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REPORTS

YEAR(S):

2006



INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS AND CONSULTANTS

Malcolm Pirnie, 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.

Dennis Tucker, P.E., BCEE

Senior Associate

Enclosure

Cc:

Wayne Price - OCD

Innis L. Jucke

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	l Purpose	. 1
	1.1.1 Purpose of North Boundary Barrier	
	1.1.2 Purpose of Fluids Collection System	
1.2		
1.3		
1.4		
2.0	NORTH BOUNDARY BARRIER CONSTRUCTION	4
2.1	CONSTRUCTION MONITORING ACTIVITES, REPORTS, AND MEETINGS	5
2.2	BARRIER CONSTRUCTION SEQUENCE	5
2	2.2.1 Utility Excavations	5
2	2.2.2 Slurry Trench Sequence	6
2.3		
2.4	FIELD AND LABORATORY MATERIALS TESTING	7
2.5	5 TRENCH SPOILS SEGREGATION AND TESTING	8
3.0	FLUIDS COLLECTION SYSTEM	9
3.1	COLLECTION SYSTEM WORK PLAN	9
3.2	WELL CONSTRUCTION AND INSTALLATION	9
	3.2.1 Collection Wells	
j	3.2.2 Observation Wells	10
3.3		
3.4		
3.5	BASELINE MONITORING	11
_	3.5.1 Fluid Levels	
-	3.5.2 Groundwater Sampling	
3.6		
-	3.6.1 Fluid Levels	
	3.6.2 Groundwater Sampling	
Ĵ	3.6.3 Fluids Recovery	12
۱ ۸	DEFEDENCES	12

Page

LIST OF FIGURES

Description	
Observation and Collection Well Location Map	
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	
_	

LIST OF APPENDICES

Summary of Baseline Groundwater Analytical Results

Summary of Groundwater Sampling Baseline Field Parameter Results

Appendix	Description	
A	Corrective Action Plan and Agency Comments	
В	Record Drawings - Barrier Alignment and Profile	
C	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	
I	Baseline Groundwater Analytical Laboratory Reports	
J	Field Sampling Methods	
K	Barrier Construction Quality Control Measures	

4

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.

2.0 NORTH BOUNDARY BARRIER CONSTRUCTION

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 $1x10^{-7}$ centimeters per second (cm/s). Laboratory tests on samples of the soil-bentonite indicated permeability ranged from 2.01 x 10^{-8} cm/s to 6.90 x 10^{-8} 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:

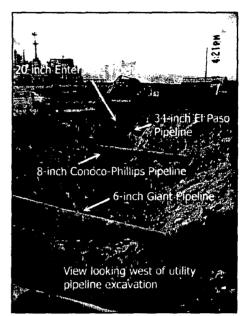
- French Drain Collection System Piping, STA 8+90
- 16-inch Giant Fire Water Pipeline, STA 22+30

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 0.040-inch 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 0.040-inch 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 9th, 2005 are summarized in Table 3.

3.5.2 Groundwater Sampling

In response to a written request submitted to Giant by OCD dated May 9th, 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 28th, 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

Giant Refinery - Bloomfield, New Mexico

Notes:

1. NMED SSLs based on New Mexico Environmental Department TPH Screening Guidelines for Industrial Exposure, November 2005. 2. NMED SSLs based on 1E-05 industrial target risk for carcinogens or hazard quotient of 1 for non-carcinogens.

Table 2: Observation and Collection Well Survey Information

	Measuring Point Elevation	Measuring Point Elevation		
Well ID	Prior to Ecbruary 2006	After February 2006		
		(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

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 (mmhos/cm)	pH (Std. Units)	Temperature	Total Dissolved Solids (mg/L)
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	5.5	1023
CW 1+50	5/10/05	1463	6.86	56	1023
CW 1+30 CW 3+85	5/10/05	2880	6.87	56	2270
CW 5+50	5/10/05	8765	6.81	56	7762
CW 6+70	5/11/05	8175	6.86	55	7191
CW 8+10	5/11/05	5199	6.83	55	4358
CW 8+45	5/8/05	SPH	SPH	SPH	SPH
CW 11+15	5/8/05	SPH	SPH	SPH	SPH
CW 14+10	5/11/05	4103	6.85	58	3353
CW 16+60	5/11/05	2420	6.91	60	1875
CW 19+50	5/10/05	2844	6.83	56	6724
CW 22+00	5/10/05	3202	6.83	57	2548
CW 23+10	5/12/05	3046	6.92	54	2425
CW 23+90	5/12/05	2702	6.86	55	2124
CW 25+95	5/12/05	1287	6.92	56	949

Notes:

SPH = Well Contains Separate Phase Hydrocarbon - No Sample

NA = Not Enough Water in the Well to Sample - Not Analyzed

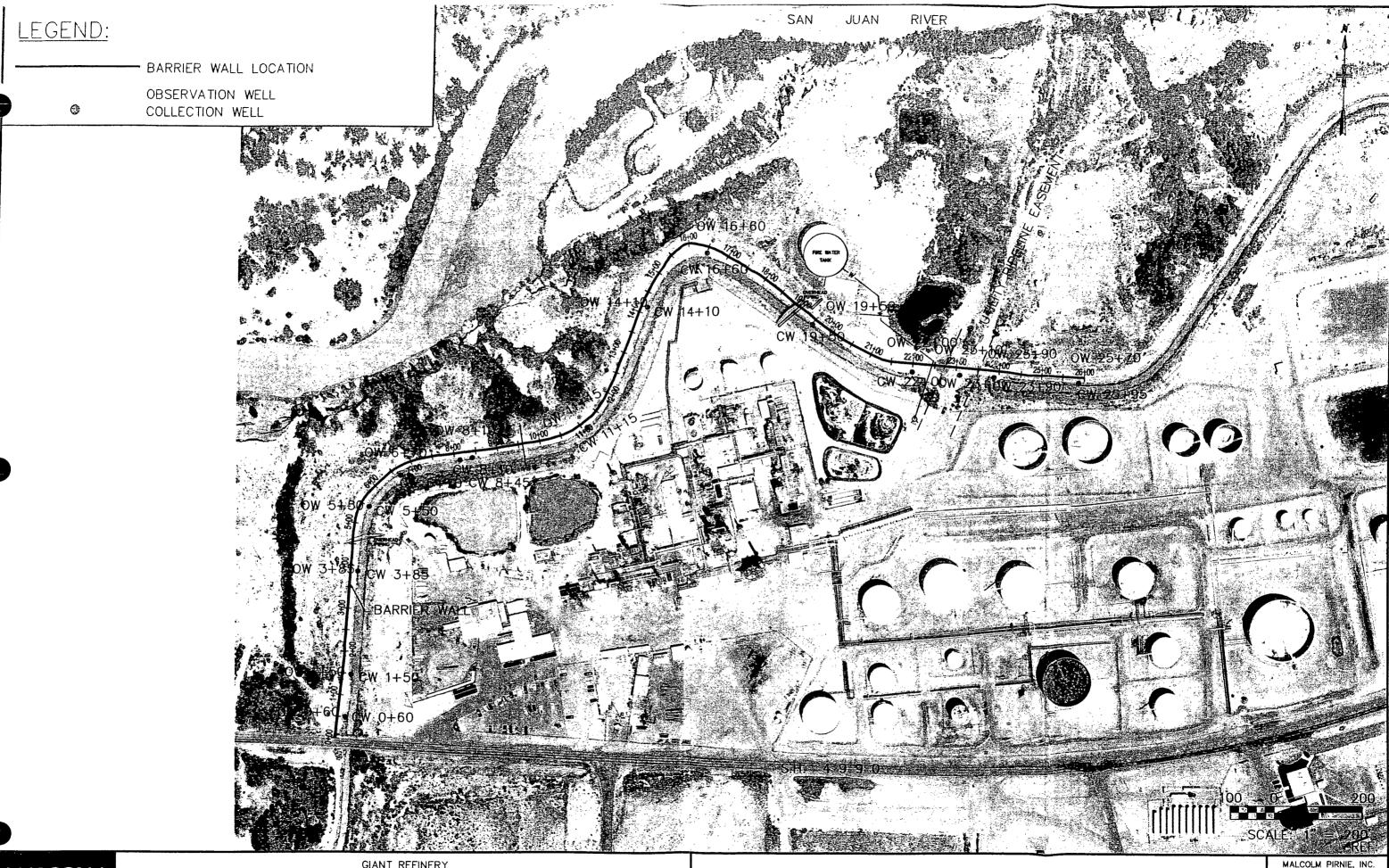
NS = Well is Dry - No Sample Collected

Table 5: Summary of Baseline Groundwater Analytical Results

Well ID	Date of	Fluoride	Chloride	P	Sulfate	Nitrate
Weit 119	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
CW 0+60	5/10/05	0.51	39	< 0.5	75	<0.5
CW 0+60 CW 1+50	5/10/05	0.59	43	<0.5	5.8	<0.5
CW 1+30 CW 3+85	5/10/05	0.39	270	<0.5	3.8	<0.5
CW 5+50	5/10/05	0.21	2700	<0.5	75	<0.5
CW 5+30 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

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



MALCOLM PIRNIE

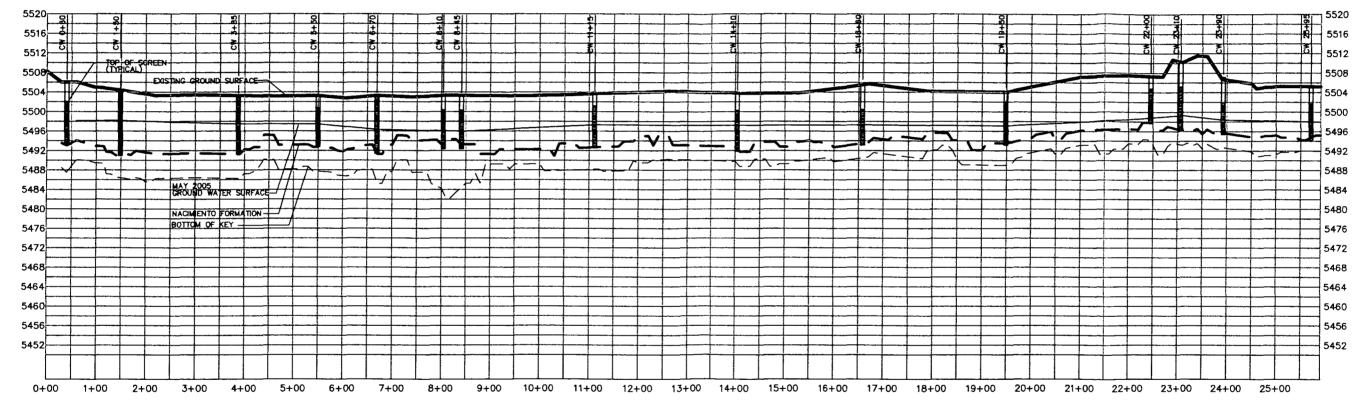
GIANT REFINERY BLOOMFIELD, NEW MEXICO

INTERIM MEASURES IMPLEMENTATION REPORT

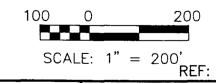
OBSERVATION AND COLLECTION WELL LOCATION MAP SCALE: 1"=200"

JUNE 2006

FIGURE-1



NACIMIENTO SURFACE PROFILE



MALCOLM PIRNIE

GIANT REFINERY BLOOMFIELD, NEW MEXICO

INTERIM MEASURES IMPLEMENTATION REPORT

FLUIDS PROFILE ALONG BARRIER ALIGNMENT

SCALE: 1"=200'

JUNE 2006
FIGURE—2

APPENDIX A

Corrective Action Plan and Agency Comments

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

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 A	DEFEDENCES	16

LIST OF TABLES

Table 1 - Groundwater and Phase-Separated Hydrocarbon (PSH) Level Data

Table 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)

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

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

- ✓ 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

- ✓ 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.

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 shallow-zone 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:

Summary of Hydraulic Properties from Slug Tests

Well ID	Transmissivity (Ft²/day)	Hydraulic Conductivity (Ft/day)
MW-45	N/A	N/A
MW-47	19.6	31.6

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.

Hydraulic Conductivity Data of Nacimiento Formation

Depth of Sample	Hydraulic Conductivity
(ft)	(cm / sec)
12 - 12.5	6.0 x 10 ⁻⁷
9.5 – 10.5	1.2 x 10 ⁻⁹

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).

Summary of Hydraulic Properties

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

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:

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

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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 $1x10^{-7}$ cm/sec or less.

Canal Service Road

Canal Service Road

Refinery Compacted Trench Cover River

SHP

Groundwater Level

Nacuniemto Formation

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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

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

Fluids Entraction using Giant Vacuum Trick

Clackson Lake Tenace

Entraction Well

Oroundwater

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.

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.



Groundwater and Phase-Separated Hydrocarbon (PSH) Level Data

			Field Data		Da	Data Interpretation	
		Total Boring Depth Depth to Water Depth to SPH	Depth to Water	Depth to SPH	Depth to	Water Depth on SPH Depth on	SPH Depth on
Well ID	Date of Data	Below Grade	Below Grade	Below Grade	Nacimiento Below	top of Nacimiento	Top of
	Collection	€	3	(£)	Grade	(3)	Groundwater
MW-47	8/16/2004	14.28	78 8	14.0	10.01	1	
	10/13/2004	14.28	8.59	7.54	10.2	ţ. 19	201
MW-46	8/16/2004	10.39	QX	CN	3.01	0:	G
	10/13/2004	10.39	Q	2	5.5		o c
SB1-0704	9/1/2004	01	7.67	QX	×	0.33	
	10/13/2004	10	7.59	2	- o oc	0.41	0 0
SB2-0704	8/30/2004	5.11	7.47	QN	01	2.53	0
	10/13/2004	11.5	7.4	QN	10	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
MW-45 (1)	8/16/2004	16.92	Not Measured	Not Measured	7	Not Measured	Not Measured
	10/13/2004	16.92	13.04	8.79	7	ĉ	(2)
SB4-0764	9/1/2004	=	8.21	S	9.5	1.29	0
	10/13/2004	-	7.96	ND	9.5	1.54	0
MC-6764	9/1/2004	10.5	Not Measured	Not Measured	9.25	Not Measured	Not Measured
	10/13/2004	10.5	7.46	ND	9.25	1.79	0
MW-24	8/26/2004	15.14	ND	13.96	12.5	0	(2)
	10/13/2004	15.14	Not Measured	Not Measured	12.5	Not Measured	Not Measured
P6 (SB&-1103)	8/30/2004	11	86.6	9.62	=	1.02	0.36
	10/13/2004	=	9.81	9.48	=	1.19	0.33
SB6-6764	8/30/2004	10.5	7.44	QN	80	0.56	0
1000 000	10/13/2004	10.5	7.17	ND	8	0.83	С
49/9-/ac	8/30/2004	10.5	7.35	6.78	6	1.65	0.57
P7 (CD0 1103)	10/13/2004	10.5	6.77	6.44	6	2.23	0.33
(6011-605)	10/13/2004	4 -	6.84	Q S	12	5.16	0
PR (SR7, 1103)	+007/C1 W.	* 5	0.08	Q	12	5.32	0
(2012/20)	10/13/2004	7 [9.42	9.32	10.5	1.08	0.1
SR8 0704	0/1/00/4	71	7.38	87.6	10.5	1.12	0.1
	10/13/2004	10.5	0.0	2 2	σ.	2.4	0 0
P9 (SB6-1103)	8/30/2004	10.5	7.13		, 0	2.4.7	
	10/13/2004	10.5	7.08		10 00	0.87	
						77.70	

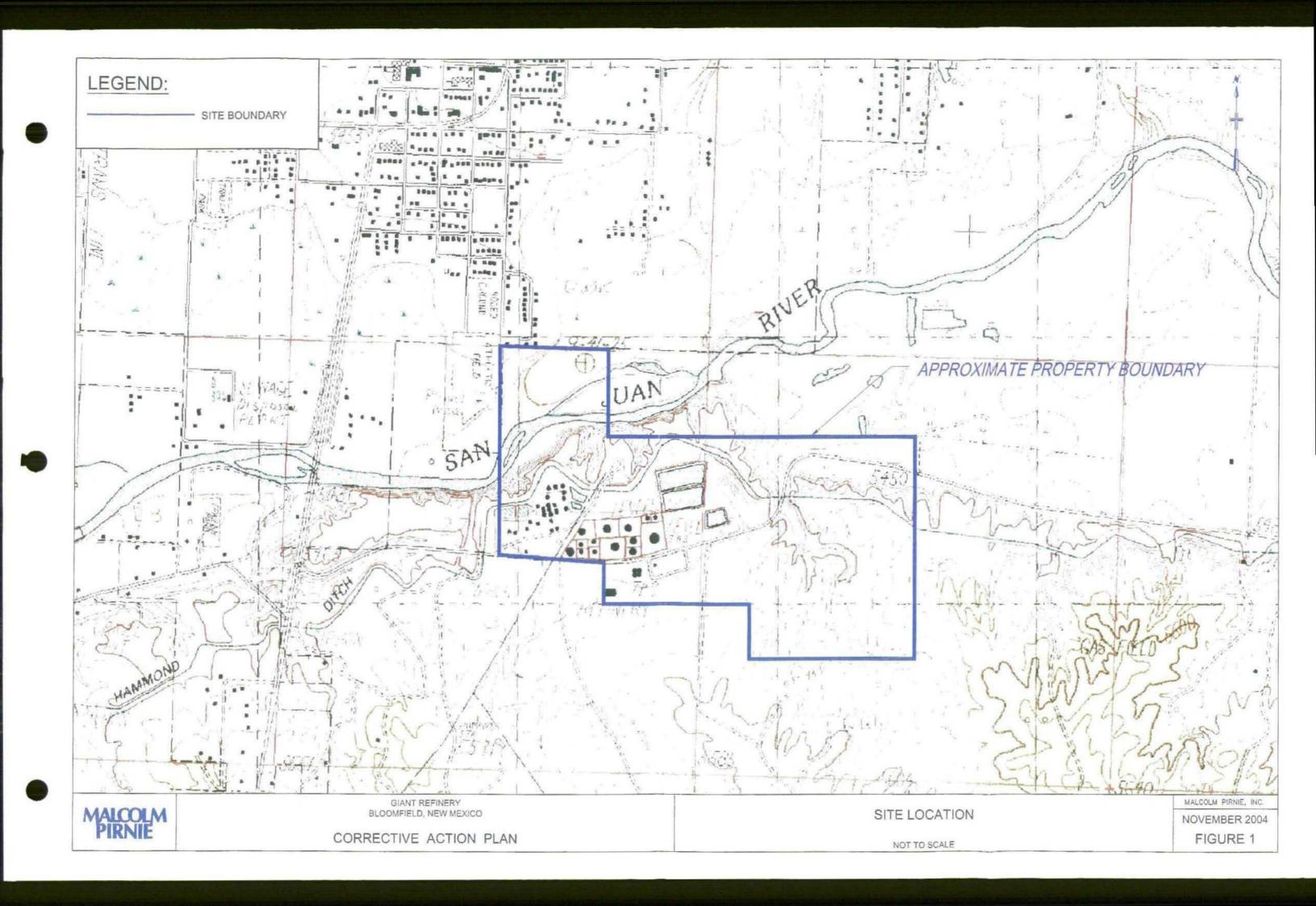
Notes:

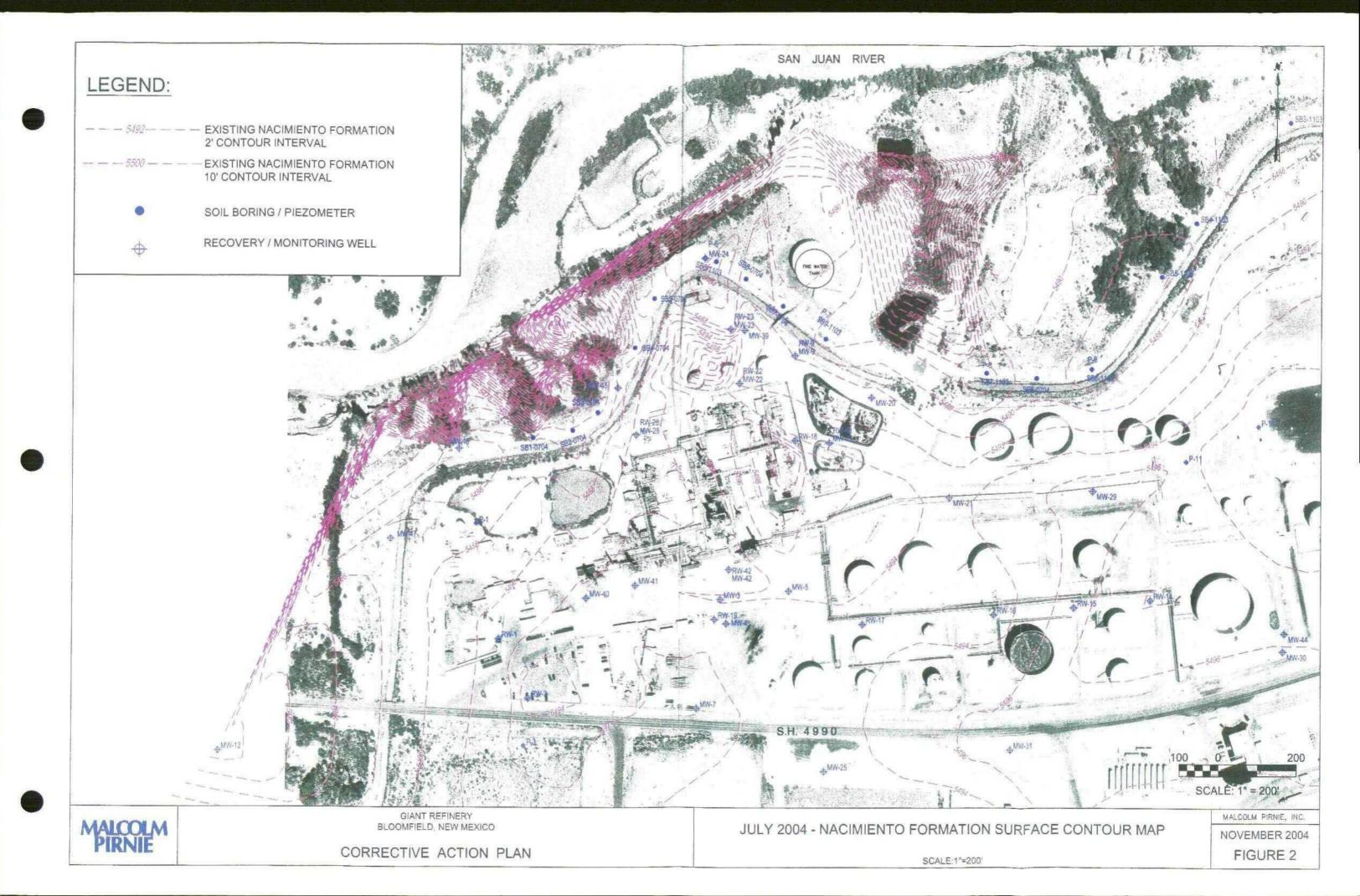
(1) - Groundwater level not measured in August '04 because monitoring well is currently equipped with a submersible pump, serving as a Recovery Well.

