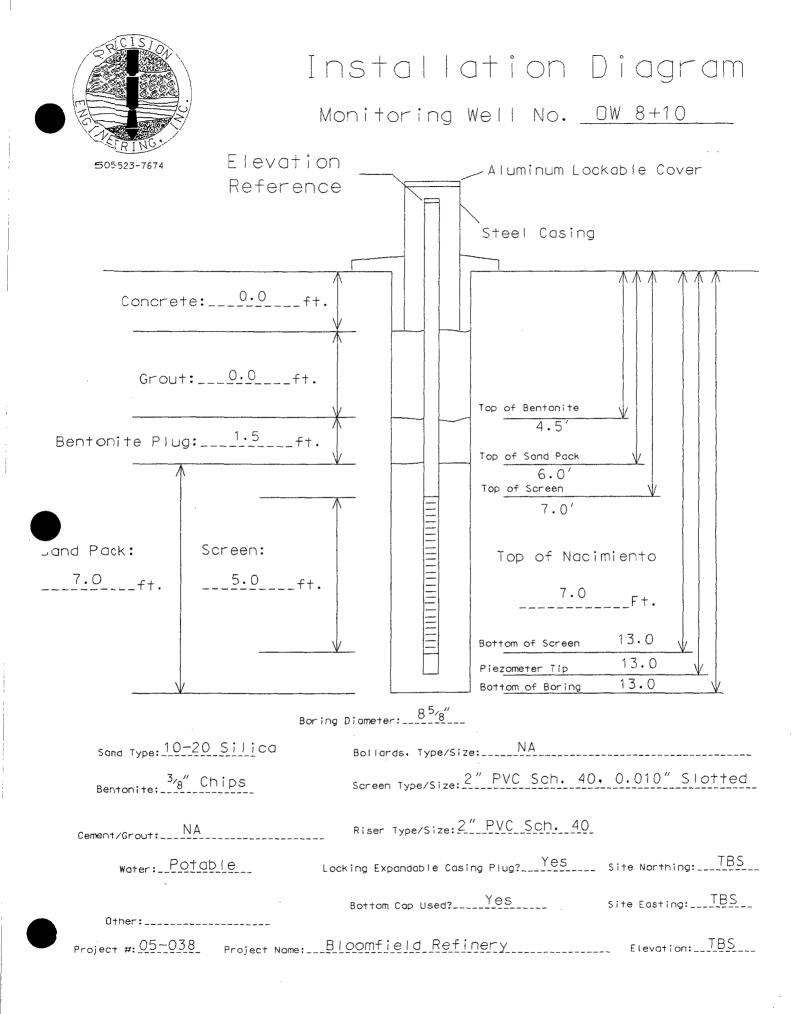
Elevation Reference Steel Vault - Flush Mount Concrete Concrete: 0.0\_\_\_\_ft. Sand Grout: \_\_\_\_\_ft. Top of Bentonite 2.5 Bentonite Plug: \_\_\_\_2.5 \_\_\_\_ft. Top of Sand Pack 5.0 Top of Screen 4.0' Jund Pack: Screen: Top of Nacimiento <u>5.0</u>\_\_\_ft. 7.0 ft. 12.0 Ft. 12.0' Bottom of Screen 12.0' Piezometer Tip 12.0' Bottom of Boring Boring Diameter:  $8^{5} 8''$ Sand Type: 10-20 Silica Bollards. Type/Size: NA Screen Type/Size: 2" PVC Sch. 40, 0.40" Slotted Bentonite: \_\_\_\_\_ Chips Cement/Grout: NA Riser Type/Size: 2" PVC Sch. 40 water: Potable Locking Expandable Casing Plug? Yes Site Northing: TBS Bottom Cap Used? Yes Site Easting: TBS Other:\_\_\_\_\_ Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS

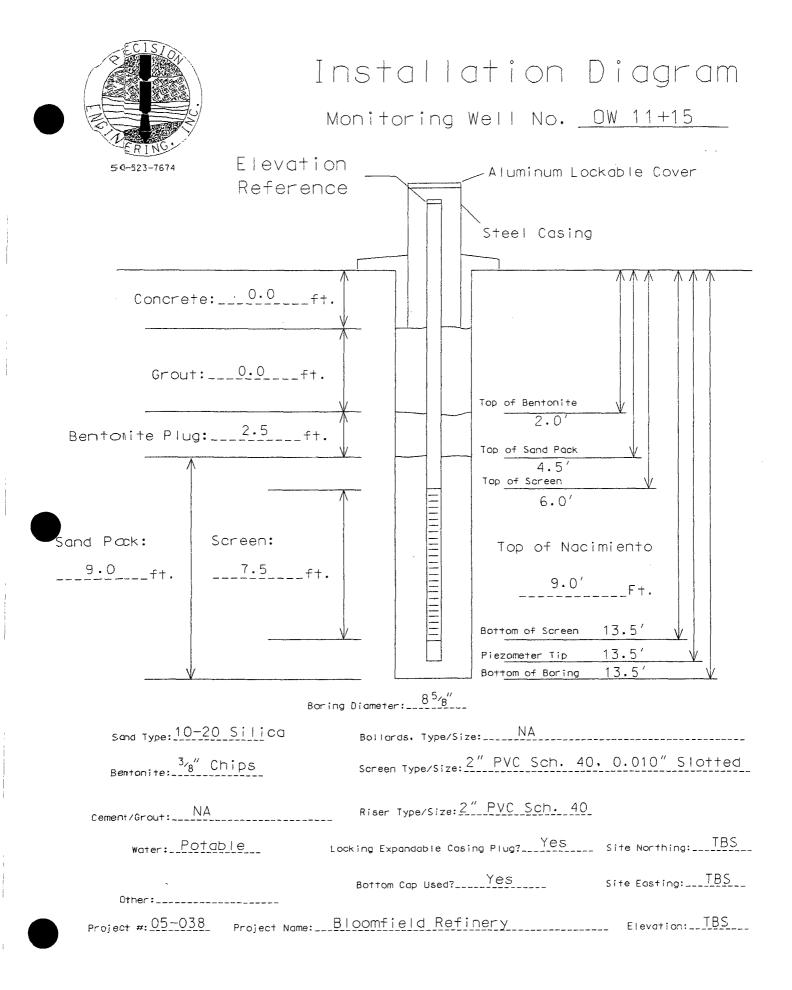


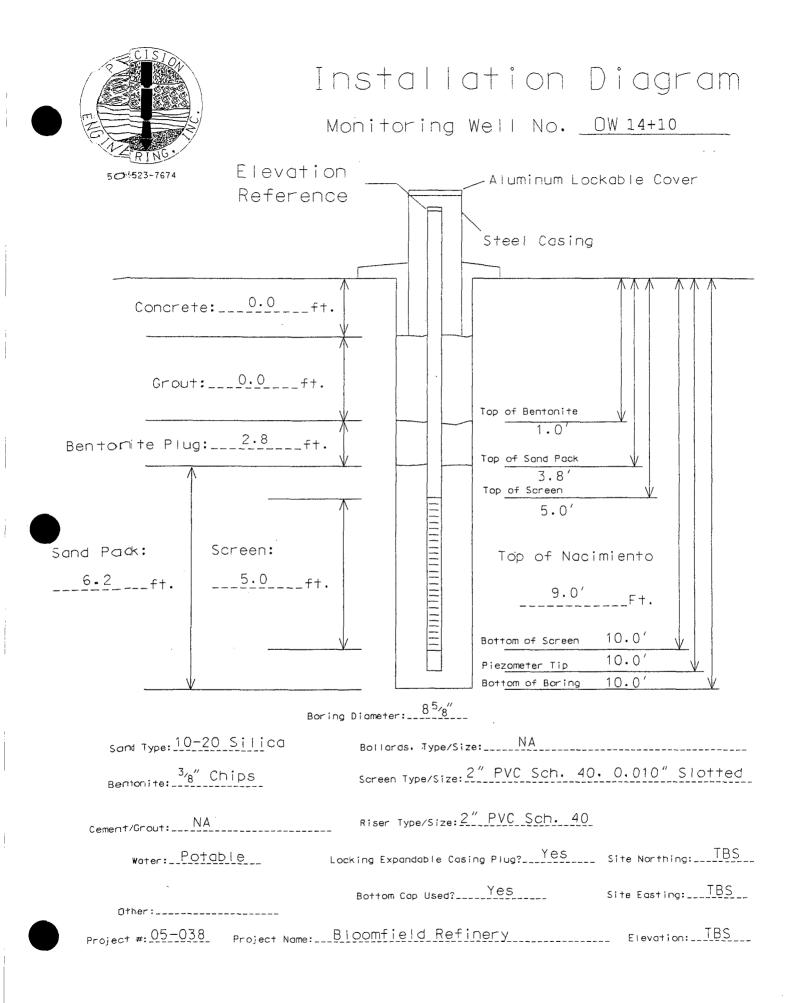


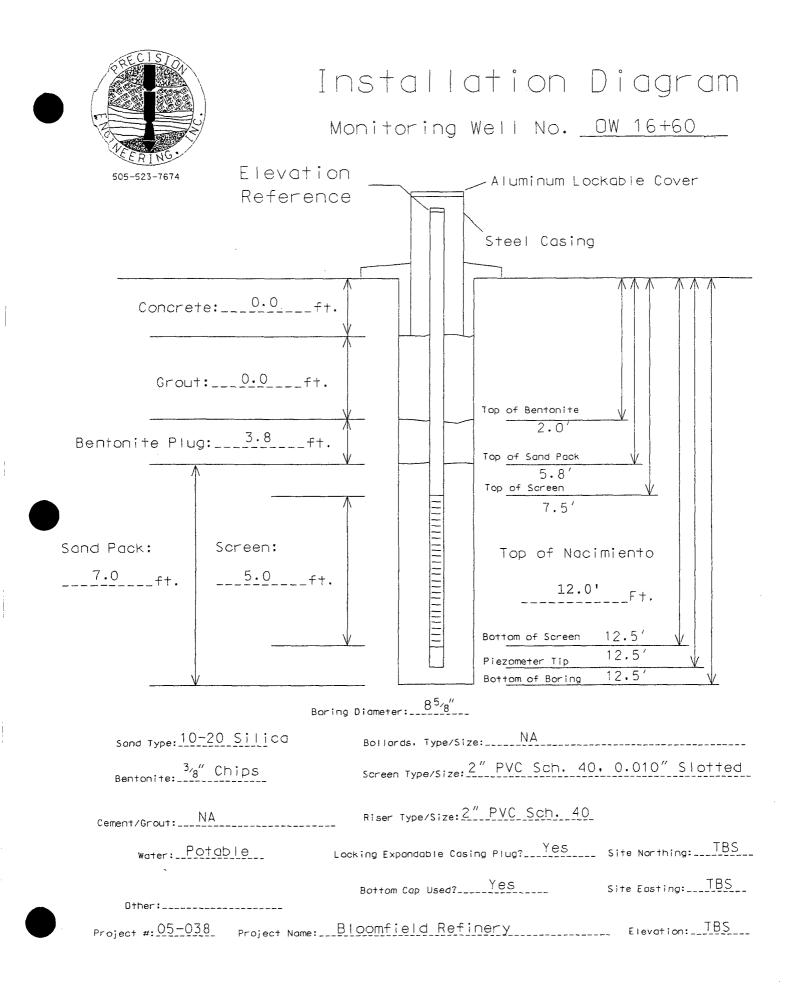


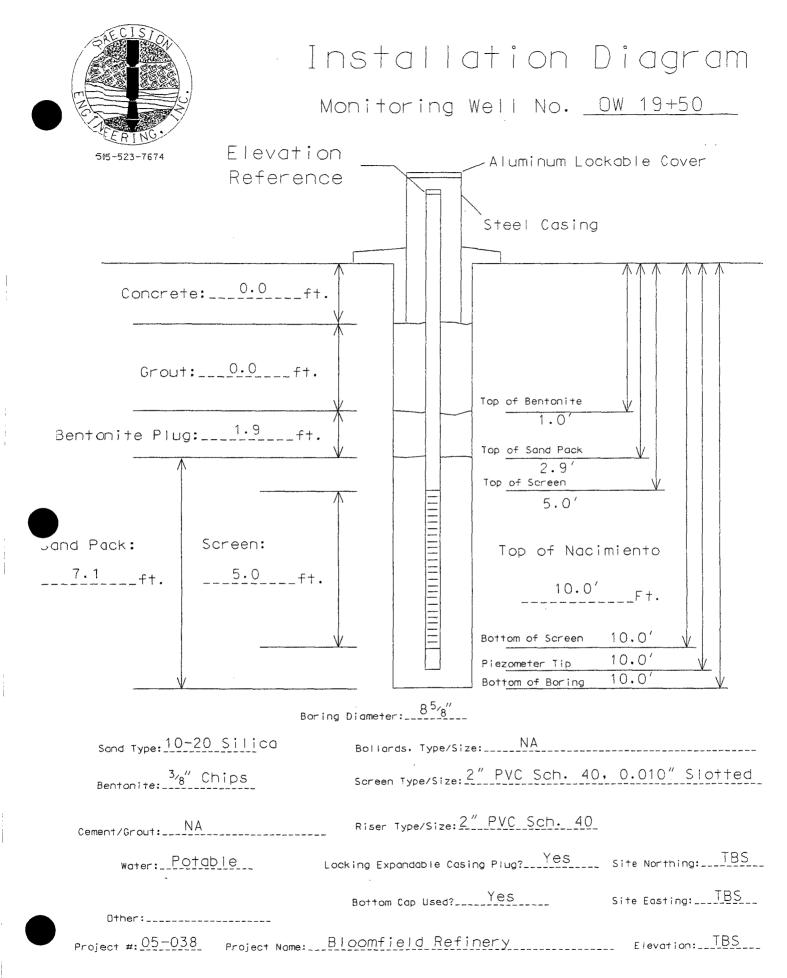








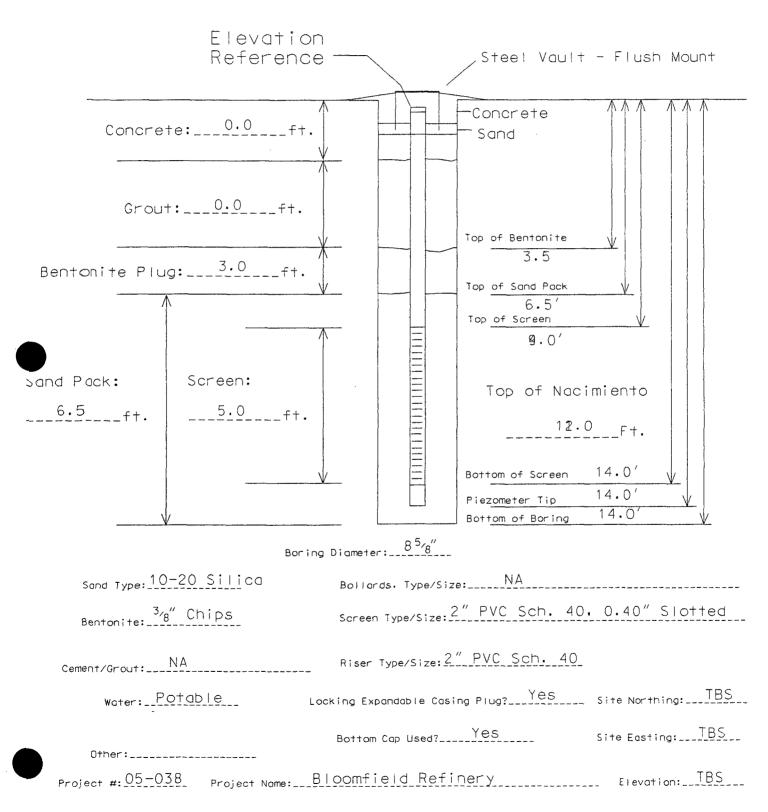


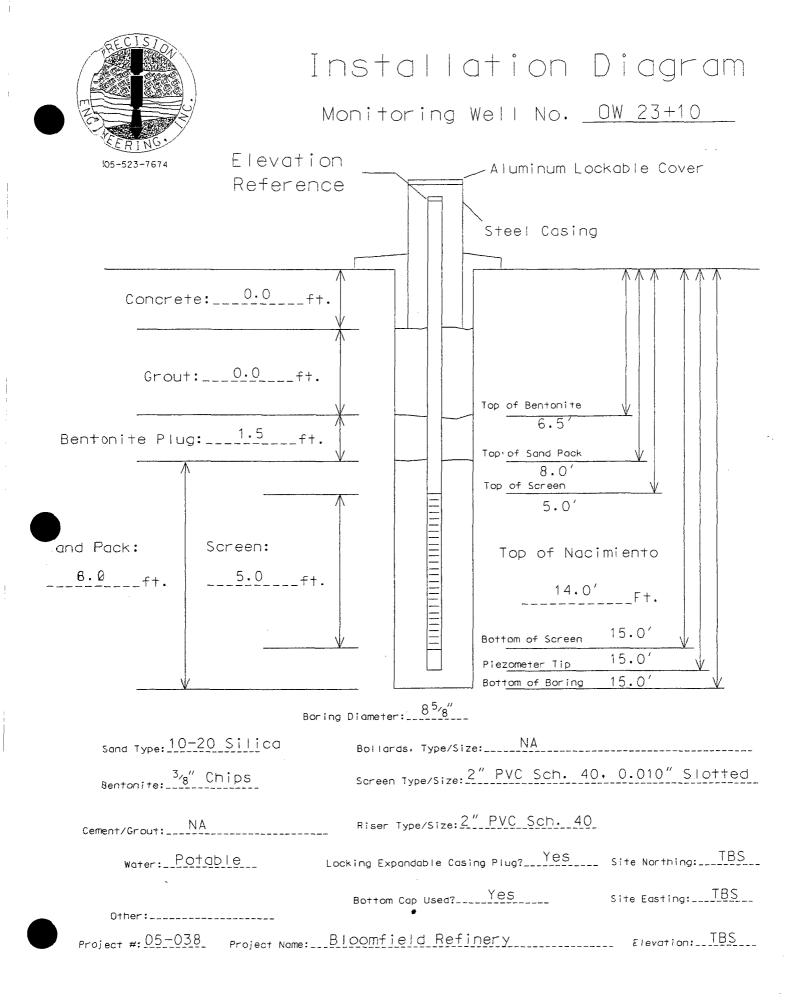


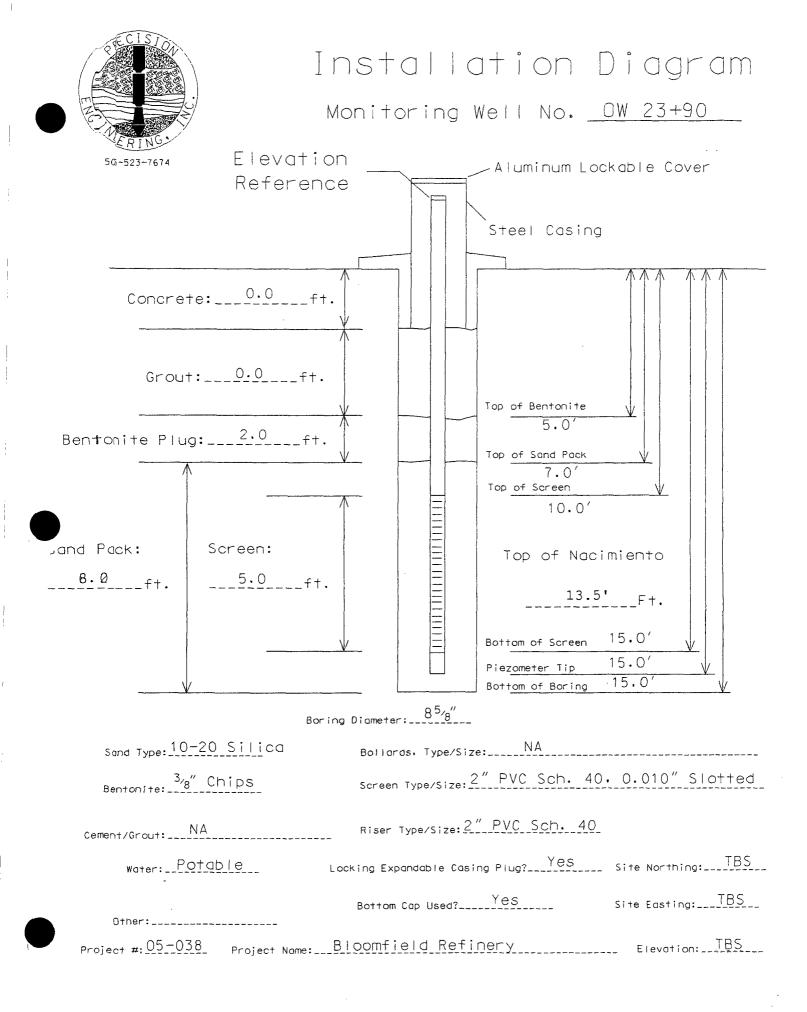


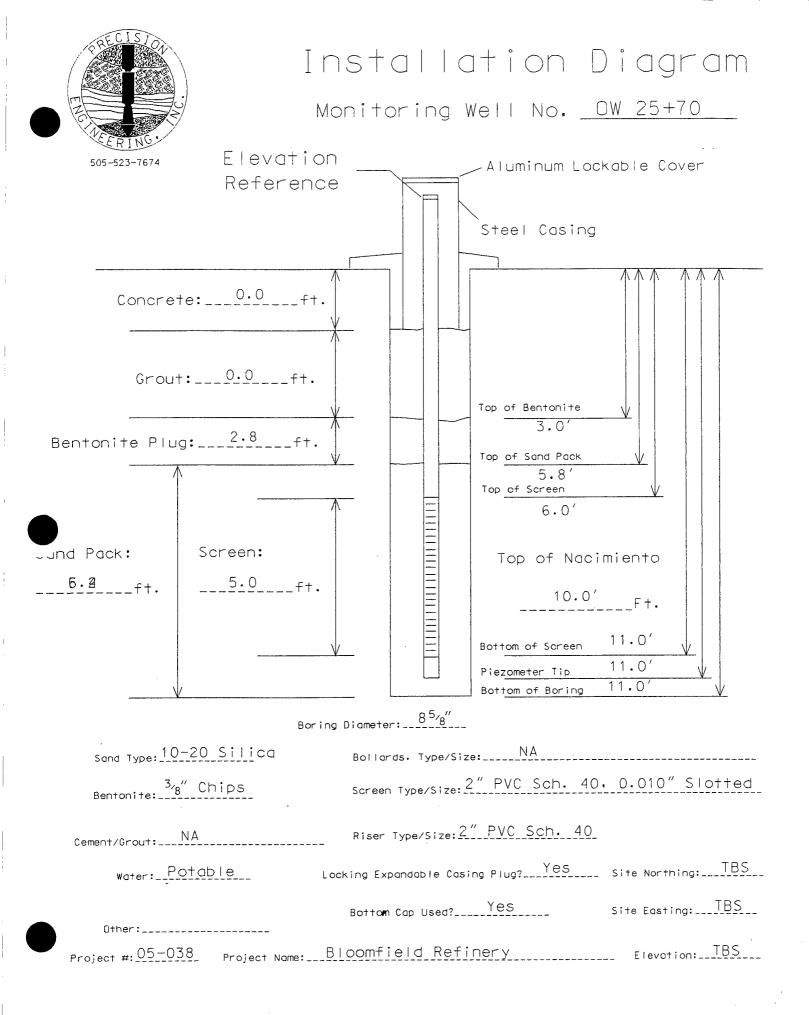
# Installation Diagram

Monitoring Well No. DW 22+00









Sheet: 1 OF 15 Bor: Point: See Plan Water Elevation: 10.7' Borig No .: OW 0+60

ł

#### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 4/20/2005

#### Log of Test Borings

		BLOW			MATERIAL CHARACTERISTICS	[			
LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	Pl	CLASS
	00-2.0		***//***		<u>Sand</u> , very fine to fine, brown,				
			***//***		moist				
			***//***			ļ			
	20-3.5		***00***		Gravel, cobbles, to boulder size, grey, moist				
			***00***	<u>2.5</u>	very dense,				
			***00***						
	3.5-8.0		***00*** *******		Sand, silty, clayey, yellow-brown, damp,				
	3.5-6.0		*******		moderately dense				
			******	<u>5.0</u>					
			******	0.0					
			*******						
			******			ļ			
			******						
			******	<u>7.5</u>					
		······	******						
	8.D-11.5		******		<u>Sand</u> , silty, grey-black, hydrocarbon odor,				
		·	*****		dense, moist,	}			
			******		-				•
			*******	<u>10.0</u>					
			*****		Water Level 10.7'				
			******						
	12.0		*****						
	12.5		====		Nacimiento Formation				
			====		Friable Sandstone, silty, yellow-brown,				
			====		dense, damp, no odor				
	14.0				TD				
l				<u>15.0</u>					
		,							
					Set 2" Well @ 12.0'			ĺ	
					5' of Screen, 7' of Riser				
					Top of Sand 5.0'				
					Top of Bentonite 2.5'				
				<u>20.0</u>				ŀ	
				20.0					
		•							
						Į			
SIZE	& TYPE C	F BORING	4 1/4" ID	HOLLOW	/ STEMMED AUGER	LOGO	ED	BY:	KMM

Sheet: 2 OF 15 B on Point: See Plan Water Elevation:

Boring No.: OW 1+50

# Precision Engineering, Inc.

P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 4/20/2005

#### Log of Test Borings

1~			BLOW			MATERIAL CHARACTERISTICS				
	AB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
<u> </u>		0.0-8.0	000111	0.0*00		<u>Gravel</u> , cobbles, to boulder size, brown to				02/100.
				000*00		grey rock, slightly sandy, very dense				
				000*00		groy rook, onghay banay, tony abhoa				
				000*00						
				000*00						
				000*00						
				0°0,0400						
				000*00						
				000*00						
				000*00						
				000*00			]			
				000*00						
	ļ			00*00						
				000*00						
				0.0+00						
				000*00						
		8.0-11.5		******		Sand, medium, silty, grey/black, wet				
				******		dense, moist, moderately dense				
				******		Slighty water bearing				· •
				******	<u>10.0</u>					
<u> </u>				*****						
				******						
-				******			ļi			
		12.0		******		Nacimiento Formation				
				====		Sandstone, degraded, weathered, very dense				
	·	12.5	, 	= = = =		yellow-brown to light brown, damp				
		13.5				TD				
1										
					15.0					
					<u>15.0</u>					
1										
						Set 2" Well @ 12.0'				
						5' of Screen, 7' of Riser				
Í						Top of Sand 5.0'	(			
						Top of Bentonite 2.5'				
					<u>20.0</u>					
1					<u></u>					
			•						}	
1						•				
	ł					· · ·			[	
	SIZE	& TYPE (	OF BORING	4 1/4" ID	HOLLOW	/ STEMMED AUGER	LOGG	ED	BY:	WHK
-			ation Well Lo				·			