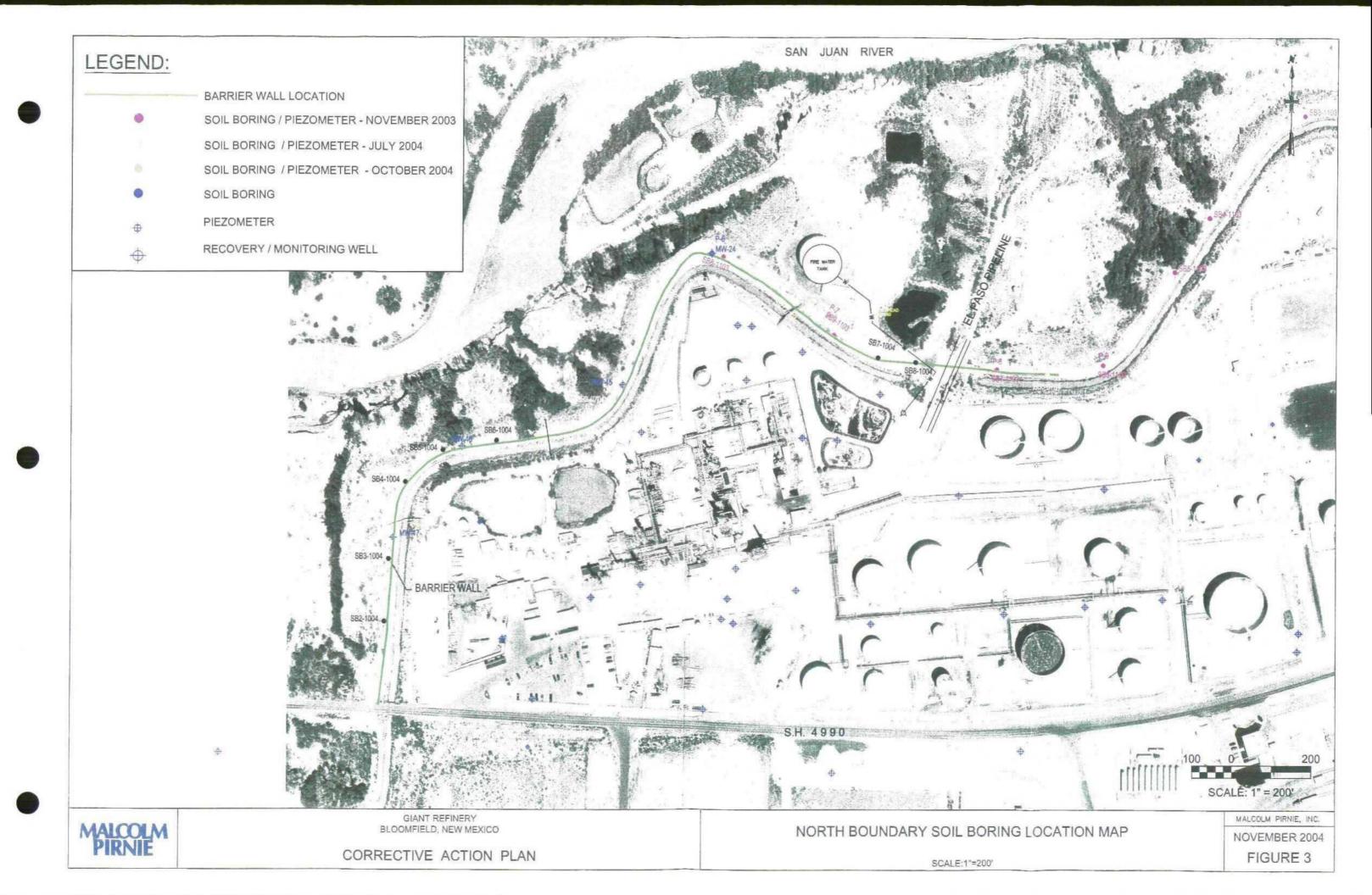
(2) Depth to groundwater and/or PSH measured to be below top of Nacimiento Formation due to total well depth. Fluid thickness within well sump not representative of fluids depth overlying Nacimiento Formation surface.ND = Not Detected

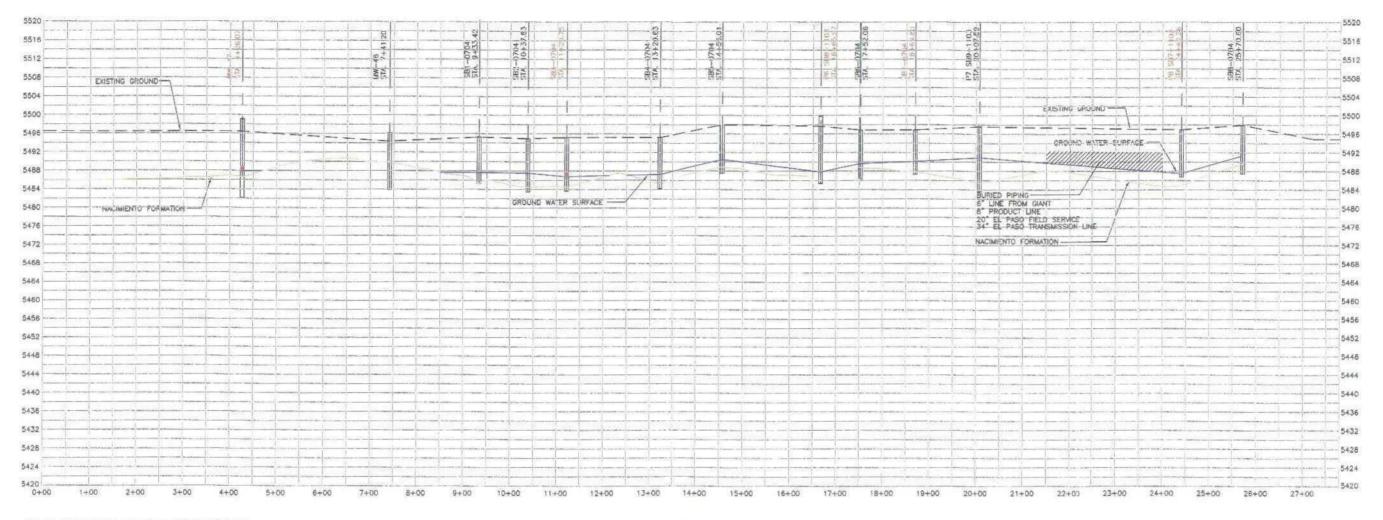
TABLE 2
Monthly Monitoring Schedule

Well ID	Dagara a garanan 1	November 8th, 2004	
SB2-1004		T	
<u> </u>	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB3-1004	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
MW-47	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB4-1004	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB5-1004	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
MW-46	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB6-1004	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB1-0704	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB2-0704	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB3-0704	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
MW-45	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB4-0704	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB5-0704	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
P-6 (SB8-1103)	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB6-0704	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB7-0704	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
P-7 (SB9-1103)	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB7-1004	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB8-1004	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
P-8 (SB7-1103)	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
SB8-0704	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005
P-9 (SB6-1103)	November 8 th , 2004	December 6 th , 2004	January 3 rd , 2005









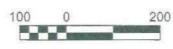
(1) ELEVATION OF THE FORMATION SHOWN IS FROM THE JULY 2004 CONTOUR MODEL. A REVISED FIGURE 5 WILL BE SUBMITTED, SHOWING THE OCTOBER 2004 BORINGS AND NOVEMBER 2004 CONTOURS ONCE THE NEW CONTOUR MODEL IS AVAILABLE.

SECTION A-A'

LEGEND:

SB3-0704 SOIL BORING WHERE SEPARATE PHASE HYDROCARBON (SPH) WAS DETECTED

MW-47 MONITORING WELL WHERE SEPARATE PHASE HYDROCARBON (SPH) WAS DETECTED



SCALE: 1" = 200'



GIANT REFINERY BLOOMFIELD, NEW MEXICO

CORRECTIVE ACTION PLAN

NORTH BOUNDARY BARRIER CROSS SECTION A-A' (1)

MALCOLM PIRNIE, INC.
NOVEMBER 2004

SCALE:1"=200"

FIGURE 5

				- taeiū	FIGURE 6	Vaedu	
ws-			Estimated C	Blo bed Corrective	Bloomfield Refinery tive Action Impleme	Bloomfield Refinery orrective Action Implementation Schedule	
0	Task Name		Duration	Start	Finish	November 2004 December 2004 January 2005 February 2005 Mai 11/7 1/1 1/2 1/2 1/2 1/2 1/2 1/3 1/3 1/3 2/2 2/2 2/27	March 2 /27 3/6
-	Contractor Selection Process	rocess	35 days	Mon 11/1/04	Mon 12/20/04		
2	Prepare Construction Documents	Documents	10 days	Mon 11/1/04	Fri 11/12/04		:
т	Pre-Bid Site Walk		0 days	Tue 11/23/04	Tue 11/23/04	♦ 11/23	
4	Bid Due Date		0 days	Wed 12/8/04	Wed 12/8/04	♦ 12/8	:
2	Contract Award		0 days	Mon 12/20/04	Mon 12/20/04	4 12/20	:
9	Construction of Containment Barrier	inment Barrier	25 days	Mon 1/17/05	Fri 2/18/05		
_	Contractor Mobilization	uc	5 days	Mon 1/17/05	Fri 1/21/05		:
∞	Barrier Wall Construction	tion	20 days	Mon 1/24/05	Fri 2/18/05		:
6	Fluids Collection System	me	35 days	Mon 1/17/05	Fri 3/4/05		
9	Review Additional Monitoring Data	nitoring Data	5 days	Mon 1/17/05	Fri 1/21/05		
1	Design Fluids Collection System	on System	10 days	Mon 1/24/05	Fri 2/4/05		:
12	Engage Installation Contractor	ontractor	10 days	Mon 2/7/05	Fri 2/18/05		:
13	Install Collection System	em	10 days	Mon 2/21/05	Fri 3/4/05		
		Task		Milestone		External Tasks	
Proje Date:	Project: Estimated CA Schedule_1109 Date: Sat 7/9/05	Split Progress		Summary Project Summary		External Milestone ◆	
Bloor	Bloomfield Refinery CAP November 8, 2004						

!

AGENCY CORRESPONDANCE



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

Re: Hammond Ditch Conditions

File No 04-043

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

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 (7-½) 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

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

Project Bloomfield-Hammond Ditch

File No. 03-122

Date November 2, 2004

							Si	eve A	nalysi	Sieve Analysis %Passing	ssing					Att	Atterberg Limits	Moisture	Unit Wt.	Classi	Classification
Boring No.	PEI Lab No	Depth ft.	3".	2"	11/2"	., L	3/4"	1/2"	3/8"	#4 #	#10 #20	20 #40	09# 0		#140 #200		Ы	W%	PCF	nscs	AASHTO
	46450	5.0-5.4							100	100	99 97	7 74	31	10	8.7		Ν	3.8		SP-SM	A-3
	46451	11.0-11.5				100	90	98	85			3 48			4.7		N/P	15.6		SP	A-1-b
	46452	9.0-10.0							100	100	71 57		5 37	28	23.8		N/P	5.6		SM	A-1-b
	46458	10.0-11.0				100	83	73	89	64 (62 55	5 25	6	က	2.5		МР	19.2		SP	A-1-b
	46464	Surface								100	100 100	96 00	3 92		-		Ν P	8.6		ML	A-4
	46465	Sruface							100	100	100 99	96 6	3 92	79	71.3		N M	14.8		ML	A-4
	46461	Surface	95	95	93	88	98	83	84	79	78 75	-	52	29	23.7		Ν	2.5		SM	A-2-4
	46462	Surface	96	80	92	64	25	49	44	40	38 31	1 22	16	∞	7.0		J.	6.0		GP-GM	A-1-a
	46463	Surface	94	98	92	64	54	43	38	32	29 23	3 14	6	9	5.3		N/P	1.1		GP-GM	A-1-a
	46456	12-12.5						Hydra	ulic Cc	Hydraulic Conductivity:		6.0 X10 ⁻⁷	om/sec	၁၉				13.3	118.7		
	46454	9.5-10.5						Hydra	ulic Cc	nducti	Hydraulic Conductivity: 1.2 X10° cm/sec	2 X 10	9 cm/se	30				13.8	117.1		
										-		_	_								
													-	<u> </u>	-	<u> </u>	-				
														-			ļ				
											-	-		_							
																_					
													-	-	_		_				
			_							-											
																					-
C:VAA	FWFILE	C:\AAFWFILE\projects\2003\03-122 Bloom\Grain Size Summary Hammond Ditch.xls\S1	03/05	1-122 E	loom/	Grain	Size	Summ	ary Ha	mmon	1 Ditch.	.xls]S1						Prep	Prepared By:		

Bore Point: End of Hammond Ditch

Road adjacent to fence bend in

cut section

Water Elevation: Not Encountered

Boring No.: SB1-1103

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				-
LAB#		COUNT	PLOT	SCALE		%M	LL	PΙ	CLASS
	0-5.25				Gravel, very sandy, cobble and bouldersize				
					rock very common. <u>Jackson Lake Terrace</u>				
	:								
	:					•			
				5.0		ļ			
	5.25-7.5				Nacimiento Formation				
		SPT			Sandstone, very weathered, light brown, moist,				
	j				dense				
	T.D.			7.5					
	:								
	1								
	;								
	i								
								!	
	:								
	:								
	1								
)									
IZF &	TYPE OF	BORING: 4	-1/4" ID	Hollov	v Stemmed Auger	LOGG	ED F	 3 Y :	KM/NS

Bore Point: Near N E. corner of

evaporation lagoon on Hammond

Ditch Road

Precision Engineering, Inc.

P.O. Box 422

Las Cruces, NM 88004

505-523-7674

File #: 03-122 Site: Bloomfield

Refinery

Flevation: Exisiting

ter Elevation: Not Encountered		Elevation: Existing
Boring No.: 882-1103	Log of Test Borings	Date: 11/4/03

i		BLOW			MATERIAL CHARACTERISTICS				
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	ΡI	CLASS.
	0-5.0				Gravel, very sandy, cobble and bouldersize				
					rock, light brown, moist. <u>Jackson Lake Terrace</u>				
									:
:									į
				<u>5.0</u>					
	5.0-7.5				Nacimiento Formation				
		SPT			<u>Sandstone</u> , very weathered, green grey, clayey,				
					(N/P), moist, medium dense				
					(possible trace of water at top of the Nacimiento Formation)				
	T.D.			7.5	Machinerito i offination)				
	1.2,			, , ,					
								i	
İ									
									:
1 1									
						<u> </u>			
& ZEاد	TYPE OF	BORING: 4	-1/4" ID	Hollov	v Stemmed Auger	LOGG	EDE	3Y:	KM/NS

Bore Point: 80' west of straight

on curves

Precision Engineering, Inc.

P.O. Box 422 Las Cruces, NM 88004

505-523-7674

File #: 03-122
Site: Bloomfield

Refinery

Water Elevation: 6 6'

Boring No.: 983-1103

Log of Test Borings

Elevation: Exisiting
Date: 11/4/03

BLOW COUNT PLOT SCALE MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.) %M LL PI CL	ASS.
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water 1 hour	LASS.
Iight brown, (~ old grade?), water bearing at 6.6'. Jackson Lake Terrace	
7.5 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious. not water bearing, top of water after 1 hour	
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
7.5-9.0 SPT Nacimiento Formation Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
Sandstone, weathered, yellow/red -brown, medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
medium-grained, clean, some black inclusions moist, relatively impervious, not water bearing, top of water after 1 hour	
moist, relatively impervious, not water bearing, top of water after 1 hour	
top of water after 1 hour	
IZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger LOGGED BY: KM	

Bore Point: 385' West of SB3-1103

along Hammond Ditch Road

Precision Engineering, Inc.

P.O. Box 422

Las Cruces, NM 88004

505-523-7674

Refinery

File #: 03-122

Site: Bloomfield

Water Elevation: Not Encountered

Boring No.: SB4-1103

Log of Test Borings

Elevation: Exisiting Date: 11/4/03

			BLOW			MATERIAL CHARACTERISTICS				`
	LAB#	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS.
		0-8.5				Gravel, sandy, cobble and bouldersize material				
						common, moist, dense, very difficult to drill 7.5-				
İ						8.5', dry from 7.5-8.5'				
						Jackson Lake Terrace				
:		,								
		:								
Ì										
	1				5.0					
	ĺ									
		}								
					7.5					
		!			7.5					
-	i	8.5-9.0				Nacimiento Formation	 			
		9.0-10.5	SPT			Sandstone, weathered, yellow-brown to light				
						brown, moist-damp, hard				
					10.0					
		T.D.			10.5					
ŀ										
		:			}					
		:								
				:						
	į									
			,							
-										
]									
		;								
		ļ								
J	0175.5	T)/DF 0=	DODING	4/48/15						ICNA/NIC
1	SIZE &	TYPE OF	BORING: 4	-1/4" ID	Hollow	/ Stemmed Auger	LOGG	ED E	3Y:	KM/NS

Bore Point: West side outfall, north

side of Hammond Ditch Road

Precision Engineering, Inc.

P.O. Box 422

Las Cruces, NM 88004

505-523-7674

File #: 03-122 Site: Bloomfield

Refinery

Water Elevation: Not Encountered

Boring No.: SB5-1103

Log of Test Borings

Elevation: Exisiting

Date: 11/4/03

		BLOW		Γ -	MATERIAL CHARACTERISTICS				
	DEDTU		DI OT	<u>-</u>	MATERIAL CHARACTERISTICS	%M		ΡI	CLASS.
LAB#		COUNT	PLOT	SCALE	tarangan kanangan ang atau at at at at at at at at at at at at at	70 IVI	LL	PI	CLASS.
	0-2.5				Sand, fine, silty (Qe), brown, moist, loose				
	!								
				0.5					
	25075			2.5	C				
	2.5-8.75				Gravel, sandy, cobbles and boulders common,				
					light brown, moist, very dense Jackson Lake Terrace				
			j j	ļ ,	Jackson Lake Terrace				
				<u>5.0</u>					
				<u>5.0</u>					
				<u>7.5</u>					
				<u> </u>					
					Nacimiento Formation				
	8.75-10.25	9-19-20			Sandstone, weathered, yellow-brown to light				
					brown, argillaceous, some black inclusions				
				10.0	medium-grained				
	T.D.			10.25	(no water bearing zones)				
	1								
	ļ								
	İ								
	ĺ								
	į								
عZE &	TYPE OF	BORING: 4	-1/4" ID	Hollov	v Stemmed Auger	LOGG	ED E	3Y:	KM/NS

Bore Point: 275' west of SB5 on

Hammond Ditch Road, west side of

road

Vater Elevation: Not Encountered

Boring No.: \$86-1103

Precision Engineering, Inc.

P.O. Box 422

Las Cruces, NM 88004

505-523-7674

Elevation: Exisiting

Date: 11/4/03

LOGGED BY: KM/NS

File #: 03-122

Site: Bloomfield

Refinery

Log of Test Borings

BLOW MATERIAL CHARACTERISTICS PLOT | SCALE (MOISTURE, CONDITION, COLOR, ETC.) %M LL PI CLASS. LAB # DEPTH COUNT 0-3.5 Sand, fine, silty (Qe), brown, damp-moist, loose 3.5-8.0 Gravel, sandy, cobble and boulder size material common, light brown, difficult to drill, water Jackson Lake Terrace bearing. 5.0 Nacimiento Formation 8.0-10.5 17-26-49 Sandstone, weathered, yellow-brown to light brown, argillaceous, laminar, damp-moist, very dense 10.0 T.D. Installed 2" hand slotted PVC (slotted 48") 10.5

JIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger

Bore Point: 230' west of SB6 on

Hammond Oitch Road, adjacent to

siphon on west side of road Water Elevation:

Boring No.: SB7-1103

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

			T	i			i		
		BLOW			MATERIAL CHARACTERISTICS	0, 11		5.	01.400
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	PΙ	CLASS.
	0-2.5				Sand				
						1			
!									
				<u>2.5</u>		ļ			
	2.5-10.0				Gravel, sandy, cobbles and boulders, very				
	į				dense, tan, moist, difficult to drill, water bearing				
					at 9.0', (free product). Jackson Lake Terrace				
				F 0					
				<u>5.0</u>					
	;								
!				<u>7.5</u>					
				<u></u>					
	į								
				<u>10.0</u>					
1									
	10.5-12.0				Nacimiento Formation				
					<u>Sandstone</u> , weathered, yellow-brown, laminar				
					banded (yellow, brown,red), damp-moist, hard				
! !	T.D.			<u>12.0</u>	Installed 2" hand slotted PVC (slotted 48")				
								İ	
	}								
			:						
	}								
	!								
	:								
	•								
	1								
SIZE &	TYPE OF	BORING: 4	-1/4" ID	Hollov	v Stemmed Auger	LOGG	ED E	3Y:	KM/NS

Bore Point: West side of Hammond

Ditch Road, 100' east of overhead

pipe rack

ter Elevation: Not Encountered

Boring No.: SB8-1103

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: Existing

Date: 11/5/03

!		3LOW	Τ	T	MATERIAL CHARACTERISTICS				
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	PΙ	CLASS
	0-7.5	333111	1. 201	DOMEL	Gravel, sandy, cobbles and boulders, light	7,5111			
·	0 , .0				brown, moist, very dense, difficult drilling, water				
					bearing. Jackson Lake Terrace				
					dung. dungon zake remade		,		
ļ									
į									
ĺ				<u>5.0</u>		į			
	1								
	1								
]						
	7.5-10.0	85 (12")			Nacimiento Formation				
					Sandstone, weathered, not water bearing, very				
					argillaceous, some claystone fragments,				
					hydrocarbon odor at 9.0'				
				<u>10.0</u>					
Ì	10-11.0				Sandstone, weathered, medium grained,				
					slightly argillaceous, yellow-brown, damp-			1	
					moist, very dense, laminar banded, some red				
					laminae				
	T.D.			<u>11.0</u>	Installed 2" hand slotted PVC (slotted 48")				
								ĺ	
1									
	İ								
			1			1	Ī		

Bore Point: 260' west of pipe rack

crossing on west side of Hammond

Ditch Road

ter Elevation: Not Encountered

Boring No.: SB9-1103

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: Existing

Date: 11/5/03

		BLOW			MATERIAL CHARACTERISTICS				
_AB#	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	Ы	CLASS
	0-12.0				Gravel, sandy, silty, cobbles and boulders,				
					light brown, hydrocarbon odor below 11.0'				
	:				Jackson Lake Terrace				
								Ì	
				<u>5.0</u>					
						ļ			
						Ì			
					·				
				<u>10.0</u>					
				12.0					
	12-14.0				Nacimiento Formation				
1					Sandstone, light brown-yellow brown, damp-				
					moist, very dense, very argillaceous, laminar				
	- F D			44.0	banded	-			
	T.D.			14.0	Installed 2" Hand Slotted PVC (slotted 48")				
								Ì	
	1				1		. 1		

Sheet:

Bore Point: NO BORING

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:

		BLOW			MATERIAL CHARACTERISTS				
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	PI	CLASS.
				10	BORING				
				<u>5.0</u>					-
				<u>7.5</u>					
				<u>10.0</u>					
				<u>15.0</u>					
				20.0					
SIZF	& TYPF (OF BORING:	4 1/4" IF	HOLLOW	STEMMED AUGER	LOGO	SED	BY:	
	0704 yls]Sh								

Bore Point: SW corner of fresh-

water pond

Precision Engineering, Inc.

P.O. Box 422

Las Cruces, NM 88004

505-523-7674

File #: 03-122

Site: Bloomfield

Refinery

ter Elevation: Not Encountered

Boring No.: SB11-1103

Log of Test Borings

Elevation: Exisiting

Date: 11/6/03

<u></u>		BLOW	1		MATERIAL CHARACTERISTICS	ή			
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	PI	CLASS.
	0-7.0			00/122	Sand, silty, slightly clayey, brown, moist, loose,	70			
					(Qe), more clay with depth > 4'				
!					(QC), more day with depth - 1				
i									
!		1				}			
		!							
				<u>5.0</u>					
				<u> </u>			j		
								}	
	7.0-10.0			7.0	Clay, sandy, light brown, moist-wet, firm	 			
								Ì	
						1			
	ĺ					1			
				10.0					
	10.0-15.0				Gravel, medium to coarse, sandy, cobbles and				
					boulders are abundant, brown, moist				
				45.0					
	15.0-20.0			15.0	Same as above with associanal conditions				
	15,0-20,0				Same as above, with occasional sand lens < 8-10" thick				
					< 6-10 thick				
				1					
				ļ					
	İ			20.0					
	}			<u></u>					
_									
SIZE &	TYPE OF	BORING: 4-	1/4" ID 4		Stemmed Auger	LOGG	FD F		KM/NS
- 1 - L		DOMINO, T	11 T 1111	1011000	Common Augus			· · ·	

 $C: \AAFWFILE \projects \aligned 2003 \aligned 3-122 Bloom \B11 \ 1103.xls] Sheet 1$

Bore Point: BW corner of fresh-

water pond

Precision Engineering, Inc.