C:\unzipped\Observation Well Logs\[OW1+50.xls]Sheet1

Sheet: 3 OF 15 Bore Point: See Plan Water Elevation: 10.7' Boring No.: OW 3+85

# Precision Engineering, Inc. P.O. Box 422

P.O. Box 422 Las Cruces, NM 88004 505-523-7674 File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 4/20/2005

#### Log of Test Borings

		BLOW			MATERIAL CHARACTERISTICS				
LAB #	DEPTH	COUNT	PLOT	SCALE		%M		ΡI	CLASS
	0.0-10.5		000*00		Gravel, cobbles, to boulder size, brown to				
		-	000*00		grey rock, slightly sandy, very dense		)		
			000*00						
			000*00				}		
			000*00						
			000*00						
			000*00						
			O₀O*O₀						• •
			000*00						
			000*00				[		
			000*00						
			OoO*Oo						
			000*00				ļ		
			000*00						
			000*00						
			000*00				ļ		
			000*00						
			000*00						
			000*00						
			000*00	<u>10.0</u>					
	10.5		000*00		Water Level 10.7'				
			******		Sand, medium, silty, grey/black, water bearing				
			******		dense, moist, moderately dense	ļ	ļ		
	12.5		*****		Nacimiento Formation				
			====		Sandstone, degraded, weathered, fissile,				
			====		very, dense, yellow-brown to light brown, damp				
			====				{		
	14.0		====						
					TD		[		
			1	<u>15.0</u>					
		}			· ·		}		
							Ì		
					Set 2" Well @ 12.5'				
					5' of Screen, 7' of Riser				
					Top of Sand 7.0'				
			ļ		Top of Bentonite 5.5'				
				<u>20.0</u>					
		-							
						1			
S17E	8 TVDE		A 4/411 1						WHK
		vation Well Lo			V STEMMED AUGER			ום.	VVIIN

Sheet: 4 OF 15 Bore Point: See Plan Water Elevation: 10.7' Boring No.: OW 5+50

#### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 5/1/2005

#### Log of Test Borings

PLOT 000*00 000*00 000*00 000*00 000*00 000*00 000*00 000*00 000*00	<u>2.5</u>	<u>MATERIAL CHARACTERISTICS</u> (MOISTURE, CONDITION, COLOR,ETC.) <u>Gravel</u> , cobbles, to boulder size, sandy, silty, brown, very dense	%M	LL	PI	CLASS
000*00 000*00 000*00 000*00 000*00 000*00 000*00 000*00	<u>2.5</u>	Gravel, cobbles, to boulder size, sandy, silty,				
0°0,0,00 0°0,00 0°0,00 0°0,00 0°0,00 0°0,00 0°0,00 0°0,00	<u>2.5</u>					
0°0,0,00 0°0,00 0°0,00 0°0,00 0°0,00 0°0,00 0°0,00	<u>2.5</u>					
0°0,0,00 0°0,0,00 0°0,0,00 0°0,0,00 0°0,0,00 0°0,00	<u>2.5</u>					
0°0*0° 0°0*0° 0°0*0° 0°0*0° 0°0*0°	<u>2.5</u>					
000*00 000*00 000*00 000*00						
0₀0*0₀ 0₀0*0₀ 0₀0*0₀						
000*00 000*00			1			
000*00						
\$ 1						
0.0*00						
1 1						
1 1						
1 1			}	) i		
1 1						
1 1						
1 1						
******		Sand, fine to medium, greeniish brown,				
******	10.0					
====		Nacimiento Formation				
		TD				
1						
	······			L		
				}		
	<u>15.0</u>					
		20 <sup>2</sup>				
				1		
· ·		Set 2" Well @ 10.7				
		5' of Screen, 9' of Riser	[			
		Top of Sand 4.0'	]			
		Top of Bentonite 1.0'	}			
	20.0					
	<u> </u>		ł			
			}			
: 4 1/4" ID	HOLLOW	/ STEMMED AUGER	LOGO	SED	BY:	WHK
•	000*00 000*00 000*00 000*00 000*00 1	000*00 000*00 000*00 000*00 000*00 000*00 	CoO*Oo       Oo         CoO*Oo       7.5         CoO*Oo       Oo         CoO*Oo       Sand, fine to medium, greeniish brown,         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.0         ********       10.7         5' of Screen, 9' of Riser         Top of Sand 4.0'         Top of Bentonite 1.0'	OoO*Oo       OoO*Oo         OoO*Oo       7.5         OoO*Oo       Sand, fine to medium, greeniish brown,         ********       10.0         damp, dense       *******         ********       10.0         damp, dense       *******         TD       TD         *******       10.0         Set 2" Well @ 10.7         5' of Screen, 9' of Riser         Top of Sand 4.0'         Top of Bentonite 1.0'         20.0         *4 1/4" ID HOLLOW STEMMED AUGER       LOGO	OoO*Oo       Sand, fine to medium, greeniish brown,         OoO*Oo       Sand, fine to medium, greeniish brown,         IOO*Oo       IOO         Macimiento Formation       IOO         IDO       Set 2" Well @ 10.7         S' of Screen, 9' of Riser       Top of Sand 4.0'         IOO of Sand 4.0'       Top of Bentonite 1.0'         20.0       LOGGED	0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x         0x0*0x<

Sheet: 5 OF 15 Bore Point: See Plan Water Elevation: Not Encountered

Boring No.: OW6+70

#### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004

File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 4/6/2005

#### Log of Test Borings

505-523-7674

		BLOW	()		MATERIAL CHARACTERISTICS			· · ·	
LAB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	ΡI	CLASS.
	0.0-5.5	COONT	FLOT	JUALL	<u>Sand</u> , Very Fine to Fine, Silty, Brown, Moist,	70101	<u> </u>		01,00.
	0.0-0.0		******		Gravel, Cobbles				
			******						
			******						
			******	<u>2.5</u>					
			******	<u></u>					
			******						
			*** <u>_</u> ***						
			******						
			******	5.0					
	5.5-13.0		*o**o*		Sand, Fine, Silty, Light Brown, Damp, Some				
			*o**o*		Small Gravel, (Cobbles @ 12.0')				
			*o**o*						
			*o**o*						
			*0**0*	<u>7.5</u>					
			*0**0*						
			*o**o*						
			*o**o*						
			*o**o*			· .			
			*0**0*	<u>10.0</u>					
1			*o**o* *o**o*						
			*0**0*			1			
			*o**o*						
			*o**o*			ļ			
			*0**0*						
	13.0'		====		Nacimiento Formation				·····
			====						
		2	====						
			====	<u>15.0</u>					
	15.0	· · · · · · · · · · · · · · · · · · ·			TD				
					1.5' of Bentonite (Bottom of Hole)				
					Set 2" Well @ 13.5'				
					5' of Screen				
					12.5' of Riser				
					Top of Sand 6.5'				
				_	Top of Bentonite 4.0'	ł			
				<u>20.0</u>					
		~							
0175			4 4/411/2						
·		ation Well Lo			V STEMMED AUGER	LOGO		DT:	NIVIIVI

C:\unzipped\Observation Well Logs\[OW6+70.xls]Sheet1

Sheet: 6 OF 15 Bore Point: See Plan Water Elevation: Not Encountered Boring No.: OW8+10 Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674 File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 4/6/2005

#### Log of Test Borings

								·		
			BLOW			MATERIAL CHARACTERISTICS				•
	LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS.
		0.0-7.0		******		Sand, Fine to Coarse, Slightly Silty, Brown,				
				******		Damp, Gravel, Cobbles				
				******						
				******						
				******	<u>2.5</u>				-	
				******						
				******						
				******						
				******						
				******	<u>5.0</u>					
				******						
				******						
				******						
		7.0-13.0		====		Nacimiento, Sand, Fine, Green/Brown, Damp				
				====	<u>7.5</u>	Hydrocarbon Odor				
				====						
				====						
				====						
			· · · · · ·	= = = ,=	• •					
				====	<u>10.0</u>	· · · · · · · · · · · · · · · · · · ·				
				====						
				====						
·				= = = =						
				====						
				====						
				====						
		13.0'		ļ		TD				
						Set 2" Well @ 13.0'				
					<u>15.0</u>	5' of Screen			ŀ	
						11.0' of Riser	1			
						Top of Sand 6.0'			2	
						Top of Bentonite 4.5'				
						· · · · ·				
				1						
				1	1					
				1	<u>20.0</u>					
1				ļ						
	SIZE	E & TYPE (	OF BORING	: 4 1/4" 1[	D HOLLOV	V STEMMED AUGER	LOGO	SED	BY:	KMM
	C:\unzip	ped\Obser	vation Well Lo	gs\[OW8	+10.xls]Sh	eet1				

Sheet: 7 OF 15 Bore Point: See Plan Water Elevation: 9.4' Boring No.: OW11+15

#### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 4/7/2005

#### Log of Test Borings

		BLOW	[]		MATERIAL CHARACTERISTICS	1	<u></u>	· · · ·									
LAB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	ΡI	CLASS.								
	0.0-9.0		**0**0**	00/(22	<u>Sand</u> , Very Fine to Medium, Brown, Damp,			<u> </u>	02,000.								
			**0**0**		Gravel, Cobbles, Hydrocarbon Odor @ 5.0'		ļ										
			**0**0**			1											
			**0**0**				i .	]									
			**0**0**	<u>2.5</u>													
			**0**0**	<u> </u>			1	}									
			**0**0**				1										
			**0**0**					}									
			**0**0**														
			**o**O**	<u>5.0</u>													
			**0**0**	0.0													
			**o**O**					Į.									
			**0**0**														
			**0**0**														
			**0**0**	<u>7.5</u>													
			**0**0**	<u>1.0</u>			ļ										
			**0**0**														
\	9.0-13.5		*******		Sand, Very Fine to Medium, Black/Grey,												
	9.4	· .	******		Damp, Strong Hydrocarbon Odor, Water 9.4'												
			******	10.0			ļ	}									
			******	<u></u>													
1			******														
			******														
			******			ļ	]										
			******														
			******														
		<u></u>	====		Nacimiento												
	13.5				TD												
1																	
				<u>15.0</u>	Set 2" Well @ 13.5'												
					7.5' of Screen, 9' of Riser		ļ										
					Top of Sand 4.5'	·											
					Top of Bentonite 2.0'												
							ļ		,								
ļ								Į									
				<u>20.0</u>													
		_							ļ								
		-															
ł					-												
SIZE	& TYPE C	OF BORING	4 1/4" IE	HOLLOV	V STEMMED AUGER	LOGO	ED	BY:	KMM								
							SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: KMM										

C:\unzipped\Observation Well Logs\[OW11+15.xis]Sheet1

Sheet: 8 OF 15 Bore Point: See Plan Water Elevation: Boring No.: OW 14+10

#### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 5/6/2005

#### Log of Test Borings

		BLOW	11		MATERIAL CHARACTERISTICS			[ · · · ]	
LAB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	ΡI	CLASS.
	0.0-8.5		000*00		<u>Gravel</u> , cobbles, to boulder size, sand fine				
			000*00		to coarse, damp dense				
			000*00						
1			000*00			[			
			000*00						
			O₀O*O₀						
			000*00						
			000*00						
			000*00						
			0.0*00						
			000*00						
			000*00			}			
			000*00						
			000*00						
			0.0*00			ĺ			
			000*00						
			0.0*00			ļ			· · · ·
	8.5		******		Sand, fine to coarse, some gravel, grey, moist				
			******	· .		Į			
	9.0		=====		Nacimiento Formation				
	10.0				TD	1			i
						<u> </u>			
				. – .					
				<u>15.0</u>					
									·
					Set 2" Well @ 10.0				
					5' of Screen, 8' of Riser				
					Top of Sand 3.8'				
					Top of Bentonite 1.5'				
1				<u>20.0</u>					
						1			
			ļ						
					V STEMMED AUGER	LOGO	SED	BY:	WHK
C·\unzin	ned\Obsan	ation Well Lo		4+10 rev	visìSheet1				

C:\unzipped\Observation Well Logs\[OW14+10\_rev.xls]Sheet1

Sheet: 9 OF 15 Bore Point: See Plan Water Elevation: 9.5' Boring No.: OW16+60

#### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 4/7/2005

#### Log of Test Borings

		BLOW			MATERIAL CHARACTERISTICS				
LAB #	DEPTH	COUNT	PLOT	SCALE		%M	LL	PI	CLASS.
	0.0-5.0		***//***		Sand, Very Fine to Fine, Clayey, Brown,				
			***//***		Moist, Gravel, Cobbles				
			***//***						
			***//***						
			***//***	<u>2.5</u>					
			***//***						
			***//***						
			***//***						
			***//***						
ļ			***//***	<u>5.0</u>					
	5.0-10.0		*****		Sand, Fine to Coarse, Black, Moist, Gravel,				
	1		*****		Some Cobbles, Hydrocarbon Odor @ 5.0'				
			******						
			*******	75					
			*******	<u>7.5</u>		{ ;			
			******						
			******						
			******						
	9.5		******	10.0	Water Level 9.5'				
	10.0-12.0		******		Same as Above, No Gravel or Cobbies, Black	}			
			******		Strong Hydrocarbon Odor				
			*****			ļ			
	12.0		====		Nacimiento				
	12.5				TD	Ì			
					Set 2" Well @ 12.5'				
					5' of Screen, 10' of Riser				
				15.0	Top of Sand 5.8' Top of Bentonite 3.5'	:			
				<u>15.0</u>					
			1						
					· ·				
			}						
				<u>20.0</u>					
		-							
			}						
			L		1				
		OF BORING:			V STEMMED AUGER	LOGO	ED	BY:	KMM

C:\unzipped\Observation Well Logs\[OW16+60.xls]Sheet1

Sheet: 10 OF 15 Bore Point: See Plan Water Elevation: Not Encountered Boring No.: OW19+50

#### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004

505-523-7674

File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 5/7/2005

#### Log of Test Borings

			<u> </u>							
0.0-8.0			BLOW			MATERIAL CHARACTERISTICS				,
SIZE & TYPE OF BORING: 4 1/4* ID HOLLOW STEMMED AUGER         LOGGED BY: KMM	LAB #		COUNT		SCALE		%M	LL	PI	CLASS.
SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER         LOGGED BY: KMM		0.0-8.0								
SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER         LOGEED BY: KMM						Cobbles				
SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER         LOGED BY: KMM										
start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start         start <td< td=""><td></td><td></td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td></td<>				1						
size & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER         LOGGED BY': KMM					<u>2.5</u>					
Size & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER         LOGGED BY: KMM				F 1						
Set & TYPE OF BORING: 4 1/4* ID HOLLOW STEMMED AUGER         LOGGED BY: KMM										
SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER         S.0           SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER         LOGGED BY: KMM				-	•					
Size & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER         LOGGED BY: KMM				-						
Set 2" Well @ 10.0'         Set 2" Well @ 10.0'         Set 2" Well @ 10.0'           10.0         = = = =         Nacimiento           20.0         15.0         15.0				1	<u>5.0</u>					
Size & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER         LOGGED BY: KMM										
store         7.5           8.0-10.0         ***o***o           ***o***o         Sand, Fine to Medium, Grey/Black, Moist, Hydrocarbon Odor, Small Gravel           10.0         ***o***o           ***o***o         10.0           10.0         ***e ***o           Set 2" Well @ 10.0'           5' of Screen           8.0' of Riser           Top of Sand 2.9'           Top of Bentonite 1.0'           15.0           20.0           SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER										
***0***0         7.5           8.0-10.0         ***0***0           ***0***0         Sand, Fine to Medium, Grey/Black, Moist, Hydrocarbon Odor, Small Gravel           ***0***0         10.0           10.0         = = =           Nacimiento           Set 2" Well @ 10.0' 5' of Screen 8.0' of Riser Top of Sand 2.9' Top of Bentonite 1.0'           15.0           15.0           SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER           LOGGED BY: KMM										
8.0-10.0       ***0***0*       Sand, Fine to Medium, Grey/Black, Moist, Hydrocarbon Odor, Small Gravel         10.0       ***0***0*       10.0         10.0       = = =       Nacimiento         Set 2" Well @ 10.0°       5' of Screen         8.0° of Riser       Top of Sand 2.9°         Top of Bentonite 1.0°       15.0         15.0       15.0         SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER       LOGGED BY: KMM										
Image: Size & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER         LOGGED BY: KMM										
Image: Size & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER         LOGGED BY: KMM		8.0-10.0		1						
Image: state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s						Hydrocarbon Odor, Small Gravel				
Image: state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s				1						
10.0         = = =         Nacimiento           Set 2" Well @ 10.0'         5' of Screen         8.0' of Riser           Top of Sand 2.9'         Top of Bentonite 1.0'         15.0           15.0         15.0         20.0         15.0							· ·			1 A.
Size & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: KMM				***0***0*	10.0					
5' of Screen 8.0' of Riser Top of Sand 2.9' Top of Bentonite 1.0' 15.0 20.0 SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: KMM	·	10.0		====		Nacimiento				·
SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: KMM					<u>15.0</u>	5' of Screen 8.0' of Riser Top of Sand 2.9'				
	SIZF	& TYPF (		4 1/4" IF		V STEMMED AUGER	LOGG	ED	BY:	KMM
A A MARINA MARINA MARINA MARINA MARINA ANA MARINA MARINA MARINA MARINA MARINA MARINA MARINA MARINA MARINA MARINA										

Sheet: 11 OF 15 Bore Point: See Plan Water Elevation: Not Encountered Boring No.: OW22+00

#### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 5/6/2005

#### Log of Test Borings

·		BLOW	T		MATERIAL CHARACTERISTICS				· · · · · · · · · · · · · · · · · · ·
LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS.
	0.0-11.0	000111	***0***0		Gravel, cobbles, to boulder size, brown to				
	0.0 11.0		***0***0		grey rock, slightly sandy, very dense				
			***o***O		grey rook, enginay banay, very acheo				
			***0***0						
			***0***0	<u>2.5</u>					
			***0***0	2.0					
			***0***0	-					
			***o***O						
			***0***0	-					
			***0***0	5.0					
			***0***0	<u>5.0</u>					
			***0***0	-					
			***0***0	•					
			***0***0	•					
			***0***0	<u>7.5</u>					
			***0***0*	<u>1.5</u>					
			***0***0*						
			***0***0*						
			***0***0*						
			***0***0*	<u>10.0</u>					
			***0***0*	<u></u>					
1			***0***0*						
	11.0-14.0		**-**0**		Sand, Fine to Medium, some clay, some		,		
			**-**0**		gravel, damp dense				
			**-**0**					}	
			**-**0**					[	
			**-**0**						
			**-**0**						
	14.0				TD				
				<u>15.0</u>					
			1		Set 2" Well @ 14.0'				
	1		Ĩ		5' of Screen				
		-			9.5' of Riser			ļ	
					Top of Sand 6.5'			1	
					Top of Bentonite 3.5'				
				<u>20.0</u>					
				l					
			1						
SIZ	E & TYPF (		: 4 1/4" IF		V STEMMED AUGER	LOGO	SED	BY:	KMM
have a second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second se		ation Mell Lo							

C:\unzipped\Observation Well Logs\[OW22+00.xls]Sheet1

Sheet: 12 OF 15 Bore Point: See Plan Water Elevation: Not Encountered Boring No.: OW23+10

ļ

ļ

#### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 5/6/2005

## Log of Test Borings

r			·······			<u></u>	···· ·· ·		
		BLOW			MATERIAL CHARACTERISTICS				
LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS.
	0.0-13.5		***o***O*		Gravel, cobbles, to boulder size, brown to				
			***0***0*		grey rock, slightly sandy, very dense				
			***0***01						
			***o***O						
			***0***0	2.5					
			***0***0						
			***0***0						
			***0***0						
			***0***0	•		1			
			***o***O	<u>5.0</u>					
			***0***0	<u>5.0</u>					
			0 0 ***o***O						
			***0***0	T					
			***0***0	•					
			***0***0	<u>7.5</u>					
			***0***0			ļ			
			***0***0						
			***0***0'		- -				
			***0***0						
			***0***0	<u>10.0</u>					
-			***0***0*						
			***o***O*			}			
			***0***0*						
			***0***0	•					
			***0***0*						
	13.5	· · · · · · · · · · · · ·	***o***O	·					
			*****		Sand, Fine to coarse, dark brown, moist,				
			******		dense				
			*****						
	14.0		====		Nacimiento Formation	1			
	15.0			15.0	TD				
					Set 2" Well @ 15.0'				
					5' of Screen				
					10.5' of Riser	1			
					Top of Sand 8.0'				
					Top of Bentonite 1.0'				
				<u>20.0</u>					
		-							
I									
			ļ						
SI7E	L TVDE (		· <u>/</u> 1/// IF			LOGO		ΒV·	KMM
		ation Well Lo		and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second se				<u></u>	

C:\unzipped\Observation Well Logs\[OW23+10\_rev.xls]Sheet1

Sheet: 13 OF 15 Bore Point: See Plan Water Elevation: Not Encountered Boring No.: OW23+90

#### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 5/6/2005

## Log of Test Borings

		BLOW			MATERIAL CHARACTERISTICS				
LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	ΡI	CLASS.
	0.0-12.0		***0***0*		Gravel, cobbles, to boulder size, brown to				
			***0***0*		grey rock, slightly sandy, very dense				
			***0***0						
			***0***0*						
			***0***0	<u>2.5</u>					
			***0***0*						
			***o***O* ***o***O						
			***0***0	-					
			***0***0	5.0					
			***0***0	<u>0.0</u>					
			***0***0						
			***0***0	-					
			***0***0'						
			***0***0	<u>7.5</u>					
			***o***O						
			***0***0*						
			***0***0						
			***0***0			1 .			
			***0***0	<u>10.0</u>					
I			***o***O* ***o***O						
			***0***0						
	12.0		***0***0						
			******		Sand, Fine to coarse, dark brown, moist,				
			******		dense				
	13.5		====		Nacimiento Formation	ļ			
					TD				
				<u>15.0</u>					
					Set 2" Moll @ 15 0'				
					Set 2" Well @ 15.0' 5' of Screen				
					7.0' of Riser			ĺ	
					Top of Sand 7.0'				
					Top of Bentonite 5.0'				
		[		20.0					
		_							
			1						
	1								
<b>D</b>									
	the second second second second second second second second second second second second second second second s				V STEMMED AUGER	LOG	SED	BY:	KMM
C:\unzi	pped\Obsen	vation Well Lo	as\fOW2	3+90 rev.:	xls]Sheet1				

Sheet: 14 OF 15 Bore Point: See Plan Water Elevation: 8.4' Boring No.: OW25+70

#### Precision Engineering, Inc. P.O. Box 422 Las Cruces, NM 88004 505-523-7674

File #: 05-038 Site: Bloomfield Giant Refining Elevation: EXISTING Date: 4/6/2005

#### Log of Test Borings

Γ			BLOW			MATERIAL CHARACTERISTICS				
	LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS.
		0.0-10.5		*******		Sand, Very Fine to Medium, Brown, Damp				
Ì				******		Gravel, Cobbles				*
				******						
				*******						
				*****	<u>2.5</u>					
				******						
				*****						
				*******						
				******	<u>5.0</u>					
				******	<u><u> </u></u>					
				*****						
				******						
				******						
				*******	<u>7.5</u>					
				*******						
				*****						
		8.4		******		Water Level 8.4'				
		· .		*******						
				******	<u>10.0</u>					
1		10.0		====		Nacimiento Formation				
	1	10.0		====						
Ī		11.0				TD				
						Set 2" Well @ 11.0'				
						5' of Screen				
						9.0' of Riser				
	1				150	Top of Sand 5.8'				
					<u>15.0</u>	Top of Bentonite 3.0'				
							Į .			
						· · · · · ·				
					<u>20.0</u>					
			-							
				L						1/2 0 0 0 0
			OF BORING:			V STEMMED AUGER	LOGO		BI:	

C:\unzipped\Observation Well Logs\[OW25+70\_rev.xls]Sheet1

# **APPENDIX I**

# **Baseline Groundwater Analytical Laboratory Reports**

5127-002 Giant Refining Company



HALL ENVIRONMENTAL ANALYSIS LABORATORY

#### COVER LETTER

May 27, 2005

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

RE: Phase II Monitoring

Order No.: 0505104

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 7 samples on 5/12/2005 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,

1

Andy Freeman, Business Manager Nancy McDuffie, Laboratory Manager



4901 Hawkins NE Suite DE Albuquerque, NM 87109 505.345.3975 Fax 505.345.4107 www.hallenvironmental.com

Date: 27-May-05

CLIENT:	San Juan Refining			Client Sam	ple ID: C	CW 6 +	70
Lab Order:	0505104			Collecti	on Date:	5/11/2	005 9:15:00 AM
Project:	Phase II Monitoring						
Lab ID:	0505104-01				Matrix:	AQUI	EOUS
Analyses		Result	PQL	Qual Units		DF	Date Analyzed
EPA METHOD	300.0: ANIONS						Analyst: MAP
Fluoride		ND	0.50	mg/L		5	5/24/2005
Chloride		2400	10	mg/L		100	5/24/2005
Phosphorus, O	rthophosphate (As P)	ND	0.50	mg/L		1	5/12/2005
Sulfate		170	2.5	mg/L		5	5/24/2005
Nitrate (As N)+	Nitrite (As N)	ND	0.50	mg/L		5	5/24/2005
EPA METHOD	8021B: VOLATILES						Analyst: NSB
Benzene		2.7	0.50	µg/∟		1	5/16/2005 4:54:42 PM
Toluene	,	ND	0.50	רפי/∟		1	5/16/2005 4:54:42 PM
Elhylbenzene		ND	0.50	µg∕L		1	5/16/2005 4:54:42 PM
Xylenes, Total		1.3	0.50	µg/L		1	5/16/2005 4:54:42 PM
Surr. 4-Brom	ofluorobenzene	100	83.3-121	%REC		1	5/16/2005 4:54:42 PM
EPA METHOD	7470: MERCURY						Analyst: CMC
Mercury		ND	0.00020	mg/L		1	5/17/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS		• ,			Analyst: CMC
Arsenic		ND	0.020	mg/L		1	5/16/2005 2:09:29 PM
Barium		0.34	0.020	mg/L		1	5/16/2005 2:09:29 PM
Cadmium		ND	0.0020	mg/L		1	5/16/2005 2:09:29 PM
Chromium		ND	0.0060	mg/L		1	5/16/2005 2:09:29 PM
Lead		ND	0.0050	mg/L		1	5/16/2005 2:09:29 PM
Selenium		ND	0.050	mg/L		1	5/16/2005 2:09:29 PM
Silver		ND	0.0050	mg/L		1	5/16/2005 2:09:29 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

1/18

Page 1 of 7

Date: 27-May-05

CLIENT:	San Juan Refining			Client Sample ]	D: CW 8 +	· 10
Lab Order:	0505104			•		2005 10:30:00 AM
Project:	Phase II Monitoring			Donation 1		
Lab ID:	0505104-02			Ma	trix: AQU	EOUS
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	300.0: ANIONS					Analyst: MAP
Fluoride		0.29	0.10	mg/L	1	5/24/2005
Chloride		1100	10	mg/L	100	5/24/2005
Phosphorus, O	rthophosphate (As P)	ND	0.50	mg/L	1	5/12/2005
Sulfate		720	50	mg/L	100	5/24/2005
Nitrate (As N)+	Nitrite (As N)	ND	0.50	mg/L	5	5/24/2005
EPA METHOD	8021B: VOLATILES					Analyst: NSB
Benzene		430	25	μg/L	50	5/16/2005 5:26:08 PM
Toluene		ND	25	µg/L	50	5/16/2005 5:26:08 PM
Ethylbenzene		51	25	µg/L	50	5/16/2005 5:26:08 PM
Xylenes, Total		660	25	µg/L	50	5/16/2005 5:26:08 PM
Surr: 4-Bron	nofluarobenzene	102	83.3-121	%REC	50	5/16/2005 5:26:08 PM
EPA METHOD	7470: MERCURY					Analyst: CMC
Mercury		ND	0.00020	mg/L	1	5/17/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS	•			Analyst: CMC
Arsenic		ND	0.020	mg/L	1	5/16/2005 2:13:35 PM
Barium		0.49	0.020	mg/L	1	5/16/2005 2:13:35 PM
Cadmlum		ND	0.0020	mg/L	1	5/16/2005 2:13:35 PM
Chromium		ND	0.0060	mg/L	1	5/16/2005 2:13:35 PM
Lead		ND	0.0050	mg/L	1	5/16/2005 2:13:35 PM
Selenium		ND	0.050	mg/L	1	5/16/2005 2:13:35 PM
Silver		ND	0.0050	mg/L	1	5/16/2005 2:13:35 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

Page 2 of 7

Date: 27-May-05

CLIENT:	San Juan Refining			Client Samp	le ID: OW 11 +	15
Lab Order:	0505104			Collectio	n Date: 5/11/200	05 11:45:00 AM
Project:	Phase II Monitoring					
Lab ID:	0505104-03			1	Matrix: AQUEC	DUS
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 3	300.0: ANIONS					Analyst: MAP
Fluoride		0.43	0.10	mg/L	1	5/24/2005
Chloride		320	5.0	mg/L	50	5/24/2005
Phosphorus, Ort	Ihophosphate (As P)	ND	0.50	mg/L	1	5/12/2005
Sulfate		130	5.0	mg/L	10	5/24/2005
Nitrate (As N)+N	litrite (As N)	ND	0.50	mg/L	5	5/24/2005
EPA METHOD	8021B: VOLATILES					Analyst: NSB
Benzene		420	25	µg/L	50	5/16/2005 5:57:32 PM
Toluene		ND	25	µg/L	50	5/16/2005 5:57:32 PM
Ethylbenzene		140	25	µg/L	50	5/16/2005 5:57:32 PM
Xylenes, Total		520	25	µg/L	50	5/16/2005 5:57:32 PM
Surr: 4-Brom	ofluorobenzene	104	83.3-121	%REC	50	5/16/2005 5:57:32 PM
EPA METHOD	7470: MERCURY					Analyst: CMC
Mercury		ND	0.00020	mg/L	1	5/17/2005
EPA 6010: TOT	AL RECOVERABLE ME	TALS		· .		Analyst: CMC
Arsenic		0.037	0.020	mg/L	1	5/16/2005 2:17:47 PM
Barium		1.9	0.20	mg/L	10	5/16/2005 3:06:50 PM
Cadmium		ND	0.0020	mg/L	1	5/16/2005 2:17:47 PM
Chromlum		0.020	0.0060	mg/L	1	5/16/2005 2:17:47 PM
Lead		0.028	0.0050	mg/L	1	5/16/2005 2:17:47 PM
Selenium		ND	0.050	mg/L	1	5/16/2005 2:17:47 PM
Silver		ND	0.0050	mg/L	1	5/16/2005 2:17:47 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

3/18

Page 3 of 7

#### Date: 27-May-05

CLIENT:	San Juan Refining			Client Sample	ID: CW 14	+ 10
Lab Order:	0505104			Collection I	Date: 5/11/2	2005 1:45:00 PM
Project:	Phase II Monitoring					
Lab ID:	0505104-04			M:	ntrix: AQUI	EOUS
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	300.0: ANIONS				·····	Analyst: MAP
Fluoride		2.1	0.10	mg/L	1	5/24/2005
Chloride		78	2.0	mg/L	20	5/24/2005
Phosphorus, Or	thophosphate (As P)	ND	0.50	mg/L	1	5/12/2005
Sulfate		2300	25	mg/L	50	5/27/2005
Nitrate (As N)+	Nitrite (As N)	ND	0.50	mg/L	5	5/26/2005
EPA METHOD	8021B: VOLATILES					Analyst: NSB
Benzene		9800	25	µg/L	50	5/16/2005 6:28:57 PM
Toluene		ND	25	µg/L	50	5/16/2005 6:28:57 PM
Ethylbenzene		2100	25	μg/L	50	5/16/2005 6:28:57 PM
Xylenes, Total		1300	25	hair	50	5/16/2005 6:28:57 PM
Surr: 4-Brom	ofluorobenzene	108	83.3-121	%REC	50	5/16/2005 6:28:57 PM
EPA METHOD	7470: MERCURY					Analyst: CMC
Mercury		ND	0.00020	mg/L	1	5/17/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS				Analyst: CMC
Arsenic		ND	0.10	mg/L	5	5/16/2005 3:09:42 PM
Barium		0.33	0.10	mg/L	5	5/16/2005 3:09:42 PM
Cadmium		ND	0.010	mg/L	5	5/16/2005 3:09:42 PM
Chromium		ND	0.030	mg/L	5	5/16/2005 3:09:42 PM
Lead		ND	0.025	mg/L	5	5/16/2005 3:09:42 PM
Selenium		ND	0.25	mg/L	5	5/16/2005 3:09:42 PM
Silver		ND	0.025	mg/L	5	5/16/2005 3:09:42 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

4/18

Page 4 of 7

Date: 27-May-05

CLIENT:	San Juan Refining			Clier	nt Sample ID: (	OW 14	+ 10
Lab Order:	0505104			c	Collection Date:	5/11/2	005 2:15:00 PM
Project:	Phase II Monitoring						• •
Lab ID:	0505104-05				Matrix:	AQUI	EOUS
Апаlyses		Result	PQL	Qual I	Units	DF	Date Analyzed
EPA METHOD	300.0: ANIONS						Analyst: MAP
Fluoride		0.53	0.10	r	mg/L	1	5/24/2005
Chloride		73	2.0	ĩ	mg/L	20	5/24/2005
Phosphorus, Or	rthophosphate (As P)	ND	0.50	· r	mg/L	1	5/12/2005
Sulfate		350	10	r	mg/L	20	5/24/2005
Nitrate (As N)+I	Nitrite (As N)	ND	0.50	r	mg/L	5	5/26/2005
EPA METHOD	8021B: VOLATILES						Analyst: NSB
Benzene		10000	50	1	μց/L	100	5/16/2005 8:02:40 PM
Toluene		ND	50	I	µg/L	100	5/16/2005 8:02:40 PM
Ethylbenzene		3900	50	ş	μg/L	100	5/16/2005 8:02:40 PM
Xylenes, Total		3200	50	I	µg/L	100	5/16/2005 8:02:40 PM
Surr: 4-Brom	ofluorobenzene	106	83.3-121	ı	%REC	100	5/16/2005 8:02:40 PM
EPA METHOD	7470: MERCURY						Analyst: CMC
Mercury		ND	0.00020	I	mg/L	1	5/17/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS					Analyst: CMC
Arsenic		0.11	0.020	1	mg/L	1	5/16/2005 2:30:31 PM
Barium		11	0.40	1	mg/L	20	5/16/2005 3:35:50 PM
Cadmium		ND	0.0020	I	mg/L	1	5/16/2005 2:30:31 PM
Chromium		0.090	0.0060	1	mg/L	1	5/16/2005 2:30:31 PM
Lead		0.73	0.0050	1	mg/L	1	5/16/2005 2:30:31 PM
Selenium		ND	0.050	I	mg/L	1	5/16/2005 2:30:31 PM
Silver		ND	0.0050	1	mg/L	1	5/16/2005 2:30:31 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

5/18

Page 5 of 7

Date: 27-May-05

CLIENT:	San Juan Refining			Client Sample I	D: CW 16	+ 60
Lab Order:	0505104			Collection D	ate: 5/11/2	2005 3:00:00 PM
Project:	Phase II Monitoring					
Lab ID:	0505104-06			Ma	trix: AQU	EOUS
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	300.0: ANIONS					Analyst: MAP
Fluoride		0.42	0.10	mg/L	1	5/24/2005
Chloride		150	2.0	mg/L	20	5/24/2005
Phosphorus, O	rthophosphate (As P)	ND	0.50	mg/L	1	5/12/2005
Sulfate		150	10	mg/L	20	5/24/2005
Nitrate (As N)+	Nitrite (As N)	ND	0.50	mg/L	5	5/26/2005
EPA METHOD	8021B: VOLATILES					Analyst: NSB
Benzene		5300	25	µg/L	50	5/16/2005 8:33:39 PM
Toluene		75	25	µg/L	50	5/16/2005 8:33:39 PM
Ethylbenzene		3800	25	µg/L	50	5/16/2005 8:33:39 PM
Xylenes, Total		7300	25	µg/L	50	5/16/2005 8:33:39 PM
Sur: 4-Bron	nofluorobenzene	106	83.3-121	%REC	50	5/16/2005 8:33:39 PM
EPA METHOD	7470: MERCURY					Analyst: CMC
Mercury		ND	0.00020	mg/L	1	5/17/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS				Analyst: CMC
Arsenic		ND	0.020	mg/L	1	5/16/2005 3:18:45 PM
Barium		0.60	0.020	mg/L	1	5/16/2005 3:18:45 PM
Cadmium		ND	0.0020	mg/L	1	5/16/2005 3:18:45 PM
Chromlum		ND	0.0060	mg/L	1	5/16/2005 3:18:45 PM
Lead		0.010	0.0050	mg/L	1	5/16/2005 3:18:45 PM
Selenium		ND	0.050	mg/L	1	5/16/2005 3:18:45 PM
Silver		ND	0.0050	mg/L	1	5/16/2005 3:18:45 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

Page 6 of 7

CLIENT: Lab Order:	San Juan Refining 0505104			Client Sample Collection J	•	ank
Project:	Phase II Monitoring					
Lab ID:	0505104-07			Ma	atrix: TRIP	BLANK
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	8021B: VOLATILES	-				Analyst: NSB
Benzene		ND	0.50	μg/L	1	5/16/2005 9:04:43 PM
Toluene		ND	0.50	µg/L	1	5/16/2005 9:04:43 PM
Ethylbenzene		ND	0.50	µg/L	1	5/16/2005 9:04:43 PM
Xylenes, Total		ND	0.50	μg/L	1	5/16/2005 9:04:43 PM
Surr: 4-Bron	nofluorobenzene	98.2	83.3-121	%REC	1	5/16/2005 9:04:43 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

Date: 27-May-05

R - RPD outside accepted recovery limits

E - Value above quantitation range

Page 7 of 7

CLIENT:	San Juan Refining	<b>P</b>							QCSU	QC SUMMARY REPORT	( REPC	DRT
Work Order: Project:	0505104 Phase II Monitoring	gu								4	Method Blank	Blank
Sample ID MBLK	Batch 1	Batch ID: R15380	Test Code: E300	E300	Units: mg/L		Analysis	Analysis Date 5/12/2005	2005	Prep Date	B	
Client ID:			Run 1D:	LC_050512A			SegNo:	361746	16			
Analyte		Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD I	RPDLImit	Qual
Fluoride		QN	0.1									
Chloride		DN	0.1									
Phosphorus, Orthophosphate (As P)	tosphate (As P)	QN	0.5									
Sulfate		QN	0.5									
Nitrate (As N)+Nitrite (As N)	(As N)	ON.	0.1		-							
Sample ID MB	Batch I	Batch ID: R15380	Test Code: E300	E300	Units: mg/L		Analysis	Analysis Date 5/12/2005	2005	Prep Date	Ð	
Client ID:			Run (D:	LC_050512A			SeqNo:	361769	6			
Analyte		Result	POL	SPK value	SPK Røf Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD F	RPDLimit	Qual
Fluorida		QN	0.1									
Chloride		QN	0.1									
Phosphorus, Orthophosphate (As P)	iosphate (As P)	ON S	0.5									
Sulfale			0.5									
Nitrate (As N)+Nitrite (As N)	(As N)	QN	0.1									
Sample ID MB	Batch II	Batch ID: R15380	Test Code: E300	E300	Units: mg/L		Analysis	Analysis Date 5/14/2005	2005	Prep Date	0	
Client ID:			Run ID:	LC_050512A			SeqNa:	362063	3			
Analyta		Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimlt	HighLimit RPD Ref Val	%RPD F	RPDLimit	Qual
Fluoride		QN	0.1	0	0	D	0	D	D			
Chloride		DN	0.1	0	Ð	0	0	0	0			
Phosphorus, Orthophosphate (As P)	osphate (As P)	an	0.5	ο	0	Q	0	0	0			,
Sulfate		0.1124	0.5	D	Ð	D	D	0	D			7
Nilrate (As N)+Nitrite (As N)	(As N)	QN	0.1	0	0	0	o	0	0			
					i							
Qualifiers: N	ND - Not Detected at the Reporting Limit	e Reporting Limit		S - Spi	S - Spike Recovery outside accepted recovery limits	accepted reco	very limits		B - Analyte detected in the associated Method Blank	in the associate	ed Method B	lank
	: • •				•	•	•		•			

Troject:         Phase II Monitoring           Anoye         Inst. mg/L         Anolysis Data 5/24/2005           Clent LD:         Ranult:         Icel Code:         E300         Units. mg/L         Anolysis Data 5/24/2005           Clent LD:         Rasult         POL         SPK value         SPK Ref Val         SeqNo:         365438           Analyce         ND         0.1         SPK value         SPK Ref Val         %REC         LowLmh         Hghulmit         RPC           Chordreb         ND         0.1         0.1         Manis MC         Manis Spate 5/25/2005         365438           Fluoride         ND         0.1         Anolysis Data 5/25/2005         365448         MAN           Chordreb         ND         0.1         Anolysis Data 5/25/2005         365448         MAN           Fluoride         ND         0.1         Anolysis Data 5/25/2005         365704         Manis MC           Fluoride         ND         0.1         Anolysis Data 5/25/2005         SeqNo         Manis MC         Manis PD           Fluoride         ND         0.1         Anolysis Data 5/25/2005         SeqNo         SeqNo         SeqNo         SeqNo           Fluoride         ND         ND         Anolys	CLJENT: San Juan Refining Work Order: 0505104						QC SUI	QC SUMMARY REPORT	OR' Blan
D         MBLK         Batch ID: R15492         Test Code:         E300         Unls: mg/L         Analysis           Run ID:         Run ID:         Run ID:         LC_05052AA         Unls: mg/L         Analysis           Run ID:         Result         PCL         SPK ret Val         %REC         LowLinit           nus, Orthophosphate (As N)         ND         0.1           SeqNo:           nus, Orthophosphate (As N)         ND         0.1         0.1          SeqNo:           nus, Orthophosphate (As N)         ND         0.1           SeqNo:           As N)+NItrite (As N)         ND         0.1           SeqNo:           D         BLK         Batch ID: R15502         Test Code:         SPK ret Val         %REC         LowLinit           No         0.1         ND         0.1          SeqNo:         SeqNo:           MBLK         Batch ID: R1550         Test Code:         SPK ret Val         %REC         LowLinit           Nus.         ND         0.1         ND         0.1         SeqNo:         SeqNo:           MBLK         Batch ID: R15717         Test Code:         SPK ret Val         %	•								
Run D:         LC_050524A         Serdival	MBLK	Test Code	: E300	Units: mg/L		Analysis Da	ite 5/24/2005	Prep Date	l
Result         PQL         SPK value         SPK Ref Val $%$ REC         LowLintlic           ND         0.1         0.1         0.1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1	ä	Run ID:	LC_050524A			SeqNo:	365448		
$\label{eq:constraints} \mbox{ND} \qquad 0.1 \\ \mbox{ND} \qquad 0.5 \\ \mbox{As N} \mbox{ND} \qquad 0.5 \\ \mbox{As N} \mbox{ND} \qquad 0.5 \\ \mbox{As N} \mbox{ND} \qquad 0.5 \\ \mbox{As N} \mbox{ND} \qquad 0.5 \\ \mbox{As N} \mbox{ND} \qquad 0.1 \\ \mbox{As N} \mbox{ND} \qquad 0.1 \\ Run ID: Result Result PCA E E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: mg/L PCA E300 MINI: $			SPK value	SPK Ref Val	%REC		HighLimit RPD Ref Val	%RPD RPDLimit	Qual
nus. Orthophosphate (As N)       0.5       0.5 $0.5$ $0.5$ $0.5$ As N)+Nutrite (As N)       ND       0.5 $0.1$ $0.5$ $0.5$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$ $0.1$							-		
As N)+Nitrite (As N)         ND         0.5         ND         0.1         Analysis           ID         MBLK         Batch ID: R15502         Test Code:         E300         Unlis: mg/L         Analysis           PD         MBLK         Batch ID: R15502         Test Code:         E300         Unlis: mg/L         Analysis           PD         MBLK         Batch ID: R15502         Test Code:         E300         Unlis: mg/L         Analysis           PD         MD         PCL         SPK value         SPK Kaf Val         MCL         SeqNo:           Nus, Orthophosphate (As N)         ND         0.1         ND         0.5         Analysis         SeqNo:           MS N)+Nitrite (As N)         ND         0.1         ND         0.5         Analysis         SeqNo:           MS N)+Nitrite (As N)         ND         0.5         Analysis         SeqNo:         Analysis           MS N)+Nitrite (As N)         ND         0.5         Analysis         SeqNo:         SeqNo:           MS N)         ND         ND         0.5         Analysis         SeqNo:         SeqNo:           MS N         MS N         ND         ND         ND         ND         SeqNo:         SeqNo:	rus, Orthophosphate (As P)								
ID       MBLK       Batch ID: R15502       Test Code:       E300       Unlis:       Mg/L       Analysis         Plant       Run ID:       LC_050525A       SPK reif Val       %REC       Loulint       SeqNo:         Invs. Orthophosphate (As P)       ND       0.1       SPK value       SPK Reif Val       %REC       Loulint         Invs. Orthophosphate (As P)       ND       0.1       ND       0.1       SPK value       %REC       Loulint         Invs. Orthophosphate (As P)       ND       0.1       0.1       Analysis       SeqNo:         Match (As N)       ND       0.1       0.1       Analysis       SeqNo:       Analysis         Match (As N)       ND       0.1       0.1       Analysis       SeqNo:       Analysis         Match (As N)       ND       0.1       0.1       Analysis       SeqNo:       Analysis         Match (As N)       ND       0.1       Analysis       Analysis       SeqNo:       Analysis         Match (As N)       Match (As N)       MD       Analysis       Analysis       SeqNo:       Analysis         Match (As N)       Match (As N)       MD       Analysis       SeqNo:       Analysis         Match (As N)	As N)+Nitrite (As N)								
ID       MBLK       Batch ID: R15502       Test Code: E300       Units: mg/L       Analysis         Part       Run ID:       LC_0505254       SPK Ref Val       %REC       LowLimit         Analysis       ND       D1       SPK Ref Val       %REC       LowLimit         Analysis       ND       0.1       SPK Ref Val       %REC       LowLimit         Analysis       ND       0.1       ND       0.1       SPK Ref Val       %REC       LowLimit         Analysis       ND       0.1       ND       0.1       SPK Ref Val       %REC       LowLimit         Analysis       ND       0.1       ND       0.1       Analysis       SeqNo:         Analysis       ND       0.1       ND       0.1       Analysis       SeqNo:         Analysis       ND       0.1       ND       ND       Analysis       SeqNo:         Analysis       ND       ND       ND       ND       ND       SeqNo:       SeqNo:         Analysis       ND       ND       ND       ND       ND       SeqNo:       SeqNo:         Analysis       ND       ND       ND       ND       ND       SeqNo:       SeqNo: <tr< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr<>									
Run ID:         LC_056555A         SeqNo:           Result         PQL         SPK value         SPK Ref Val         %REC         LowLimit           nus, Orthophosphate (As P)         ND         0.1         %REC         LowLimit         Male         SPK value         SPK Ref Val         %REC         LowLimit           nus, Orthophosphate (As P)         ND         0.1          Antility         N         Antility         Antility         Male         Antility         Male         Antility         Male         <		Test Code	: E300	Units: mg/L		Analysis Da	ite 5/25/2005	Prep Date	
ResultPQLSPK valueSPK Ref Val $%$ RECLowLimitND0.10.10.10.10.10.1nus. Orthophosphate (As N)ND0.50.5AAND0.50.50.5AAND0.50.50.1AAND0.50.50.1AAND0.50.50.5AAND0.10.10.1AANDND10.1LC_050526AANDND0.1ASeqNo:NDND0.1AAND0.10.1AAND0.10.1AAND0.5AAANothoposphate (As N)ND0.5AANothoposphate (As N)ND0.5AANothoposphate (As N)ND0.5AANothoposphate (As N)ND0.5AANothoposphate (As N)ND0.5AANothoposphate (As N)ND0.1AANothoposphate (As N)ND0.5AANothoposphate (As N)ND0.5AANothoposphate (As N)ND0.1AANothoposphate (As N)ND0.1AANothoposphate (As N)ND0.1AANothoposphate (As N)ND0.5A	ï	Run ID:	LC_050525A			SeqNo:	365704		
ND         0.1           ND         0.1           ND         0.5           As N)+Nitrite (As N)         ND           ND         0.5           Run ID:         Run ID:           Run ID:         LC_056526A           Run ID:         LC_056526A           Run ID:         LC_056526A           Run ID:         Run ID:           Run ID:         LC_056526A           Run ID:         Run ID:           Run ID:         RUN ID:           ND         0.1           ND         0.1           Nus, Orthophosphata (As P)         ND           ND         0.5           N)+Nilrite (As N)         0.1			SPK value	SPK Ref Val	%REC		HighLimit RPD Ref Val	%RPD RPDLImit	Qual
ND       0.1         nus, Orthophosphate (As P)       ND       0.5         As N)+Nitrite (As N)       ND       0.5         As N)+Nitrite (As N)       ND       0.1         D       Diff       0.1         As N)+Nitrite (As N)       ND       0.1         ND       ND       0.1         As N)+Nitrite (As N)       ND       0.1         ID       MBLK       Batch ID: R15517       Test Code:       E300         Run ID:       Run ID:       LC_050326A       SPK Nel Val       SeqNo:         Run ID:       PCL       SPK value       SPK Nel Val       NeC       LowLimit         nus, Orthophosphate (As P)       ND       0.1       N       N       N       N         As N)+Nitrite (As N)       ND       0.5       N       N       N       N       N									
Nuls       0.5       ND       0.5         As N)+Nitrite (As N)       ND       0.5       Analysis         As N)+Nitrite (As N)       ND       0.1       Analysis         ID       MBLK       Batch ID: R15517       Test Code: E300       Unlis: mg/L       Analysis         IC       MBLK       Batch ID: R15517       Test Code: E300       Unlis: mg/L       Analysis         IC       MBLK       Batch ID: R15517       Test Code: E300       Unlis: mg/L       Analysis         IC       MBLK       Batch ID: R15517       Test Code: E300       Unlis: mg/L       Analysis         IC       MBLK       Batch ID: R15517       Test Code: E300       Unlis: mg/L       Analysis         IC       MBLK       Batch ID: R15517       Test Code: E300       Unlis: mg/L       Analysis         IC       MBLK       PCL       SPK value       SPK Ref Val       %REC       LowLimit         Ins. Orthophosphate (As P)       ND       0.1       0.1       Ins.       Ins.       Ins.       Ins.         As N)+Nitrite (As N)       ND       0.1       0.1       Ins.       Ins.       Ins.       Ins.				·					
ND         0.5           As N)+Nitrite (As N)         ND         0.1         0.1           ID         MBLK         Batch ID: R15517         Test Code: E300         Unlis: mg/L         Analysis           ID         MBLK         Batch ID: R15517         Test Code: E300         Unlis: mg/L         Analysis           ID         MBLK         Batch ID: R15517         Test Code: E300         Unlis: mg/L         Analysis           ID         MBLK         Run ID:         LC_050526A         SeqNo:         SeqNo:           ID         MD         PQL         SPK value         SPK Ref Val         %REC         LowLimit           Ins, Orthophosphate (As P)         ND         0.1         0.1         Instruct (As N)         0.5         Instruct (As N)         0.5           As N)+Nlittle (As N)         ND         0.1         0.1         Instruct (As N)									
As N)+Nitrite (As N)       ND       0.1         ID       MBLK       Batch ID: R15517       Test Code: E300       Unlts: mg/L       Analysis         ::       Run ID:       LC_050526A       SeqNo:       SeqNo:         ::       Result       PCL       SPK value       SPK Ref Val       %REC       LowLimit         .:       ND       0.1       0.1            s, Orthophosphate (As P)       ND       0.1        0.1            s, N)+Nlittle (As N)       ND       0.5         0.1									
ID         MBLK         Batch ID: R15517         Test Code:         E300         Units:         mg/L         Analysis           ::         Run ID:         LC_050526A         SPK Ref Val         %REC         LowLimit           ::         Run ID:         LC_050526A         SPK Ref Val         %REC         LowLimit           ::         Result         PQL         SPK value         SPK Ref Val         %REC         LowLimit           rus, Orthophosphate (As P)         ND         0.1         0.1 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
Run ID:         LC_050526A         SeqNo:           Result         PQL         SPK value         SPK Ref Val         SeqNo:           nus, Orthophosphate (As P)         ND         0.1         N         0.1           Nus, Orthophosphate (As P)         ND         0.1         N         N           As N)+Nlittle (As N)         ND         0.1         0.1         N		Test Code.	: E300	Units: mg/L		Analysis Dai	te 5/26/2005	Prep Date	
Result         PQL         SPK value         %REC         LowLimit           nus, Orthophosphate (As P)         ND         0.1 <td< td=""><td></td><td>Run ID:</td><td>LC_050526A</td><td></td><td></td><td>SeqNo:</td><td>366186</td><td></td><td></td></td<>		Run ID:	LC_050526A			SeqNo:	366186		
			SPK value	SPK Ref Val	%REC		HighLimit RPD Ref Val	%RPD RPDLImit	Qual
ON D									
QN	~								
									,
Qualifiers: ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits		imit	S - Spil	te Recovery outside	accepted reco	verv limits	B - Annlyte detected	<ul> <li>B - Analyte detected in the associated Method Blank</li> </ul>	3lank
1 - Analyte detected helow munititation limite				•	•	•	•		