P.O. Box 422

Las Cruces, NM 88004

505-523-7674

File #: 03-122 Site: Bloomfield

Refinery

er Elevation: Not Encountered

Boring No.: 3B11-1103

Log of Test Borings

Elevation: Exisiting

Date: 11/6/03

DEPTH 22.5-24.0 T.D.	BLOW COUNT	PLOT	SCALE 22.0	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	ΡI	CLASS.
22.5-24.0	COUNT	PLOT		(MOISTURE, CONDITION, COLOR, ETC.)	% IVI	LL	P1	CLASS.
			22.0					
T.D.				Nacimiento Formation				
T.D.				Sandstone, weathered, very light brown, moist-				
Ι.Ο.				not water bearing, dense Installed 2" hand slotted PVC (slotted 60")	-			
			<u>24.U</u>	Installed 2 Harld Slotted PVC (Slotted 60)				
						Ì		
!								
	}							
į								
						į		
]			
			ĺ					
			ļ					
;			}					
		1						
YPE OF F	BORING: 4-	1/4" ID H	Hollow	Stemmed Auger	LOGG	ED P	Y:	KM/NS
	YPE OF E	YPE OF BORING: 4-	YPE OF BORING: 4-1/4" ID	YPE OF BORING: 4-1/4" ID Hollow	YPE OF BORING: 4-1/4" ID Hollow Stemmed Auger	YPE OF BORING: 4-1/4" ID Hollow Stemmed Auger LOGG	YPE OF BORING: 4-1/4" ID Hollow Stemmed Auger LOGGED B	YPE OF BORING: 4-1/4" ID Hollow Stemmed Auger LOGGED BY:

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

Boring No.: SB12-1103

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: 11/6/03

		BLOW	_		MATERIAL CHARACTERISTICS				
LAB#		COUNT	PLOT	SCALE	<u> </u>	%M	LL	PI	CLASS
	0-3.5				Sand, very fine, silty, light brown, damp, (Qe)				
	3.5-7.0			<u>5.0</u>	Gravel, sandy, brown, cobbles/boulders common, damp-moist, dense, difficult drilling				
	7.0-11.0				Sand, medium, clean, light brown, damp, loose, occasional fine gravel				
	11.0-17.5				<u>Gravel</u> , sandy, clean, cobbles and boulders boulders are abundant, brown, damp, very dense, difficult to drill				
				<u>15.0</u>					
	17.5-20.0				Nacimiento Formation Sandstone, weathered, yellow-brown, very dense, not water bearing				
	T.D.			20.0	Installed 2" hand slotted PVC (slotted 60")				
1	į		1	1			1	- 1	

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

		BLOW	l		MATERIAL CHARACTERISTICS	<u> </u>			
LAB#	DEPTH	COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS.
LAD#		COUNT	*_**_*_*	SCALE		701VI	<u> </u>	FI	CLASS.
	0-2		*_**_*		Sand, silty, brown, moist	}			
			*_**_*						
			*_**_*_*						
	2-8.0		0*0*0*0	2.5	Cobbles, gravel, silty, sand, brown, moist				
	2-0.0		0*0*0*0	2.5	CODDIES, graver, sirry, saria, brown, moist				
			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		Black with hydrocarbon odor				
			0*0*0*0	<u>7.5</u>	· · · · · · · · · · · · · · · · · · ·				
			0*0*0*0						
	8.0-9.0		====		Nacimiento Formation				
			====		T.D. 8.0				
_									
				<u>10.0</u>					
					Placed 2" PVC, 4' hand slotted screen,				
					backfilled with cuttings				
					17.5' N of canal edge				
				45.0					
				<u>15.0</u>					
								Ì	
							l		
				20.0					
				20.0					
1									
SIZE	& TYPE O	E BORING:	4 1/4" ID	HOLLOW	STEMMED AUGER	LOGG	FD	BY:	WHK

Sheet: 2 of 8
Bore Point: See plan
ater Elevation: 6.85
Boring No.: SB2-0704

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

	i i	DI 014/	1		MATERIAL CUARACTERISTICS			1 7	
		BLOW	D. O.T.	0015	MATERIAL CHARACTERISTICS	04.8	١,,		01.400
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	PΙ	CLASS.
	0-2.5		*_**_*_*		Sand, fine, silty, brown, moist, moderately				
			*_**_*_*		dense		1		
			*_**_*_*						
			*_**_*_*						
			*_**_*_*	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						
			0*0*0*0	5.0					
			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	···					
	9.0-10.0		****		<u>Sand</u> , black, water bearing, hydrocarbon odor,				
			* * * * *	10.0	loose				
	10.0-11.5		====		Nacimiento Formation				
			====						
			====		T.D. 11.5		1		
					Placed 2" PVC, 4' hand slotted screen,				
					backfilled with cuttings				
					16' N of canal edge				
				<u>15.0</u>					
						l			
[
								}	
				<u>20.0</u>					
	İ								
_									
SIZE	& TYPE C	F BORING:	4 1/4" ID	HOLLOV	V STEMMED AUGER	LOGG	SED	BY:	WHK

Sheet: 3 of 8
Bore Point: See plan
(ater 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

	,				•				
		BLOW			MATERIAL CHARACTERISTICS	24.14		<u> </u>	01.400
LAB#	DEPTH	COUNT	PLOT	SCALE	<u> </u>	%M	LL	PH	CLASS.
	0-4.0		*_**.*.*		Sand, fine, silty, brown, damp, loose				
			*_**_*_*						
			*_**_*_*						
			*-**-*-						
			*_**_*_*	<u>2.5</u>					
			*_**_*						
			*_**_*_*						
	4005		*_**_*_*						
	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	7.5					
			0*0*0*0						
			0*0*0*0						
	0.5.10.0		0*0*0*0		Sand, fine, black, water bearing, loose		-		
	8.5-10.0		****		Sand, line, black, water bearing, loose				
			* * * * *	10.0					
	10.0-11.5		====	10.0	Nacimiento Formation, mudstone, moist, not				
	10.0-11.5		====		water bearing below 10.5, grey-black, hard				
			====		T.D. 11.5				
							-		
					Placed 2" PVC, 4' hand slotted screen,				
					backfilled with cuttings				
					SPH 6.78 (total .1')				
				15.0	,				
				<u></u>					
							:		
				20.0					
				<u>20.0</u>					
1									
SIZE	L TYDE (DE BORING:	A 1/A" IF	HOLLOV	V STEMMED AUGER	1060	JED.	BY:	WHK
	- WILLE	A DOMING.	4 1/4 1	/ 1 1 O L L O V	A OTERAIMED MOOFIL			٠ ١ سا	· · · · · · ·

Sheet: 4 of 8 Bore Point: See plan Water Elevation: 7.50

Boring No.: SB4-0704

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

		BLOW			MATERIAL CHARACTERISTICS	i			
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	PI	CLASS.
LAD#	0-2.75	COUNT	*_**_*_*	JOALL	Sand, silty, some fine gravel, brown, moist,	/OIVI	<u> </u>		CLASS.
	0-2.70		*_**_*_*		loose				
			*_**_*_*		10056	į			
	1		*_**_*						
			*_**_*_*	2.5					
			* ** * *	<u> </u>					
	2.75-8.0		0*0*0*0		Cobbles, gravelly, grey, dry, very dense				
	2.70 0.0		0*0*0*0		gravery, gravery, gray, ary, very defice				
			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	7.5					
			0*0*0*0						
	8.0-9.5		0*0*0*0		<u>Sand</u> , fine, some fine gravel, clayey, grey	1			
	1		****						
			* * * * *			<u> </u>			
ĺ	9.5-11.0		====	<u>10.0</u>	Nacimiento Formation, mudstone, very sandy,				
			====		grey, moist-wet				
			====		TD 440				·····
					T.D. 11.0				
								1	
					Placed 2" PVC, 4' hand slotted screen, @ 10.5'				
					backfilled with cuttings				
					SPH 7.49 (total .1')			İ	
ŀ	į			<u>15.0</u>	(total .1)				
	į			10.0	'				
	i								
		:							
	İ							ļ	
		i							
-				<u>20.0</u>					
	,								
	;								
SIZE	& TYPE O	F BORING:	4 1/4" ID	HOLLOW	STEMMED AUGER	LOGG	SED	BY:	WHK

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

		BLOW			MATERIAL CHARACTERISTICS				,
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	PI	CLASS.
L/ (L) II	0-2.5		*_**_*		Sand, fine, silty, brown, damp-moist				
	2.13		*_**_*						
			*_**_*_*						
			*_**_*						
			*_**_*	2.5					
	2.5-8.5		0*0*0*0		Cobbles, gravelly, grey, dry, very dense			Ì	
			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						
	<u>.</u>		0*0*0*0						
	8.5-9.25		* * * * *		Sand, fine, some fine gravel, grey, moist				
	0.05.10.5			40.0	fresh hydrocarbon odor				
	9.25-10.5		====	<u>10.0</u>	Nacimiento Formation, mudstone, very sandy,				
			====		grey, moist-wet T.D. 10.5				·········
					1.0.10.3				
						,			
					Placed 2" PVC, 4' hand slotted screen,				
					backfilled with cuttings				
					2 dottimos man ostanigo				
	!			<u>15.0</u>					
								Ì	
				20.0					
SIZE	& TYPE C	OF BORING:	4 1/4" IE	HOLLOV	V STEMMED AUGER	LOGG	SED	BY:	WHK

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

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

i		BLOW	1		MATERIAL CHARACTERISTICS				
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	11	PI	CLASS.
L/\D#	0-1.0		*_**_*		Sand, fine, silty, brown, damp, loose	70141			
	0 1.0		*_**-*-*		<u>ouria</u> , into, only, brown, damp, tooco				
	1.0-6.5 i		0*0*0*0		Cobbles, some gravel, grey, dry, very dense				
	1.0 0,0		0*0*0*0		<u></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	<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'				
			* * * * *		<u> </u>				
	8.0-10.5		====		Nacimiento Formation, sandstone, green-grey				
			_ = = = =		very dense,				
			====	10.0					
			====	10.0					
					T.D. 10.5	· 			
					1.2.10.0				
	į								
					Placed 2" PVC, 4' hand slotted screen,				
					backfilled with cuttings				
				<u>15.0</u>					
			:						
				00.0					
				20.0					,
SIZE	& TYPE C	E BORING:	4 1/4" 10	HOLLOV	V STEMMED AUGER	1060	ED.	BY.	WHK

Sheet: 7 of 8

Bore Point: See plan
/ater Elevation: 6.35

Boring No.: SB7-0704

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

1		DIOIN	1		MATERIAL CHARACTERICTICS	T	T		
	DE030	BLOW		00415	MATERIAL CHARACTERISTICS	0/8			01.400
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	PΙ	CLASS.
	0-1.5		*_**_*_*		Sand, fine, silty, brown, damp, loose				
			*_**_*_*						
	4.5.0.5		*_**_*_*		Calabi	<u> </u>			
	1.5-8.5		0*0*0*0	2.5	<u>Cobbles</u> , grey, damp, very dense				
			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	<u>5.0</u>					
			0*0*0*0	3.0					
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0	<u>7.5</u>					
			0*0*0*0	7.5					
	ļ		0*0*0*0						
	8.5-9.0		* * * * *		Sand, fine, black,				
	9.0-10.5		====		Nacimiento Formation, mudstone, sandstone,				
			====	10.0	green-grey				
			====						
					T.D. 10.5				
					Placed 2" PVC, 4' hand slotted screen,				
					backfilled with cuttings				
				<u>15.0</u>					
			}						
				l					
				20.0					
				20.0					
0175	& TVDE	JE BUDINIO:	A 1/A" ID	HOLLOW	/ STEMMED ALIGER	1000	7ED	RV.	WHK
SIZE	ALIPEL	OF BURING.	4 1/4 1U	HOLLON	V STEMMED AUGER	1000		<u>u.</u>	V V I I I V V

Sheet: 8 of 8

Bore Point: See plan
(ater Elevation: 5.92

Boring No.: SB8-0704

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

		BLOW	1		MATERIAL CHARACTERISTICS				
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	P!	CLASS.
LAD#	0-5.0	COONT	*_**_*_*	00/122	Sand, fine, silty, brown, moist, loose	70101		 	
	0 0.0		*_**_*		, , , , , , , , , , , , , , , , , , , ,				
			*_**_*_*						
			*_**_*_*						:
			*_**_*	2.5					
			*_**_*						
			*_**_*						
			*_**_*_*						
			*_**_*						
			*_**_*	5,0					
	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		====		Nacimiento Formation, mudstone, moist,				
			====	<u>10.0</u>	green-grey				
			====						
					T.D. 10.5				
					Placed 2" PVC, 4' hand slotted screen,				ļ
					backfilled with cuttings				
				<u>15.0</u>					
1				13.0					
	i ! ;								
				20.0					
			ļ			1000		DV	10011
		DF BORING:			V STEMMED AUGER	LOGO	2 <u>LU</u>	DY:	vvnn

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:

		BLOW			MATERIAL CHARACTERISTICS				
LAB#	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PΙ	CLASS.
			:	<u>2.5</u>					
				2.0					
					4 huillad				
					t Drilled				
					A BAILLIA A				
				<u>7.5</u>					
				10.0					
				<u>10.0</u>					
				45.0					
				<u>15.0</u>					
				00.0					
				20.0					
					· · · · · · · · · · · · · · · · · · ·				
SIZE	& TYPE C	F BORING:	4 1/4"	HOLLOV	STEMMED AUGER	LOGO	ED	BY:	KM

Sheet: 2 of 8

Bore Point: 21' 7" W of canal edge

Fiter 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

			ı		MATERIAL CHARACTERISTICS	1		1	
1 40 4	DEDTI	BLOW	DIOT	COALE	MATERIAL CHARACTERISTICS	%M		PI	C1 A C C
LAB#	DEPTH	COUNT	PLOT	SCALE	ļ	701VI	LL	PI	CLASS.
	0-3.0	İ	*_**_*_*		Sand, fine to coarse, silty, damp, tan				
1	1		*_**_*_*						
			*_**_*_*						
			*_**_*_*	0.5					
			*_**_*	<u>2,5</u>					
	3.0-5.0		***0***		Cobbles, gravel, sand, silty, tan, damp	<u>!</u>			
	3,0-5,0		0*0*0*0		Cobbles, graver, sand, sitty, tan, damp				
			0*0*0*0						
			0*0*0*0	5.0					
46450	5.0-5.4		******	2.0	Sand, fine to coarse, dry, clean, tan,	3.8		N/P	SP-SM
40430	3.0-3.4		******		moderately dense	3.0		177	A-3
	6.0-7.0	· · · · · · · · · · · · · · · · · · ·	******		Gravel, sand, medium, dry, tan,				7.0
	9.0-7.0		******		States, barra, modulin, dry, tall,				
	7.0-11.5		******	7.5	Sand, medium, gravel, dark grey,				
	7.0 11.5		******	<u>1</u>	hydrocarbon odor, moist			ļ	
			******		injurgodisen eder, meiot				

			*****		wet at 8'				
			******	10.0					

46451	11.0-11.5		*****		Sand, medium, gravel, dark grey, moist	15.6		N/P	SP/A-1-b

	11.5-12.0		====		Nacimiento Formation mudstone, dry				
<u></u> 46456	12.0-12.5		====		Sample Number HC 1				
					Total depth bottom of well 12' 5' of hand slotted screen				
				15.0	S of Harid Slotted Screen				
				13.0	no water for first 8 hours				
		· '			Water for mist o nodes				
								-	
		!							
				20.0					
				20.0					
		1							
			l						
SIZE		L RORING.	A 1/A" IT	HOLLOV	V STEMMED AUGER	LOGO	FD	BY:	KM
$\cup 1 \angle \Box$	שווהבע	JI DURING.	4 1/4 IL	/ ITULLUV	A OTEMMED WORK		<u>سا ـــا ،</u>	∪ I.	LVIVI

Sheet: 2 of 8

Bore Point: 17' 7" W of canal edge

Vater Elevation: 7.2' below ground surface

Boring No.: SB3-1004

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

		BLOW	1		MATERIAL CHARACTERISTICS	1	Ī		
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	PΙ	CLASS.
	0-1		*_**_*_*		Silt, sandy, very fine to fine, brown, moist				
			*_**_*_*						
	1-8.0		0*0*0*0		Cobbles, gravel, sand, fine, silty, moist, brown	İ			
			0*0*0*0						
			0*0*0*0	<u>2.5</u>					l.
			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					İ	
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0	<u>7.5</u>					
			0*0*0*0						
	8-10.5		**0**0**		Sand, fine to coarse, gravel,				
			oo** **o**o**		dark grey, wet, hydrocarbon odor				:
			00**	<u>10.0</u>					٠
			00**	10.0					
	10.5-11.5		*****		Sand, medium, argillaceous, damp				
	10.5-11.5		*****		<u>Sana</u> , mediam, arginaceous, damp				
	12.0		====		Nacimiento Formation, mudstone				
					Total depth 11' 9"				
			1						
					5' of hand slotted screen	! 			
					8' 5" top of pipe				
					no water for first 8 hours				
	į						İ		
ľ									
į									
				20.0					
				<u> 20.0</u>					
								Į	
SIZF	& TYPF O	F BORING:	4 1/4" ID	HOLLOV	/ STEMMED AUGER	LOGG	ED.	BY:	KM
				20.0					
SIZE	& TYPE C	F BORING:	4 1/4" ID	HOLLON	STEMMED AUGER	LOGG	SED	BY:	KIM

Sheet: 4 of 8

Bore Point: 16' 2" W of canal edge

(ater Elevation: 8.5' below ground surface

Boring No.: SB4-1004

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

<u></u>	· · · · · · · · · · · · · · · · · · ·	D1 014/	t		MATERIAL CHARACTERISTICS				1
1	הבחדוו	BLOW	DI OT	CONF	MATERIAL CHARACTERISTICS	0/84			01.400
LAB#	DEPTH	COUNT	PLOT *-**-*	SCALE		%M	LL	ΡI	CLASS.
	0-6.0		*_**_*		Silt, sandy, very fine to fine, brown, damp				
			*_**_*						
			*_**_*_*						
			*_**_*	2 5				}	
			*_**_*_*	<u>2.5</u>				1	į
			*_**_*					ŀ	
			*_**_*					}	
			*_**_*_*					ļ	
			*_**_*_*	<u>5.0</u>					
			*_**_*_*	<u>5.0</u>					
			*_**_*_*						
	6.0-9.0		0*0*0*0		Cobbles, gravel, sand, fine to medium, silty,				
	5.5 5.6		0*0*0*0		brown, damp				1
			0*0*0*0		provin, damp				
			0*0*0*0						
			0*0*0*0			:			
			0*0*0*0						
	9.0-10.5		*****		Sand, medium to coarse, grey, moist				
			******	<u>10.0</u>	hydrocarbon odor				

	10.5-11.0		====		Nacimiento Formation, mudstone				
					Total depth 10' 1/2"				
					5' of hand slotted screen				
				<u>15.0</u>					
								ļ	
	İ							ì	
	İ								
				20.0					
0175	0. TVDE 0				(OTENMED ALLOED	1000	, <u> </u>	DV:	1/1/4
SIZE	& TYPE C	OF BORING:	4 1/4" ID	HOLLOV	V STEMMED AUGER	LOGO		DY:	NIVI .

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

·····	l i	BLOW	1		MATERIAL CHARACTERISTICS	Ī	<u> </u>		
LAB#	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS.
	0-6.0		*_**_*_*		Silt, sandy, very fine to fine, brown, moist				32,333
,			*_**_*_*						
			*_**_*_*						
	3		*_**_*_*			1			
			*_**_*	<u>2.5</u>		1			
			*_**_*						
			*_**_*						
			*_**_*						
			*.**.*.*						
			*_**_*	<u>5.0</u>					
			*-**-*-						
	<u>'</u>		*_**_*_*						
	6.0-9.0		0*0*0*0		Cobbles, gravel, sand, fine to medium, silty,				
			0*0*0*0		brown, moist				
	1		0*0*0*0	<u>7.5</u>	hydrocarbon odor				
			0*0*0*0						
			0*0*0*0						
46452	0.0.10.0		0*0*0*0		Sound mandisms become used	5.6		NI/D	SM/A-1-b
46452	9.0-10.0		******	10.0	Sand, medium, brown, wet	0.0		N/P	21VIVA-1-D
46453	10.0-10.5		====	10.0	Nacimiento Formation, mudstone, moist	16.1			
46454	9.5-10.5				Sample Number HC 2	'0.'			
				<u>15.0</u> <u>20.0</u>	Total depth 10' 7" 5' of hand slotted screen no water for first 8 hours				
SIZE	& TYPE OI	F BORING:	4 1/4" ID	HOLLOW	/ STEMMED AUGER	LOGO	ED.	BY:	KM

Sheet: 6 of 8

Bore Point: 22' 7" W of canal edge

Vater Elevation: Not Encountered

Boring No.: SB6-1004

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

	1	51.0141	1		MATERIAL CHARACTERISTICS	1	ı ——		
		BLOW			MATERIAL CHARACTERISTICS			5.	01.100
LAB#	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	ΡI	CLASS.
	0-0.5		*_**_*_*		Silt, sandy, very fine to fine, brown, damp		<u> </u>		
	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	2.5		-			
			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			1			
16455	7.0-7.5		ļļ	<u>7.5</u>	Sand, medium to coarse, brown, occasional	İ			
46455	7.5-8.5		====		gravel, damp, slight hydrocarbon odor	9.3			
			====		Nacimiento Formation, mudstone, moist very compact, grey to black	9.3			
					very compact, grey to black	<u> </u>			
				10.0					
				10.0					
	:								
	İ				Total depth 8' 6"				
					5' of hand slotted screen				
				15.0					
	I								
				<u> 20.0</u>					
SIZE	& TYPE C	OF BORING:	4 1/4" ID	HOLLOW	V STEMMED AUGER	LOGG	SED	BY:	KM

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

:		BLOW	ı		MATERIAL CHARACTERISTICS	1			
LAB#	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	ΡI	CLASS.
U 10 #	0-0.5	300111	*_**_*	OOTTE	Silt, sandy, very fine to fine, brown, damp	76701	L 1	' '	<u> </u>
	0.5-9.0		0*0*0*0		Cobbles, gravel, sand, fine to coarse,				
	0.0 0.0		0*0*0*0		silty, brown, moist				
			0*0*0*0		Janty, Brown, moist				
			0*0*0*0	2.5					
			0*0*0*0	2.0					
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
	:		0*0*0*0	<u>5.0</u>					
	i		0*0*0*0	<u> </u>					
			0*0*0*0						
			0*0*0*0						
			0*0*0*0						
			0*0*0*0	<u>7.5</u>					
	j		0*0*0*0		Sand, fine to coarse, brown, occasional				
			0*0*0*0		gravel, wet, slight hydrocarbon odor				
	ŀ		0*0*0*0						
	9.0-9.5		******		Sand, fine to coarse, grey, occasional				
ļ			*****	10.0	wet, slight hydrocarbon odor	1			
46457			====		Nacimiento Formation, mudstone, moist	11.8			
	<u> </u>		====		gray to black				
İ	i				Total depth 10' 2"				
					5' of hand slotted screen				
	j				does not produce water in the first 8 hours				
								i	
				<u>15.0</u>					
į			-						!
	1								
	 		Ì						
				<u>20.0</u>					
	i !								
	a a								
	!								
SIZE	& TYPE OF	BORING:	4 1/4" ID	HOLLOV	V STEMMED AUGER	LOGG	ED	BY:	KM

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

	1	DLOW			MATERIAL CHARACTERISTICS		i		
	DEDT	BLOW	DI OT	00015	MATERIAL CHARACTERISTICS	07.84	١		01.400
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	PΙ	CLASS.
ļ	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						
			0*0*0*0	<u>2.5</u>					
			0*0*0*0						
			0*0*0*0				1		
			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>					
ļ			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		******		<u>Sand</u> , fine to coarse, grey, strong hydrocarbon	19.2		N/P	SP/A-1-b
			*****		odor, water bearing				
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'			İ	
				<u>15.0</u>	5' of hand slotted screen				
				'					
						:			
				<u>20.0</u>					
									,
SIZE	& TYPE C	F BORING:	4 1/4" ID	HOLLOV	V STEMMED AUGER	LOGG	SED	BY:	KM

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 x 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)

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.

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

Sincerely;

Wayne Price-Pet. Engr. Spec.

cc: OCD Aztec Office

assept Pini



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

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.

Randy Schmaltz
Giant Refining Company Bloomfield
December 21, 2004
Page 2 of 4

- 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 10⁻⁷ cm/sec.
- 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.
- 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 hand-slotted 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.
- 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.
- 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.

- Appendix A provides 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.
- 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 Monzeglio Project Leader

Hazardous Waste Bureau

Idage Marylet

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 x 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.

50 ROAD 4990 P.O. BOX 159 BLOOMFIELD NEW MEXICO 87413 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 10⁻⁷ 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).

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 x 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.

- 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 10⁻⁷ 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.
- 7. 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.

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.