Work Order: 0505104 Project: ' Phase II ?	san Juan Keuning 0505104 Phuse II Monitoring		:					QC SUM	QC SUMMARY REPORT Method Blank	<b>Y REPORT</b> Method Blank
Sample ID Reagent Blank 5m	I Batch ID: R15402	Test Code:	SW8021 U	Units: µg/L		Analysis Date Soothor	Date	5/16/2005 7:08:29 AM	Prep Date	
Culeriu IO: Analyte	Result	Pol.	SPK value	SPK Ref Val	%REC	LowLimit	High	PD Ref Val	%RPD RPDLimit	mlt Qual
Benzene	QN	0.5								
Toluene	QN	0.5								
Ethylbenzene	DN	0.5								
Xylenes, Total Surr: 4-Bromofluorobenzene	ND 20.29	0.5 0	20	D	101	83.3	121	D		
Sample ID MB-7989	Batch ID: 7989	Test Code: SW7470	SW7470	Units: mg/L		Analysis Date	: Date 5/17/2005	05	Prep Date 5/17	5/17/2005
Client ID:		Run ID:	MI-LA254_050517A	50517A		SeqNo:	362937			
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RF	RPD Ref Val	%RPD RPDLIMI	mit Qual
Mercury	QN	0.0002								
Sample ID MB-7969	Batch ID: 7969	Test Code: SW6010A	SW6010A	Units: mg/L		Analysis	Analysis Date 5/16/2005 1:06:22 PM	05 1:06:22 PM	Prep Date 5/13	5/13/2005
Client ID:		Run ID:	ICP_050516B			SeqNo:	362840			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RF	RPD Ref Val	%RPD RPDLImit	nlt Qual
Arsenic	DN	0.02								
Barium	QN	0.02								
Cadmium	ON	0.002								
Chromium		0.006								
Leau Setadium		0,005								
Silver	- ON	0.005								
										,
Qualifiers: ND - Not Det	ND - Not Detected at the Reporting Limit		S - Spi	<ul> <li>S - Spike Recovery outside accented recovery limits</li> </ul>	nacented reco	very limits	B.	Annlyte detected in	B - Analyte detected in the associated Method Blank	nd Blank
	J - Analyte detected below quantitation limits	si	מ- א	R - RPD outside accepted recovery limits	ecovery limits		1			
					,					1

CLJENT: San Juan Refining Work Order: 0505104 Project: Phase II Monitoring											
rder:	Refining		-					oc su	QC SUMMARY REPORT	/ REP(	DRT
	lonitorine								Sam	Sample Duplicate	licate
	0										
Sample ID 0505104-01B DUP	Batch ID: R15380	Test Code: E300	E300	Units: mg/L		Analysis	Analysis Date 5/12/2005	2005	Prep Date	e	
Client ID: CW 6 + 70		Run ID:	LC_050512A			SeqNo:	361758	8			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLImit	Qual
Phosphorus, Orthophosphate (As P)	DN (4	0.5	0	D	D	0	0	0	D	20	
Sample ID 0505104-06C DUP	Balch ID: 7969	Test Code: SW6010A	SW6010A	Unlts: mg/L		Analysis	Date 5/16/2	Analysis Date 5/16/2005 3:22:52 PM	Prep Date	Prep Date 5/13/2005	
Client ID: CW 16 + 60		Run (D:	ICP_050516B			SeqNo:	362863	3.			
Analyle	Result	Pal	SPK value	SPK Ref Val	%REC	LawLimit	HighLimit	RPD Ref Val	NRPD	RPDLimit	Qual
Arsenic	0.01937	0.02	0	0	0	0	0	D	0	BE	-
Barium	0.6668	0.02	D	0	0	0	0	0.6004	10,4	30	
Cadmlum	QN	0.002	D	0	0	0	0	0	0	30	
Chromium	QN	0.006	D	0	0	0	0	0	a	30	
Lead	0.01333	0.005	0	0	0	0	Ð	0.01022	26.4	30	
Selenium	QN	0.05	Ð	0	0	0	0	D	٥	30	
Silver	0.0007985	0.005	0	0	0	0	0	0	Ð.	30	<b>.</b> ,
				• •							
-											
											,
Qualifiers: ND - Not Detec	ND - Not Detected at the Reporting Limit		S - Spi	S - Spike Recovery outside accepted recovery limits	accepted reco	very limits		<ul> <li>B - Annlyte detected in the associated Method Blank</li> </ul>	in the associate	ed Method B	ank
	J - Analyte detected below quantitation limits	sli	R - RP	R - RPD outside accepted recovery limits	ecoverv limits						-

Hall Envirc	onmental	Hall Environmental Analysis Laboratory	atory							Date: 21	CU-401-12 :0100	
CLJENT: , Work Order:	San Juan 0505104	San Juan Refining 0505104							QC SUMMARY REPORT	[MAR]	MARY REPORT	DR'
Project:	Phase II	Phase II Monitoring								. dumo	VIII	nd n
Sample ID 05051	0505104-01B MS	Batch ID: R15380	Test Code: E300	E300	Units: mg/L		Analysi	Analysis Date 5/12/2005	2005	Prep Dale	e	
Client ID: CW 6 + 70	01 + 70		Run ID:	LC_050512A			SeqNo:	: 361759	6			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LawLimit	HighLimit	RPD Ref Val	%RPD	RPDLImit	Qual
Phosphorus, Orthophosphate (As P)	ophosphate (A	\s P) 5.075	0.5	a	0	102	80	120	0			
Sample ID 0505104-01B MSD	104-01B MSD	Batch ID: R15380	Test Code: E300	E300	Units: mg/L		Analysi	Analysis Date 5/12/2005	2005	Prep Dale	le	
Client ID: CW 6 + 70	+ 70		Run (D:	LC_050512A			SeqNo:	: 361760	0			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Orthophosphate (As P)	ophosphate (A	(s P) 4.964	0.5	2 2	0	99.3	80	120	5.075	2.22	20	}
Sample ID 0505104-01a ms	04-01a ms	Batch ID: R15402	Test Code: SW8021	SW8021	Units: µg/L		Analyst	s Date 5/16/2	Analysis Date 5/16/2005 9:35:32 PM	Prep Date	e	
Cllent ID: CW 6 + 70	+ 70		Run ID:	PIDFID_050516A	16A		SeqNo:	362634	4			
Analyte		Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%КРD	RPDLImit	Qual
Benzene		22.01	0.5	20	2.675	96.7	88.7	114	0			
Toluene		19.67	0.5	20	0.297	96.9	89.3	112	0			
Ethylbenzene		20.05	0.5	20	0.4584	98.0	88.6	113	0			
Xylenes, Total		58.06	0.5	60	1.266	94.7	89.4	112	D			
Surr: 4-Bromofluorobenzene	norobenzene	23.36	Ð	24	0	97.3	83.3	121	C			
Sample ID 0505104-01a msd	04-01a msd	Batch ID: R15402	Test Code: SW8021	SW8021	Units: µg/L		Analysis Date		5/16/2005 10:06:25 PM	Prep Date	6	
Client ID: CW 6 + 70	+ 70		Run ID:	PIDFID_050516A	16A		SeqNo:	362635	10 I			
Analyte		Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit F	RPD Ref Val	%RPD	RPDLImit	Qual
Benzene		22.12	0.5	20	2.675	97.2	88.7	114	22.01	0.464	27	
Toluene		19.48	0.5	20	0.297	95.9	89.3	112	19.67	0.966	19	
Ethytbenzene		20.23	0.5	20	0.4584	98,8	88.6	113	20.06	0.802	10	
Xylenes, Total		57.92	0.5	60	1.266	94.4	89.4	112	58.06	0.242	13	
Surr: 4-Bromolivorobenzene	Jorobenzene	23.49	0	24	0	97.9	83.3	121	23.36	0.547	0	
Qualifiers:	ND - Not Det	ND - Not Detected at the Reporting Limit		S - Spi	- Spike Recovery outside accepted recovery limits	accepted rec	overy limits	B	B - Analyte detected in the associated Method Blank	the associat	ed Method B	lank
							•		,			

CLIENT: Work Order:	San Juan Refining 2r: 0505104	Refining							QC SUMMARY REPORT	IMAR)	Y REPO	RT
Project:	Phase II }	Phase II Monitoring								Sample	Sample Matrix Spike	bik
Sample ID 0	0505104-06C MS	Batch ID: 7969	Test Code: Birn ID:	: SW6010A	Units: mg/L		Analysis Date Servio:	Date	5/16/2005 2:55:37 PM 362856	Prep Da	Prep Date 5/13/2005	
		Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit		HighLimit RPD Ref Val	0.48%	RPDLImit	Qual
Arsenic		0.5693	0.02	0.5	0.02032	110	75	125	0			
Cadmlum Chromlum		0.5242 0.5004	0.002 0.006	0.5	<b>.</b>	105 100	75 75	125 125	0 0			
Lead		0.5047	0.005	0.5	0.01022	98.9	75	125	0			
Selenlum Silver		0.5375	0.05	0.5	00	93.0 107	75 75	125	00			
Sample (D 05	0505104-06C MSD	Batch ID: 7969	Test Code:	Test Code: SW6010A	Units: mg/L		Analysis	Dale 5/16/	Analysis Dale 5/16/2005 2:59:48 PM	Prep Da	Prep Date 5/13/2005	1
Client ID: CI	CW 16 + 60		Run ID:	ICP_050516B			SeqNo:	362857	11			
Analyte		Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	RPDLImit	Qual
Arsenic		0.567	0.02	0.5	0.02032	109	75	125	0,5693	0.415	20	
Cadmium		0.5172	0.002	0.5	0	103	75	. 125	0.5242	1.33	20	
Chromlum		0.4934	0.006	0.5	0	98.7	75	125	0.5004	1.42	20	
Lead		0.4987	0.005	0.5	0.01022	97.7	75	125	0.5047	1.21	20	
Selenłum		0.4678	0.05	0.5	D	93.6	75	125	0.4651	0.575	20	
Silver		0.528	0,005	0.5	<b>0</b>	106	75	125	0.5375	1.79	20	
		۰. ۱										1
				·								
Qualifiers:	ND - Not Dete J - Anslyte det	ND - Not Detected at the Reporting Limit J - Amblyte differted helow anomativation United		ida - s ita - a	<ul> <li>S - Spike Recovery outside accepted recovery limits</li> <li>P PUD conside concerts</li> </ul>	accepted reco	very limits	H	B - Annlyte detected in the associated Method Blank	the associat	ted Method Bla	¥ ,
	ישו שונותות ד	ни чонанияма флановной	5	IV - 101	K - KirD outsido accepted recovery limits	covery limits						5

CLIENT:												
-	San Juan Refining								QC SUI	MMAR	QC SUMMARY REPORT	CRC
Work Order: Project:	0505104 Phase II Monitoring	50							Laboratory Control Spike - generic	' Control	Spike - g	sneri
Sample ID LCS	Batch ID:	Batch ID: R15380	Test Code: E300	E300	Units: mg/L		Analysis	Analysis Date 5/12/2005	2005	Prep Date	ale	
Client ID:			Run ID:	LC_050512A			SeqNo:	361747	11			
Analyte		Result	PQL	SPK value	SPK Røf Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLIMIt	Qual
Fluoride		0.5047	0.1	0.5	0	101	66	110	0			
Chloride		4.755	0.1	5	D	95.1	06	110	0			
Phosphorus, Orthophosphate (As P)	iosphate (As P)	4.836	0.5	מו	<b>0</b>	96.7	06	110	0			
Sulfate		9.669	0.5	10	D	96.7	06	110	a			
Nitrate (As N)+Nitrite (As N)	(As N)	3.386	0.1	3.5	D	96.7	06	110	0			
Sample ID LCS	Batch ID: R15380	R15380	Test Code: E300	E300	Unlts: mg/L		Analysis	Analysis Date 5/12/2005	2005	Prep Date	ate	
Client ID:			Run ID:	LC_050512A			SeqNo:	361770	0			
Analyte		Result	Pal	SPK value	SPK Ref Val	%REC	LowLlmit	HighLimit	HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride		0.5233	0.1	0.5	0	105	66	110	0			
Chlorlde		4.89	0.1	ŝ	0	97.8	60	110	0			
Phosphorus, Orthophosphate (As P)	iosphate (As P)	5.19	0.5	5	D	104	06	110	0			
Sulfate		9.994	0.5	10	0	<b>99.9</b>	06	110	0			
Nitrate (As N)+Nitrite (As N)	(As N)	3.485	0.1	3.5	O	9.66	06	110	C			
Sample ID LCS	Batch ID: R15380	R15380	Test Code:	E300	Unlts: mg/L		Analysis	Analysis Date 5/14/2005	2005	Prep Date	ate	
Client ID:			Run ID:	LC_050512A			SeqNo:	362064	4			
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	048%	RPDLImit	Qual
Fluoride		0.516	0.1	0.5	0	103	06	110	0			
Chloride		4.744	0.1	5	o	94.9	06	110	0			
Phosphorus, Orthophosphate (As P)	osphate (As P)	4.845	0.5	ۍ ا	0	96.9	06	110	0			ï
Sulfate		9.712	0.5	10	0.1124	96.0	06	110	a		•	
Nitrate (As N)+Nitrite (As N)	(As N)	3.383	0.1	3.5	0	96.7	06	110	D			
Qualifiers: N	ND - Not Detected at the Reporting Limit	Reporting Limit		S - Spi	S - Spike Recovery outside accepted recovery limits	e accepted rect	very limits		B - Analyte detected in the associated Method Blank	l in the associ	ated Method F	llank
-	I - A notice detected helow munitation finite	11		1								

CLJENT: Work Order: Project:	San Juan Refining 0505104 Phase II Monitoring						I	QC SUI	QC SUMMARY REPORT Laboratory Control Spike - generic	REPO ike - gei	IR1
Sample ID LCS Client ID:	Batch ID: R15492	Test Code: E300 Run ID: LC 0	: E300 LC 050524A	Unlts: mg/L		Analysis SegNo:	Analysis Date   5/24/2005 SegNo:	2	Prep Date		[]
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RP	RPD Ref Val	%RPD RI	RPDLimit	Qual
Fluoride	0.5042	0.1	0.5	0	101	06	110	0			
Chloride	4.586	0.1	2	o	91.7	06	110	0			
Phosphorus, Orthophosphate (As P)		0.5	5	D	93.1	06	110	0			
Sulfate Nitrate (As N)+Nitrite (As N)	e (As N) 3.255	0.5 0.1	10 3.5	0 0	93.2 93.0	06	110 110	0 0			
Sample ID LCS	Batch ID: R15502	Test Code: E300	: E300	Units: mg/L		Analysis	Analysis Date 5/25/2005	5	Prep Date		
Client ID:		Run (D:	LC_050525A			SeqNo:	365705				
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RP	RPD Ref Val	%RPD R	RPDLimit	Qual
Fluoride	0.5249	0.1	0.5		105	06	110	0			
Chloride	4.589	0.1	5	0	91.8	06	110	٥			
Phosphorus, Orthophosphate (As P)	shosphate (As P) 4.656	0.5	5	O ,	93.1	06	110	0			
Sulfate	9.366	0.5	10	D	93.7	06	110	Ð			
Nitrate (As N)+Nitrite (As N)	e (As N) 3.236	0.1	3.5	D	92.4	06	110	0			
Sample ID LCS	Batch ID: R15517	Test Code:	E300	Units: mg/L		Analysis Dale	Date 5/26/2005	6	Prep Date		
Client ID:	•	Run ID:	LC_050526A			SeqNo:	366187				
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RPD Ref Val	D Ref Val	%RPD RF	RPDLimit	Qual
Fluoride	0.4586	0.1	0.5	0	91.7	08	110	0			
Chloride	4.665	0.1	Ω	o	93.3	08	110	0			
Phosphorus, Orthophosphate (As P)	hosphale (As P) 4.688	0.5	Ω	D	93.8	06	110	D			
Sulfate	9.338	0.5	10	Ģ	93.4	06	110	٥			
Nilrate (As N)+Nilrite (As N)	e (As N) 3.306	0.1	3.5	O	94.5	06	110	٥			t
Qualifiers:	ND - Not Detected at the Reporting Limit	iit 	S-Sp Id	S - Spike Recovery outside accepted recovery limits	accepted rect	wery limits	B-/	Analyte detected	B - Analyre detected in the associated Method Blank	Method BI	붙
	1 - Wilking under under Unit with the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the second state of the secon	1111115	2-4	K - KUD OUISIDE RECEDICO FECOVERY HIMILS	COVCTY IIIIII						

	0505104 Phase II Monitoring							Laboratory Control Spike - generic	Control	Spike - ge	neric
Sample ID BTEX Ics 100ng Client ID:	Batch ID: R15402	Test Code: SW8021 Run ID: PIDFID	SWB021 U PIDFID_050516A	Units: µg/L 16A		Analysis SeqNo:	Date	5/17/2005 2:41:13 AM 362606	Prep Dale	ale	
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene Taluene Ethylbenzene Xylenes, Total	19.62 19.42 19.56 58.39	0.5 0.5 0.5 0.5	20 20 20 60	0000	98.1 97.1 97.8 97.3	88.7 89.3 88.6 89.4	112 112 113 112	0000			
Sample ID LCS-7989	Batch ID: 7989	Test Code: SW7470	SW7470	Unlts: mg/L		Analysis Date	Date	5/17/2005	Prep Da	Prep Date 5/17/2005	
Cilent ID: Analyte	Result	Run 10: POL	MI-LA254_050517A SPK value SPK I	0517A SPK Ref Val	%REC	SegNo: LowLimit	362938 HighLimit R	38 RPD Ref Val	%RPD	RPDLImit	Qual
Mercury	0.004839	0.0002	0.005	0.	96.8	75.2	134	D			
Sample ID LCSD-7989	Batch ID; 7989	Test Code: SW7470	SW7470	Unlts: mg/L		Analysis	Analysis Date   5/17/2005	2005	Prep Da	Prep Date 5/17/2005	
Cllent ID:		Run ID:	MI-LA254_050517A	0517A		SeqNo:	362962	32			
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.004773	0.0002	0.005	0	95.5	75.2	134	0.004839	1.35	D	
Sample ID LCS-7969	Batch ID: 7969	Test Code: SW6010A	SW6010A	Unlts: mg/L		Analysis	: Date 5/16/	Analysis Date 5/16/2005 1:09:21 PM	Prep Dale	le 5/13/2005	
Client ID:		Run ID:	ICP_050516B			SeqNo:	362841	11			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.526	0.02	0.5	0	105	80	120	0			
Barium	0.5109	0.02	0.5	O	102	80	120	0			
Cadmium	0.5159	0.002	0.5	D	103	80	120	D			
Chromium	0.5079	0.006	0.5	Ō	102	80	120	0			,
Selenium	0.5057	euu.u 0.05	0.5 0.5		1 <u>0</u>	08 08	120				
Silver	0.5122	0.005	0.5	D	102	80	120	0			
Qualifiers: ND - Not Dete	ND - Not Detected at the Reporting Limit		S - Spi	S - Spike Recovery outside accepted recovery limits	accepted rect	overy limits		B - Analyte detected in the associated Method Blank	n the associa	ated Method B	ank
J - Analyte de	J - Analyte detected below quantitation limit	aits	R - RP	R - RPD outside accepted recovery limits	ecovery limit					·	لى

CLJENT: Work Order:	San Juan 0505104	San Juan Refining 0505104							QC SUMMARY REPORT Laboratory Control Spike Dunlicate	IMAR)	<b>/ REPO</b>	RT
Project:	Phase II	Phase II Monitoring								-	•	
Sample ID LCSD-7969	-7969	Batch ID: 7969	Test Code:	Fest Code: SW6010A	Units: mg/L		Analysis Date	Date 5/16/2	5/16/2005 1:12:23 PM	Prep Dat	Prep Date 5/13/2005	
Cllent ID:			Run ID:	ICP_050516B			SeqNo:	362842	2			
Analyle		Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic		0.5106	0.02	0.5	0	102	8	120	0.526	2.97	20	
Barlum		0,4946	0.02	0.5	0	98.9	80	120	0,5109	3.23	20	
Cadmium		0.5016	0.002	0.5	D	100	80	120	0.5159	2.82	20	
Chromium		0.4943	0.006	0.5	D	98.9	80	120	0.5079	2.71	20	
Lead		0.4894	0.005	0.5	0	97.9	80	120	0.5041	2.95	20	
Selenium		0.4864	0.05	0.5	0	97.3	80	120	0.5057	3.89	20	
Silver		0.4958	0.005	0.5	0	99.2	80	120	0.5122	3.26	20	
Qualífiers:	ND - Not Det J - Analyte de	ND - Not Detected at the Reporting Limit J - Analyte detected below quantitation limits	ii I	S - Spil R - RPI	S - Spike Recovery outside accepted recovery limits R - RPD outside accepted recovery limits	accepted reco ecovery limits	very limits	æ	B - Analyte detected in the associated Method Blank	n the associat	ed Method Bla	ank 4

Hall Environmental Analysis Labo	oratory				5
	Sample	Receipt Ch	ecklist		
Client Name SJR			Date and Time	Received:	5/12/2005
Nork Order Number 0505104	$\bigcap$		Received by	TA	
Checklist completed by	Shin	Date	5/12/	05	
Matrix	Carrier name	UPS			
Shipping container/cooler in good condition?		Yes 🗹	No 🗆	Not Present	
Custody seals intact on shipping container/cooler	}	Yes 🗹	No 🗆	Not Present	Not Shipped
Custody seals intact on sample bottles?		Yes 🗌	No 🗹	N/A	
Chain of custody present?		Yes 🗹	No 🗖		
Chain of cuslody signed when relinquished and re	ceived?	Yes 🗹	No 🗔		
Chain of custody agrees with sample labels?		Yes 🗹	No 🗖		
Samples in proper container/bottle?		Yes 🗹	No 🗔		
Sample containers intact?		Yes 🗹	No 🗆		
Sufficient sample volume for indicated test?		Yes 🗹	No 🗆		
All samples received within holding time?		Yes 🗹	No 🗆		
Water - VOA vials have zero headspace?	No VOA vials subr	nitted 🔲	Yes 🗹	No 🗖	
Water - pH acceptable upon receipt?		Yes 🗹	No 🗖	N/A	
Container/Temp Blank temperature?		21°	4° C ± 2 Accept If given sufficien		
COMMENTS:					
Client contacted	Date contacted:		Per	son conlacted	
Contacted by:	Regarding				
Comments:					
				,,, <b></b>	
			*****		
Corrective Action					
					· · · · · · · · · · · · · · · · · · ·
	<u>.</u>		<u> </u>	······	······································

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D Albuquerque, New Mexico B7109 Tel. 505.345.3975 Fax 505.345.4107 www.hallenvironmental.com	ANALYSIS REQUEST	(2808) a	A or PAH) stals C1, NO <sub>3</sub> , NO <sub>2</sub> sicides / PCB	202 (Meth 8310 (PN M 8473 M 8473 7837 (F, 1837 Pest 82608 (V V) 80258 V) 80258 V) 8250 (Ser			X	×		×	×	· · · · · · · · · · · · · · · · · · ·					
	<u>(۸)</u>	n0 eniloze0)	1965 + 1991 1965 + 1991 1993 + 1997 1993 + 1997	BTEX + Metho tpH Metho	X				 X						Remarks:		
BA/ GC Package: Std a level 4 a Other: Project Name: Phase II Monchorring	Project #:	Project Manager:	Sampter: Indu Hur tado Angelc Sample Temperature:	Number/Volume H9CL <sub>2</sub> HNO <sub>3</sub>	2-YOA X 17505104-1	1-250m 0. H2 Sout	1-250ml	1-50ml X	210A X -2	1-20ml Hr.S.4	1-250ml	1-500 × X			15/12/05-	Received By: (Signature)	•
CHAIN-OF-CUSTODY RECORD	Aldreft 50, CR 4990 Rloom 4. eld, NM 87413		Phone #: 505-632-4141 Fax #: 505-632-39/1	Date Matrix Sample I.D. No.	5-11-05 915 Hz0 CW Le + 70			۲ ۲	5-11-05 1030 HzO RW 8 +10					1	)5- Z4Dpm	Date: Time:' Relinquished by: (Signature)	-

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D Albuquerque, New Mexico 87109 Tel. 505, 345, 3975 Fax 505, 345, 4107 www.hallenvironmental.com	EDB (Method 504.1) EDC (Method 8021) 8310 (PVA or PAH) Anions (F, Cl, VO <sub>2</sub> , VO <sub>2</sub> , PO <sub>4</sub> , SO <sub>4</sub> ) 88608 (YOO <sub>2</sub> , VO <sub>2</sub> , PO <sub>4</sub> , SO <sub>4</sub> ) 82608 (YOA) 82500 (Semi-VOA) 8270 (Semi-VOA)		
	BTEX + MTBE + TMB's (8024) BTEX + MTBE + TPH (Gasoline Only) TPH (Method & 0.5 (Gas/Diesel) TPH (Method & 18.1)		
Dither: Btd D Level 4 C Other: Project Name: Project #:	Project Manager: Sample?	2-VoA-X 2-VoA-X 1-252ml HrSe 1-252ml X 1-Sobul X 2-VOA-X 1-252ml HrSe 1-252ml HrSe 1-257ml HrSe 1-257ml HrSe 1-257ml X 1-257ml HrSe 1-257ml	
CHAIN-OF-CUSTODY RECORD Client: SAN Juan Refund	TF SU CK 4440 Phone #: 505-632-4161 Fax #: 505-632-4161 Date Time Matrix Sample I.D. No.	S-11-05 1145-4hm H2O OW 11 + 15 5-11-05 1145-pm H2O OW 14 + 10 C11-05 1145pm H2O CW 14 + 10 Date: Time: 0 Relifughishert BV: (Signature) A Date: Time: Relifughishert BV: (Signature) A	

I

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D	Albuquerque, New Mexico a7 109 Tel: 505.345.3975 Fax 505.345.4107 www.hallenvironmental.com	ANALYSIS REDUEST		085)	18} s,	7) \\ LCB 1'' NO <sup>5</sup> 11)	08 bor 21835 00 , 15 28615 200 , 15 200 , 10 200 - 10	EDC (Meti B310 (PV RCRA 8 M Anions (F, 8081 Pesi 8081 Pesi 8250 (Sei V) 8250 (Sei 8270 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 8150 (Sei 81500 (Sei 81500 (Sei 8150 (Sei 81500 (Sei 8		×		×		×	~					•
			(Ájt	ı0 ənilo	)28 <b>6</b> )	198 (C 198 (C	,08 bo 14 901 14 901 18 4	8TEX +-₩ BTEX + M TPH Meth TPH Meth TPH (Meth	K										 Remarks;	
QA/ GC Package: Std 🔲 Level 4 🗍 Other:	Project Name: PLASE IT NON Found	Project #:		Project Manager:	. /	Samplet Hutzolo/Angela Folk	Sample Temberature: 1/	Number/Valume H9Cl <sub>2</sub> HNO <sub>3</sub> HEAL No.	2-VOR X ROV-5		0	X mags-1	 2-VOF X -6	1-250m0 H25DV	1-250mD	X Judes-1	7-		Regeived by: (Signaturb) S/ (2/03- Received By: (Signature)	
CHAIN-OF-CUSTODY RECORD	Client: SAN Juan Reprines	Rd 4990	Bloom Fild, NW	61460,		632-41ul	632-3911	Matrix Sample I.D. No.	420 DW 14 +10				H20 CW 16+60				The Back	-	 Relinguished By: (Bignatulre) Luch Chur Allo Ralinquished By: (Signature)	
CHAIN-OF-	Client: SAN J	Address: #50 Rd	Bloom			Phone #:505-632-4141	Fax #: 505-632-	Date	5-11-05 2152-				 571-05 3pm						Date: Time: S-11-05 340m Date: Time:	



HALL ENVIRONMENTAL ANALYSIS LABORATORY

#### COVER LETTER

May 27, 2005

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

RE: Phase II Monitoring

Order No.: 0505088

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 9 samples on 5/11/2005 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



4901 Hawkins NE∎ Suite D■ Albuquerque, NM 87109 505.345.3975 ¥ Fax 505.345.4107 www.hallenvironmental.com

Date: 27-May-05

CLIENT:	San Juan Refining			<b>Client Sample</b>	ID: CW 0+0	60
Lab Order:	0505088			<b>Collection</b>	Date: 5/10/2	2005 8:30:00 AM
Project:	Phase II Monitoring					
Lab ID:	0505088-01			M	ntrix: AQUI	EOUS
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	300.0: ANIONS		<u></u>			Analyst: IC
Fluoride		0.51	0.10	mg/L	1	5/11/2005
Chloride		39	0.50	mg/L	5	5/16/2005
Phosphorus, Or	thophosphate (As P)	ND	0.50	mg/L	1	5/11/2005
Sulfate		75	0.50	mg/L	1	5/11/2005
Nitrate (As N)+I	Nitrite (As N)	ND	0.50	mg/L	5	5/26/2005
EPA METHOD	8021B: VOLATILES					Analyst: NSB
Benzene		200	10	μg/L	20	5/13/2005 7:01:46 PM
Toluene		32	10	hð\r	20	5/13/2005 7:01:46 PM
Ethylbenzene		180	10	µg/L	20	5/13/2005 7:01:46 PM
Xytenes, Total		1000	10	µg/L	20	5/13/2005 7:01:46 PM
Surr: 4-Brom	oluorabenzene	108	83.3-121	%REC	20	5/13/2005 7:01:46 PM
EPA METHOD	7470: MERCURY					Analyst: CMC
Mercury		ND	0.00020	mg/L	1	5/17/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS			, .	Analyst: CMC
Arsenic	•	ND	0.020	mg/L	1	5/16/2005 1:24:22 PM
Barium		0.33	0.020	mg/L	1	5/16/2005 1:24:22 PM
Cadmium		ND	0.0020	mg/L	1	5/16/2005 1:24:22 PM
Chromium		ND	0.0060	mg/L	1	5/16/2005 1:24:22 PM
Lead	4 A. J.	0.012	0.0050	mg/L	1	5/16/2005 1:24:22 PM
Selenium		ND	0.050	mg/L	่ 1	5/16/2005 1:24:22 PM
Silver		ND	0.0050	mg/L	1	5/16/2005 1:24:22 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

Page 1 of 9



Date: 27-May-05

CLIENT:	San Juan Refining			Clier	nt Sample ID: (	CW 1+3	50
Lab Order:	0505088			C	Collection Date:	5/10/2	005 9:15:00 AM
Project:	Phase II Monitoring						
Lab ID:	0505088-02				Matrix:	AQUI	EOUS
Analyses		Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD	300.0: ANIONS						Analyst: IC
Fluoride		0.59	0.10	i	mg/L	1	5/11/2005
Chloride		43	0.50	i	mg/L	5	5/16/2005
Phosphorus, O	rthophosphate (As P)	ND	0.50		mg/L	1	5/11/2005
Sulfate		5.8	0.50		mg/L	1	5/11/2005
Nitrate (As N)+	Nitrite (As N)	ND	0.50		mg/L	5	5/26/2005
EPA METHOD	8021B: VOLATILES						Analyst: NSE
Benzene		1200	10		µg/L	20	5/13/2005 7:32:51 PM
Toluene		41	10		µg/L	20	5/13/2005 7:32:51 PM
Ethylbenzene		240	10		hð\r	20	5/13/2005 7:32:51 PM
Xylenes, Total		2300	10		μg/L	20	5/13/2005 7:32:51 PM
Surr: 4-Brom	nofluorobenzene	109	83.3-121		%REC	20	5/13/2005 7:32:51 PM
EPA METHOD	7470: MERCURY						Analyst: CM0
Mercury		ND	0.00020		mg/L	1	5/17/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS			· .		Analyst: CM
Arsenic		ND	0.020		mg/L	1	5/16/2005 1:28:17 PM
Barium		0.59	0.020		mg/L	1	5/16/2005 1:28:17 PM
Cadmium		ND	0.0020		mg/L	1	5/16/2005 1:28:17 PM
Chromium		ND	0.0060		mg/L	1	5/16/2005 1:28:17 PM
Lead		0.0070	0.0050		mg/L	1	5/16/2005 1:28:17 PM
Selenium		ND	0.050		mg/L	1	5/16/2005 1:28:17 PM
Silver		ND	0.0050		mg/L	1	5/16/2005 1:28:17 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

2/16

Page 2 of 9

Date: 27-May-05

CLIENT:	San Juan Refining			Clien	t Sample ID: (	W 19-	+50
Lab Order:	0505088			C	ollection Date:	5/10/2	2005 10:15:00 AM
Project:	Phase II Monitoring						
Lab ID:	0 <b>5</b> 05088-03				Matrix:	AQUI	EOUS
Analyses		Result	PQL	Qual L	Jnits	DF	Date Analyzed
EPA METHOD	300.0: ANIONS						Analyst: IC
Fluoride		0.35	0.10	ព	ng/L	1	5/11/2005
Chloride		290	2.0	r	ng/L	20	5/16/2005
Phosphorus, O	rthophosphate (As P)	ND	0.50	п	ng/L	1	5/11/2005
Sulfate		290	10	п	ng/L	20	5/16/2005
Nitrate (As N)+	Nitrite (As N)	ND	0.50	n	ng/L	5	5/26/2005
EPA METHOD	8021B: VOLATILES						Analyst: NSB
Benzene		1900	10	ų	ıg/L	20	5/13/2005 8:03:34 PM
Toluene		13	10	Ч	ig/L	20	5/13/2005 B:03:34 PM
Ethylbenzene		860	10	ų	ig/L	20	5/13/2005 B:03:34 PM
Xylenes, Total		3200	10	μ	ıg/L	20	5/13/2005 8:03:34 PM
Surr: 4-Bron	ofluorobenzene	109	83.3-121	%	6REC	20	5/13/2005 8:03:34 PM
EPA METHOD	7470: MERCURY						Analyst: CMC
Мегсилу		ND	0.00020	n	ng/L	1	5/17/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS					Analyst: CMC
Arsenic		ND	0.020	n	ng/L	1	5/16/2005 1:32:07 PM
Barium		0.23	0.020	п	ng/L	1	5/16/2005 1:32:07 PM
Cadmium		ND	0.0020	n	ng/L	1	5/16/2005 1:32:07 PM
Chromium		ND	0.0060	n	ng/L	1	5/16/2005 1:32:07 PM
Lead		0.024	0.0050	л	ng/L	1	5/16/2005 1:32:07 PM
Selenium		ND	0.050	n	ng/L	1	5/16/2005 1:32:07 PM
Silver		ND	0.0050	n	ng/L	1	5/16/2005 1:32:07 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

Page 3 of 9



Date: 27-May-05

CLIENT:	San Juan Refining			Client Sam	ple ID: C	W 19+	-50
Lab Order:	0505088			Collecti	on Date:	5/10/2	.005 10:45:00 AM
Project:	Phase II Monitoring						
Lab ID:	0505088-04				Matrix:	AQUE	EOUS
Analyses		Result	PQL	Qual Units		DF	Date Analyzed
EPA METHOD	300.0: ANIONS						Analyst: IC
Fluoride		0.35	0.10	mg/L		1	5/11/2005
Chloride		230	2.0	mg/L		20	5/16/2005
Phosphorus, O	rthophosphate (As P)	ND	0.50	mg/L		1	5/11/2005
Sulfate		260	10	mg/L		20	5/16/2005
Nitrate (As N)+	Nitrite (As N)	ND	0.50	mg/L		5	5/26/2005
EPA METHOD	8021B: VOLATILES						Analyst NSE
Benzene		4800	100	hð\r		200	5/16/2005 9:08:18 AM
Toluene		21	20	µg/L		40	5/13/2005 8:34:07 PM
Ethylbenzene		1700	100	µg/L		200	5/16/2005 9:08:18 AM
Xylenes, Total		5100	100	µg/L		200	5/16/2005 9:08:18 AM
Surr: 4-Bron	nofluorobenzene	103	83.3-121	%REC		200	5/16/2005 9:08:18 AM
EPA METHOD	7470: MERCURY						Analyst CMC
Mercury		ND	0.00020	mg/L		1	5/17/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS					Analyst: CM
Arsenic		ND	0.020	mg/L		1	5/16/2005 1:36:10 PM
Barium		0.20	0.020	mg/L		1	5/16/2005 1:36:10 PM
Cadmium		ND	0.0020	mg/L		1	5/16/2005 1:36:10 PM
Chromium		ND	0.0060	mg/L		1	5/16/2005 1:36:10 PM
Lead .		0.0061	0.0050	mg/L		1	5/16/2005 1:36:10 PM
Selenium		ND	0.050	mg/L		1	5/16/2005 1:36:10 PM
Silver		ND	0.0050	mg/L		1	5/16/2005 1:36:10 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

Page 4 of 9

Date: 27-May-05

CLIENT:	San Juan Refining			Client Sample	ID: CW 3+	85
Lab Order:	0505088			Collection	Date: 5/10/2	2005 1:30:00 PM
Project:	Phase II Monitoring					
Lab ID:	0505088-05			М	atrix: AQU	EOUS
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	300.0: ANIONS					Analyst: IC
Fluoride		0.21	0.10	mg/L	1	5/11/2005
Chloride		270	2.0	mg/L	20	5/16/2005
Phosphorus, O	rthophosphate (As P)	ND	D.50	mg/L	1	5/11/2005
Sulfate		32	0.50	mg/L	1	5/11/2005
Nitrate (As N)+	Nitrite (As N)	ND	0.50	mg/L	5	5/26/2005
EPA METHOD	8021B: VOLATILES					Analyst: NSB
Benzene		35	10	µg/L	20	5/13/2005 9:04:37 PM
Toluene		22	10	µg/L	20	5/13/2005 9:04:37 PM
Ethylbenzene	•	20	10	µg/L	20	5/13/2005 9:04:37 PM
Xylenes, Totai		250	10	µg/L	20	5/13/2005 9:04:37 PM
Surr: 4-Bron	nofluorobenzene	105	83.3-121	%REC	20	5/13/2005 9:04:37 PM
EPA METHOD	7470: MERCURY					Analyst: CMC
Mercury		ND	0.00020	mg/L	1	5/17/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS		· · ·		Analyst: CMC
Arsenic		ND	0.020	mg/L	1	5/16/2005 1:49:03 PM
Barium		0.68	0.020	mg/L	1	5/16/2005 1:49:03 PM
Cadmium		ND	0.0020	mg/L	1	5/16/2005 1:49:03 PM
Chromium		ND	0.0060	mg/L	1	5/16/2005 1:49:03 PM
Lead		ND	0.0050	mg/L	1	5/16/2005 1:49:03 PM
Selenium		ND	0.050	mg/L	1	5/16/2005 1:49:03 PM
Sliver		ND	0.0050	mg/L	1	5/16/2005 1:49:03 PM

Qual	lifiers:
------	----------

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

5/16

Page 5 of 9

Date: 27-May-05

CLIENT:	San Juan Refining			Client Sample I	<b>D:</b> CW 5+5	50
Lab Order:	0505088			Collection D	ate: 5/10/2	005 2:15:00 PM
Project:	Phase II Monitoring					
Lab ID:	0505088-06			Ma	trix: AQUI	EOUS
Analyses		Result	PQL (	Qual Units	DF	Date Analyzed
EPA METHOD 3	00.0: ANIONS					Analyst: IC
Fluoride		0.33	0.10	mg/L	1	5/11/2005
Chloride		2700	10	mg/L	100	5/17/2005
Phosphorus, Orth	rophosphate (As P)	ND	0.50	mg/L	1	5/11/2005
Sulfate		75	50	mg/L	100	5/17/2005
Nitrate (As N)+Ni	itrite (As N)	ND	0.50	mg/L	5	5/26/2005
EPA METHOD 8	021B: VOLATILES					Analyst: NSB
Benzene		200	10	µg/L	20	5/13/2005 9:35:08 PM
Toluene		11	10	µg/L	20	5/13/2005 9:35:08 PM
Ethylbenzene		64	10	µg/L	20	5/13/2005 9:35:08 PM
Xylenes, Total		240	10	µg/L	20	5/13/2005 9:35:08 PM
Surr: 4-Bromo	fluorobenzene	105	83.3-121	%REC	20	5/13/2005 9:35:08 PM
EPA METHOD 7	470: MERCURY					Analyst: CMC
Mercury		ND	0.00020	mg/L	1	5/17/2005
EPA 6010: TOT.	AL RECOVERABLE ME	TALS				Analyst: CMC
Arsenic		ND	0.020	mg/L	1	5/16/2005 1:53:08 PM
Barium		0.83	0.020	mg/L	1	5/16/2005 1:53:08 PM
Cadmium		ND	0.0020	mg/L	1	5/16/2005 1:53:08 PM
Chromium		ND	0.0060	mg/L	1	5/16/2005 1:53:08 PM
Lead		ND	0.0050	mg/L	1	5/16/2005 1:53:08 PM
Selenium		ND	0.050	mg/L	1	5/16/2005 1:53:08 PM
Silver		ND	0.0050	mg/L	1	5/16/2005 1:53:08 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

6/16

Page 6 of 9

	J					
CLIENT:	San Juan Refining			Client San	ple ID: Trip Bla	unk
Lab Order:	0505088			Collect	ion Date:	
Project:	Phase II Monitoring					
Lab ID:	0505088-07				Matrix: TRIP	BLANK
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	8021B: VOLATILES	<u> </u>				Analyst: NSB
Benzene		ND	0.50	µg/L	1	5/13/2005 10:05:30 PM
Toluene		ND	0.50	µg/L	1	5/13/2005 10:05:30 PM
Ethylbenzene		ND	0.50	µg/L	1	5/13/2005 10:05:30 PM
Xylenes, Total		ND	0.50	µg/L	1	5/13/2005 10:05:30 PM
Surr: 4-Brom	olluorobenzene	98.6	83.3-121	%REC	1	5/13/2005 10:05:30 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

Date: 27-May-05

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

7/16

Page 7 of 9



Date: 27-May-05

CLIENT:	San Juan Refining			Client S	ample ID: (	CW 224	+00
Lab Order:	0505088			Colle	ection Date:	5/10/2	2005 2:45:00 PM
Project:	Phase II Monitoring		·				
Lab ID:	0505088-08				Matrix:	AQUI	EOUS
Analyses		Result	PQL	Qual Uni	ts	DF	Date Analyzed
EPA METHOD	300.0: ANIONS				<u> </u>		Analyst: IC
Fluoride		0.74	0.10	mg/L	-	1	5/11/2005
Chloride		510	2.0	mg/L	-	20	5/17/2005
Phosphorus, Or	thophosphate (As P)	ND	0.50	mg/l	-	1	5/11/2005
Sulfate		38	0.50	mg/l	-	1	5/11/2005
Nitrate (As N)+1	Nitrite (As N)	ND	0.50	mg/l	-	5	5/17/2005
EPA METHOD	8021B: VOLATILES						Analyst: NSB
Benzene		7000	100	µg/L		200	5/16/2005 9:38:58 AM
Toluene		90	10	µg/L		20	5/13/2005 10:35:52 PM
Ethylbenzene		95	10	µg/L		20	5/13/2005 10:35:52 PM
Xylenes, Total		200	10	µg/L		20	5/13/2005 10:35:52 PM
Surr: 4-Brom	olinompeuzene	106	83.3-121	%RE	EC	20	5/13/2005 10:35:52 PM
EPA METHOD	7470: MERCURY						Analyst: CMC
Mercury		ND	0.00020	mg/l	-	1	5/17/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS				•	Analyst: CMC
Arsenic		ND	0.020	mg/l	-	1	5/16/2005 1:57:15 PM
Barium		0.61	0.020	mg/l	L <b>.</b>	1	5/16/2005 1:57:15 PM
Cadmium		ND	0.0020	mg/l	L	1	5/16/2005 1:57:15 PM
Chromium		ND	0.0060	mg/l	L.	1	5/16/2005 1:57:15 PM
Lead		ND	0.0050	mg/l	-	1	5/16/2005 1:57:15 PM
Selenium		ND	0.050	mg/l	Ļ	1	5/16/2005 1:57:15 PM
Silver		ND	0.0050	mg/l	L	1	5/16/2005 1:57:15 PM

Qualifiers:

- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits
- J Analyte detected below quantitation limits
- B Analyte detected in the associated Method Blank
- \* Value exceeds Maximum Contaminant Level
- R RPD outside accepted recovery limits
- E Value above quantitation range

8/16

Page 8 of 9

CLIENT:	San Juan Refining			Client Sar	nple ID: (	)W 22-	+00
Lab Order:	0505088			Collec	tion Date:	5/10/2	2005 3:10:00 PM
Project:	Phase II Monitoring						
Lab ID:	0505088-09				Matrix:	AQUI	EOUS
Analyses		Result	PQL	Qual Units		DF	Date Analyzed
EPA METHOD	300.0: ANIONS						Analyst: IC
Fluoride		0.78	0.10	mg/L		1	5/11/2005
Chloride		480	2.0	mg/L		20	5/17/2005
Phosphorus, Or	thophosphate (As P)	ND	0.50	mg/L		1	5/11/2005
Sulfate		140	10	mg/L		20	5/17/2005
Nitrate (As N)+N	Nitrite (As N)	ND	0.50	mg/L		5	5/17/2005
EPA METHOD	8021B: VOLATILES						Analyst: NSB
Benzene		3100	10	µg/L		20	5/13/2005 11:06:13 PM
Toluene		45	10	μg/L		20	5/13/2005 11:06:13 PM
Ethylbenzene		150	10	µg/L		20	5/13/2005 11:06:13 PM
Xylenes, Total		340	10	µg/L		20	5/13/2005 11:06:13 PM
Surr. 4-Brom	olluorobenzene	105	83.3-121	%REC		20	5/13/2005 11:06:13 PM
EPA METHOD	7470: MERCURY						Analyst: CMC
Mercury		ND	0.00020	mg/L		1	5/17/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS					Analyst: CMC
Arsenic		ND	0.020	mg/L		1	5/16/2005 2:01:22 PM
Barium		0.16	0.020	mg/L		1	5/16/2005 2:01:22 PM
Cadmium		ND	0.0020	mg/L		1	5/16/2005 2:01:22 PM
Chramium		ND	0.0060	mg/L		1	5/16/2005 2:01:22 PM
Lead		0.012	0.0050	mg/L		1	5/16/2005 2:01:22 PM
Selenium		ND	0.050	mg/L		1	5/16/2005 2:01:22 PM
Silver		ND	0.0050	mg/L		1	5/16/2005 2:01:22 PM

Qualifiers:

ND - Not Detected at the Reporting Limit

Hall Environmental Analysis Laboratory

- 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

Date: 27-May-05

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

9/16

Page 9 of 9

XT:       San Juan Refining         Order:       0505088         L:       Phase II Monitoring         L:       Phase II Monitoring         DMBLK       Batch ID: R15365       Test Code: E300       Unlits: mg/L         ID       MBLK       Batch ID: R15365       Test Code: E300       Unlits: mg/L         Inus, Orthophosphate (As P)       ND       0.1       NREC       Lo         Nus, Orthophosphate (As P)       ND       0.1       0.1       NREC       Lo         Nus, Orthophosphate (As P)       ND       0.1       0.1       NREC       Lo       Lo         Nus, Orthophosphate (As N)       ND       0.1       0.1       NREC       Lo       Lo	QC SUMMARY REPORT         Method Blank         Analysis Date 5/11/2005       Prep Date         SeqNo:       361369         WLinit       HighLinit         RPD Ref Val       %RPD         Malysis Date 5/1/2005       Prep Date         SeqNo:       361369         WLinit       HighLinit         RPD Ref Val       %RPD         Analysis Date 5/16/2005       Prep Date         SeqNo:       362672         Maliyit       HighLinit         RPD Ref Val       %RPD
ID       MBLK       Balch ID: R15366       Test Code: E300       Units: mg/L         D:       Run ID:       LC_050511A       Mnits: mg/L         Run ID:       Run ID:       LC_050511A       MREC         Drus, Orthophosphate (As P)       ND       0.1       MREC         Drus, Orthophosphate (As P)       ND       0.1       MREC         Mus, Orthophosphate (As N)       ND       0.1       MREC         Mus, Orthophosphate (As N)       ND       0.1       MREC         Mus, Orthophosphate (As N)       ND       0.1       MREC         Multicle (As N)       ND       0.1       MIE         Multicle (As N)       MD       0.1       MIE         Multicle (As N)       MD       0.1       MIE         Multicle (As N)       MD       MIE       MIE	is Date 5/11/2005 Prep Date 361369 Arran Maran Maran HighLimit RPD Ref Val MAPD RPDLimit s Date 5/16/2005 Prep Date 362672 Prep Date HighLimit RPD Ref Val MRPD RPDLimit
ND       0.1         ND       0.1         NN       0.5         ND       0.5         As N)+Nitrite (As N)       0.0         ND       0.5         As N)+Nitrite (As N)       0.1         ND       0.5         As N)+Nitrite (As N)       0.1         ND       0.5         Run ID:       10.1         Run ID:       1.0_00516A         Result       PQL         ND       0.1	s Date 5/16/2005 Prep Date : 362672 Mrep RPDLImit HighLimit RPD Ref Val %RPD RPDLimit
ID MBLK Batch ID: R15404 Test Code: E300 Unlis: mg/L Run ID: LC_050516A Result PQL SPK value SPK Ref Val %REC Lo ND 0.1	s Date 5/16/2005 Prep Date : 362672 HighLimit RPD Ref Val %RPD RPDLimit
ND	
Critoride 0.1 Phosphorus, Orthophosphate (As P) ND 0.5 Sulfate XS N)+Nitrite (As N) ND 0.5 Nitrate (As N)+Nitrite (As N) D 0.1	-
Sample ID MBLK Batch ID: R15517 Test Code: E300 Units: mg/L Analysis Client ID: LC_050526A SeqNo: Analyte Result PQL SPK value SPK Ref Val %REC LowLimit	Analysis Date 5/26/2005 Prep Date SeqNo: 366186 wLtmit HighLimit RPD Ref Val %RPD RPDLImit Qual
Fluoride ND 0.1 Chloride ND 0.1 Phosphorus, Orthophosphata (As P) ND 0.5 Sulfate N)+Mitrite (As N) ND 0.5 Nitrate (As N)+Mitrite (As N) ND 0.1	
Qualifiers:     ND - Not Detected at the Reporting Limit     S - Spike Recovery outside accepted recovery limits       J - Analyte detected below quantitation limits     R - RPD outside accepted recovery limits	imits B - Analyte detected in the associated Method Blank

B - Analyte detected in the accordited Method Blank			elini harren bataren etridia etridia etridia.	5		ND - Not Detected at the Reporting 1 imit	Ounliforce. ND - Not Det
			• .		0.0002	ON .	Mercury
%RPD RPDLImlt Qual	LowLimit HighLimit RPD Ref Vai	%REC	SPK Ref Val	SPK value	Pal	Result	Analyte
	SeqNo: 362937		0517A	MI-LA254_050517A	Run (D:		Client ID:
Prep Date 5/17/2005	Analysis Date 5/17/2005		Units: mg/L	SW7470	Test Code: SW7470	Batch ID: 7989	Sample ID MB-7989
	83.3 121 0	101	0	20	0 0	20.29	Ayienes, Total Surr: 4-Bromofluorobenzene
				÷	0.5	QN 9	Ethylbenzene
					0.5 0.5	ON ON	Benzene Toluene
%RPD RPDLimit Qual	LowLimit HighLimit RPD Ref Val	%REC	SPK Ref Val	SPK value	Pal	Result	Analyte
	SeqNo: 362600		16A	PIDFID_050516A	Run ID:		Cllent ID:
Prep Date	Analysis Date 5/16/2005 7:08:29 AM		Units: µg/L	: SW8021	Test Code: SW8021	Balch ID: R15402	Sample ID Reagent Blank 5m
	83.3 121 0	97.7	0	20	0	19.54	Surr: 4-Bromolluorobenzene
					0.5	QN	Xylenes, Total
					0.5	2 2	Ethylbenzene
	-				0.5	ON R	Benzene
%RPD RPDLimit Qual	LowLimit HighLimit RPD Ref Val	%REC	SPK Ref Val	SPK value	Pal	Result	Analyle
	SeqNo: 361595		13A	PIDFID_050513A	Run ID:		Client ID:
Prep Date	Analysis Date 5/13/2005 8:43:30 AM		Units: µg/L	: SWB021	Test Code: SW8021	Batch ID: R15378	Sample ID Reagent Blank 5m
Method Blank						Phase II Monitoring	
The second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon							Work Order: 0505088
OC SUMMARY REPORT	OC SUM					San Juan Refining	CLIENT: San Juan