CERTIFIED MAIL # 7099 3220 0010 2242 4849

January 17, 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 – 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 6×10^{-7} cm/sec at a depth of 12.0 to 12.5 feet below ground surface (bgs); soil boring SB5-1004, permeability of 1.2×10^{-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 10⁻⁷ 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.

- 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

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

Vames R. Schmaltz

Environmental Manager

Cc: Wayne Price - OCD

Denny Foust - OCD Aztec Office

Bob Wilkinson – EPA

Ed Riege

Chad King

ATTACHMENT A

Annotated Test Results Summary from Precision Engineering, Inc.

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

Project Bloomfield-Hammond Ditch

File No. 03-122

Date November 2, 2004

	srg Moisture Unit Wt. Classification	PI %M PCF USCS AASHTO	SP-SM	SP /	N/P 5.6 SM A-1-b	N/P 19.2 SP A-1-b	N/P 8.6 ML A-4	N/P 14.8 ML A-4	N/P 2.5 SM A-2-4	N/P 0.9 GP-GM A-1-a	N/P 1.1 GP-GM A-1-a	13.3 118.7	13.8 117.1			57A	,	0																
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	Sieve	3/4" 1/2"	\vdash	90 86	_	89 73	_		86 83	7 49	54 43	Hyo	Hyc			40	0	Nont	L	7	+	1				-	-	-	+	+	+	+	\dashv	\dashv
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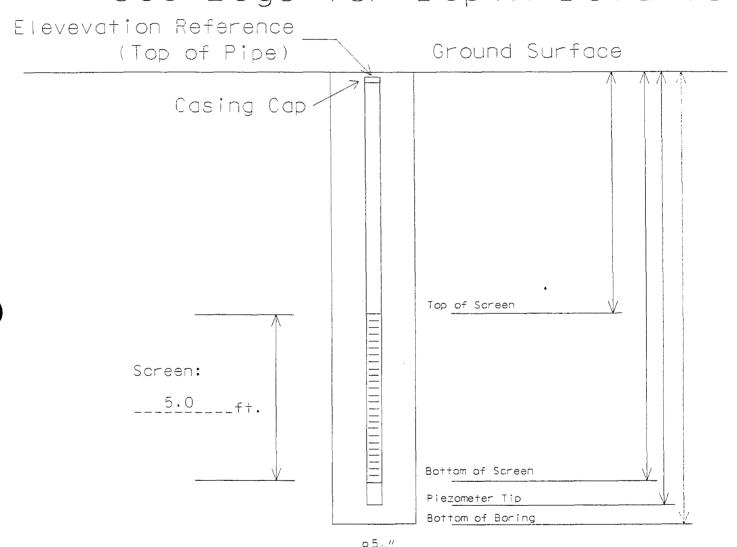
ATTACHMENT B

Typical Piezometer Log



Temporary Piezometer

Installation - Typical See Logs for Depth Details



Boring Diameter: 85/8"

Native Backfill

Sand Type: Native Backfill Bollards, Type/Size: None

None Screen Type/Size: 2" PVC Sch. 40, 0.060" Hand Slotted @ 3" Intervals

Cement/Grout: None Riser Type/Size: 2" PVC Sch. 40

Water: POTABLE Locking Expandable Casing Plug? NO Site Northing: (Slip Cap)

Other: N/A Bottom Ccp Used? Yes Site Easting:

Giant Refining Co.

Project #: 03-122 Project Name: Bloomfield Wells

Elevation:_____

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 ⁽¹⁾ Depth Above Groundwater:	1.05 ft
Total Fluids Above Naci:	2.66 ft

Time	Depth to GW	Dh	h/h _o
(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:

$$r = 0.083 \text{ ft}$$
 $R = 0.083 \text{ ft}$
 $L = 10 \text{ ft}$

Therefore:

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

$$K = 32 \text{ Ft/Day}$$

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 x 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 soil-bentonite 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	Test Designation	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.

5127-001

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.

1.3 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.

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.

5127-001 02234-5

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 10⁻⁷ 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

5127-001

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.

5127-001 02234-8

- D. The slurry wall shall be excavated in a continuous manner to the lines and grades shown on the Drawings and as specified herein.
- 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.

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.

- G. Placement of backfill shall result in a backfill surface below the slurry that shall follow a smooth grade and not trap pockets of slurry during subsequent backfill placement.
- 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,

5127-001

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

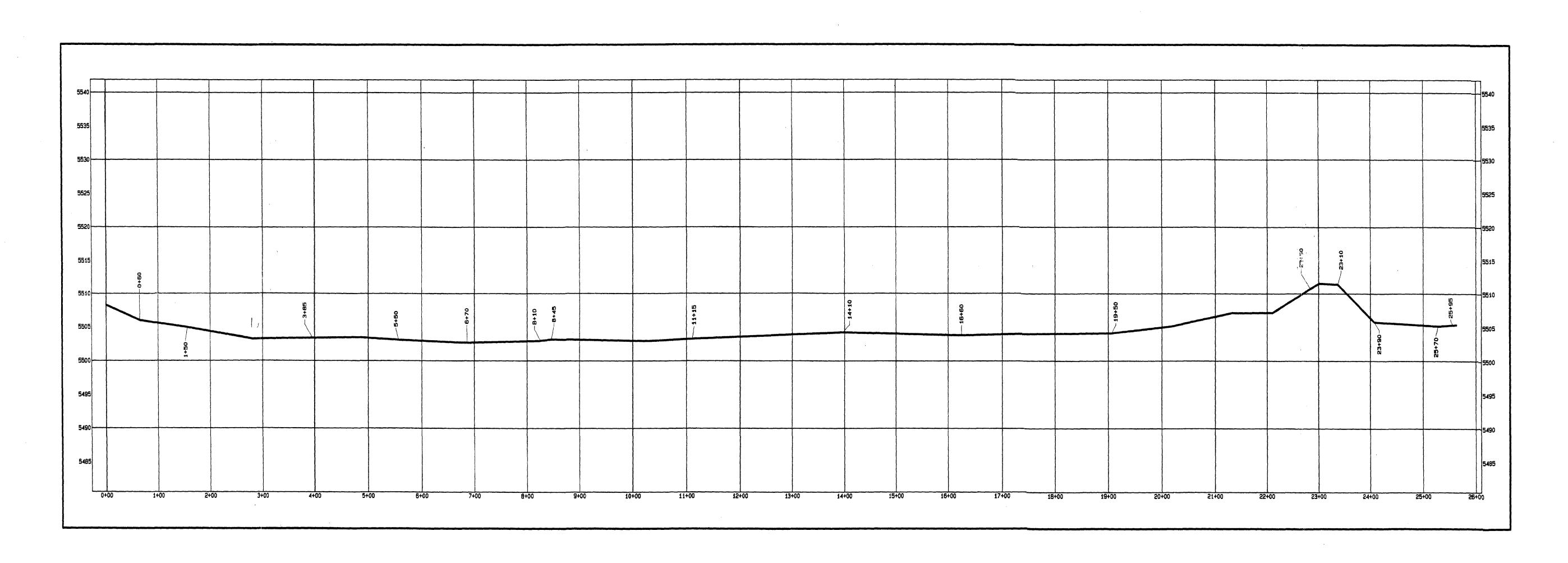
Canal service road shall be restored to its original grade and condition by placing a minimum 6-inch layer of compacted General Fill material. Finished grade of the service road shall slope away from the canal a minimum of 1/8-inch per foot.

+ + END OF SECTION + +

APPENDIX B

Record Drawings - Barrier Alignment and Profile

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

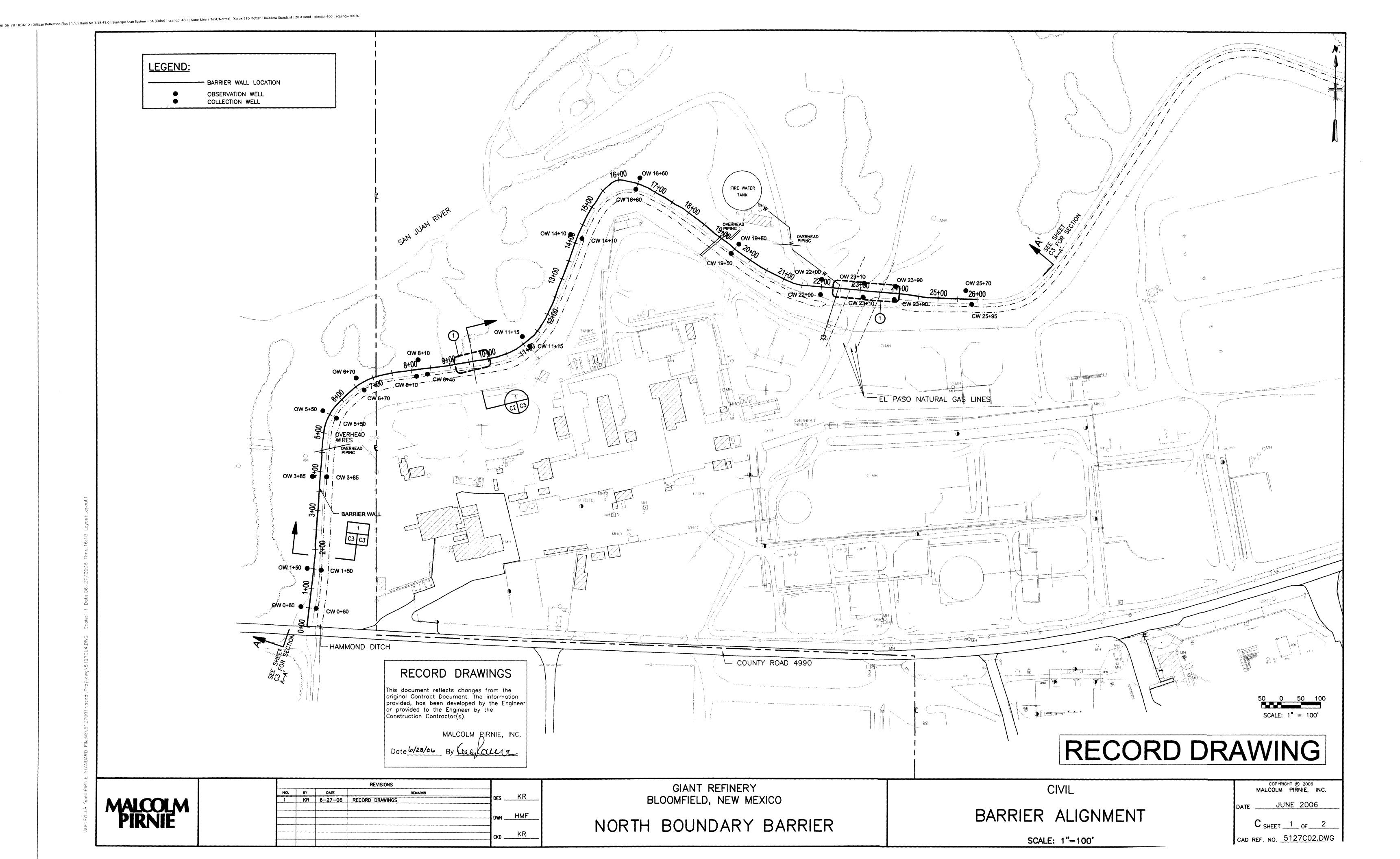


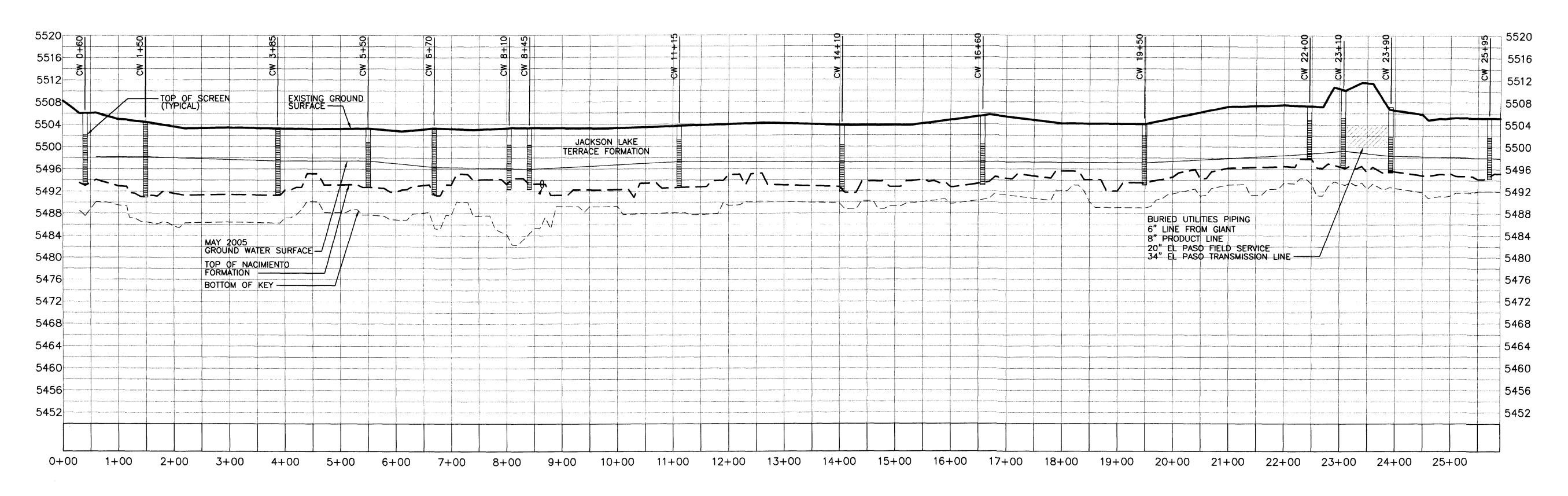
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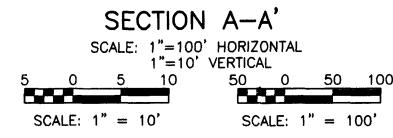
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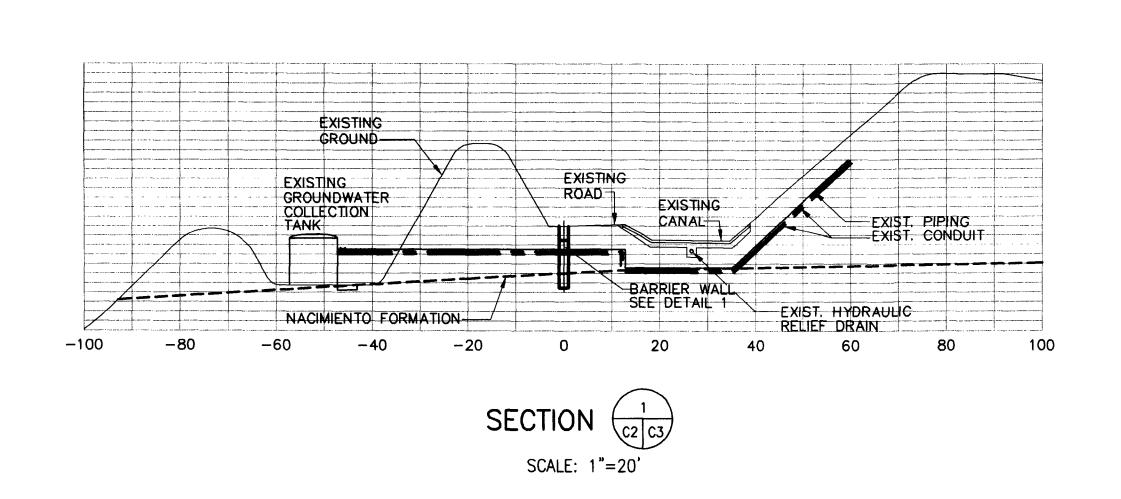
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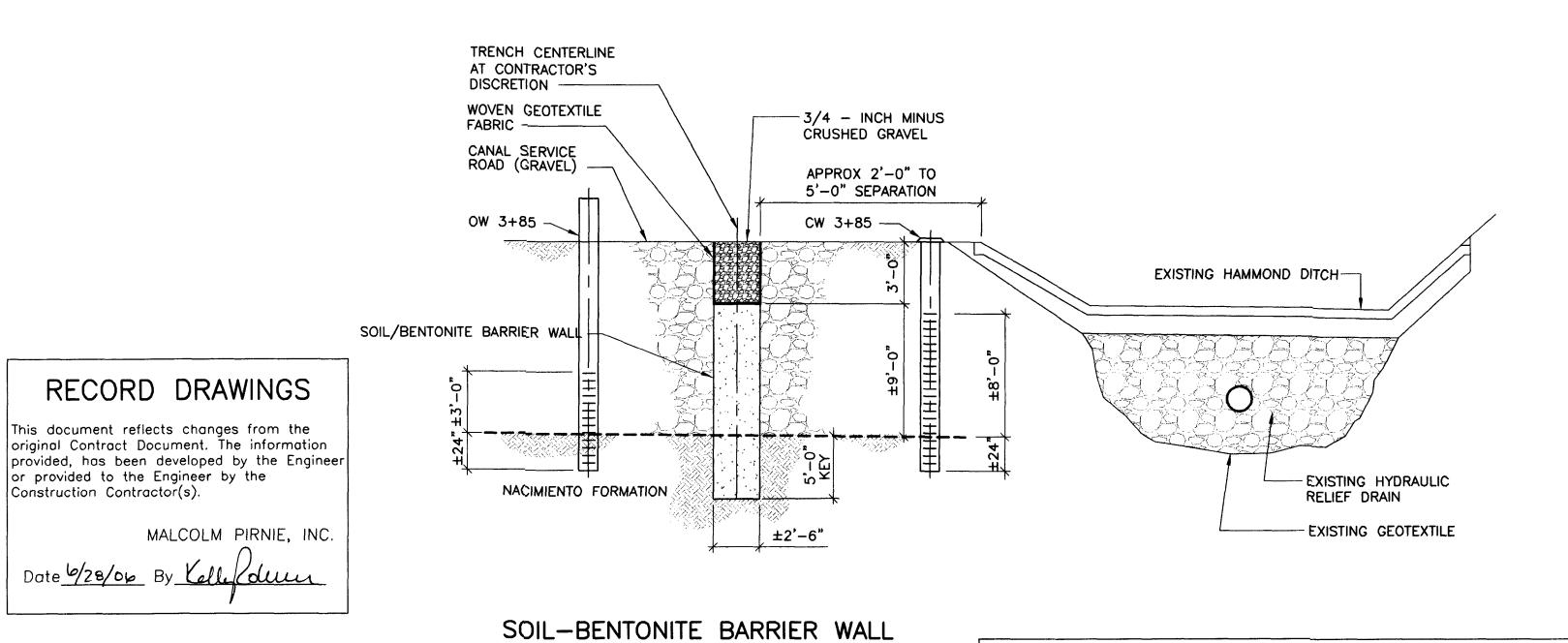




REVISIONS

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DETAIL

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GIANT REFINERY BLOOMFIELD, NEW MEXICO

NORTH BOUNDARY BARRIER

CIVIL

BARRIER PROFILE

SCALE: AS SHOWN

COPYRIGHT © 2006
MALCOLM PIRNIE, INC.

DATE JUNE 2006

C SHEET 2 OF 2

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RECORD DRAWING

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MALCOLM PIRNIE

APPENDIX C

RECON – Final Report and QC Test Data



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 $1x10^{-7}$ 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

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

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 BAR	RIER WALL	3
	L AND REAMOVAL ED/OUTOF SPC. MATERIAL	3
CONSTRUCTION S	ITE	3
UNDERGROUND U	JTIITIES	3
TESTING AND INS	PECTION	4
LABORATORY TE	STING	4
THIRD PARTY CQ	A	4
SITE CONTROL		4
BARIER PROFILE		4
Construction Scho	edule	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.

<u>Design Criteria and Removal of Contaminated/out of Spec.</u> <u>Materials</u>

RECON developed a design capable of attaining 1 x 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 Firnie 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 1x10⁻⁷ 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.

APPENDIXA Daily Quality Control Sheets

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Station   Time   Unit Wt.   Slump   %>#200   Comments:   SANJH									1	
Slurry Data Center   Flant   Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Depth   Ballory   73   50   Surjoury   73   50   Surjoury   73   50   Surjoury   73   50   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury		,			Backfill D	ata Center	·			
Slurry Data Center   Flant   Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Depth   Ballory   73   50   Surjoury   73   50   Surjoury   73   50   Surjoury   73   50   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury	Station	Time	Unit Wt.	Slump	%>	#200	Comments:	٠ و ام سم	111/14/11	91/2
Slurry Data Center   Flant   Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Depth   Ballory   73   50   Surjoury   73   50   Surjoury   73   50   Surjoury   73   50   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury   75   60   Surjoury	93+60	AM.	130	4.21				3 14 100	0.7	and and the second
Solution   Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Depth   Unit Wt.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   Visc.   V				•	36.5				736763	3,3
Slurry Data Center  Trench  Station Time Depth Unit Wt. Visc. Unit Wt. Filtrate Visc. pH Time  23+160 AM MIL 70 44 64.5 18 46 9 AM  34+60 PM MIL 72 45 64 18.5 39 AM  12.1124 75 60 Comments:  Client: 41/fwl RF-PINIEC Remedial Construction Services, L.P.					/			5 AN 1	- PM MIL	85%
Slurry Data Center  Trench  Station Time Depth Unit Wt. Visc. Unit Wt. Filtrate Visc. pH Time  23+160 AM MIL 70 44 64.5 18 46 9 AM  34+60 PM MIL 72 45 64 18.5 39 AM  12.1124 75 60 Comments:  Client: 41/fwl RF-PINIEC Remedial Construction Services, L.P.	24+20	1-14	135	5				- ;	Rolls	7.11.8/2
Plant   Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Depth   Plant   Time   Depth   Plant   Time   Depth   Plant   Time   Depth   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   Plant   P			<u> </u>		<u> </u>					- 70 - 20
Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time	II				Slurry Da					
23+160 AM MIL 70 44 64.5 18 46 9 AM  BITCH 73 50  34+60 PM MIL 79 45 64 18.5 39 8 PM  Comments:  Client: (-1/+NT RFF)NILC  Remedial Construction Services, L.P.	1		· · · · · · · · · · · · · · · · · · ·				r			
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34+60   PM   MIJ   79   45   69   18.5   39   8   P/Y     Gomments:	22+100	AM				64.5	18	40	7	17-19
Comments:  Client: (-1/+w) RFF winc Remedial Construction Services, L.P.		1.4.0.4		1/3						7734
Comments:  Client: (-1/+WT RFF) VINC   Remedial Construction Services, L.P.	34+60	17/11		73	<del>, , , , , , , , , , , , , , , , , , , </del>	69	18.5	37	×	12/1
Client: (+1/+NT REPLIE) Remedial Construction Services, L.P.	<u> </u>		18.7127	15	60	ļ	·		<del> </del>	<u> </u>
Client: (+1/+NT REPLIE) Remedial Construction Services, L.P.	Caramania		l		<u> </u>	I			<u> </u>	
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Dy. F. Lay VI T View		, , , , , ,	111-11)	VINC						٠, ١, ١, ١, ١, ١, ١, ١, ١, ١, ١, ١, ١, ١,
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,						Date:	3-1	1-05	
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		F	Remedial	Construc	ction Ser	vices, L.F	Ρ,		
		Soil Bento	nite Slurry	Trench Cu	t Off Wall	Quality Cor	ntrol Sheet		
SF	1615		•		SFTD	37575			
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	<u> </u>		E	xcavation	Data Cent	er	<u> </u>		
Station	Depth	Key	Comments		Station	Depth	Key	Comments	:
21440	16			•					
31+50	16							1	
31460	160							1	
11+70	15								
31180	14		-					1	•
31476	15							]	
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27470	-13	,	•					[	
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Station	Time	Unit Wt.	Slump		<del>#</del> 200	Comments	" Soul	Ant M.	1 5.4
121+50	13.11	120		36.3			COVER	Hay M.	9
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21 +70	PM	123	4/2			South	Con plu	1 556	4.8
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[	Ĺ <u></u>			Shirm De	ta Center	<u> </u>		, ,	
Trench	···			Sidily Da	Plant	<u></u>			
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pН	Time
2/12	BM	Mic	7 1	116 · 416	1195	15	40	8	HATT
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21+80	Pm	naid	71	45	44.5	18	(1) :	9	Pol
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						Job Numb	er: 🏥	-1780	
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-		F	Remedial	Constru	ction Ser	vices, L.F	) <u> </u>		
						Quality Cor			
SF	1277.4				SFTD	2887			
		1							
	<u> </u>		E	xcavation	Data Cent	er	·	<u> </u>	
Station	Depth	Key	Comments		Station	Depth	Key	Comments	;
20+50	15			.=					•
30+60	15								
20+70	14	<b>†</b>							
20+80	14							1	
70+96	14		=					1	•
21400	14							1	
31+10	14							1	
31720	14							1	
31+30	14							1	1
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	1	<del></del>	·	Backfill D	ata Center	•	I	<u> </u>	
Station	Time	Unit Wt.	Slump	%>;		Comments	:	1 / - 5/	
20-60		T	4/2	21, 4	F	Carl	- 6/16 201	16.5%	
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				Slurry Da	ta Center				
Trench				<b></b>	Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	рH	Time
20460	Hm	Mil	70	43	104.5	18	40	9	Aut.
		butdon	75.5	58			<u> </u>		
26490	PM	111.1	72	Ule	64.5	18	40:	9	FAI
		12460	76.5	61					
Comments	<u>;</u> :								
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1 /						Date:	3-	14-05	
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		F	Remedial	Constru	ction Ser	vices, L.P			
						Quality Cor			
SF	8/2,5				SFTD	37683		<u> </u>	T
	777.537.5			<del></del>		1700			<del>                                     </del>
	i	<del>-1</del>	E	xcavation	Data Cent	er		<u></u>	<u> </u>
Station	Depth	Key	Comments		Station	Depth	Key	Comments	::
17+70	13,5			•			7		•
20+00	13.5								
30+10	17.5					1			
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# APPENDIX B

Hydraulic Conductivity Test Report

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

SAMPLE ID	PER. CM/SEC
STA 2+00	2.10E-08
STA 4+00	6.90E-08
STA 6+00	2.08E-08
STA 8+00	2.01E-08
STA 10+00	2.71E-08
STA 12+00	4.04E-08
STA 14+00	2.38E-08
STA 16+00	3.09E-08
STA 18+00	3.62E-08
STA 20+00	4.58E-08
STA 22+00	2.71E-08
STA 24+00	2.72E-08
STA 26+00	2.81E-08



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.

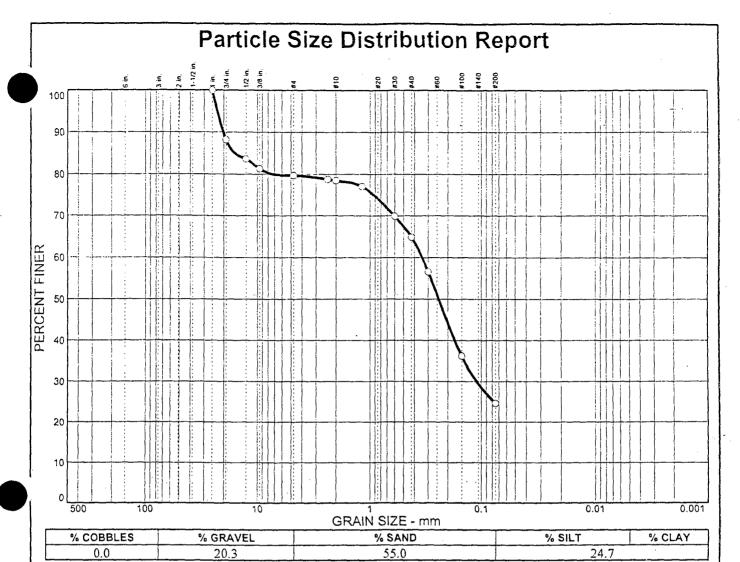
Should you have any questions or require additional information, please contact our office at your convenience.

Very truly yours.

Chad M. Walker Project Manager

Enclosures

ks



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
1 in. 3/4 in. 1/2 in. 3/8 in. #48 #10 #16 #30 #40 #50 #1000	100.0 88.2 83.6 81.3 79.7 78.8 78.5 77.1 69.9 64.9 56.6 36.2 24.7		

	<del> </del>	
	Material Description	<u>on</u>
PL=	Atterberg Limits	PI=
PL~	LL≃	P1-
	Coefficients	-
D ₈₅ = 15.9	D ₆₀ = 0.340	D ₅₀ = 0.241 D ₁₀ =
D ₃₀ = 0.110 C _u =	D ₁₅ = C _c =	5.10-
	Classification	
USCS=	Classification AASHT	·o=
		_
	<u>Remarks</u>	

* (no specification provided)

Sample No.: STA 4+00

Location:

Source of Sample: STA 4+00

**Date:** 2-15-05

Elev./Depth:

SIERRA TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

Figure

#### SAMPLE DATA

Sample Identification: Sta 4+00, 2/10/05

Sample Depth, ft.: N/A

Visual Description: N/A

Sample Type: SB Backfill Material

Remarks:

#### **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

Specimen Diameter, cm: 7.11

Dry Unit Weight, pcf: 94.2

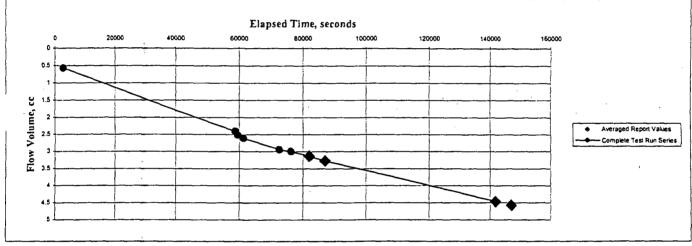
Specimen Height, cm: 4.98

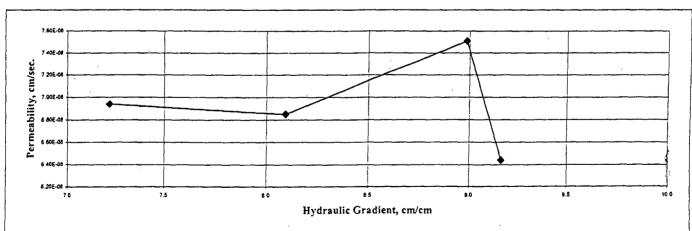
After Test

Specific Gravity, Assumed

Percent Saturation:

Moisture Content, % 27.6





Test Method: ASTM D5856

PROJECT NUMBER: 05-103 February 11, 2005

Giant Refinery, 2-1780



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



# 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:



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.

Very truly yours

Chad M. Walker Project Manager

**Enclosures** 

ks

#### SAMPLE DATA

Sample Identification: Sta 4+00, 2/10/05

Sample Depth, ft.: N/A

Visual Description: N/A

Sample Type: SB Backfill Material

Remarks:

#### **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

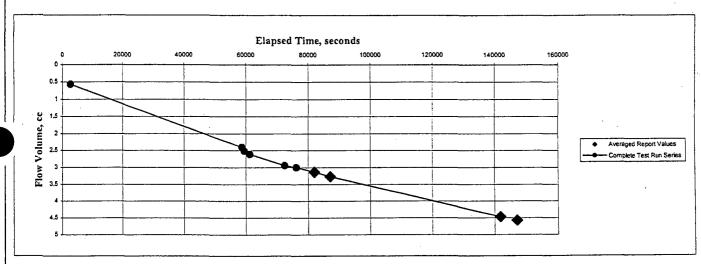
Worsture Content, % 40

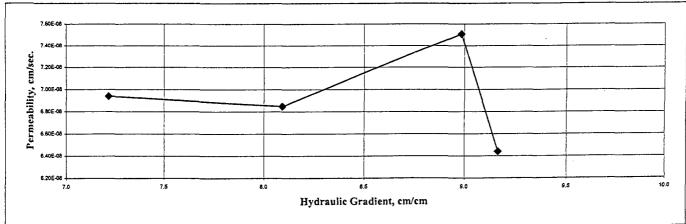
Specific Gravity, Assumed Percent Saturation:

#### After Test

Specimen Height, cm: 4.98 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 94.2

Moisture Content, % 27.6





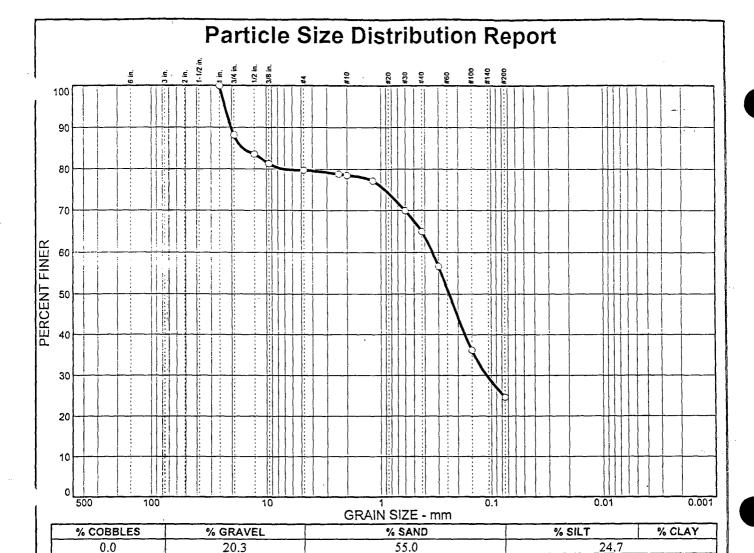
Test Method: ASTM D5856

PROJECT NUMBER: 05-103 | February 11, 2005

SIERRA TESTING LABORATORIES, INC.

Giant Refinery, 2-1780

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



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
1 in. 3/4 in. 1/2 in. 3/8 in. #4 #8 #10 #16 #30 #40 #50 #100 #200	100.0 88.2 83.6 81.3 79.7 78.8 78.5 77.1 69.9 64.9 56.6 36.2 24,7		

	Material Description	on
PL=	Atterberg Limits	i Pl=
D ₈₅ = 15.9 D ₃₀ = 0.110 C _U =	$\begin{array}{c} \underline{\text{Coefficients}} \\ D_{60} = 0.340 \\ D_{15} = \\ C_{c} = \end{array}$	D ₅₀ = 0.241 D ₁₀ =
USCS=	Classification AASHT	ΓO=
	Remarks	

(no specification provided)

Sample No.: STA 4+00

Source of Sample: STA 4+00

Date: 2-15-05

Elev./Depth:

Location:

SIERRA Client: RECON

**Project:** Giant Refining Company

TESTING LABS, INC.

Project No: 05-103

Figure



# 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:



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.

Very truly yours.

Chad M. Walker Project Manager

**Enclosures** 

ks

#### SAMPLE DATA

Sample Identification: Sta 4+00, 2/10/05

Visual Description: N/A

Sample Depth, ft.: N/A

Remarks:

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

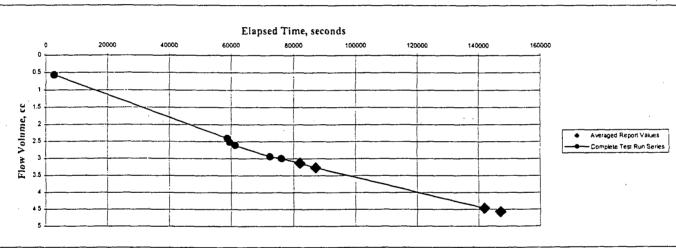
#### **Before Test**

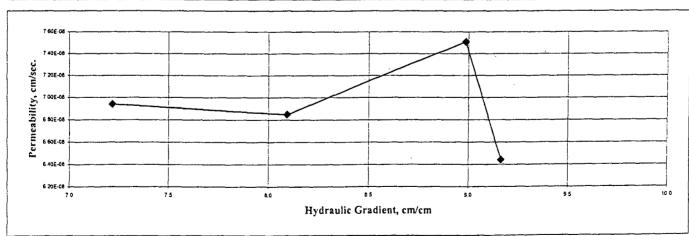
Specimen Height, cm: 5.84 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 80.3 Moisture Content, % 40.3

After Test

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

Specific Gravity, Assumed Percent Saturation:





Test Method: ASTM D5856 February 11, 2005

05-103

Giant Refinery, 2-1780

PROJECT NUMBER:

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



# 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:



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

Project Manager

Enclosures

ks

# Giant Refining Company, SB Slurry Wall Bloomfield, New Mexico Recon Job No.: Sierra Testing Laboratories Job No. 05-103

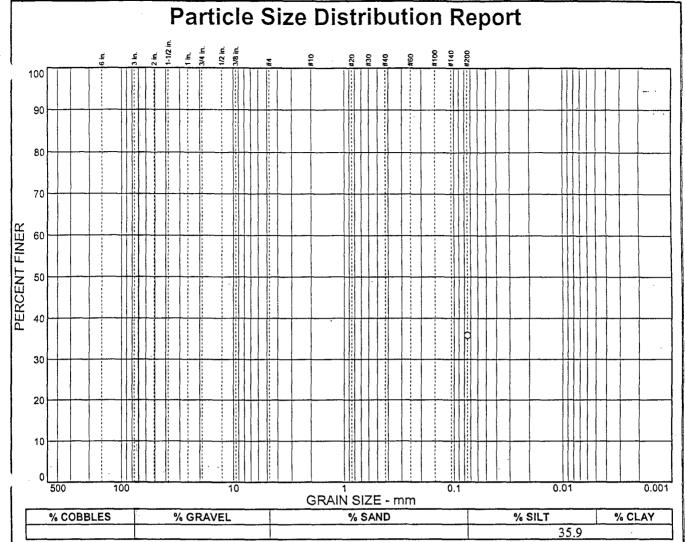
re		**	Pe	ž	2 3	2 2	7 7		Notes: 11	Š	p :		Witx Design #2		•		Pe				Pe	SI	M	De		Notes: 0.5		7 2	Notes: Th	Mix Design #1	2	D <u>.</u>		Notes: Th	Imported Material	ָם ב	Re	Notes: Th
rermeabury Sample #2 ASTM D5084  Perm Rate (envsee)  Moisture Content (%)	Density (pcl)	Moisture Content (%)	Permeability Sample #I ASTM D5084	Slump ASTM C143	Molsture Content ASTM DZZ16	Maister Contact ASTM Dans	Suris of Figure 17600 Page C 3	Results of ASTM D1140	% (by dry wt) Dry Bentonie was added and 40 mar	Moisture Content ASTM D2216	Density ASTM D698 Para C 2	Results of ASTM D1140	The excavated material and the impact were mixed inorder to achieve a composite with at least 15% fines	Density (pct)	Moisture Content (%)	Perm Rate (cm/sec)	Permeability Sample #2 ASTM D5084	Density (pcf)	Moisture Content (%)	Perm Rate (cm/sec)	Permeability Sample #1 ASTM D5084	Slump ASTM C143	Moisture Content ASTM D2216	Density ASTM D698 Para C.2	Results of ASTM D1140	0.5% (by dry wt) Dry Bentonite was added and 40 marsh slurry was then added to achieve slump of the backfill	indian Contact A SPM Danie	Results of ASTM D1040	The exeavated material and the import were mixed inorder to achieve a composite with at least 35% lines.		Moisture Content ASTM D2216	Dry Density ASTM D698 Para C.2	Results of ASTM D1140	The import material was classified as an orange brown sandy SILT (ASTM D2488). The fines content extinited little plasticity.	Moistare Content ASIM DZZIO	Dry Density ASTM D698 Para C.2	Results of ASTM D1140	The excavated material was classified as a brown silty Sand with gravel and cobble (ASTM D2488). Fines content was of no plasticity
6.99E-08	92.8	26.5	Initial	4.0"	26.5%	77.8pc1	07.076	%8 6t	John welt sem Amils der	99%	71 And	740 5t	wher to achieve a compo	98.0	23.8	7.49E-08		76.1	23.5	8.1213-08	Initial	4.5"	23.5%	76.1	38.5%	rsh slurry was then added	000	35.9% 71 April	order to achieve a compo	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	10.7%	64.7pcf	43.7%	sandy SILT (ASTM DZ	7.4%	77.6pcf	11.4%	Sand with gravel and co
E-08 21.3	103.8	20.7	Final	!		-		400000000000000000000000000000000000000	d to achieve sh				site with at lea	108.1	19.1	-		106.6	19.9	13-08	Final					: d to achieve sl:			site with at lea		:			2488). The fin		•	-	obble (ASTM I
	•							mb or me one	ma of the bucks				a 15% fines		* *						•				٠	unp of the back			st 35% lines.					s content exibit				)2488). Fines c
	•								₫				é													=								ed little plasticity	٠			ontent was of no
																																			:		,	plasticity
																																		٠				

# MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample	Wet Unit	Dry Unit	Moisture
Identification	Weight, lb/ft.3	Weight. lb/ft.3	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		



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
#200	35.9		
			l
		:	
1	i		

	Material Descri	ption
PL=	Atterberg Lin LL=	nits Pl=
D ₈₅ = D ₃₀ = C _u =	Coefficient D ₆₀ = D ₁₅ = C _c =	<u>s</u> D ₅₀ = D ₁₀ =
USCS=	<u>Classificatio</u> AAS	on SHTO=
	Remarks	

(no specification provided)

Sample No.: Design Blend

Source of Sample: Mix Design Soils

Date: 1-5-05

Elev./Depth:

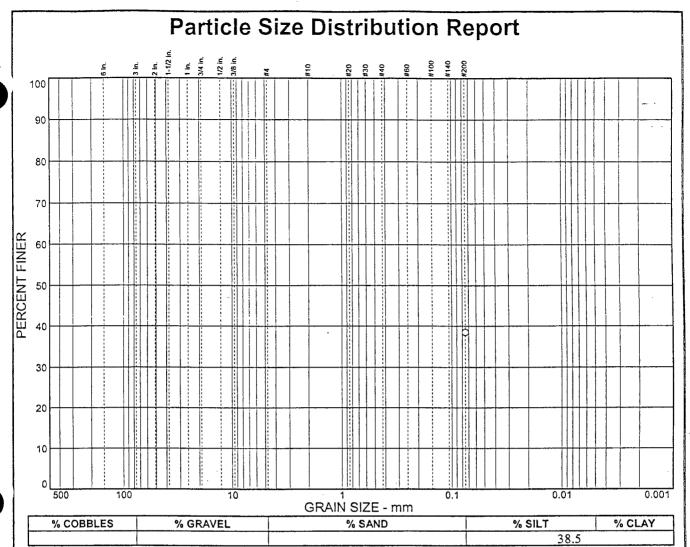
Location:

**SIERRA TESTING LABS, INC.**  Client: RECON

Project: Giant Refining Company

Project No: 05-103

**Figure** 



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
#200	38.5		
			,

	Material Descripti	ion .
	e e	
	844-uh aum 1 tt4-	_
PL=	Atterberg Limits	<u>s</u> Pl=
D ₈₅ = D ₃₀ = C _u =	Coefficients D60= D15= C _c =	D ₅₀ = D ₁₀ =
USCS=	Classification AASH	TO=
	<u>Remarks</u>	

(no specification provided)

Sample No.: ..5% Ben+Design BlerSource of Sample: Mix Design Soils

Location:

Date: 1-5-05

Elev./Depth:

SIERRA TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

**Figure** 

#### SAMPLE DATA

Sample Identification: Mix w / 0.5% Bentonite #1 Sample Depth, ft.: N/A

Visual Description: N/A

Sample 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

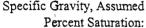
Specific Gravity, Assumed

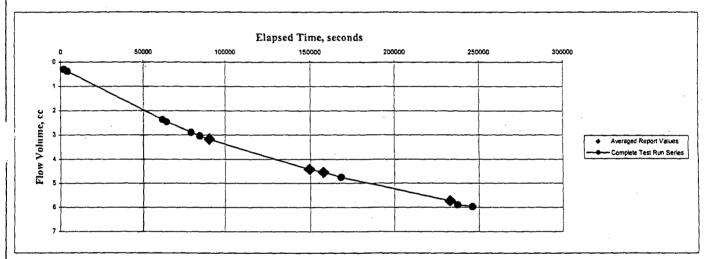
#### After Test

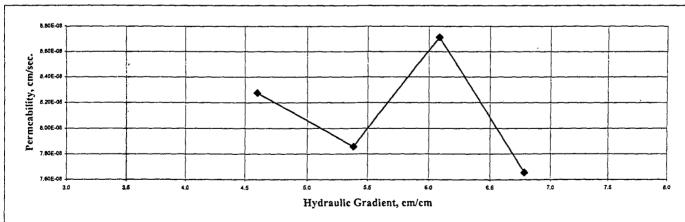
Specimen Height, cm: 6.53 Specimen Diameter, cm: 7.11

Dry Unit Weight, pcf: 106.6

Moisture Content, % 19.9







Test Method: ASTM D5856

PROJECT NUMBER:

05-103

January 5, 2005

Giant Refinery Co



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

#### SAMPLE DATA

Sample Identification: Mixed w/ 0.5% Bentonite #2

Visual Description: N/A

Remarks:

Sample Depth, ft.: N/A

Sample Type: SB Backfill Material

#### **TEST RESULTS**

Permeability, cm/sec.: 7.49E-08

Average Hydraulic Gradient: 7.3

Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

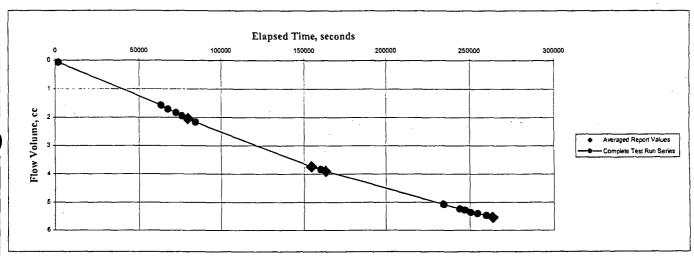
#### **Before Test**

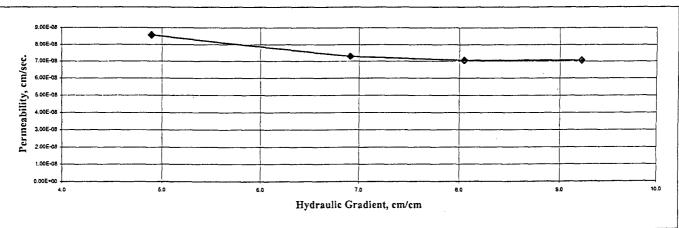
Specimen Height, cm: 5.97
Specimen Diameter, cm: 7.11
Dry Unit Weight, pcf: 98.0
Moisture Content, % 23.8
pecific Gravity, Assumed

Specific Gravity, Assumed Percent Saturation:

#### After Test

Specimen Height, cm: 5.41 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 108.1 Moisture Content, % 19.1





Test Method: ASTM D5856

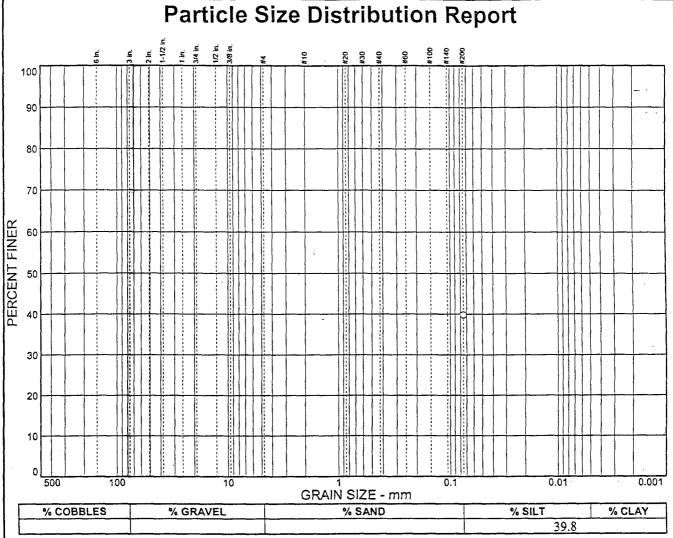
January 5, 2005

05-103

Giant Refining Co

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

PROJECT NUMBER:



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
#200	39.8		
		<u> </u>	
		}	
		İ	

	Material Descriptio	<u>n</u>
PL=	Atterberg Limits LL=	PI=
D ₈₅ = D ₃₀ = C _u =	Coefficients D60= D15= Cc=	D ₅₀ = D ₁₀ =
USCS=	Classification AASHT0	)=
	Remarks	

(no specification provided)

Sample No.: -1% Ben+Design BlenSource of Sample: Mix Design Soils

Date: 1-5-05

Location:

Elev./Depth:

**SIERRA** TESTING LABS, INC.

Client: RECON

Project: Giant Refining Company

Project No: 05-103

**Figure** 

#### SAMPLE DATA

Sample Identification: Mix w / 1% Bentonite #1

Sample Depth, ft.: N/A

Visual Description: 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

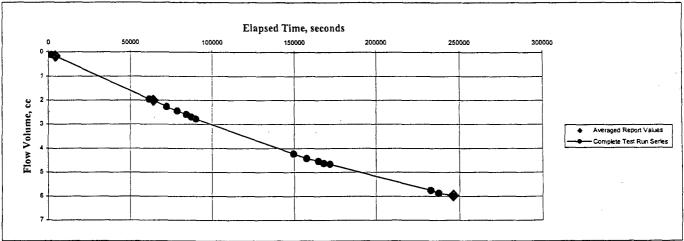
#### Before Test

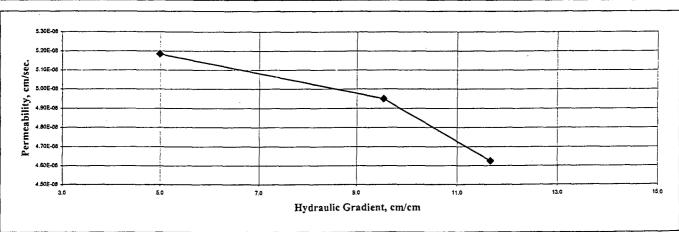
Specimen Height, cm: 6.48 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 92.8 Moisture Content, % 26.5 Specific Gravity, Assumed

#### After Test

Specimen Height, cm: 5.77 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 103.8 Moisture Content, % 20.7

Percent Saturation:





Test Method: ASTM D5856

PROJECT NUMBER:

05-103

January 5, 2005

Giant Refinery Co.