CLIEN'T:							QC SI	UMMAI	QC SUMMARY REPORT	DRT
Work Order: Project:	Phase II Monitoring								Method Blank	31ank
Sample ID MB-7969	-7969 Batch (D: 7969	Test Code: SW6010A	SW6010A	Units: mg/L	Ana	Ilysis Dale	Analysis Date 5/16/2005 1:06:22 PM		Prep Date 5/13/2005	2
Client 1D:		Run ID: 1	JCP_050516B		Sac	SeqNo:	362840			
Analyte	Result	POL	SPK value	SPK Ref Val	%REC LowLimit		HighLimit RPD Ref Val	%RPD	RPDLImit	Qual
Arsenic	ON	0.02								
Barium	ΩN	0.02								
Cadmlum	ΩN	0.002								
Chramlum	DN	0.006								
Lead	QN	0.005								
Selenium	ON .	0.05								
Silver	QN	0.005								
										,
				· .						
Qualificers:	ND - Not Detected at the Reporting Limit		S - Spike	S - Spike Recovery outside accepted recovery limits	septed recovery lin	nits	B - Analyte detected in the associated Method Blank	ted in the ussoc	ciuted Method B	lank
									~	

Sample ID LCS Client ID: Analyte	0505088 Phase II Monitoring							QC SU Laboratory	QC SUMMARY REPORT Laboratory Control Spike - generic	POR generi
Client ID: Analyte	Batch ID: 815366	Tast Coder E300	Eann	1 Inlts: ma/L		Analvsk	Analvsis Date 5/11/2005	2005	Preo Date	
Analyte		Run ID:	LC_050511A			SeqNo:	361370	R		
	Result	POL	SPK value	SPK Ref Val	%REC	LowLimlt	LowLimit HighLimit RPD Ref Val	RPD Ref Val	%RPD RPDLimit	t Quaf
Fluoride	0.5049	0.1	0.5	0	101	08	110	-		
Chloride	4.695	0.1	. ¥Ĵ	D	93.9	06	110	۵		
Phosphorus, Orthophosphate (As P)	P) 4.781	0.5	5	O	95.6	6	110	0		
Sulfate Nitrate (As N)+Nitrite (As N)	9.703 3.329	0.5 0.1	10 3.5	O D	97.0 95.1	06	110 110	00		
Sample ID LCS	Batch ID: R15404	Test Code: E300	E300	Unlts: mg/L		Analysis	Analysis Date 5/16/2005	005	Prep Date	
Client ID:		Run ID:	LC_050516A			SegNa:	362675	10		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Vai	%RPD RPDLimit	t Qual
Fluoride	0.5306	0.1	0.5	0	106	06	110	D		
Chloride	4.664	0.1	υ.	0.05255	92.2	06	110	D		
Phosphorus, Orthophosphate (As P)	P) 4.747	0.5	ΰ	0	94.9	06	110	D		
Sulfate	9.524	0.5	10	0	95,2	06	110	Ð		
Nitrate (As N)+Nitrite (As N)	3.281	0.1	3.5	0	93.7	06	110	0		
Sample ID LCS	Batch ID: R15517	Test Code: E300	E300	Units: mg/L		Analysis	Analysis Date 5/26/2005	005	Prep Date	
Client ID:		Run ID:	LC_050526A			SeqNo:	366187			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit J	RPD Ref Val	%RPD RPDLImit	t Qual
Fluoride	0.4586	0.1	0.5	0	91.7	06	110	0		
Chloride	4.665	0.1	ŝ	<b>0</b>	93.3	30	110	a		
Phosphorus, Orthophosphate (As P)	P) 4.688	0.5	ŝ	D	93.8	06	110	0		
Sulfate	9.338	0.5	10	0	93.4	6	110	0		,
Nilrate (As N)+Nitrite (As N)	3.306	0.1	3.5	0	94.5	06	110	D		
Qualifiers: ND - Not Detec	ND - Not Detected at the Reporting Limit		S - Sp	- Spike Recovery outside accepted recovery limits	accepted reco	overy limits	B	- Analyte detected	B - Analyte detected in the associated Method Blank	d Blank

, 0	1.35	0.004839	134	75.2	95.5	Ð	0.005	0.0002	0.004773	Mercury
mit Qual	%RPD RPDLIMI	RPD Ref Val %	HighLimit RP	LowLimit	%REC	SPK Ref Val	SPK value	Pal	Result	Analyte
			362962	SeqNo:		0517A	MI-LA254_050517A	Run ID:		Client ID:
/2005 -	Prep Date 5/17/2005		Analysis Date 5/17/2005	Analysis		Unlts: mg/L	SW7470	Test Code: SW7470	Batch ID: 7989	Sample ID LCSD-7989
		O	134	75.2	96.8	0	0.005	0.0002	0.004839	Mercury
mlt Qual	%RPD RPDLImit	RPD Ref Val	HighLimit RP	LowLimit	%REC	SPK Ref Val	SPK value	POL	Result	Analyte
			362938	SeqNo:		0517A	MI-LA254_050517A	Run ID:		Client ID:
/2005	Prep Date 5/17/2005		Analysis Date 5/17/2005	Analysis		Units: mg/L	SW7470	Test Code: SW7470	Batch ID: 7989	Sample ID LCS-7989
		0	112	89.4	97 <b>.</b> 3	Ó	60	0.5	58.39	Xylenes, Total
		D	113	88.6	87.8	D	20	0.5	19.56	Ethytbenzene
		00	112	00.7 89.3	97.1	00	20	0.5	19.42	benzene Toluene
mit Qual	%RPD RPDLIMIt	RPD Ref Val %	HighLimit RP	LowLimit	%REC	SPK Ref Val	SPK value	Pal	Result	Anaiyte
	i		362606	SeqNo:		16A	PIDFID_050516A	Run ID:		Client ID:
	Prep Date		Analysis Date 5/17/2005 2:41:13 AM	Analysis		Units: µg/L	SW8021	Test Code: SW8021	Batch ID: R15402	Sample ID BTEX Ics 100ng
		Q	112	89.4	103	0	60	0.5	61.73	Xylenes, Total
		0	113	88.6	106	0	20	0.5	21.21	Ethylbenzene
		0	112	89.3	102	0	20	0.5	20.41	Toluene
		0	114	88.7	102	0	20	0.5	20.32	Benzene
mlt Qual	%RPD RPDLImit		HighLimit RPD Ref Val	LawLimit	%REC	SPK Ref Val	SPK value	Pal	Result	Analyte
			362246	SeqNo:		13A	PIDFID_050513A	Run ID:		Client ID:
	Prep Date		Analysis Date 5/14/2005 2:37:48 AM	Analysis		Units: µg/L	SW8021	Test Code: SW8021	Batch ID: R15378	Sample ID BTEX lcs 100ng
- generic	trol Spike	Laboratory Control Spike - generic							0505088 Phase II Monitoring	Work Order: 0505088 Project: Phase II N
<b>TRORT</b>	ARY RE	QC SUMMARY REPORT							Refining	CLIENT: San Juan Refining

3

R - RPD outside accepted recovery limits

J - Analyte detected below quantitation limits

Ì

ł

ł

I I I

ļ

1

	San Juan Nounug							OC SUMMARY REPORT	<b>IMAR</b>	Y REP(	<b>DRJ</b>
Work Order: Project:	0505088 Phase II Monitoring							Laboratory Control Spike - generic	Control S	spike - ge	neri
Sample ID LCS-7969	Batch ID: 7969	Test Code:	Test Code: SW6010A	Units: mg/L		Analysis Date		5/16/2005 1:09:21 PM	Prep Da	Prep Date 5/13/2005	5
Cllent ID:		Run ID:	ICP_050516B			SeqNo:	362841	41			
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	∆RPD	RPDLimit	Qual
Arsenic	0.526	0.02	0.5	D	105	80	120	0			
Barium	0.5109	0.02	0.5	. 0	102	80	120	0			
Cadmlum	0.5159	0.002	0.5	0	103	80	120	Ð			
Chromlum	0.5079	0.006	0.5	0	102	80	120	0			
Lead	0.5041	0.005	0.5	a	101	80	120	D			
Selenlum	0.5057	0.05	0.5	D .	101	80	120	C			
Silver	D,5122	0.005	0.5	0	102	80	120	O			
Sample ID LCSD-7969	69 Balch ID: 7969	Test Code:	Test Code: SW6010A	Units: mg/L		Analysis	Dale 5/16/	Analysis Dale 5/16/2005 1:12:23 PM	Prep Da	Prep Date 5/13/2005	5
Client ID:		Run ID:	ICP_050516B			SeqNo:	362842	12			
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	047%	RPDLImit	Qual
Arsenic	0.5106	0.02	0.5	P	102	80	120	0.526	2.97	20	
Barlum	0.4946	0.02	0.5	0	98.9	80	120	0.5109	3.23	20	
Cadmlum	0.5016	0.002	0.5	0	100	80	120	0.5159	2.82	20	
Chromlum	0.4943	0.006	0.5	0	98.9	80	120	0.5079	2.71	20	
Lead	0.4894	0.005	0.5	0	97.9	80	120	0.5041	2.95	20	
Selenium	0.4864	0.05	0.5	0	97.3	80	120	0.5057	3.89	20	
Silver	0.4958	0.005	0.5	0	99.2	80	120	0.5122	3,26	20	
Qualificrs: NI	ND - Not Detected at the Reporting Limit		S - Spi	S - Spike Recovery outside accepted recovery limits	accepted reco	very limits	r.	$_{a}$ B - Analyte detected in the associated Method Blank	n the associa	ted Method B	lank
<b>.</b>	<ol> <li>Analyte detected below munitation limits</li> </ol>	ils	da - 4	R - RPD anteide norented recovery limite	PERVER limite						ħ

	Sample I	Rece	eipt Che	ecklist		
Client Name SJR				Date and Time	Received:	5/11/2005
Work Order Number 0505088	Λα			Received by	GLS	
Checklist completed by Signature	Soppe_		5- Date	11-05		
Malrix	Carrier name	UPS				
Shipping container/cooler in good condition?		Yes	V	No 🗀	Not Present	]
Custody seals intact on shipping container/cooler?		Yes		No 🗔	Not Present 🗹	Not Shipped
Custody seals intact on sample bottles?		Yes		No 🗖	N/A 🔽	]
Chain of custody present?		Yes	$\checkmark$			
Chain of custody signed when relinquished and rec	eived?	Yes	V	No 🗔		
Chain of custody agrees with sample labels?		Yes		No 🗔		
Samples in proper container/bottle?		Yes				
Sample containers intact?		Yes	$\checkmark$	No 🗔		
Sufficient sample volume for indicated test?		Yes	$\mathbf{\nabla}$	No 🗖		
All samples received within holding time?		Yes	$\checkmark$	No 🗌		
Water - VOA vlais have zero headspace?	No VOA vials subm	itted		Yes 🗹	No 🗆	
Water - pH acceptable upon receipt?		Yes	$\mathbf{\nabla}$	No 🗔	N/A 🗆	
Container/Temp Blank lemperature?			1"	4° C ± 2 Accepta If given sufficient		
COMMENTS:						
Client contacted D	ate contacted:			Pers	son contacted	
·				· · · · · ·	-	<u>, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>
Contacted by: R	egarding					
Comments:						
			<del></del>			
				<u></u>	······	· · · · · · · · · · · · · · · · · · ·
-		u #				· · · · · · · · · · · · · · · · · · ·
Corrective Action						

16/16

1

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D	uquerque, New Me 505.345.3975 w.hallenvironment:	AIVAY515 (130U351			1) 5,804 Dd ' <sup>2</sup> 0N (I	- 747 no sla: , OV , , 29bit (ADV- (ADV-	ime2) ( ime2) (	0168 ARDA 100nA 1808 0358 0358 0558 0558		X				•	X		×		
			(Vir	nO eniloa	(1) (1)	418 18018 18018	TM +	XƏT8 TPH (	X					X					Remarks:
0A/ GC Package: Std 🗖 Level 4 🛄 Other:	Project Name: PhASE IL Non-prung			Project Manager:		Sample Temperature:	Preservative	Number/Volume HgCl <sub>2</sub> HNO <sub>3</sub> HAL No.		1-2500 Htel -1	1- Mesz-1	1 X 11	-	2- MA X AV	1-220 m	1-250rD 1-2	1-SDOM X MORE		Received By: (Signature)
CHAIN-OF-CUSTODY RECORD	Client: San Juga, Estruce	Attoress: # 50 R/ 4990	Bloomfield, NW 87413		Phone #: CNC 127 ULL	Fax #: <2/2 - 1/37 - 34 -1		Uate lime Matrix Sample I.D. No.	5-10-05 830A HD CWO+60					5-005 9154 40 CWI +50					 Date: Time: Relinquished By: (Signature) S-10-05 33 Pm. Unduc Yun 7 ad 0 Date: Time: Relinquished By: (Signature)

ļ

ļ

L

	HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE. Suite D	Albuquerque, New Mexico 87109 Tel. 505.345.3975 Fax 505.345.4107	L.			( or V)	908		uDV-in H no a													
	HALL ENVIRONME ANALYSIS LABOR 4901 Hawkins NE, Suite D	Mexico 3 Fax	www.hallenvironmental.com	ANALYSIS REQUEST					(40	V) 80	826					 						
	N N N N N N N N N N N N N N N N N N N	, New 1, 3974	ronme			085) '20 <sup>°</sup> )			ovi ,iu esbiois				V	X		 	$\overline{\times}$	X		 		
		erque 5.345	allenvi	315						MBA			^	7	X	 	$\neg$		$\times$	 		
		llbuqu 91. 501	ww.h:					(H)	A 70 A	NG) (	158											
	T 4 4	A F	3	Z _					j8 pòi											 		
									14 bor 13 bor							 				   <sup> </sup>		
					<u></u>	[ 858	0/se		,08 pc							 				 		
					(հյս	10 anilo																Remarks:
					,	(150	<del>8) 5,(</del>	IWI-	1-381 	₩+)	(318	7				 $\times$						
	0A/0C Package: Std 🗖 Level 4 🗍	Ucner: Project Name:	PLASE IT Monthornes	Project #:		Project Manager:	-	Sampler inder Austado / Angla folk	Sample Température:	Preservative		2-WA-X 2-	1-25th   1-25th		S- X mas-1	17-104 X 401-2	1-250m0 (12504 -U	h- masz-1	1-Some X -4			Received By: (Signature) S-11.005 Received By: (Signature)
D	CHAIN.DE.CIISTONY RECORD	Client: A D	Front AN NAN NAC	Address: SD RJ 4990	1 2			Phone #: SDS-632 - 416/	Fax#: 5D5-632-391/		uada ime iviadrix campie i.u. No.	5-10-05 1015/A HZO OW19450				5-10-05 10454 420 CW19+50						Date: Time: Refinjuished By: (Signaturje) 5-10-05 3.3.9.1.N. Lucur 7.4.W.7.1.0.0 Date: Time: Relinquished By: (Signature)

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D	Tel. 505.345.3975 Fax 505.345.4107 www.hallenvironmental.com	ANALYSIS REOUEST	(	(ləzəiO/ze , 02, 50, (S808) z (S808) z	158 (G 151) 121) 121) 121) 121) 121) 121) 121)	08 bo hod 50 bod 50 bo 60 80 00 00 00 00 00 00 00 00 00 00 00 00	HTEX + M TPH Meth TPH (Meth EDB (Met EDB (Met 8310 (PN 8310 (PN 8310 (Pu 8310 (Se 8310 (Se 19e 8250 (Se 19e 8250 (Se 19e 19e 19e 19e 19e 19e 19e 19e 19e 19		X	X	X		×	×	×		arks:		
0A/0C Package: Std 🗖 Level 4 🗍 Other:	Project Name: Phase TT_ Monitor Price			Project Manager:	Samper Hurtado/Angela Folk	sture: //	Preservative         HEAL No.           Habro Number/Valume         HgGI <sub>2</sub> Hundrey Natione         HgGI <sub>2</sub>		1-250m0 H2S4 -5	1-250ml -5	1-570ml X 2-5	3-107 X -6 X	1-250ml H2504 -(0	1-250 ml	1-500 ml X -6			Repéived tty: (Signaturé)	
CHAIN-OF-CUSTODY RECORD	Client: SAN Juan Refining	Address: #50 Rd 499	Bloom till, NM	87413	Phone #: 505-632-4161	Fax#: 505-632-39//	Date Time Matrix Sample I.D. No.	5-10-05 Zer H20 143485				5-10 or 215pm H20 CW 5450				Trip Blank	S 330hr	Date: Tume: Relinquished By: 'I Signature'	

,

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D Albuquerque, New Mexico 87109 Tel. 505, 345, 3975 Fax 505, 345, 4107 www.hallenvironmental.com	8310 (PUA or PAH) PCRA 8 Metals Anions (F, CI, NO <sub>2</sub> , NO <sub>2</sub> , PO <sub>4</sub> , SO <sub>4</sub> ) 8087 Pesticides / PCB's (8082) 82608 (VOA) 8270 (Semi-VOA) Air Bubbles or Headspace (Y or N)			
	EDC (Method 8021) EDC (Method 8015B (Gasoline Only TPH Method 8015B (Gasoline Only TPH (Method 8015B (Gasoline Only TPH (Method 8021)			Utemarks:
QA/GC Package:       Backage:       Std I       Level 4 I       Other:       Project Name:       Project #:	Project Manager: Service Alutitade/Arsela Foll Sample Temperature: Number/Volume Preservative HEAL No.	THE X	P- 40204 X Anor-2 P- 40204 X Anor-1 P- 10002-1 P- 10002-1	Received My. 10 and 10 and 21 LC
CHAIN-OF-CUSTODY RECORD Client: SAN Juan Refund	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	5-10-05 245m H2U (WZZ+00	5-10-05 310 m H2U 0W ZZ 700	Date: Time: Reinnulished/By: (Sidni/turrel) 5-10-05 330pm Lucu WWWMAAD Date: Time: Relinquished By: (Signature)

-----

Ì.



E HALL ENVIRONMENTAL ANALYSIS LABORATORY

#### COVER LETTER

May 31, 2005

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

RE: Phase II Monitoring

Order No.: 0505119

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 7 samples on 5/13/2005 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



49D1 Hawkins NE Suite D Albuquerque, NM 87109 505.345.3975 Fax 505.345.4107 www.hallenvironmental.com

Date: 31-May-05

CLIENT:									
Lab Order:	0505119			Collecti	on Date: 5/12	/2005 8:30:00 AM			
Project:	Phase II Monitoring								
Lab ID:	0505119-01				Matrix: AQU	JEOUS			
Analyses		Result	PQL	Qual Units	DF	Date Analyzed			
EPA METHOD	300.0: ANIONS			·········		Analyst: IC			
Fluoride		0.59	0.10	mg/L	1	5/14/2005			
Chloride		450	2.0	mg/L	20	5/25/2005			
Phosphorus, O	rthophosphale (As P)	ND	0.50	mg/L	1	5/14/2005			
Sulfate		9.7	0.50	mg/L	1	5/14/2005			
Nitrate (As N)+	Nitrite (As N)	ND	0.50	mig/L	5	5/25/2005			
EPA METHOD	8021B: VOLATILES					Analyst: NSB			
Benzene		6300	50	µg/L	100	5/17/2005 10:12:56 AM			
Toluene		76	10	µg/L	20	5/16/2005 10:37:05 PM			
Ethylbenzene		190	10	μg/L	20	5/16/2005 10:37:05 PM			
Xylenes, Total		350	10	րց/լ	20	5/16/2005 10:37:05 PM			
Surt. 4-Bron	nofluorobenzene	105	83.3-121	%REC	20	5/16/2005 10:37:05 PM			
EPA METHOD	7470: MERCURY					Analyst: CMC			
Mercury		0.00038	0.00020	mg/L	1	5/26/2005			
EPA 6010: TO	TAL RECOVERABLE ME	TALS				Analysi: CMC			
Arsenic		ND	0.020	mg/L	1	5/18/2005 1:15:23 PM			
Barium	•	0.73	0.020	mg/L	1	5/18/2005 1:15:23 PM			
Cadmium		ND	0.0020	mg/L	1	5/18/2005 1:15:23 PM			
Chromium		ND	0.0060	mg/L	1	5/18/2005 1:15:23 PM			
Lead		ND	0.0050	mg/L	1	5/18/2005 1:15:23 PM			
Selenium		ND	0.050	mg/L	1	5/18/2005 1:15:23 PM			
Silver		ND	0.0050	mg/L	1	5/18/2005 1:15:23 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

Page 1 of 7



Date: 31-May-05

CLIENT:	San Juan Refining			Client Sample I	D: CW 23-	+90
Lab Order:	0505119			Collection L	ate: 5/12/2	2005 9:20:00 AM
Project:	Phase II Monitoring					
Lab ID:	0505119-02			Ma	trix: AQUI	EOUS
Analyses	······································	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	300.0: ANIONS					Analyst: IC
Fluoride		0.39	0.10	mg/L	1	5/14/2005
Chloride		350	2.0	mg/L	20	5/25/2005
Nitrogen, Nitrite	: (As N)	ND	0.10	mg/L	1	5/14/2005
Nitrogen, Nitrat	e (As N)	ND	0.10	mg/L	1	5/14/2005
Phosphorus, Or	rthophosphate (As P)	ND	0.50	mg/L	1	5/14/2005
Sulfate		4.9	0.50	mg/L	1	5/14/2005
EPA METHOD	8021B: VOLATILES					Analyst: NSB
Benzene		3400	10	μg/L	20	5/16/2005 11:07:51 PM
Toluene		35	10	µg/L	20	5/16/2005 11:07:51 PM
Ethylbenzene		170	10	µg/L	20	5/16/2005 11:07:51 PM
Xylenes, Total		400	10	µg/L	20	5/16/2005 11:07:51 PM
Surr: 4-Brom	olluorobenzene	105	83.3-121	%REC	20	5/16/2005 11:07:51 PM
EPA METHOD	7470: MERCURY					Analyst: CMC
Mercury		ND	0.00020	mg/L	1	5/26/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS		• •		Analyst: CMC
Arsenic		ND	0.020	mg/L	1	5/18/2005 1:19:31 PM
Barium		0.40	0.020	mg/L	1	5/18/2005 1:19:31 PM
Cadmium		ND	0.0020	mg/L	1	5/18/2005 1:19:31 PM
Chromium		ND	0.0060	mg/L	1	5/18/2005 1:19:31 PM
Lead		ND	0.0050	mg/L	1	5/18/2005 1:19:31 PM
Selenium		ND	0.050	mg/L	1	5/18/2005 1:19:31 PM
Silver		ND	0.0050	mg/L	1	5/18/2005 1:19:31 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

Page 2 of 7

\_

#### Date: 31-May-05

CLIENT:	San Juan Refining			Client Sam	ple ID: CW 25+95	5
Lab Order:	0505119			Collecti	on Date: 5/12/200	5 10:10:00 AM
Project:	Phase II Monitoring					
Lab ID:	0505119-03				Matrix: AQUEO	US
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	300.0: ANIONS					Analyst: IC
Fluoride		0.43	0.10	mg/L	1	5/14/2005
Chloride		85	1.0	mg/L	10	5/25/2005
Nitrogen, Nitrite	e (As N)	ND	0.10	mg/L	1	5/14/2005
Nitrogen, Nitral	ie (As N)	ND	0.10	mg/L	1	5/14/2005
Phosphorus, O	rthophosphate (As P)	ND	0.50	mg/L	1	5/14/2005
Sulfate		270	5.0	mg/L	10	5/25/2005
EPA METHOD	8021B: VOLATILES					Analyst: NSB
Benzene		1.0	0.50	μg/L	1	5/16/2005 11:38:28 PM
Toluene		ND	0.50	μg/L	1	5/16/2005 11:38:28 PM
Ethylbenzene		ND	0.50	µg/L	1	5/16/2005 11:38:28 PM
Xylenes, Total		ND	0.50	µg/L	1	5/16/2005 11:38:28 PM
Surr: 4-Bron	nofluorobenzene	100	83.3-121	%REC	1	5/16/2005 11:38:28 PM
EPA METHOD	7470: MERCURY					Analyst: CMC
Mercury		ND	0.00020	mg/L	1	5/26/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS				Analyst: CMC
Arsenic		ND	0.020	mg/L	1	5/18/2005 1:23:39 PM
Barium		0.085	0.020	mg/L	1	5/18/2005 1:23:39 PM
Cadmium		ND	0.0020	mg/L	1	5/18/2005 1:23:39 PM
Chromium		ND	0.0060	mg/L	1	5/18/2005 1:23:39 PM
Lead		ND	0.0050	mg/L	1	5/18/2005 1:23:39 PM
Selenium		ND	0.050	mg/L	1	5/18/2005 1:23:39 PM
Sliver		ND	0.0050	mg/L	1	5/18/2005 1:23:39 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

Page 3 of 7



Date: 31-May-05

CLIENT:	San Juan Refining			Client	Sample ID:	OW 25-	+70
Lab Order:	0505119			Co	llection Date	: 5/12/2	.005 10:20:00 AM
Project:	Phase II Monitoring						
Lab ID:	0505119-04				Matrix	: AQUI	EOUS
Analyses		Result	PQL	Qual U	nits	DF	Date Analyzed
EPA METHOD	300.0: ANIONS						Analyst: IC
Fluoride		0.53	0.10	m	g/L	1	5/14/2005
Chloride		50	1.0	m	g/L	10	5/25/2005
Nitrogen, Nitrite	e (As N)	ND	0.10	mg	g/L	1	5/14/2005
Nitrogen, Nitrat	le (As N)	ND	0.10	m	g/L	1	5/14/2005
Phosphorus, O	rthophosphate (As P)	ND	0.50	m	g/L	1	5/14/2005
Sulfate		350	5.0	m	g/L	10	5/25/2005
EPA METHOD	8021B: VOLATILES						Analyst: NSB
Benzene		0.79	0.50	μg	p/L	1	5/17/2005 12:09:01 AM
Toluene		ND	0.50	μc	g/L	1	5/17/2005 12:09:01 AM
Ethylbenzene		ND	0.50	hõ	]/∟	1	5/17/2005 12:09:01 AM
Xylenes, Total		ND	0.50	pq	g/L	1	5/17/2005 12:09:01 AM
Sur: 4-Brom	nofluorabenzene	101	83.3-121	%	REC	1	5/17/2005 12:09:01 AM
EPA METHOD	7470: MERCURY						Analyst: CMC
Mercury		ND	0.00020	m	g/L	1	5/26/2005
EPA 6010: TO	TAL RECOVERABLE ME	TALS					Analyst: CMC
Arsenic		0.14	0.10	m	g/L	5	5/18/2005 2:48:09 PM
Barium		25	2.0	m		100	5/18/2005 3:22:11 PM
Cadmium		ND	0.010	m	g/L	5	5/18/2005 2:48:09 PM
Chromium		0.44	0.030	m	 g/L	5	5/18/2005 2:48:09 PM
Lead		0.13	0.025	m		5	5/18/2005 2:48:09 PM
Selenium		ND	0.25	m	g/L	5	5/18/2005 2:48:09 PM
Silver		ND	0.025	m	g/L	5	5/18/2005 2:48:09 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

Page 4 of 7

Date: 31-May-05

CLIENT: San Juan Refining Client Sample ID: OW 23+90									
Lab Order:	0505119			Collect	ion Date: 5/12/2	2005 12:30:00 PM			
Project:	Phase II Monitoring								
Lab ID:	0505119-05				Matrix: AQUI	EOUS			
Analyses		Result	PQL	Qual Units	DF	Date Analyzed			
EPA METHOD	300.0: ANIONS					Analyst: IC			
Fluoride		0.72	0.10	mg/L	1	5/14/2005			
Chloride		320	2.0	mg/L	20	5/25/2005			
Nitrogen, Nitrite	(As N)	ND	0.10	mg/L	1	5/14/2005			
Nitrogen, Nitrate	e (A5 N)	ND	0.10	mg/L	1	5/14/2005			
Phosphorus, Or	thophosphate (As P)	ND	0.50	mg/L	1	5/14/2005			
Sulfate		77	0.50	mg/L	1	5/14/2005			
EPA METHOD	8021B: VOLATILES					Analyst: NSB			
Benzene		980	10	μg/L	20	5/17/2005 12:39:31 AM			
Toluene		16	10	μg/L	20	5/17/2005 12:39:31 AM			
Ethylbenzene		31	10	μg/L	20	5/17/2005 12:39:31 AM			
Xylenes, Total		130	10	μ <b>g/L</b>	20	5/17/2005 12:39:31 AM			
Surr: 4-Brom	ofiuorobenzene	105	83.3-121	%REC	20	5/17/2005 12:39:31 AM			

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

Page 5 of 7



## Hall Environmental Analysis Laboratory

Date: 31-May-05

-

CLIENT: San Juan Refining Client Sample ID: OW 23+10 Lab Order: 0505119 Collection Date: 5/12/2005 1:00:00 PM **Project:** Phase II Monitoring Matrix: AQUEOUS Lab ID: 0505119-06 . .1. \* 1. . . . .

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: IC
Fluoride	0.47	0.10	mg/L	1	5/14/2005
Chloride	270	2.0	mg/L	20	5/25/2005
Nitrogen, Nitrite (As N)	ND	0.10	mg/L	1	5/14/2005
Nitrogen, Nitrate (As N)	ND	0.10	mg/L	1	5/14/2005
Phosphorus, Orthophosphate (As P)	ND	0.50	mg/L	1	5/14/2005
Sulfate	360	10	mg/L	20	5/25/2005
EPA METHOD 8021B: VOLATILES					Analyst: NSB
Benzene	340	5.0	µg/L	10	5/17/2005 10:43:37 AM
Toluene	9.2	5.0	µg/L	10	5/17/2005 10:43:37 AM
Ethylbenzene	11	5.0	µg/L	10	5/17/2005 10:43:37 AM
Xylenes, Total	80	5.0	μց/L	10	5/17/2005 10:43:37 AM
Surr. 4-Bromofluorobenzene	105	83.3-121	%REC	10	5/17/2005 10:43:37 AM
EPA METHOD 7470: MERCURY					Analyst: CMC
Mercury	0.00096	0.00020	mg/L	1	5/26/2005
EPA 6010: TOTAL RECOVERABLE	METALS	• •			Analyst: CMC
Arsenic	ND	0.020	mg/L	1	5/18/2005 1:34:49 PM
Barium	0.75	0.020	mg/L	1	5/18/2005 1:34:49 PM
Cadmium	ND	0.0020	mg/L	1	5/18/2005 1:34:49 PM
Chromium	0.020	0.0060	mg/L	1	5/18/2005 1:34:49 PM
Lead	0.0091	0.0050	mg/L	1	5/18/2005 1:34:49 PM
Selenium	ND	0.050	mg/L	1	5/18/2005 1:34:49 PM
Silver	ND	0.0050	mg/L	1	5/18/2005 1:34:49 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

6/16

Page 6 of 7

## Hall Environmental Analysis Laboratory

Date: 31-May-05

CLIENT: Lab Order:	San Juan Refining 0505119				ple ID: Trip Bla ion Date:	nk
Project: Lab ID:	Phase II Monitoring 0505119-07				Matrix: TRIP I	BLANK
Analyses		Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD	8021B: VOLATILES					Analyst: NSE
Benzene		ND	0.50	μg/L	1	5/17/2005 2:10:51 AM
Toluene		ND	0.50	µg/L	1	5/17/2005 2:10:51 AM
Ethylbenzene		ND	0.50	µg/L	1	5/17/2005 2:10:51 AM
Xylenes, Total		ND	0.50	μg/L	1	5/17/2005 2:10:51 AM
Surr: 4-Brom	ofluorobenzene	97.4	83.3-121	%REC	1	5/17/2005 2:10:51 AM

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

7/16

Page 7 of 7



CLIENT:	San Juan Refining						QC SU	QC SUMMARY REPORT	K REPO	DRT
Work Urder: Project:	Phase II Monitoring								Method Blank	Blank
Sample ID MBLK	Batch (D: R15380	Test Code: E300	: E300	Units: mg/L		Analysis	Analysis Date 5/12/2005	Prep Date	9	
Cilent ID:		Run ID:	LC_050512A			SeqNo:	361746			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC L	LowLimit	HighLimit RPD Ref Val	NRPD	RPDLimit	Qual
Fluoride	QN	0.1								
Chloride	ON	0.1								
Nitrogen, Nitrite (As N)		0.1								
Nitrogen, Nitrate (As N)		0.1								
Phosphorus, Orthophosphate (As P)		0.5								
Sulfate		0.5								
Nitrate (As N)+Nitrite (As N)	(As N)	0.1								
Sample ID MB	Batch ID: R15380	Test Code: E300	E300	Units: mg/L		Analysis [	Analysis Date 5/12/2005	Prep Date	Ð	
Client ID:		Run ID:	LC_050512A			SeqNo:	361769			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC L	LowLimit HighLimit	HighLimit RPD Ref Val	%RPD	RPDLImit	Qual
Fluaride	QN	0.1								
Chloride	QN	0.1								
Nitrogen, Nitrite (As N)	(f) (f)	0.1								
Nitrogen, Nitrale (As N)		0.1								
Phosphorus, Orthophosphate (As P)		0.5								
Sulfate		0.5								
Nilrale (As N)+Nilrite (As N)	(As N)	0.1								
								·		
										·
Qualifiers: N	ND - Not Detected at the Renortine Limit		S - Snit	5 - Snike Recovery atteide noemled recovery limite	ncented recove	Tu limite	R - Analyte detected in the according Method Black	tin the needering	ed Mathod B	
	J - Analyte detected below quantitation limits	nits	R - RPI	R - RPD autside accepted recovery limits	sovery limits	כווווון עוז	NANAR ALFINITY - A		-	I
										•

	Phase II Monitoring							ine nd	UC SUMMAKY KEFUKI Method Blank	<b>Y REPORT</b> Method Blank
Sample ID MB Client ID-	Batch ID: R15380	Test Code: E300 Run ID: LC 0	E300 LC 050512A	Units: mg/L		Analysis SegNo:	Analysis Date     5/14/2005 SegNo:	<b>105</b>	Prep Dale	
Analyte	Result	PQL	- SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit	limit Quaf
Fluoride	Ð	0.1	0	0	0	0	0	0		
Chloride	QN	0.1	0	D	0	0	0	0		
Nitrogen, Nitrite (As N)		0.1	0	0	D	0	D	D		
Nitrogen, Nitrate (As N)		0.1	0	0	0	0	Ð	D		
Phosphorus, Orthophosphate (As P)	phate (As P)	0.5	Ð	0	D	0	0	o		
Sulfate Nitrate (As N)+Nitrite (As N)	0.1124 (As N) ND	0.5	00	00	00	00	00	00		
Sample ID MBLK Client ID;	Batch (L); K15502	lest Code: E300 Run ID: LC_0	E300 LC_050525A	Units: mg/L		Analysis Date SeqNo:	1.002/2012/002/20105/20105/20105/20105/20105/20105/20105/20105/20105/20105/20105/20105/20105/20105/20105/20105	60	Prep Date	
Analyle	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit R	RPD Ref Val	%RPD RPDLimit	lmit Qual
Fluoride	<u> </u>	0.1								
Chloride	QN	0.1								
Nitrogen, Nitrite (As N)	QN (	0.1								
Nitrogen, Nitrate (As N)		0.1								
Phosphorus, Orthophosphate (As P)	ssphate (As P) ND	0.5								
Sulfate		0.5								
Nitrate (As N)+Nitrite (As N)		0.1								
				۰.						
Qualifiers: NI	ND - Not Detected at the Reporting Limit		S • Spi	S - Spike Recovery autside accepted recovery limits	accepted reco	very limits	Ē	- Analyte detected	B - Analyte detected in the associated Method Blank	(hod Blan
÷.	J - Analyte detected below quantitation limits	mits	R - RP	D - DDD antride accented recovery limits	acover, limitr					

CLIENT: San Juar	San Juan Refining							OC SUM	OC SUMMARY REPORT
Work Order: 0505119									Method Blank
Project: Phase II	Phase II Monitoring								
Sample ID Reagent Blank 5m	n Balch ID: R15402	Test Code	Test Code: SW8021	Units: pg/L		Analysis	: Date 5/16/20	Analysis Date 5/16/2005 7:08:29 AM	Prep Date
Client ID:		Run (D:	PIDFID_050516A	16A		SeqNo:	362600		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit Qual
Benzene	QN	0.5							
Toluene	QN	0.5							
Ethylbenzene	DN	0.5							
Xylenes, Total Surr: 4-Bromofluorobenzene	ND 20.29	0.5	20	0	101	83.3	121	O	
Sample ID Reagent Blank 5m	n Batch ID: R15413	Test Code: SW8021	: SW8021	Units: µg/L		Analysis	Date 5/17/20	Analysis Date 5/17/2005 8:39:57 AM	Prep Date
		:							
Client ID:		Run ID:	PIDFID_050517A	17A		SeqNo:	362968		
Analyte	Result	Par	SPK value	SPK Ref Val	%REC	LowLImit	HighLimit R	RPD Ref Val	%RPD RPDLimit Qual
Benzene	QN	0.5							
Toluena	ON	0.5							
Elhylbenzene	QN	0.5							
Xylenes, Tolal	DN	0.5							
Surr; 4-Bromolluorobenzene	19.76	0	20	0	98.8	83.3	121	D	
Sample ID MB-8047	Batch ID: 8047	Test Code: SW7470	: SW7470	Unlts: mg/L		Analysis	Analysis Date 5/26/2005	05	Prep Date 5/26/2005
Client ID:		Run ID;	MI-LA254_050526A	0526A		SeqNo:	366067		
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit R	RPD Ref Val	%RPD RPDLimit Qual
Mercury	QN	0.0002		· · · · · · · · · · · · · · · · · · ·					

.

10/16

ND - Not Detected at the Reporting Limit J - Analyte detected below quantitation fimits

Qualifiers:

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

B - Analyte detected in the associated Method Blank

5

Project:	0505119 Phase II Monitoring					Method Blank	
Samule ID_MB-7986	986 Batch ID: 7986	Test Code: SW6010A	010A Units: mg/L	Analysis Date	Analysis Date 5/18/2005 1:00:33 PM	Prep Dale 5/17/2005	
Client ID:		Run ID: ICP_	ICP_050518A	SeqNo:	363313		
Analyte	Result	PQL SP	SPK value SPK Ref Val	%REC LowLimit High	LowLimit HighLimit RPD Ref Val	%RPD RPDLimit 0	Qual
Arsenic	QN	0.02					
Barlum	DN	0.02			·		
Cadmium	DN	0.002					
Chromium	ΩN	0.006					
Lead	ON	0.005					
Selenium		0.05					
	· · · · · · · · · · · · · · · · · · ·						
Qualificrs:	ND - Not Detected at the Reporting Limit		S - Spike Recovery oulside accepted recovery outside accepted recovery and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second se	5 - Spike Recovery outside accepted recovery limits	B - Analyte detected i	B - Analyte detected in the associated Method Blank	yuk 🖌

,

tun Refinite 119 110 111 114 114 114 114 114 114												
	CLIENT: Work Order: Project:	San Juan Refining 0505119 Phase II Monitoring							QC SUI Laboratory	MMAR Control	Y REP( Spike - g	<b>JR</b> T eneric
Run ID:         LC, 950513.A         SeqVic:         564Vici         5617.4         5617.4           Result         POL         SPK redu         SPK red Val         %AFEC         Low/IIM         HjMLIMI         RPD Ref Val         %AFED         SetVal         %AFED         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         0         101         10         101         101         101         101         101         101         101         101         101         101         101         101         101         101         101         101         101         101         101         101         101         101         101         101	Samole ID LCS	Batch ID: R15380	Test Code:	E300	Unlts: mg/L		Analysl	s Date 5/12/	2005	Prep D	ate	
Result         PQL         SPK relic         SMC LowLimit         HighLimit         RPD Limit         RPD Limit           05047         0.1         0.5         0         101         95         100         9         100         9           4,755         0.1         1         0.5         0         101         9         100         0           4,755         0.1         1         0         93,1         90         110         0           1,4,755         0.1         1         0         93,5         90         110         0           1,800         0.5         5         0         96,7         90         110         0           1,800         0.5         1         0         96,7         90         110         0           1,800         0.5         1         0         96,7         90         110         0           1,800         1         0         101         10         10         10         10           1,800         1         0         101         10         10         10         10           1,800         1         0         101         10         10	1		Run ID:	LC_050512A	)		SeqNo	36174	11			
$\left( A_{3} F\right) = \left( \begin{array}{cccccccccccccccccccccccccccccccccccc$	Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit			икро	RPDLImit	Qual
	Fluoride	0.5047	0.1	0.5	o	101	06	110	٥			
(1372)         0.1         1         0         9.0         110         0         0           140         0.1         2.4         0.1         2.4         0.1         0.0         0.0         100         0           140         0.5         10         0.6         0.5         10         0.6         0.6           140         0.5         10         0.6         0.6         0.6         10         0           140         0.5         10         0.6         0.6         0.6         10         0           150         0.1         3.5         0         10         0.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6         9.6	Chlaride	4.755	0.1	5	0	95.1	06	110	0			
2.449         0.1         2.5         0         90         110         0           le (xs P)         3.630         0.5         3.5         0         9.67         90         110         0           3.660         0.5         3.5         0         9.67         90         110         0           3.680         0.5         1.6         0         9.67         90         110         0           3.6170         1         1.5         0         101         10         0           Run ID:         LC_05051AA         MRD         SFK Ref Val         2/5         0         101         10         0           Run ID:         LC_05051AA         SFK Ref Val         2/5         0         101         10         10           0.5733         0.1         0.1         0         7/10         10         10         10           0.5733         0.1         0.1         0         90         110         0         10           0.5733         0.1         0         0         10         10         0         10           0.5733         0.1         0         0         10         10         0 <td< td=""><td>Nitrogen, Nitrite (A</td><td></td><td>0.1</td><td></td><td>D</td><td>93.7</td><td>06</td><td>110</td><td>D</td><td></td><td></td><td></td></td<>	Nitrogen, Nitrite (A		0.1		D	93.7	06	110	D			
Le (As P)         4.830         0.5         5         0         110         0         10         0           3.366         0.5         10         0.5         90         110         0         0           3.366         0.5         3.0         95.7         90         110         0           Balch ID: K15300         Test Code:         200         Unlis: mg/L         Analysis         Dale         5172005         Frep Dale           Run ID:         LC         05         0         105         90         110         0           439         0.1         0.5         0         105         90         110         0           0.5733         0.1         0.5         0         105         90         110         0           0.5733         0.1         0.5         0         10         0         36170         16         1770           0.5733         0.1         0.5         0         105         90         110         0         16           0.5733         0.1         0.5         0         100         0         10         10         10         10         10         10         10         10	Nitrogen, Nitrate (/		0.1	2.5	D	98.0	06	110	٥			
5.660         0.5         10         0         10         0         10         0           Blatch (D: K15380         Tesl Code: E300         Unlis: mg/L         Analysis Date 51/22005         Prep Date           Run ID:         LC_05051ZA         Serrivo:         361770         0         110         0           Result         PQL         SPK value         SPK ref Val         %REC         LowLmit         HipLinit         RPD ref Val         %RPD         IRDIA           Result         PQL         SPK value         SPK ref Val         %REC         LowLmit         HipLinit         RPD Linit         RPD Linit           0.5733         0.1         0.5         0         105         90         110         0         RPD Linit           0.5733         0.1         0.5         0         90         110         0         RPD Linit           1.6         0.1         0         10         0         10         0         10           2.519         0.1         0         110         0         0         10         0           2.519         0.1         0.10         0         110         0         0         10         0         0	Phosphorus, Ortho		0.5	υ	0	96.7	06	110	D			
1386       0.1       3.5       0       10       0       10       0         Balch ID: R1530       Test Code: E300       Uhils: mg/L       Analysis Date \$1122005       Prep Date         Raun ID:       Test Code: E300       Uhils: mg/L       Analysis Date \$1122005       Prep Date         Raun ID:       Log Stat       Sath       Sath       Sath       Prep Date         Raun ID:       D.1       D.5       0       100       0       Prep IDate         0.5233       D.1       D.5       D       0.0       90       110       0         0.978       D.1       D.5       D       0       90       110       0         0.978       D.1       D       0.0       90       110       0       0         0.978       D.1       D       0.0       90       110       0       0         0.978       D.1       D       0       90       110       0       0         1.8       A.809       D.1       0       90       110       0       0         2.507       D.1       D       90       110       0       0       0         3.465       D.1       D<	Sulfate		0.5	10	0	96.7	06	110	0			
Balch (D: K15360)       Test Code: E300       Unlis: mg/L       Analysis Date       \$1/22005       Prep Date         Run (D:       LC_050512A       SeqNuc:       361770       SeqNuc:       361770       Nrep Date         Run (D:       LC_050512A       SeqNuc:       361770       SeqNuc:       361770       Nrep Date         Result       PQL       SPK ref Val       %REC       LowLinft       HighLinft       RPD Ref Val       %RPD       RPDLinft         0.5233       0.1       0.5       0       0.1       0.5       90       110       0       0         4.80       0.1       1       0       97.8       90       110       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       0       <	Nitrate (As N)+Nitri		0.1	3.5	0	96.7	06	110	Đ			
Run ID:         LG_050512A         SeqNo:         361770           Result         PQL         SPK value         SPK Ref         Val         PML         RPD Ref         Val         RPD Int           10:         0:333         0:1         0.5         0         105         00         110         0         RPD Int           0.978         0:1         0         0:1         0         0         110         0         0           0.978         0:1         1         0         90         110         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0	Sample ID LCS	Balch ID: R15380	Test Code:	E300	Units: mg/L		Analysis	s Date 5/12/	2005	Prep Da	ale	
Result         PCL         SPK ref value         SPK Ref value         SPK Ref Val         Month         RPD Ref Val         %RPD         RPDLinit           0.5233         0.1         0.5         0         105         0         10         0         0           1.89         0.1         0.5         0         105         0         106         0         0           1.89         0.1         1         0         90         110         0         0           1.97         0.378         0.1         1         0         90         110         0         0           2.507         0.1         1         0         90         10         0         0         0           2.507         0.1         2.5         0         1010         0         0         0           3.465         0.1         3.5         0         90         110         0         0           3.465         0.1         3.5         0         90         110         0         0           3.465         0.1         3.5         0         100         0         0         0           3.465         0.1         10	Client ID:		Run ID:	LC_050512A			SeqNo:		0			
0.5233     0.1     0.5     90     110       4.89     0.1     5     0     97.8     90     110       0.978     0.1     1     0     97.8     90     110       0.978     0.1     1     0     97.8     90     110       0.978     0.1     1     0     97.8     90     110       2.507     0.1     2.5     0     104     90     110       2.5094     0.5     10     2.5     0     104     90     110       9.994     0.5     10     3.5     0     99.9     90     110       3.485     0.1     3.5     0     99.6     90     110       3.485     0.1     3.5     0     99.6     90     110       10     0.5     5     0     99.6     90     110       2.5     0     10     0.5     90     110       3.485     0.1     3.5     0     99.6     110       3.481     0.5     5     0     104     90     110       3.481     0.5     5     0     99.6     110       11     11     3.5     0     110	Analyle	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4.89     0.1     5     0     97.8     90     110       0.978     0.1     1     0     97.8     90     110       2.507     0.1     1     2.5     0     100     90     110       2.507     0.1     2.5     0     104     90     110       9.994     0.5     10     0.5     10     99.9     90     110       9.994     0.5     10     3.5     0     99.9     90     110       3.485     0.1     3.5     0     99.6     90     110       3.485     0.1     3.5     0     99.6     90     110       10     10     0.5     10     0     90.6     110       10     0.1     3.5     0     90.6     110       10     10     0.1     3.5     0     110       10     10     10     10.6     100     110       10     10     10     10     110     110       11     11     11     11     110     110       11     11     11     110     110     110       11     11     11     110     110     110 <t< td=""><td>luoride</td><td>0.5233</td><td>0.1</td><td>0.5</td><td>D</td><td>105</td><td>06</td><td>110</td><td>0</td><td></td><td></td><td></td></t<>	luoride	0.5233	0.1	0.5	D	105	06	110	0			
0.978     0.1     1     0     97.8     90     110       2.507     0.1     2.5     0     100     90     110       9.94     0.5     5     5     0     104     90     110       9.994     0.5     10     0     90.9     90     110       9.994     0.5     10     0     99.9     90     110       9.994     0.5     10     0     99.9     90     110       9.994     0.1     3.5     0     99.6     90     110       9.994     0.1     3.5     0     99.6     90     110       10     11     3.5     0     99.6     90     110       11     11     3.5     0     99.6     90     110       11     11     11     11     110     110     110       11     11     11     11     110     110     110       11     11     11     11     110     110     110       11     11     11     110     110     110     110       11     11     11     110     110     110     110       11     11     110	Chloride	4.89	0.1	сл	° O	97.8	06	110	0			
2.507     0.1     2.5     0     100     90     110       le (As P)     5.19     0.5     5     0     104     90     110       9.994     0.5     10     0.5     10     99.9     90     110       9.994     0.5     10     0.5     10     99.9     90     110       3.485     0.1     3.5     0     99.6     90     110       3.485     0.1     3.5     0     99.6     90     110       10     3.485     0.1     3.5     0     99.6     90     110       110     3.5     0.1     3.5     0     99.6     90     110       110     3.5     0.1     3.5     0     99.6     90     110       110     3.5     5     5     90     90.6     110       111     3.5     5     5     90     110	Vitrogen, Nitrite (A:		0.1	+	0	97.8	08	110	O			
le (As P)       5.19       0.5       5       0       10       90       110         9.994       0.5       10       0       99.9       90       110         3.485       0.1       3.5       0       99.6       90       110         3.485       0.1       3.5       0       99.6       90       110         10       11       3.5       0       99.6       90       110         110       11       3.5       0       99.6       90       110         110       11       3.5       0       99.6       90       110         110       11       3.5       5       90       110       110         110       11       3.5       5       90       110       110         110       11       3.5       5       90       110       110         111       11       11       11       11       110       110       110         111       11       11       11       11       110       110       110       110         111       11       11       11       11       110       110       110       <	Vitrogen, Nitrate (A		0.1	2.5	0	100	6	110	Q			
9.994     0.5     10     0     99.9     90     110       3.485     0.1     3.5     0     99.6     90     110       110     3.5     0.1     3.5     0     99.6     90     110       110     110     110     110     110     110     110       110     110     110     110     110     110       110     110     110     110     110       110     110     110     110     110       110     110     110     110     110       110     110     110     110     110       110     110     110     110     110	hosphorus, Ortho		0.5	ŝ	٥	104	80	110	0			
3.485     0.1     3.5     0     99.6     90     110       In the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the	òulfate.		0.5	10	0	99.9	06	110	o			
ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits J - Analyte detected below quantitation limits R - RPD outside accepted recovery limits	litrate (As N)+Nitri		0.1	3.5	0	99.6	06	110	D			
ND - Not Detected at the Reporting Limit       S - Spike Recovery outside accepted recovery limits         J - Annlyte detected below quantitation limits       R - RPD outside accepted recovery limits												
ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits J - Annlyte detected below quantitation limits R RPD outside accepted recovery limits					• .							
ND - Not Detected at the Reporting Limit S - Spike Recovery outside accepted recovery limits J - Annlyte detected below quantitation limits R RPD outside accepted recovery limits												
ND - Not Detected at the Reporting Limit     S - Spike Recovery outside accepted recovery limits       J - Analyse detected below quantitation limits     R - RPD outside accepted recovery limits												
	Qualifiers:	ND - Not Detected at the Reporting Limi		S - Spi	ke Recovery outside	accepted rec	overy limits		3 - Analyte detected	l in the associ	ated Method E	llank
		J - Analyte detected below quantitation li	imits	R - R	D oulside necepted 1	recovery limit	, N					<u>-</u>