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: Mixed w/1% Bentonite #2

Sample Depth, ft.: N/A

Visual Description: 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

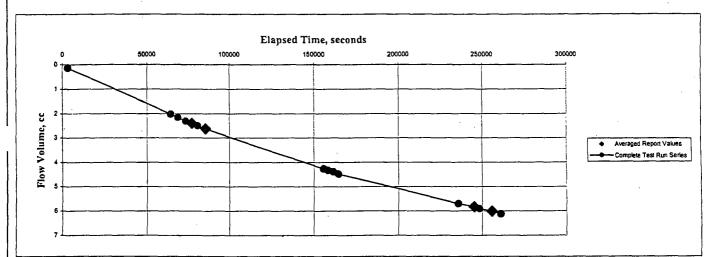
#### **Before Test**

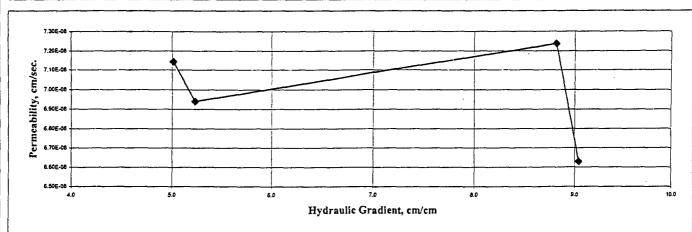
Specimen Height, cm: 6.48 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 95.4 Moisture Content, % 26.2

Specific Gravity, Assumed Percent Saturation:

#### After Test

Specimen Height, cm: 5.97 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 103.5 Moisture Content, % 21.3





Test Method: ASTM D5856

PROJECT NUMBER:

05-103

January 5, 2005

Giant Refining Co



5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762

Phone: (916) 939-3460 FAX: (916) 939-3507

#### 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

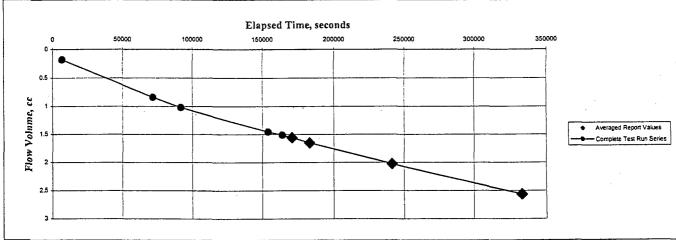
#### Before Test

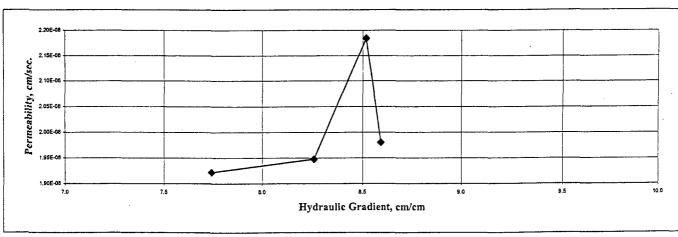
Specimen Height, cm: 7.11
Specimen Diameter, cm: 7.11
Dry Unit Weight, pcf: 65.6
Moisture Content, % 55.2
Specific Gravity, Assumed

#### After Test

Specimen Height, cm: 5.94 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 78.5 Moisture Content, % 40.6

Percent Saturation:





Test Method: ASTM D5856

05-103

February 17, 2005

Giant Refinery Co

SIERRA TESTING LABORATORIES, INC.

PROJECT NUMBER:

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



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 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

#### 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

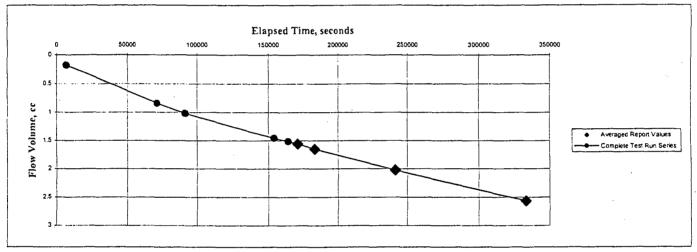
#### Before Test

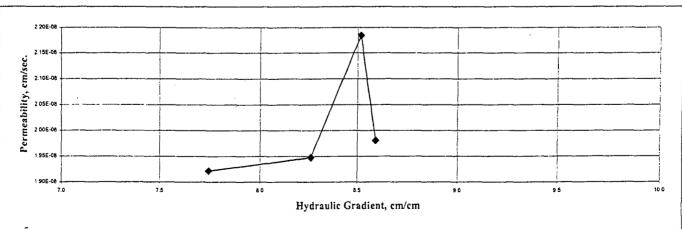
Specimen Height, cm: 7.11 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 65.6 Moisture Content, % 55.2

Specific Gravity, Assumed Percent Saturation:

#### After Test

Specimen Height, cm: 5.94 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 78.5 Moisture Content, % 40.6





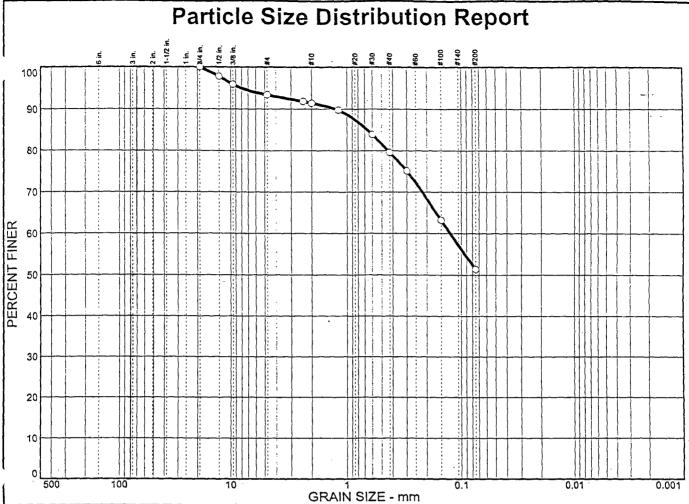
Test Method: ASTM D5856

PROJECT NUMBER: 05-103 | February 17, 2005

Giant Refinery Co

SIERRA TESTING LABORATORIES, INC.

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



	0,01110122						
ļ	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY		
	0.0	6.6	42.0	51.4			
		·—·—·		<del></del>	<del></del>		

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
3/4 in. 1/2 in. 3/8 in. #10 #16 #30 #40 #50 #100 #200	100.0 97.8 95.9 93.4 91.8 91.4 89.7 83.9 79.6 75.1 63.2 51.4		1

Material Description				
	Atterberg Limits			
PL=	LL=	PI=		
D ₈₅ = 0.661 D ₃₀ = C _u =	Coefficients D60= 0.125 D15= Cc=	D ₅₀ = D ₁₀ ≈		
USCS=	Classification AASHT	O=		
	Remarks			

(no specification provided)

Sample No.: STA 8+00

Location:

Source of Sample: STA 8+00

Flov

Elev./Depth:

SIERRA TESTING LABS, INC.

Client: RECON

Project: Giant Refining Company

Project No: 05-103

**Figure** 

Date: 2-15-05

# MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

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



March 9, 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. 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

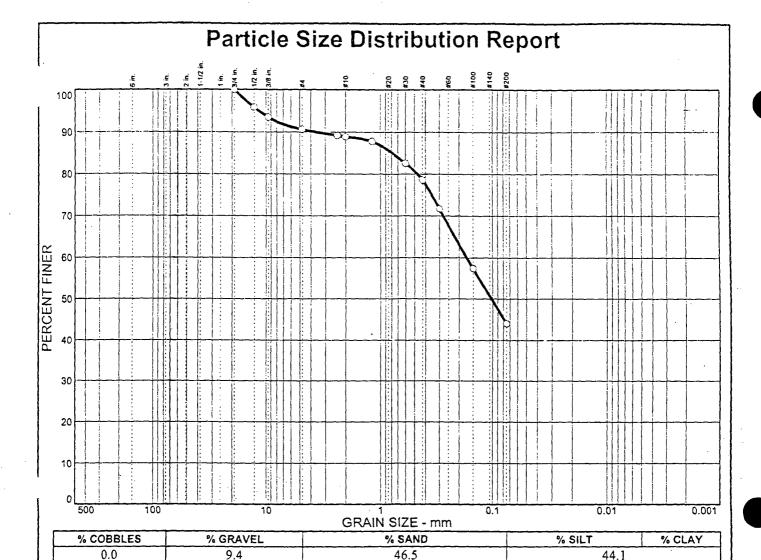
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# MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample		Wet Unit	Dry Unit	Moisture
Identification	Depth, ft.	Weight, lb/ft.3	Weight. lb/ft.3	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 D293

<u>■</u>		
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		



_		<del></del>		<del></del>
1	SIEVE	PERCENT	SPEC.*	PASS?
1	SIZE	FINER	PERCENT	(X=NO)
	3/4 in. 1/2 in. 3/8 in. #48 #10 #166 #30 #40 #50 #100 #200	100.0 95.8 93.5 90.6 89.2 88.9 87.8 82.6 78.6 71.7 57.4 44.1		

	Material Descripti	
	Material Descripti	<u>on</u>
•		
	Affaulana Limita	
PL=	Atterberg Limits	Pl= {
	0	
D ₈₅ = 0.780	Coefficients D ₆₀ ≈ 0.171	D ₅₀ = 0.102
D30= C _u =	D ₁₅ =	D ₁₀ =
C _u =	C _C =	
	Classification	
USCS=	AASHT	ro=
	Remarks	
	<del>, , , , , , , , , , , , , , , , , , , </del>	}
		ł

Sample No.: STA 2+00

Source of Sample: STA 2+00

Date: 2-24-05

Location:

Elev./Depth:

**SIERRA TESTING LABS, INC.**  Client: RECON

Project: Giant Refining Company

Project No: 05-103

## 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

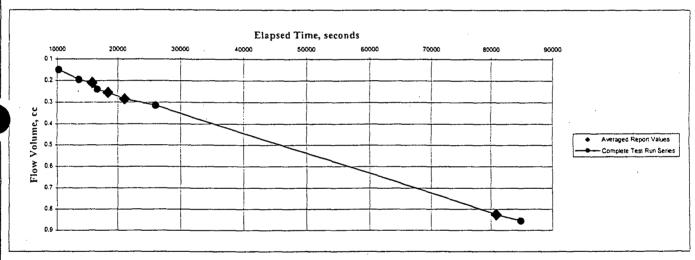
#### **Before Test**

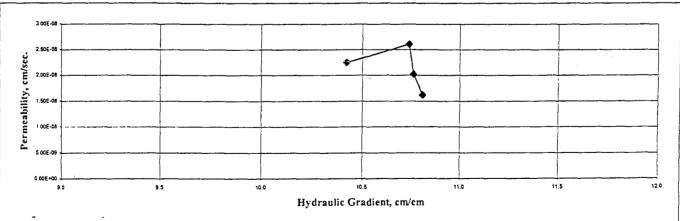
Specimen Height, cm: 7.37
Specimen Diameter, cm: 7.11
Dry Unit Weight, pcf: 73.3
Moisture Content, % 48.2

#### After Test

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

Specific Gravity, Assumed Percent Saturation:





Test Method: ASTM D5084 Method C

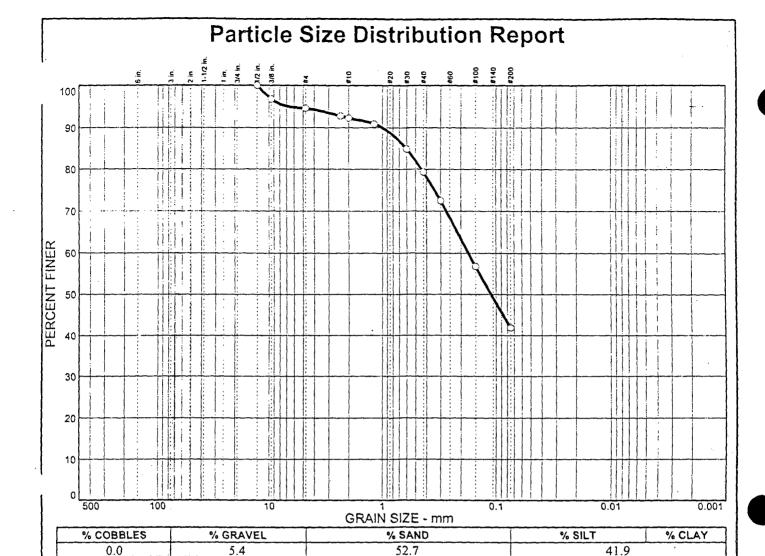
PROJECT NUMBER: 05-103

February 24, 2005

Giant Refinery Co



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



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
1/2 in. 3/8 in. #48 #10 #16 #30 #40 #50 #100 #200	100.0 96.8 94.6 92.8 92.3 90.9 84.9 79.3 72.5 56.8 41.9		

	Material Description	o <u>n</u>
PL=	Atterberg Limits LL=	Pi=
D ₈₅ = 0.604 D ₃₀ = C _u =	<u>Coefficients</u> D ₆₀ = 0.173 D ₁₅ = C _c =	D ₅₀ = 0.110 D ₁₀ =
USCS=	Classification AASHT	O=
	<u>Remarks</u>	

Sample No.: STA 6+00

Source of Sample: STA 6+00

Date: 2-24-05

Location:

Client: RECON

Project: Giant Refining Company

TESTING LABS, INC.

**SIERRA** 

Project No: 05-103

**Figure** 

Elev./Depth:

### SAMPLE DATA

Sample Identification: STA 6+00

Sample Depth, ft.: N/A

Visual Description: N/A

Sample Type: SB Backfill Material

Remarks:

## **TEST RESULTS**

Permeability, cm/sec.: 2.08E-08

Average Hydraulic Gradient: 8.6

Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

Before Test

After Test

Specimen Height, cm: 7.21 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 71.1

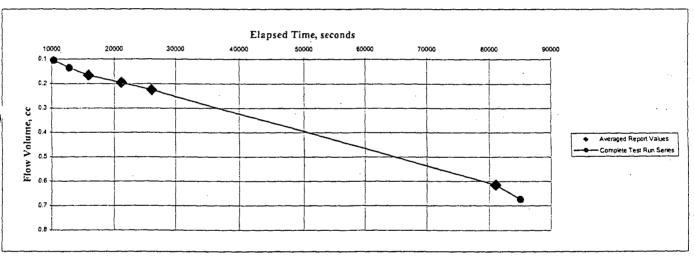
Specimen Height, cm: 6.27 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 81.8

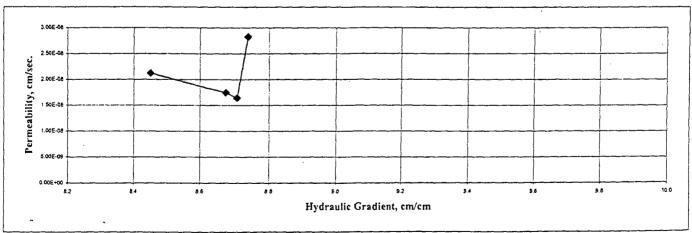
Moisture Content, % 49.4

Moisture Content, % 36.9

Specific Gravity, Assumed

Percent Saturation:

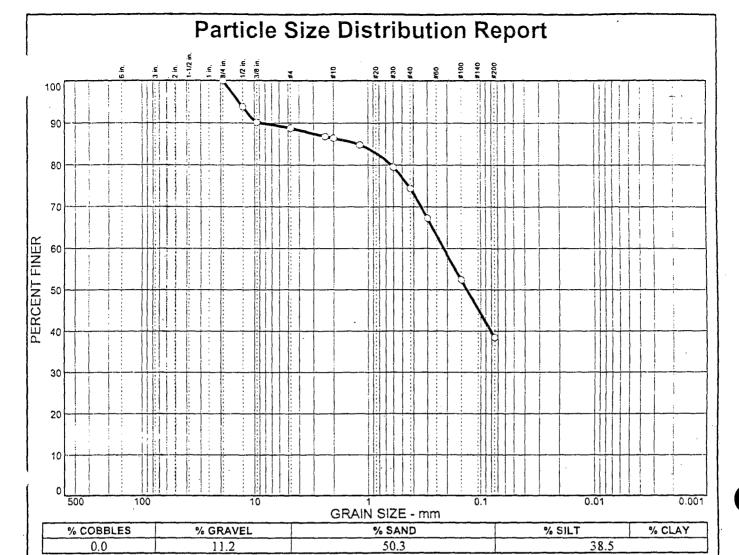




Test Method: ASTM D5084 Method C PROJECT NUMBER: 05-103 February 24, 2005

Giant Refinery Co

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



			,	
SI	EVE	PERCENT	SPEC.*	PASS?
s	IZE	FINER	PERCENT	(X=NO)
1/2 3/8	in. in. #48 #10 #16 #30 #40 #50	100.0 93.8 90.1 88.8 86.9 86.5 84.9 79.5 74.4 67.2 52.4 38.5		

	Material Description	1
PL=	Atterberg Limits LL=	Pi=
D ₈₅ = 1.21 D ₃₀ = C _u =	<u>Coefficients</u> D ₆₀ = 0.215 D ₁₅ = C _c =	D ₅₀ = 0.133 D ₁₀ =
USCS=	Classification AASHTO	)=
	<u>Remarks</u>	

Sample No.: STA 10+00

Location:

Source of Sample: STA 10+00

Date: 2-24-05

Elev./Depth:

SIERRA TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

## SAMPLE DATA

Sample Identification: STA 10+00

Sample Depth, ft.: N/A

Visual Description: N/A

Sample Type: SB Backfill Material

Remarks:

### **TEST RESULTS**

Permeability, cm/sec.: 2.71E-08

Average Hydraulic Gradient: 8.1

Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

Before Test

After Test Specimen Height, cm: 6.30

Specimen Height, cm: 7.49 Specimen Diameter, cm: 7.11

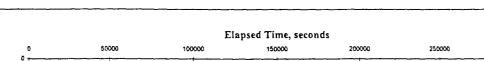
Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 83.5

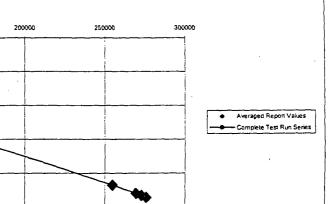
Dry Unit Weight, pcf: 70.2 Moisture Content, % 48.8

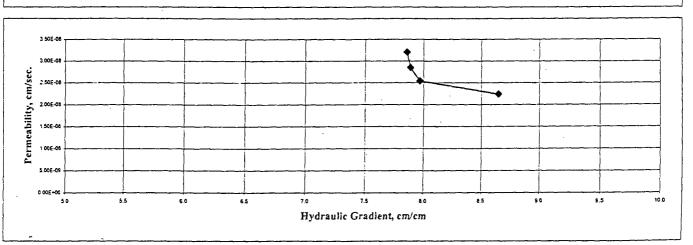
Moisture Content, % 35.4

Specific Gravity, Assumed

Percent Saturation:







Test Method: ASTM D5084 Method C

PROJECT NUMBER: 05-103 February 24, 2005

Giant Refinery Co

SIERRA TESTING LABORATORIES, INC.

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762

Phone: (916) 939-3460 FAX: (916) 939-3507



March 9, 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. 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

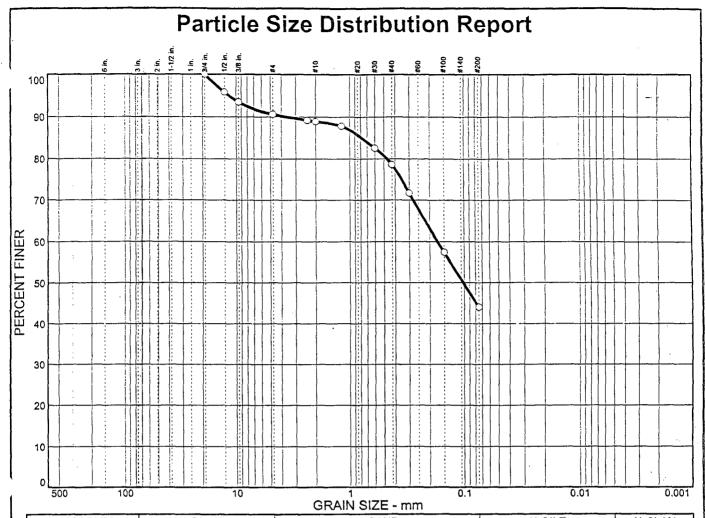
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# MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample		Wet Unit	Dry Unit	Moisture
<u>Identification</u>	Depth, ft.	Weight, lb/ft.3	Weight, lb/ft.3	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	
		j j
SIERRA TESTING LABORATORIES, INC.		1
GEOTECHNICAL AND MATERIALS TESTING SERVICES		
5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762	]	
·	1	
Phone: (916) 939-3460 FAX: (916) 939-3507		
	1	



% COBI	BLES	% GRAVEL		% SAND	% SILT	′
0.0		9.4		46.5	44.1	_
SIEVE	PERCENT	SPEC.*	PASS? (X=NO)		Material Description	
3/4 in. 1/2 in.	100.0 95.8					

- 1	SIEVE	PERCENT	SPEG.	PASS
	SIZE	FINER	PERCENT	(X=NO)
	3/4 in. 1/2 in. 3/8 in. #48 #10 #16 #30 #40 #50 #100 #200	100.0 95.8 93.5 90.6 89.2 88.9 87.8 82.6 71.7 57.4 44.1		

	Material Descriptio	<u>n</u>
PL=	Atterberg Limits LL=	Pl=
D ₈₅ = 0.780 D ₃₀ = C _u =	Coefficients D60= 0.171 D15= C _c =	D ₅₀ = 0.102 D ₁₀ =
USCS=	Classification AASHT0	D=
	<u>Remarks</u>	

Sample No.: STA 2+00

Location:

Source of Sample: STA 2+00

Date: 2-24-05

Elev./Depth:

SIERRA TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

### 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

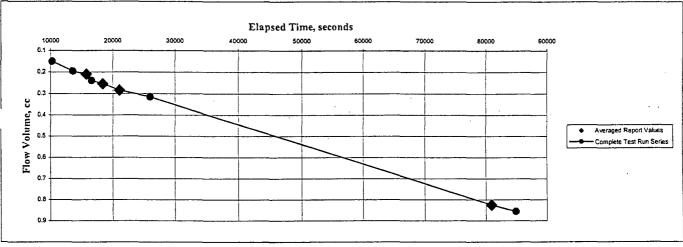
#### Before Test

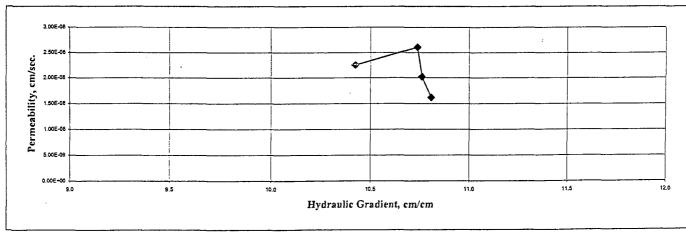
Specimen Height, cm: 7.37 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 73.3 Moisture Content, % 48.2

#### After Test

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

Specific Gravity, Assumed Percent Saturation:





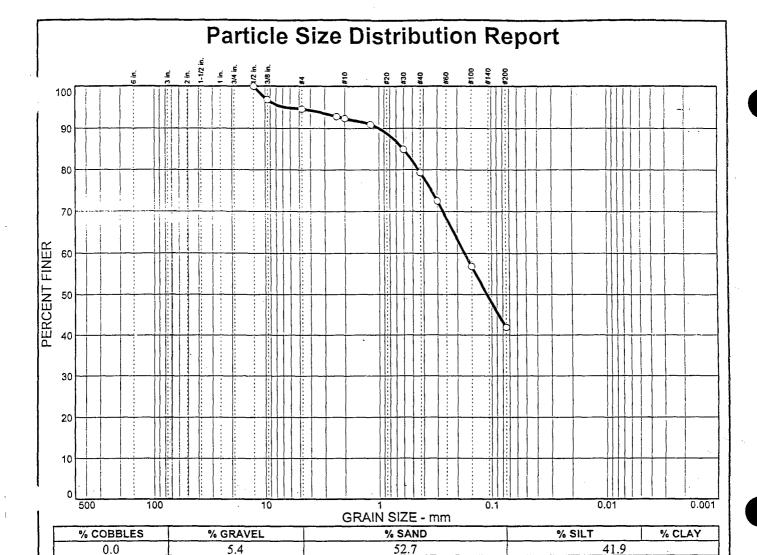
February 24, 2005

Test Method: ASTM D5084 Method C PROJECT NUMBER: 05-103

SIERRA TESTING LABORATORIES, INC.