					:		i				
B - Analyte detected in the associated Method Blank	in the asso	B - Analyte detected		covery limits	e accepted rec	S - Spike Recovery outside accepted recovery limits	s - Spi		ND - Not Detected at the Reporting Limit	ND - Not D	Qualifiers:
		3				)	3	2			
		o (	511	88.6	97.8		20	0.5	19.56		Eunyloenzene
		0	112	89.3	97.1	0	20	0.5	19.42		Toluene
		0	114	88.7	98.1	0	20	0.5	19.62		Benzene
D RPDLImit Qual	048%	HighLimit RPD Ref Val	HighLimit	LowLimit	%REC	SPK Ref Val	SPK value	Pal	Result		Analyle
		ß	362606	SegNo:		16A	PIDFID_050516A	Run ID:	÷		Client ID:
Date	Prep Dale	Analysis Date 5/17/2005 2:41:13 AM	5 Date 5/17/	Analysis		Units: µg/L	SW8021	Test Code:	Batch ID: R15402	BTEX lcs 100ng	Sample ID BTI
		a	110	06	92.4	٥	3.5	0.1	3.236	Nitrite (As N)	Nitrate (As N)+Nitrite (As N)
		0	110	06	93.7	0	10	0.5	9.366		Sulfate
		O	110	06	93.1	0	3	0.5	As P) 4.656	Phosphorus, Orthophosphate (As P)	Phosphorus, OI
		0	110	06	93.1	0	2.5	0.1	2.328	le (As N)	Nitrogen, Nitrate (As N)
		0	110	06	90.8	0	-	0.1	0.9075	e (As N)	Nitrogen, Nitrite (As N)
		0	110	06	91.8	0	5	0.1	4,589		Chloride
		c	110	06	105	C	0.5	0.1	0.5749		Finorida
D RPDLImit Qual	%RPD	RPD Ref Val	HighLimit	LowLimit	%REC	SPK Ref Val	SPK value	PQL	Result		Analyle
		ច	365705	SeqNo:			LC_050525A	Run ID:			Cilent ID:
Prep Dale	Prep	2005	Analysis Dale 5/25/2005	Analysis		Units: mg/L	: E300	Test Code:	Batch ID: R15502	ស្	Sample ID LCS
		0	110	06	96.7	0	3.5	0.1	3.383	Nitrite (As N)	Nitrate (As N)+Nitrite (As N)
		0	110	06	96.0	0.1124	10	0.5	9.712		Sulfate
		0	110	06	96.9	0	Ð	0.5	(As P) 4.845	Phosphorus, Orthophosphate (As P)	Phosphorus, O
		0	110	06	97.1	0	2.5	0.1	2.427	le (As N)	Nitrogen, Nitrate (As N)
		0	110	06	95.6	0	<del>.</del>	0.1	0.9562	o (As N)	Nitrogen, Nitrito (As N)
		0	110	06	94.9	Ū,	5	0.1	4.744		Chloride
		0	110	80	103	0	0.5	0.1	0.516		Fluoride
D RPDLImit Qual	%RPD	RPD Ref Val	HighLimit	LowLimit	%REC	SPK Ref Val	SPK value	Pal	Result		Analyte
		4	362064	SeqNo:			LC_050512A	Run ID:			Cllent ID:
Prep Date	Prep	2005	Date	Analysi		Unlts: mg/L	: E300	Test Code: E300	Batch ID: R15380	S	Sample ID LCS
									Phase II Monitoring	Phase II	Project:
Laboratory Control Snike - generic	Contro	T.ahoratory								-	Work Order:
UC SUMMARY MELOINT		,									

B - Analyte detected in the associated Method Blank	B - Annlyte detected ir		covery limits	le accepted rec	- Spike Recovery outside accepted recovery limits	S - Spi		ND - Not Detected at the Reporting Limit	Qunlifiers: ND - Not Det
	0	120	80	102	0	0.5	0.005	0.5102	Silver
	0	120	80	97.3	Û	0.5	0.05	0.4864	Selenium
	Ð	120	80	99.5	D	0.5	0.005	0.4976	Lead
	0	120	80	100	0	0.5	0.006	0.5011	Chromium
	0	120	80	102	0	0.5	0.002	0.5097	Cadmlum
	ŋ	120	80	102	٥	0.5	0.02	0.5084	Barlum
	0	120	80	106	0	0.5	0.02	0.528	Arsenic
%RPD RPDLimit Qual	RPD Ref Val	HighLimit	LowLimit	%REC	SPK Ref Val	SPK value	Pal	Result	Analyte
	14	: 363314	SeqNo:			ICP_050518A	Run ID:		Client ID:
Prep Date 5/17/2005	5/18/2005 1:03:29 PM	Analysis Date 5/18/	Analysi		Units: mg/L	SW6010A	Test Code:	Balch ID: 7986	Sample ID LCS-7986
6.36 0	0.004958	134	75.2	106	0	0.005	0.0002	0.005284	Mercury
%RPD RPDLimit Qual	RPD Ref Val	HighLimlt	LowLimit	%REC	SPK Ref Val	SPK value	Pal	Result	Analyte
	84	: 366084	SeqNo:		0526A	MI-LA254_050526A	Run ID:		Cilent ID:
Prop Date 5/26/2005	/2005	Analysis Date 5/26/2005	Analys		Unlts: mg/L	SW7470	Test Code: SW7470	Batch ID: 8047	Sample ID LCSD-8047
	0	134	75.2	99.2		0.005	0.0002	0.004958	Mercury
%RPD RPDLimit Qual	RPD Ref Val	HighLimlt	LowLimit	%REC	SPK Ref Val	SPK value	Pal	Result	Analyte
	68	1: 366068	SeqNo:		0526A	MI-LA254_050526A	Run ID:		Client ID:
Prep Date 5/26/2005	5/26/2005	Analysis Date 5/26	Analys		Units: mg/L	SW7470	Test Code:	Batch ID: 8047	Sample ID LCS-8047
	0	112	89.4	98.7	0	60	0.5	59.19	Xylenes, Total
	-			97.9		20	0.5	19.59	t viuei ie Ethylbenzene
	00	114	88.7 80 3	95.9	00	20	0.5	19.19 10 Ed	Benzene
%RPD RPDLImit Qual	RPD Ref Val	HighLimlt	LowLimit	%REC	SPK Ref Val	SPK value	Par	Result	Analyte
	19	363019	SeqNo:		117A	PIDFID_050517A	Run ID:		Client ID:
Prep Date	Analysis Date 5/17/2005 10:39:14 PM	dis Date 5/17	Analys		Units: µg/L	SW8021	Test Code:	Balch ID: R15413	Sample ID BTEX Ics 100ng
	running in							Phase II Monitoring	Project: Phase II
Lahoratory Control Snike - generic	I.aboratory (								Work Order: 0505119
<b>OC SUMMARY REPORT</b>	OC SUM							San Juan Refining	CLIENT: San Juan

-0 14	San Juan Refining 0505119 Phase II Monitoring							QC SUMMARY REPORT Laboratory Control Spike Duplicate	IMARY ontrol Spi	<b>REPO</b> ke Dupli
LCSD-7986	Batch ID: 7986	Test Code:	Test Code: SW6010A	Units: ma/L		Analvsis	Date 5/18/2	Analysis Date 5/18/2005 1:06:28 PM	Prep Dale	Prep Dale 5/17/2005
		Run ID:	ICP_050518A			SeqNo:	363315	CL		
	Result	Pal	SPK value	SPK Ref Val	%REC	LawLimit	HighLimlt	HighLimlt RPD Ref Val	%RPD F	RPDLIMIt
	0.5204	0.02	0.5	0	104	80	120	0.528	1.44	20
	0.5108	0.02	0.5	0	102	80	120	0.5084	0.483	20
	0.5099	0.002	0.5	D	102	80	120	0.5097	0.0392	20
	0.5056	0.006	0.5	D	101	80	120	0.5011	0.894	20
	0.4979	0.005	0.5	0	99.6	80	120	0.4976	0.0656	20
	0.4785	0.05	0.5	0	95.7	80	120	0.4864	1.65	20
	0.5105	0.005	0.5	0	102	80	120	0.5102	0.0645	20
QN	ND - Not Detected at the Reporting Limit		S - Spi	S - Spike Recovery outside necepted recovery limits	accepted reco	very limits	m	B - Analyte detected in the associated Method Blank	1 the associate	d Method Blan
J - A	1 - Amelyes detected below anamitation fimite				:					

## Hall Environmental Analysis Laboratory

S	Sample Receipt Ch	ecklist		
Client Name SJR		Date and Time F	Received:	5/13/2005
Work Order Number 0505119		Received by	GLS	
Checklist completed by	2 . <u>5</u> - Date	13-05	_	
Matrix Carrie	er name <u>UPS</u>			
Shipping container/cooler in good condition?	Yes 🗹	No 🗆	Not Present	
Custody seals intact on shipping container/cooler?	Yes 🗌	No 🗔	Not Present 🗹	Not Shipped
Custody seals intact on sample bottles?	Yes 🗌	No 🗌	N/A	
Chain of custody present?	Yes 🗹	No 🗔		
Chain of custody signed when relinquished and received?	Yes 🗹			
Chain of custody agrees with sample labels?	Yes 🗹			
Samples in proper container/bottle?	Yes 🗹			
Sample containers Intact?	Yes 🗹			
Sufficient sample volume for indicated test?	Yes 🔽	No 🗌		
All samples received within holding time?	Yes 🗹	No 🗔		
Water - VOA vials have zero headspace? No VOA	vials submitted	Yes 🗹	No 🗆	
Water - pH acceptable upon receipt?	Yes 🗹	No 🗆	N/A	
Container/Temp Blank temperature?	1°	4° C ± 2 Acceptat		
COMMENTS:				
Client contacted Date conta	cted:	Perso	n coniacled	
Contacted by: Regarding		· ·		
Commenis:				
		·····		
Corrective Action				
			<u></u>	

16/16

a 1

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D	uquerque, New Me 505.345.3975 w.hallenvironmenta			5 (8082) 5	/) \ bCB. <sup>[</sup> <sup>1,</sup> //O <sup>5</sup> ' ///)	49 no 4 21636 200 , IC 200 , IC 200 , IC 200 , IC	taeM) 203 B310 (PW) M 8 AR3 M 8 AR3 M 8 AR3 M 8 AR3 M 8 AR3 M 8 A 8 M 8 A 7 M		X	X	X				×				•
			ٳ٨	n0 anilozeć	91 (L.B 199 (Ga 199 (Ga	+ 381 108 bo	BTEX + M BTEX + M TPH Meth TPH (Meth TPH (Meth TPH (Meth					 X						Hemarks:	
QA/ GC Package: Std 🔲 Level 4 🛄 Other:	Project Name: Phase II Monifaring	Project #:		Project Manager:	Sampler: - 1/1/4 tolo / Areela fo / K	Sample Température:	Number/Volume HgCl <sub>2</sub> HND <sub>3</sub> OSO5179	2-VAA X -1	1- 520mg   HE SQ1 -1	-   mas-!	1-Seeml X 1	2-V04 X X04	1-252 MB41 Juc23-1	1-250ml	1-some X 2-			Michael 212 24	•
CHAIN-OF-CUSTODY RECORD	Client: SAN Juan Refining	Address: #50 CR 4990	Bloom field NM B2413		Phane #: 5ひ5-632- 41 ゆ	Fax#: SDS-632-3911	Date Time Matrix Sample I.D. No.	5-1205 830m H70 CW Z3+10				5-12-05 920441 H20 CW 23+90					Time.	5-12-05 330M (wdv Hunnand Bunder) Date: Time: Relinquishedby: (Signature)	-

-

1

•

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D	Mexico of 109 5 Fax 505,341 ental.com	4444761744		(8082)	\ bCB,ª '' NO <sup>5</sup> ' E ''H) 5J)	08 bor elsts OV, IC 200, IC 200, IC 40V-in	EDC (Meth M9) 0158 M8 A707 M8 A707 F 7 7 8007 (F 8 82503 (V 8270 (Ser 7 8 7 8 7 8 7 8 7 8 7 9 7 8 7 9 7 8 7 7 8 7 8			X			×	××				
			լչյո	10 aniloze	1PH (Ga	+ 381 °08 bo	EDB (Weft) Ibh (Weft) BIEX + W										Remarks:	
QA/ GC Package: Std □ Level 4 □ Other:	Project Name: Phase II Wern frue	Project #:		Project Manager:	Sampler: A Murtado / Angela Fo / L	erature: / V	Mumber/Volume         Preservative         HEAL No.           HgCl <sub>2</sub> HiND <sub>3</sub> OSUST/10.	2-VOA-X -3	7-25m Hosty -3	1-250 ml -3	1-50ml X -3	2-10m-X(1)	1-250mg   H2SPy -4	H- / M252-1	1-500mg X -1		Hedpéved By/ (\$) (Andrure)	Ver By: (Signetere)
CHAIN-OF-CUSTODY RECORD	Client: SAN Than Refining	Address: #57 26 4990	Bloom Field, NM 87413		Phone #: 505-1032 - 41 Lol	Fax#: SDS-632-3911	Date Time Matrix Sample I.D. No.	5:12-05 1010 At 11-0 CW 25+95				5-12-05 1020 H20 OW 257 70					Time: Rejunction By: (Signature)	5-12-05 320 m Lwdy Chut Tallo Data: Time: Relinquished By: (Signature)

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Sulte D	Albuquerque, New Mexico 87109 Tel. 505.345.3975 Fax 505.345.4107 www.hallenvironmental.com	ANALYSIS REQUEST		1082)	, PCB's (E , NO <sub>2</sub> , PO , NO <sub>2</sub> , PO , TO , TO , TO , TO , TO , TO , TO , T	08 bor 2 or PJ 2 or Ju 2 ou 2 ou 2 ou 2 ou 2 ou 2 ou 2 ou 2 o	EDB (Mett) EDC (Mett) 8310 (PN) 801 PE3 M 8 AA3A M 8 AA3A		X		X		×	×	X		Amount of	up - Do what you Can	
			رلاات	iO anilo	1,260) H9T 58 (Cas/L 82 (Cas/L	+ 381 r 08 bo	87EX +- <del>19</del> 87EX + M 7PH Meth 79=M 19=U					X				×	Remarks: Limited	drying	
Accreditation App NELAC U USACE U	Project Name:	Project #:		Project Manager:	Sampler in Autodo/ Angla Falk	Sample Tergherature:	Number/Volume HgCl <sub>2</sub> HNO <sub>3</sub> CCCCT / CC	2-WA Y -5	1-250m0 H2604 -5	1-257ml 1-257ml		2-VOA X -6	1-2500 Haby -C	1-2620	1-Struck X -6	1-10m X 11-1	Received B4: (Storyture) S-R-OS	Received By: (Signadure)	
CHAIN-OF-CUSTODY RECORD	Client: SAN JUAN Refumms	Address: #57 724 4990	193	BZ415	Phone #: 505-432-4 161	Fax#: 505-632-3911	Date Matrix Sample I.D. No.	5-12.04 1230m 49,0 OW 23 +90				42-05 pm HzD DWZ3+10				+ + h + rip / blank		Time: Relinquished By: (Signatur	

# **APPENDIX J**

# **Field Sampling Methods**

5127-002 Giant Refining Company

## FIELD MONITORING METHODS

### FIELD MONITORING PROCEDURES

Equipment and supplies needed for collecting field monitoring data includes the following:

- Interface Probe
- Distilled Water
- Sharpie Permanent Marker
- Two 5-gallon Buckets
- Paper towels

- Untrameter 6P
- Disposable Latex Gloves
- Field Paperwork / Log Sheets
- Trash Container

#### Fluid Level Measurements

All fluid levels are measured to an accuracy of 0.01 feet using a Geotech Interface Meter. At each monitoring well location, depth-to-product, depth-to-water, and total well depth measurements are recorded and used to calculate fluid level elevations and purge volumes for each sampling event.

#### Field Monitoring Parameters

Perched-groundwater quality parameters are measured using an Ultrameter 6P instrument. Electrical conductance, total dissolved solids (TDS), pH, and temperature are monitored prior to sample collection. Dissolved oxygen is monitored using the Hach High Range Dissolved Oxygen AccuVac method within thirty minutes of sampling.

#### Instrument Calibration

The Ultrameter 6P instrument calibration occurs at the beginning of each day of sampling. For conductivity and TDS calibration, the cell is rinsed three times with a 3000 umhos/cm NaCl Standard. The cell cup is refilled with the standard. Either the "COND" or the "TDS" button is pressed and then the "CAL" button is pushed. The up or down arrow is pressed until the display agrees with the standard. The "CAL" button is pressed to accept the value.

The Ultrameter 6P has an electronic oxidation reduction potential (ORP) calibration which is automatically calibrated with the 7 pH. The pH sensor well is rinsed three times with 7.0 buffer solution and then refilled again with that buffer. The "pH" button is pressed then the "CAL" button. The up or down arrow is adjusted until the display agrees with the buffer value. The "CAL" button is pushed to accept that value. The calibration steps are repeated using an acid buffer solution and then again with a base buffer solution.

## SAMPLE COLLECTION PROCEDURES

Equipment and supplies needed for collecting representative perched-groundwater and soil samples include the following:

- Disposable Latex Gloves
- Cooler with Ice
- Glass Filters, Syringes, Jars
- Field Paperwork / Logsheet
- Trash Container
- Bottle Kits with Preservatives (provided by laboratory

- String / Twine
- Paper Towels
- Sharpie Permanent Marker
- Two 5-gallon Buckets
- Ziploc Bags

#### Groundwater Sampling

A minimum of three well volumes is purged from the well prior to sample collection using a disposable bailer. The purge volume for each well is determined using the following equation:

Purge Volume = [(Total Well Depth) - (Depth to Liquid)] x (Conversion Factor) x 3

The conversion factor is determined by the diameter of the well casing.

Casing Diameter	Conversion Factor
6-inches	1.50 gallons/ft of water column
5-inches	1.02 gallons/ft of water column
4-inches	0.74 gallons/ft of water column
3-inches	0.367 gallons/ft of water column
2-inches	0.163 gallons/ft of water column

Typically disposable bailers are used for purging and sampling. Each bailer holds one liter of liquid. Three well volumes can be calculated by counting the number of times a well is bailed.

After sufficient purging, samples are collected with the bailer and poured into the appropriate sample containers provided by the laboratory. Two people are usually utilized for sampling activities. Sampling takes place over a bucket to insure that spills are contained.

All purged water is poured into a 55-gallon drum designated for sampling events.

## <u>Soil Sampling</u>

Soil samples are collected by performing the following procedure:

- Using disposable latex gloves and/or a disposable spoon or trowel, representative soil is transferred into sample jars provided by the laboratory.
- The sample jar cap is secured and the jar is labeled with the appropriate information.
- Filled sample containers are put in a Ziploc bag and placed in a cooler filled with ice immediately after sample collection.

## SAMPLE HANDLING PROCEDURES

Sample containers for chemical analysis are placed in ice-filled coolers immediately following collection, and kept at  $4\pm 2^{\circ}$  Celsius prior to and during shipment. Sample containers are packaged to avoid breakage during transportation. Ice is double-bagged to prevent leakage. Sample possession is maintained under proper chain-of-custody.

## Sample Containers and Preservation Requirements

Pre-cleaned sample containers are obtained from the laboratory. Sample volumes, container types, and preservation requirements are followed per specific method requirements.

## Sample Identification

Samples collected are identified with a sample label in addition to an entry on a chain-ofcustody form. Each sample is identified with a unique sample number that designates sample type, sample location, and depth (as applicable).

## Sample Custody

Chain-of-custody forms are placed in a sealed plastic bag and taped to the inside lid of the cooler with the samples. Signed custody seals are place on the cooler during storage or transport.

The following information concerning each sample is documented on the chain-ofcustody form:

- unique sample identification;
- date and time of sample collection;
- sample matrix;
- analytical parameters requested;
- number of containers per sample; and
- sampler's name.

Upon receipt of the sample cooler, the laboratory verifies custody and the condition of the samples. Non-conformances in sample receipt (e.g., broken sample containers, samples received out of temperature) are documented on the sample receipt form and communicated to Giant immediately.

#### Field Quality Control Samples

Trip blanks are used to evaluate if fuel hydrocarbons may have been introduced to the environmental samples during shipment, handling, or storage. Trip blanks are prepared in the laboratory by pouring deionized, distilled water into 40 millimeter vials. The trip blanks are shipped from the laboratory to the project site and then remain with the field samples back to the laboratory with each cooler containing VOA samples.

#### DECONTAMINATION AND WASTE HANDLING PROCEDURES

#### Equipment Decontamination

Equipment that may directly or indirectly contact samples will be decontaminated. In addition, care will be taken to prevent the samples from coming into contact with potentially contamination substances, such as tape, engine exhaust, corroded surfaces, and dirt.

To decontaminate sampling devices (such as level probes), surfaces will be scrubbed with a solution of potable water rand Alconox or equivalent laboratory-grade detergent. The equipment will then be rinsed with distilled, potable water. The equipment will air-dry on a clean surface or rack. If the sampling device will not be used immediately after being decontaminated, it will be wrapped in a clean plastic bag. Where possible, disposable sampling equipment will be used in order to minimize decontamination procedures and avoid cross-contamination.

#### Purge and Decontamination Water Disposal

The Ultrameter 6P and the interface probe are rinsed with distilled water after every well. The rinse procedure takes place over a bucket to insure that spills are contained. All rinse and purge water is contained and then disposed of through the refinery wastewater system.

Any glassware used is taken to the refinery laboratory and washed with Alconox and water and rinsed with reverse osmosis water. Laboratory wastewater runs through the refinery system.

#### Waste Handling

Investigation-derived waste (IDW) that is generated during field activities will consist of general trash, disposable sampling equipment, and used personal protective equipment (PPE). These waste streams will be managed onsite.

Decontamination water, if generated, will be collected and placed into the onsite treatment system. Any purge water generated will be handled in the same manner.

# **APPENDIX K**

# **Barrier Construction Quality Control Measures**

5127-002 Giant Refining Company

# BARRIER CONSTRUCTION QUALITY CONTROL MEASURES

## FIELD INSPECTION AND TESTING

#### Field Inspections

A field engineer from Malcolm Pirnie was present on-site throughout construction of the barrier wall. Duties of Malcolm Pirnie's field engineer included the following:

- Observation of trench excavation, soil and rock encountered, estimation of groundwater depth, and excavation conditions
- Identification of Nacimiento Formation key material
- Determination and measurement of key depth
- Review of field and laboratory testing conducted by RECON
- Photographic documentation of construction activities

Visual inspections of excavated soils and bedrock were extensively conducted by Malcolm Pirnie's Field engineer throughout the construction of the barrier. Representative samples of the key material were collected periodically during excavation activities.

The trench was excavated in 10 to 15-foot intervals. Excavated portions of the trench were filled with bentonite slurry prior to backfilling to provide stable trench conditions during excavation. Trench continuity was assured by movement of the trench excavation equipment vertically from top to bottom of the trench as well as move horizontally along the axis of the trench without encountering unexcavated material. Verification of the key-in depth of the slurry trench, depth of the trench, and vertical continuity was done by sounding techniques with a drop line at 10-foot intervals along the centerline of the trench. Record drawings showing the barrier profile are presented in Appendix B of this IM Implementation Report.

## <u>Field Testing</u>

Field tests of bentonite slurry and soil-bentonite backfill were conducted in accordance with the project specifications. Daily field tests and inspection of the slurry, backfill, stabilizing agent and finished slurry wall was performed by RECON. Copies of RECON's daily field testing results are provided in Appendix C of this IM Implementation Report. Testing and calibration procedures were performed by RECON in accordance with the following American Petroleum Institute (API) and American Society for Testing and Materials (ASTM) standards:

Description	Test Designation
Bentonite Slurry	
Viscosity (March Funnel)	API RP 13B-1
Filtrate Loss	API RP 13B-1
Density	API RP 13B-1
Sand Content	API RP 13B-1
pH	API RP 13B-1
Soil-Bentonite Backfill	
Slump Cone	ASTM C143 / C143M

The bentonite slurry consists of a stable colloidal suspension comprised of bentonite in water. The resulting bentonite slurry had the following minimum characteristics:

- 1. Viscosity: 35 seconds minimum (V > 35 sec-Marsh @ 68 degrees Fahrenheit) using Marsh Funnel Viscometer prior to placement of the backfill.
- 2. Filtrate loss: 25 cubic centimeters maximum in 30 minutes @ 100 psi using standard filter press.
- 3. Density: greater than  $64 \text{ lbs/ft}^3$
- 4. Sand Content: 10 percent measured five feet above the trench bottom.
- 5. pH: controlled between 7 and 12

Soils excavated from the slurry trench were mixed with bentonite slurry prior to placement in the trench. Additional dry bentonite was added to ensure a permeability of less than or equal to  $1 \times 10^{-7}$  cm/sec. The resulting soil-bentonite backfill had the following minimum characteristics as measured in the field:

1. Slump Cone: 3 to 6 inches

### THIRD PARTY QUALITY ASSURANCE

An independent third-party was retained by RECON to conduct field tests as a verification of RECON's results. The third-party retained by RECON was GEOMAT, Inc. of Farmington, New Mexico. Field testing performed by GEOMAT includes slump test, viscosity, unit weight, filtrate, and pH in accordance with API and ASTM standards specified in the project specifications.

Copies of GEOMAT's quality assurance reports are provided in Appendix C of this IM Implementation Report.

#### LABORATORY TESTING

RECON contracted Sierra Testing Laboratories, an independent qualified geotechnical laboratory, to perform slurry and soil-bentonite backfill conformance testing during construction. RECON collected representative samples of soil-bentonite backfill and delivered the samples to Sierra Testing Laboratories within 48 hours of sample collection. Sierra Laboratories initiated testing within 24 hours of receipt of samples. The following conformance tests were conducted on soil bentonite backfill:

Description	Test Designation	Frequency
Moisture Content	ASTM D 2216	Per 250 cubic yards
Density	ASTM D698 & Paragraph C.2	Per 250 cubic yards

Grain-Size Distribution	ASTM D422	Per 250 cubic yards
Hydraulic Conductivity	ASTM D5084 & Paragraph C.6	Per 250 cubic yards

A total of 13 permeability tests were performed; all of which indicated a permeability of less than 1 x 10<sup>-7</sup> cm/sec. Results reported by Sierra Testing Laboratories are included in Appendix C of this IM Implementation Report.