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

Giant Refinery Co



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
1/2 in. 3/8 in. #4 #8 #10 #16 #30 #40 #50 #100 #200	100.0 96.8 94.6 92.8 92.3 90.9 84.9 79.3 72.5 56.8 41.9		

	Material Descriptio	<u>n</u>
PL=	Atterberg Limits LL=	Pi=
D ₈₅ = 0.604 D ₃₀ = C _u =	Coefficients D ₆₀ = 0.173 D ₁₅ = C _c =	D ₅₀ = 0.110 D ₁₀ =
USCS=	Classification AASHT	0=
	Remarks	

Sample No.: STA 6+00

Location:

Source of Sample: STA 6+00

Date: 2-24-05

Elev./Depth:

SIERRA TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

#### 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

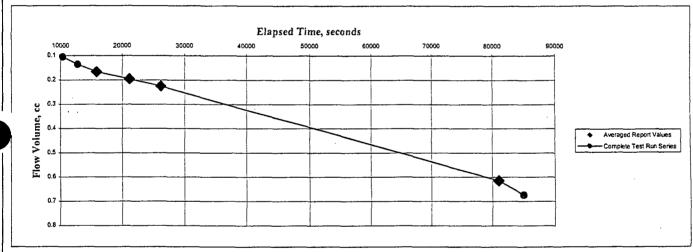
#### **Before Test**

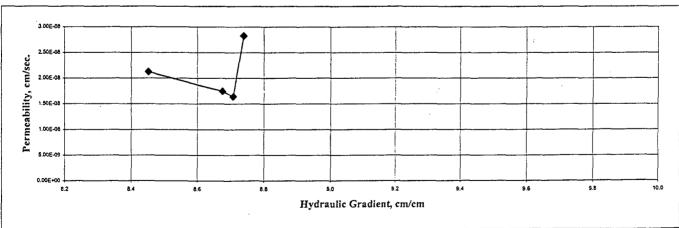
Specimen Height, cm: 7.21 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 71.1 Moisture Content, % 49.4

Specific Gravity, Assumed Percent Saturation:

### After Test

Specimen Height, cm: 6.27 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 81.8 Moisture Content, % 36.9





Test Method: ASTM D5084 Method C

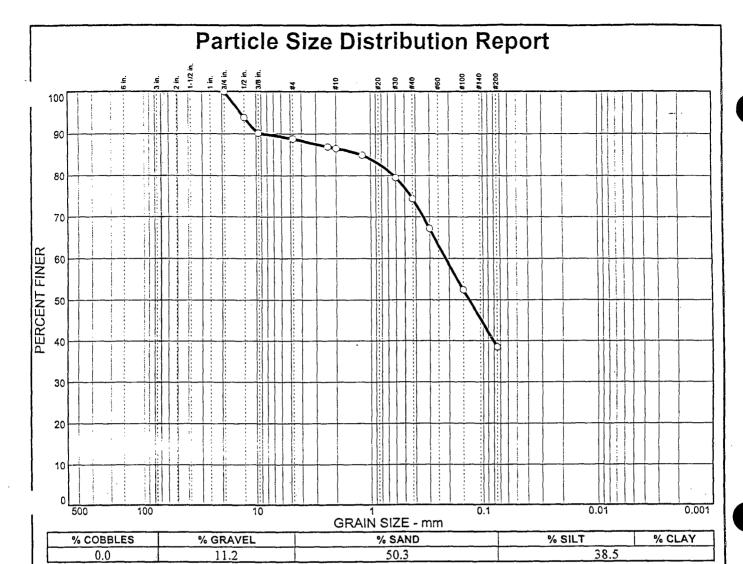
PROJECT NUMBER: 05-103 | Febru

February 24, 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 Co



	<del>,</del>	<del>,</del>	
SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
3/4 in. 1/2 in. 3/8 in. #4 #8 #10 #16 #30 #40 #50 #100 #200	100.0 93.8 90.1 88.8 86.9 86.5 84.9 79.5 74.4 67.2 52.4 38.5		

	Material Description	<u>on</u>
PL=	Atterberg Limits LL=	PI=
D ₈₅ = 1.21 D ₃₀ = C _u =	Coefficients D60= 0.215 D15= Cc=	D ₅₀ = 0.133 D ₁₀ =
USCS=	Classification AASHT	O=
	Remarks	

Sample No.: STA 10+00 Location: Source of Sample: STA 10+00

Date: 2-24-05

Elev./Depth:

SIERRA TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

### 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

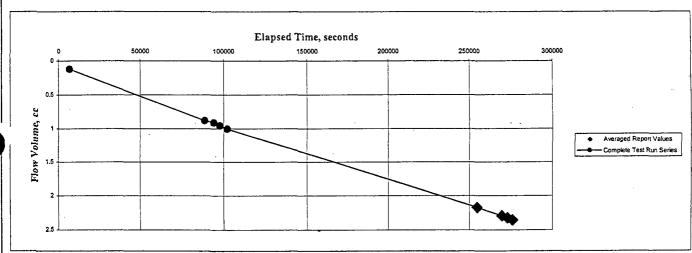
Percent Saturation:

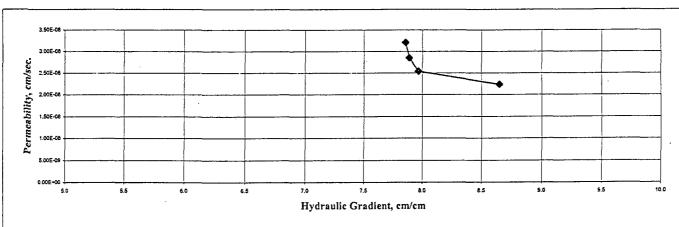
#### After Test

Specimen Height, cm: 6.30 Specimen Diameter, cm: 7.11

Dry Unit Weight, pcf: 83.5

Moisture Content, % 35.4





Test Method: ASTM D5084 Method C

PROJECT NUMBER:

05-103

February 24, 2005

Giant Refinery Co



5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762

Phone: (916) 939-3460 FAX: (916) 939-3507



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** 

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# MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

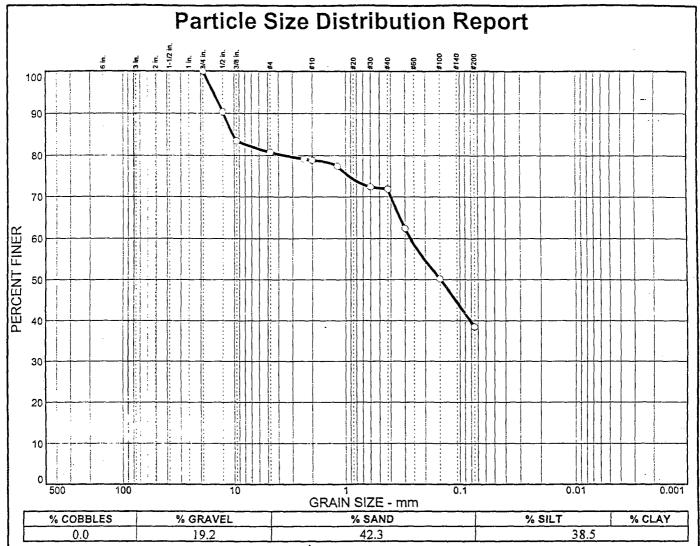
SampleWet UnitDry UnitMoistureIdentificationDepth. ft.Weight, lb/ft.³Weight, lb/ft.³Content. %STA 12+00122.596.027.7

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: 05-103 March 9, 2005

Giant Refinery Company

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



_		<del></del>		
	SIEVE	PERCENT	SPEC.*	PASS?
	SIZE	FINER	PERCENT	(X=NO)
	3/4 in. 1/2 in. 3/8 in. #4 #10 #16 #30 #40 #50 #100 #200	100.0 90.3 83.5 80.8 79.2 78.9 77.4 72.4 71.9 62.4 50.2 38.5		

	Material Description	<u>on</u>
PL=	Atterberg Limits	: P =
D ₈₅ = 10.3 D ₃₀ = C _u =	Coefficients D ₆₀ = 0.269 D ₁₅ = C _c =	D ₅₀ = 0.148 D ₁₀ =
USCS=	Classification AASHT	-O=
	<u>Remarks</u>	

Sample No.: STA 12+00 Location: Source of Sample: STA 12+00

Date: 3/9/05

Elev./Depth:

SIERRA TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

### 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

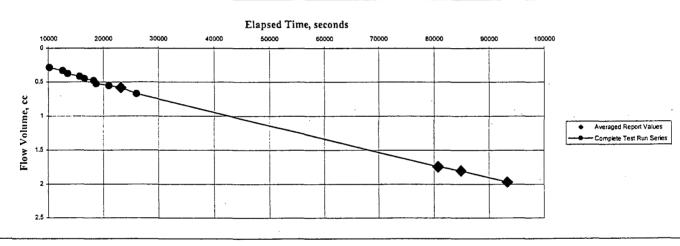
#### Before Test

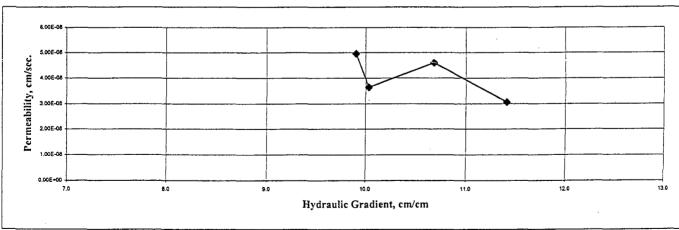
Specimen Height, cm: 6.99 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 84.4 Moisture Content, % 27.6 Specific Gravity, Assumed

#### After Test

Specimen Height, cm: 5.79 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 101.8 Moisture Content, % 22.9

Percent Saturation:





Test Method: ASTM D5084 Method C

PROJECT NUMBER:

05-103

March 2, 2005

Giant Refinery Co



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



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.

Very truly yours

Chad M. Walker Project Manager

**Enclosures** 

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# MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification

STA 14+00

Depth, ft.

Wet Unit
Weight, lb/ft.3

124.6

Dry Unit
Weight, lb/ft.³
101.2

Moisture
Content, %
23.1

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:

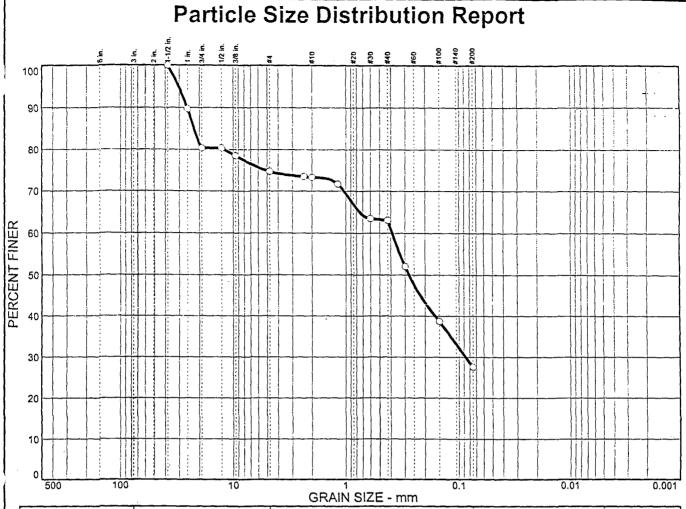
05-103

March 9, 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



	% COBBLES		% GRAVEL		% SAND		% SILT	% CLAY
i	0.0		25.3		47.1		27.6	
•						·		
	LOUINE DES	CENT	enec*	DACCO	Į.			Į.

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
1-1/2 in. 1 in. 3/4 in. 1/2 in. 3/8 in. #48 #10 #16 #30 #40 #50 #100 #200	100.0 89.7 80.4 80.4 78.5 74.7 73.5 73.3 71.7 63.5 63.1 52.1 38.7 27.6		

Material Description				
PL=	Atterberg Limits LL=	PI=		
D ₈₅ = 22.3 D ₃₀ = 0.0870 C _u =	Coefficients D60= 0.387 D15= Cc=	D ₅₀ = 0.277 D ₁₀ =		
USCS=	Classification AASHT	·O=		
	Remarks			

Sample No.: STA 14+00 Location: Source of Sample: STA 14+00

Date: 3/4/05

Elev./Depth:

SIERRA TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

## 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

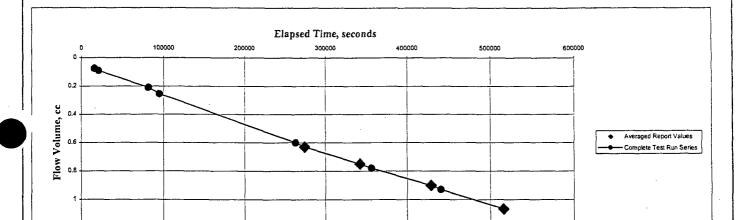
#### Before Test

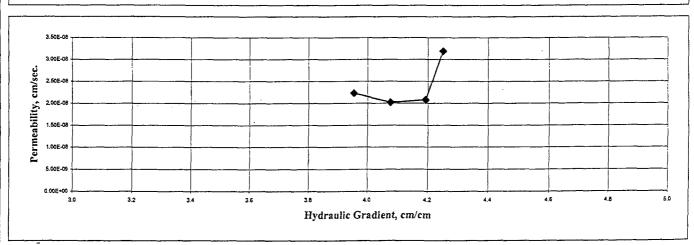
Specimen Height, cm: 8.46
Specimen Diameter, cm: 5.08
Dry Unit Weight, pcf: 108.5
Moisture Content, % 21.9
Specific Gravity, Assumed

Percent Saturation:

#### After Test

Specimen Height, cm: 8.61 Specimen Diameter, cm: 5.08 Dry Unit Weight, pcf: 106.6 Moisture Content, % 20.6





Test Method: ASTM D5084 Method C

05-103

March 7, 2005

Giant Refining Company

SIERRA TESTING LABORATORIES, INC.

PROJECT NUMBER:

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



March 15, 2005

Remedial Construction Services Attn: Bob Carlson PO Box 690708 Houston TX **7**7269-0708

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 Project Manager

**Enclosures** 

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# MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample		Wet Unit	Dry Unit	Moisture
Identification	Depth, ft.	Weight, lb/ft.3	Weight, lb/ft.3	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

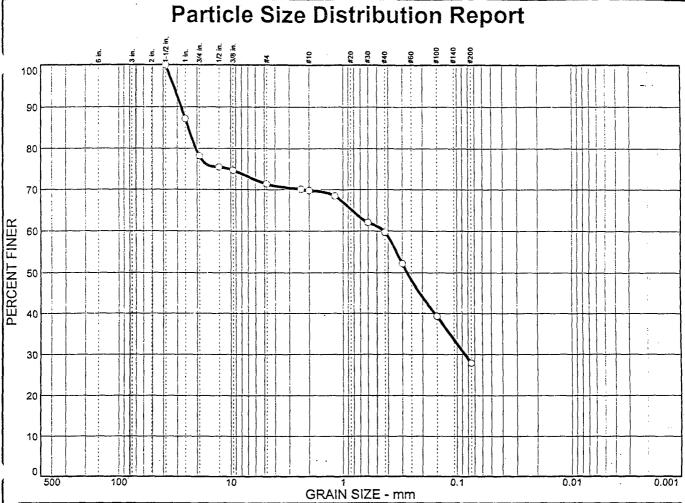
Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER: 05-103 March 9, 2005

Giant Refinery Company

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762

Phone: (916) 939-3460 FAX: (916) 939-3507



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY		
0.0	28.6	43.5	27.9			

SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
1-1/2 in. 1 in. 3/4 in. 1/2 in. 3/8 in. #40 #16 #30 #40 #50 #100 #200	100.0 87.2 78.2 75.5 74.7 71.4 70.1 69.8 62.0 59.7 52.2 39.3 27.9		

Material Description		
PL=	Atterberg Limits	PI=
D ₈₅ = 23.9 D ₃₀ = 0.0852 C _u =	Coefficients D60= 0.435 D15= Cc=	D ₅₀ = 0.272 D ₁₀ =
USCS=	Classification AASH	го=
	Remarks	

Sample No.: STA 16+00 Location: Source of Sample: STA 16+00

Date: 3/8/05

Elev./Depth:

SIERRA TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

# 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

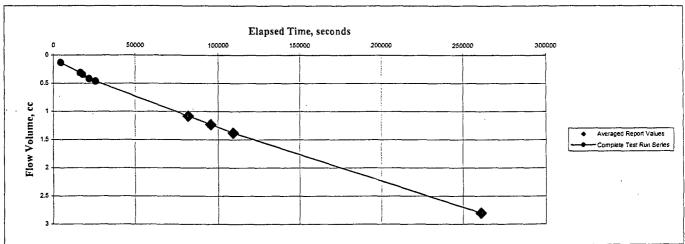
#### Before Test

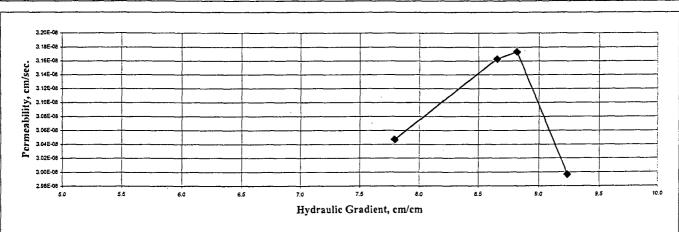
Specimen Height, cm: 6.96 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 90.4 Moisture Content, % 29.1

Specific Gravity, Assumed Percent Saturation:

#### After Test

Specimen Height, cm: 6.10 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 103.2 Moisture Content, % 22.8





Test Method: ASTM D5084 Method C

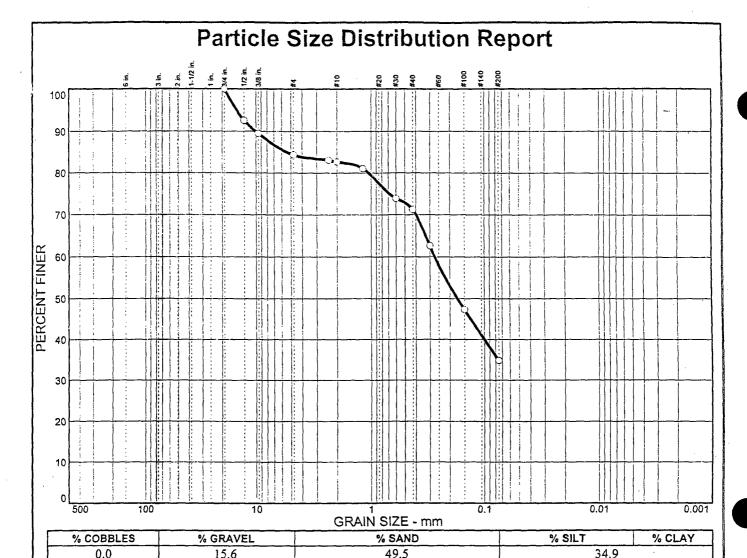
PROJECT NUMBER: 05-103

March 8, 2005

Giant Refinery Company



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



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X≃NO)
3/4 in. 1/2 in. 3/8 in. #4 #10 #16 #30 #40 #50 #100 #200	100.0 92.6 89.5 84.4 83.1 82.7 81.1 73.9 71.2 62.6 47.4 34.9		

	Material Description	<u>on</u>
PL=	Atterberg Limits LL=	Pi=
D ₈₅ = 5.38 D ₃₀ = C _u =	Coefficients D60= 0.272 D15= Cc=	D ₅₀ = 0.172 D ₁₀ =
USCS=	Classification AASHT	·O=
	Remarks	

Sample No.: STA 18+00 Location:

Source of Sample: STA 18+00

Date: 3/8/05

Elev./Depth:

**SIERRA** TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

### 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

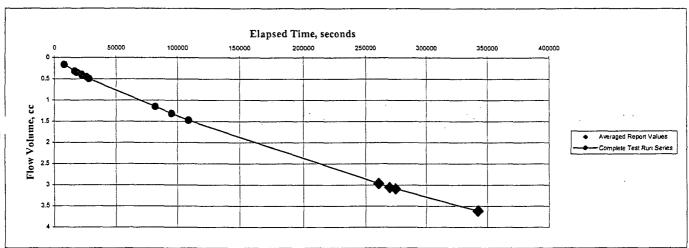
#### **Before Test**

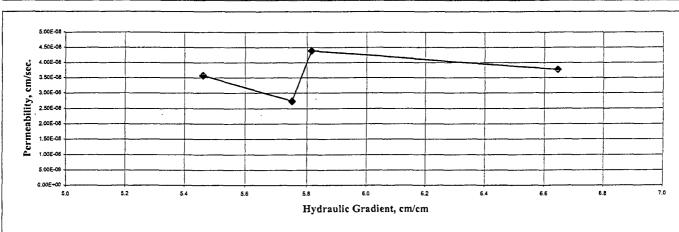
Specimen Height, cm: 7.16 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 88.7 Moisture Content, % 31.5 Specific Gravity, Assumed

Percent Saturation:

#### After Test

Specimen Height, cm: 6.38 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 99.6 Moisture Content, % 24.3





Test Method: ASTM D5084 Method C

PROJECT NUMBER:

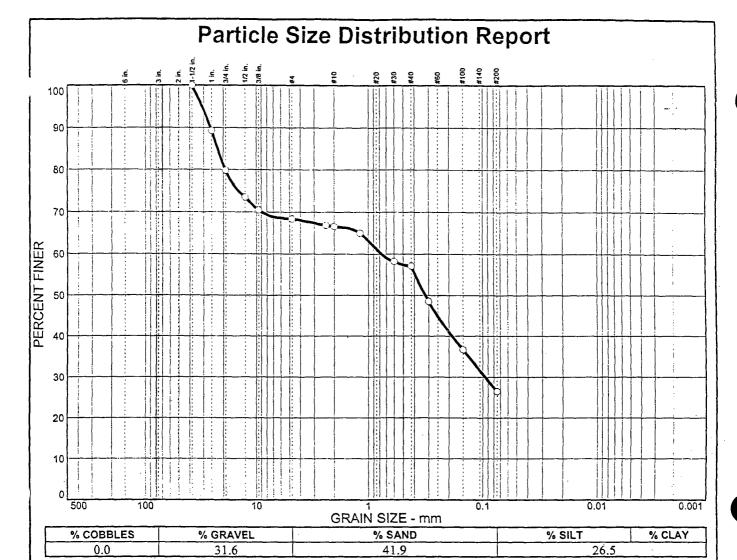
05-103

March 8, 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



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
1-1/2 in. 1 in. 3/4 in. 1/2 in. 3/8 in. #10 #10 #30 #40 #50 #100 #200	100.0 89.3 79.8 73.5 70.5 68.4 66.9 65.0 58.2 57.1 48.5 36.7 26.5		

	Material Descripti	<u>on</u>
PL=	Atterberg Limit	<u>s</u> P =
PL-	LL=	P1-
D ₈₅ = 22.4 D ₃₀ = 0.0951 C _u =	<u>Ccefficients</u> D ₆₀ = 0.767 D ₁₅ = C _c =	D ₅₀ = 0.321 D ₁₀ =
USCS=	Classification AASH	то=
	<u>Remarks</u>	

Sample No.: STA 20+00

Location:

Source of Sample: STA 20+00

Date: 3/8/05

Elev./Depth:

SIÈRRA TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

### 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

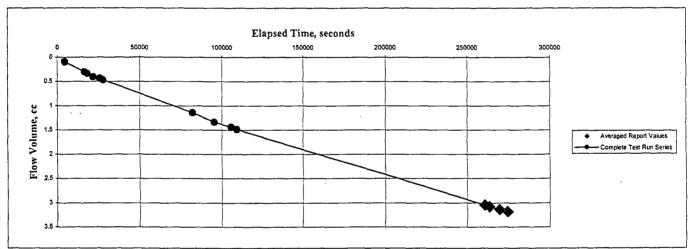
#### Before Test

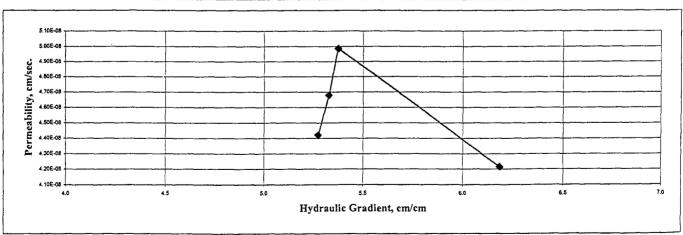
Specimen Height, cm: 7.19 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 91.9 Moisture Content, % 29.5

Specific Gravity, Assumed Percent Saturation:

#### After Test

Specimen Height, cm: 6.53 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 101.2 Moisture Content, % 23.0





Test Method: ASTM D5084 Method C

05-103

March 8, 2005

Giant Refinery Company



PROJECT NUMBER:

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



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 Project Manager

Enclosures

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# MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample		Wet Unit	Dry Unit	Moisture
<u>Identification</u>	Depth, ft.	Weight, lb/ft.3	Weight, lb/ft.3	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

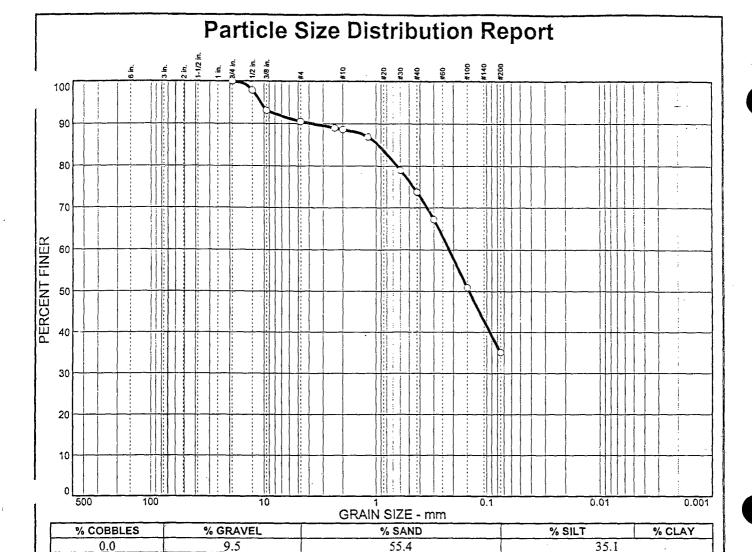
Sample		
<u>Identification</u>	Depth. ft.	Visual Classification
STA 22+00		0.0
STA 24+00	•	0.0
STA 26+00		0.0

Test Method: ASTM D2216, ASTM D2937, ASTM D2487

PROJECT NUMBER: 05-103 | March 15, 2005 | Giant Refining Company



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



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
3/4 in. 1/2 in. 3/8 in. #4 #8 #10 #16 #30 #40 #50 #100 #200	100.0 97.9 93.1 90.5 89.0 88.6 86.9 79.0 73.8 67.2 50.9 35.1		

Material Description		
PL=	Atterberg Limit	<u>s</u> Pl=
D ₈₅ = 0.951 D ₃₀ = C _u =	<u>Coefficients</u> D ₆₀ = 0.219 D ₁₅ = C _c =	D ₅₀ = 0.144 D ₁₀ =
USCS=	Classification AASH	TO=
	Remarks	

Sample No.: STA 22+00 Location: Source of Sample: STA 22+00

Date: 3/15/05

Elev./Depth:

SIERRA TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

### SAMPLE DATA

Sample Identification: STA 22+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: 7.7

Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

**Before Test** 

Specimen Height, cm: 7.06 Specimen Diameter, cm: 7.11

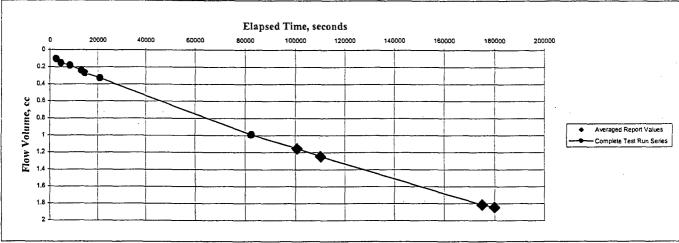
Dry Unit Weight, pcf: 83.1 Moisture Content, % 33.8

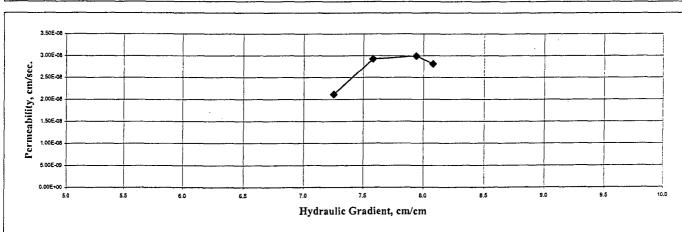
Specific Gravity, Assumed Percent Saturation: After Test

Specimen Height, cm: 6.12 Specimen Diameter, cm: 7.11

Dry Unit Weight, pcf: 95.9

Moisture Content, % 27.0





Test Method: ASTM D5084 Method C

PROJECT NUMBER:

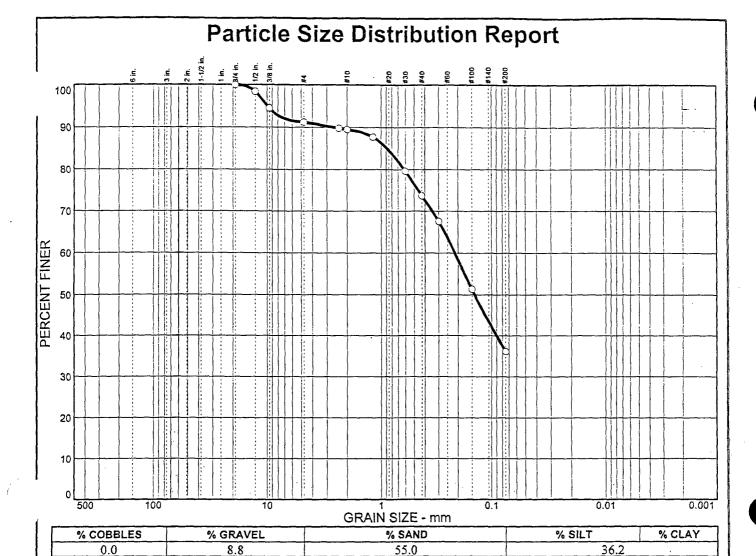
05-103

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



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
3/4 in. 1/2 in. 3/8 in. #4 #8 #10 #16 #30 #40 #50 #100 #200	100.0 98.4 94.5 91.2 89.8 89.5 87.7 79.6 73.7 67.6 51.3 36.2		

	Material Description	<u>on</u>
PL=	Atterberg Limits	i Pi=
D ₈₅ = 0.880 D ₃₀ = C _u =	Coefficients D ₆₀ = 0.214 D ₁₅ = C _c =	D ₅₀ = 0.142 D ₁₀ =
USCS=	Classification AASHT	`O=
•	Remarks	į

(no specification provided)

Sample No.: STA 24+00

Location:

Source of Sample: STA 24+00

Date: 3/15/05

Elev./Depth:

SIERRA TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

Figure

# 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

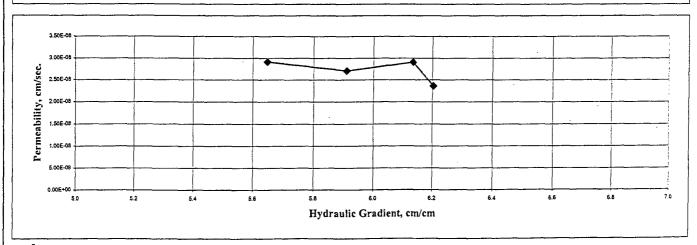
Dry Unit Weight, pcf: 86.9 Moisture Content, % 33.7

Specific Gravity, Assumed Percent Saturation:

#### After Test

Specimen Height, cm: 6.48 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 97.5 Moisture Content, % 26.2

Elapsed Time, seconds 100000 200000 Flow Volume, cc Averaged Report Values Complete Test Run Series



Test Method: ASTM D5084 Method C

PROJECT NUMBER:

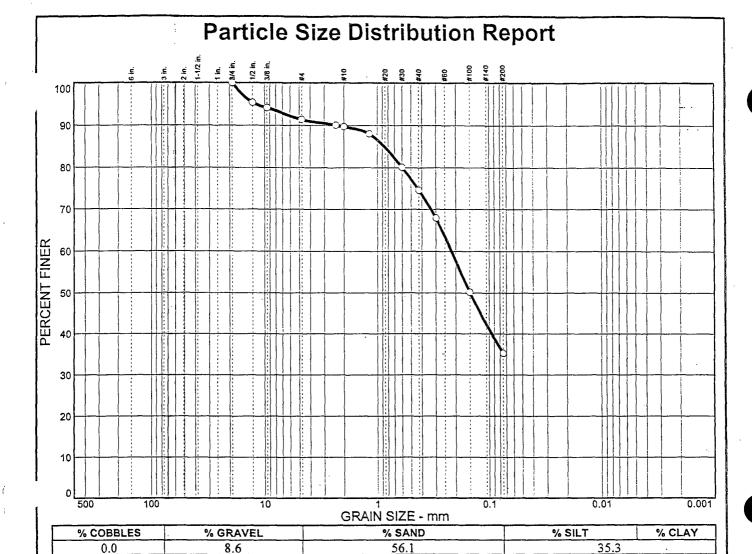
05-103

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



SIEVE	PERCENT	SPEC.*	PASS?
SIZE	FINER	PERCENT	(X=NO)
3/4 in. 1/2 in. 3/8 in. #4 #8 #10 #16 #30 #40 #50 #100 #200	100.0° 95.4° 94.2° 91.4° 90.1° 89.7° 88.0° 80.1° 74.6° 67.9° 50.2° 35.3°		

	Material Description	on
PL=	Atterberg Limits LL=	PI=
D ₈₅ = 0.857 D ₃₀ = C _u =	Coefficients D60= 0.218 D15= Cc=	D ₅₀ = 0.149 D ₁₀ =
USCS=	Classification AASHT	ΓO=
	Remarks	

(no specification provided)

Sample No.: STA 26+00

Location:

Source of Sample: STA 26+00

Date: 3/15/05

Elev./Depth:

SIERRA TESTING LABS, INC. Client: RECON

Project: Giant Refining Company

Project No: 05-103

**Figure** 

# HYDRAULIC CONDUCTIVITY TEST REPORT

#### SAMPLE DATA

Sample Identification: STA 26+00

Visual Description: N/A

Sample Depth, ft.: N/A

Sample Type: SB Backfill Material

Remarks:

#### TEST RESULTS

Permeability, cm/sec.: 2.81E-08

Average Hydraulic Gradient: 9.1

Effective Cell Pressure, psi: 5

## TEST SAMPLE DATA

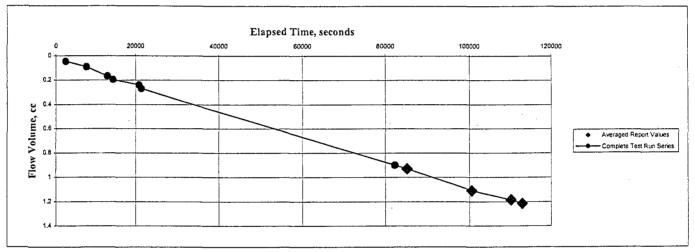
#### **Before Test**

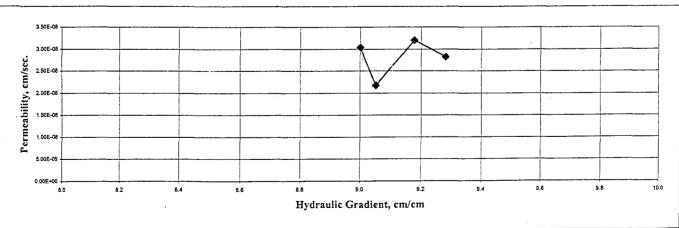
Specimen Height, cm: 7.62 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 86.4 Moisture Content, % 33.6

Specific Gravity, Assumed Percent Saturation:

#### After Test

Specimen Height, cm: 6.81 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 96.7 Moisture Content, % 26.7





Test Method: ASTM D5084 Method C

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

# APPENDIX C

Third Party Daily Inspection Report



## **DAILY INSPECTION REPORT**

#### **GEOMAT**

2060 Afton Place Farmington, New Mexico USA 87401

Phone: (505) 327-7928 Fax: (505) 326-5721

DATE: 2/15/6	
PROJECT NAME:	Grant Reducing wall
JOB NO: <u> </u>	
WEATHER CONDIT	ONS: Over IF ranger!
WORK IN PROGRES	ss: Thuring during of station & 120.
EQUIPMENT ON SI	re: levale hoe
UNEXPECTED SITE	CONDITIONS: Mydda Complex
<del></del>	
PERSON NOTIFIED	: Mike & Jie (Pacon)
ر المسام _{ات}	
	hoste at 1:48 am. 13 test sturry - fresh Alint sturry
trench string	
1 20.	sch requested xinde at lum, 2-/23/55
	Sc. 17.5%
NO. OF DENSITY T	
SOILS	PASSFAIL
ASPHALT	PASS FAIL RETEST TOTAL
CONCRETE	CYLINDER SLUMP AIR
TRAVEL TIME	$2.75$ G STANDBY/ G RETEST TIME $\geq$ TEST TIME $1.75$
DEACON FOR CTAN	TOTAL 2.5
REASON FOR STAN	IDBA: 120Ve
	· · · · · · · · · · · · · · · · · · ·
GEOMAT TECHNIC	AN: JAMES SUPER DATE: 2/3/35
CLIENT REPRESEN	
	PERINTENDENT: Michael Concluses DATE: 2/18/05

THIS REPORT CONTAINS INFORMATION RELATED TO THE REFERENCED PROJECT AND COVERS THE LOCATIONS OF THE WORK OBSERVI: D AND/OR TESTED. THE INFORMATION CONTAINED HEREIN IS PRELIMINARY. ALL TEST RESULTS OR OTHER DATA CONTAINED HEREIN ARE SUBJECT TO REVIEW PRIOR TO INCLUSION IN OUR PROJECT REPORTS. THE INFORMATION PROVIDED DOES NOT CONSTITUTE PROJECT CONTROL OR AN ENGINEERING EVALUATION OR OPINION REGARDING THE SUITABILITY OF THE SUBJECT WORK OR MATERIALS. IF YOU HAVE ANY QUESTIONS OR REQUIRE CLARIFICATION, PLEASE CONTACT THIS OFFICE.

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

# DAILY INSPECTION REPORT

	DATE: February 14, 2005
JOB NUMBER: 51-0138 PROJECT NAME: Bloomfield Giant Refinery SI	CLIENT: Remedial Construction Services, Inc. urry Wall
WEATHER CONDITIONS: Partly cloudy, dry, and calm.	
WORK IN PROCEESS.	
WORK IN PROGRESS:	
EQUIPMENT ON SITE: Trackhoe, Excavators	
UNEXPECTED SITE CONDITIONS: Muddy.	
PERSON NOTIFIED: Mike and Joe (Recon)	
REMARKS: On site at 9:52 a.m. to be insplaced into the trench north a.m.	structed by Mike to perform slump, vicousity, filtrate, and weight of slurry of the Giant Refinery. Technician requested again on 2/18/2005 at 10:00
NUMBER OF DENSITY TESTS	
SOILS PASS _	FAIL RETEST TOTAL
ASPHALT PASS _	FAIL RETEST TOTAL
CONCRETE	
CYLINDERS	S SLUMP AIR
TECHNICIAN TIME	
TRAVEL TIME 0.75 STA	NDBY/RETEST TIME TEST TIME1.75
TOTAL _	2.5
REASON FOR STANDBY:	
- GEOMAT TECHNICIAN James Simpson	DATE February 14, 2005
CLIENT REPRESENTATIVE Michael Curuthers	DATE February 14, 2005
CONTRACTOR SUPERINTENDENT	DATE
Reviewed by: 1.0. made	I among the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the seco



Remedial Construction Services, Inc.

2060 Afton Place 🌵 Farmington, NM 87401 📌 Tel (505) 327-7928 💖 Fax (505) 326-5721

GEOMAT Project No.: 51-0138

9720 Werrington Houston, TX 77064

Attn: Bob Carlson

Project: Bloomfield Giant Refinery Slurry Wall

Location: Bloomfield, New Mexico

2/14/05 Date:

	ime 15 AM	Unit Wt. 117 lb/cu.ft	Slump	Backfill Da %>#200	Comments:				
									:
	1								
			<u> </u>						
				<u> </u>	04				
				Slurry Dat					
rench Station T	ime	Depth	Unit Wt.	/ Visc.	Plant Unit Wt.	Filtrate	Visc.	рН ,	Time
	15 AM	middle	82 lbs/cu.ft	/ Visc. 56 sec.√	63 lb/cu.ft	16 ml	54 sec.	8 /	10:20 A
4.40 10.	13 AIVI	madie	62 IDS/CU.IT	30 360.4	03 lb/cd.it	101111	<del>54 300.1</del>		10.2071
			r		<del></del>			<del></del>	
			i					······································	

Reviewed By: 1a-mader



# **DAILY INSPECTION REPORT**

#### **GEOMAT**

2060 Afton Place Farmington, New Mexico USA 87401

Phone: (505) 327-7928 Fax: (505) 326-5721

DATE: 2/14/			
PROJECT NAME:	Giant Refiner		
JOB NO:	· ·	CLIENT:	
WEATHER CONDI	rions: Partly and, dry & col	1hr	
WORK IN PROGRE	,		
	1 W /		
	ITE: Arackhoo/excusotors		
UNEXPECTED SIT	E CONDITIONS: Wall		
PERSON NOTIFIE	o: Mikac. The L.		
REMARKS:	to at 9:52am to be 1	astrated to Mike	do reform or
Would dies	22 Vicositia, little and w	eight of study when	ed with the borch
- Ahlot C	is A Refused. Tech vigues	cd amin - Mily	H WALL
	7	7	
	<u> </u>		
NO. OF DENSITY	rests		•
SOILS	PASSFAIL	RETEST	TOTAL
ASPHALT	PASS FAIL	RETEST	TOTAL
CONCRETE	CYLINDER	<u>&amp;</u> SLUMP	≥ AIR
TRAVEL TIME	<u>≥ 75</u> □ STANDBY/ □ RE	ETEST TIME AF	EST TIME 175
		TOTAL 2.5	
REASON FOR STA	NDBY: NOS		
GEOMAT TECHNIC	CIAN: Jomes SPANIXUL	DATE:	2/4/5
CLIENT REPRESE	NTATIVE: Which Careth	ev -) DATE:	1
CONTRACTOR SL	PERINTENDENT:	DATE:	

THIS REPORT CONTAINS INFORMATION RELATED TO THE REFERENCED PROJECT AND COVERS THE LOCATIONS OF THE WORK OBSERVED AND/OR TESTED. THE INFORMATION CONTAINED HEREIN IS PRELIMINARY. ALL TEST RESULTS OR OTHER DATA CONTAINED HEREIN ARE SUBJECT TO REVIEW PRIOR TO INCLUSION IN OUR PROJECT REPORTS. THE INFORMATION PROVIDED DOES NOT CONSTITUTE PROJECT CONTROL OR AN ENGINEERING EVALUATION OR OPINION REGARDING THE SUITABILITY OF THE SUBJECT WORK OR MATERIALS. IF YOU HAVE ANY QUESTIONS OR REQUIRE CLARIFICATION, PLEASE CONTACT THIS OFFICE.



# DAILY INSPECTION REPORT

	DATE: February 18, 2005
JOB NUMBER: 51-0138	<b>CLIENT:</b> Remedial Construction Services, Inc.

PROJECT NAME: Bloomfield Giant Refinery Slurry Wall

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 DEN	ISITY TESTS				
	SOILS	PASS	FAIL	RETEST	TOTAL
	ASPHALT	PASS	FAIL	RETEST	TOTAL
CONCRETE					
		CYLINDERS	SLU	JMPA	R
TECHNICIAN TIME					
	TRAVEL TIME 0.7	75STANDI	BYIRETES	T TIME TEST	TIME 1.75
		TOTAL	2.5		
REASON	FOR STANDBY:				
					·
" GE(	OMAT TECHNICIAN Jam	es Simpson		DATE February	18, 2005
CLIENT	REPRESENTATIVE			DATE	
CONTRACTOR	SUPERINTENDENT Mich	nael Curuthers		DATE February	18, 2005
)	Reviewed by:	s. madeul			



2060 Afton Place Farmington, NM 87401 Tel (505) 327-7928 Fax (505) 326-5721 Remedial Construction Services, Inc.

9720 Werrington Houston, TX 77064

Attn: Bob Carlson

Project: Bloomfield Giant Refinery Slurry Wall

Location: Bloomfield, New Mexico

Date: 2/18/05

				Backfill D	ata Center	<del></del>		·	
Station	Time	Unit Wt.	Slump		Comments:				·
7+90	9:55 AM	112 lb/cu.ft	5.5"		]				
					]				
	ļ	ļ							
	ļ				4				
	<u></u>				<u> </u>				
		- <del></del>		Slurry Da	ata Center				
rench	··				Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	рН	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 Al
8+20	9:55 AM	bottom	70 lbs/cu.ft	38 sec.					
<del></del>	-								
		<del> </del> -							
			į l		1		1		i i

Distribution: Client (1)

Reviewed By: 1. a. madii

# HGEOMATING

#### **GEOMAT**

2060 Afton Place Farmington, New Mexico USA 87401

Phone: (505) 327-7928 Fax: (505) 326-5721

# DAILY INSPECTION REPORT

2/23/05
NAME: Giant Refinery Slurry Wall
NAME: Giant Refinery Slurry Wall  SI-0 CLIENT: Recon
R CONDITIONS: Overcast & wet
PROGRESS: Maring slove at station 11+30.
NT ON SITE: Trackinge
TED SITE CONDITIONS: Muddy
NOTIFIED: Ja + Mike
: Cosite at 10:02 am to test plant trench slury & bookfilt
1, The sample was taken at station 11+30. Tech requested
3/3/05 at 10 am No backfill naterial was fested because
the had mechanical difficulty.
<u> </u>
ENSITY TESTS
PASS FAIL RETEST TOTAL  PASS FAIL RETEST TOTAL
E
ME STANDBY / O RETEST TIME TEST TIME 1.5
TOTAL
OR STANDBY: Using
ECHNICIAN: DATE: 2/23/05
PRESENTATIVE: Nichael Caruthers DATE: 2/37/05
TOR SUPERINTENDENT: DATE:

OR TAINS INFORMATION RELATED TO THE REFERENCED PROJECT AND COVERS THE LOCATIONS OF THE WORK OBSERVED TEST. THE INFORMATION CONTAINED HEREIN IS PRELIMINARY. ALL TEST RESULTS OR OTHER DATA CONTAINED HEREIN ARE TO REVIEW PRIOR TO INCLUSION IN OUR PROJECT REPORTS. THE INFORMATION PROVIDED DOES NOT CONSTITUTE PROJECT L OR AN ENGINEERING EVALUATION OR OPINION REGARDING THE SUITABILITY OF THE SUBJECT WORK OR MATERIALS. IF ZEANY QUESTIONS OR REQUIRE CLARIFICATION, PLEASE CONTACT THIS OFFICE.

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

# DAILY INSPECTION REPORT

•				
			DATE: February 23	3, 2005
JOB NUMBER: 5- PROJECT NAME: BI	1-0138 loomfield Giant Refinery Slurry W		medial Construction Ser	vices, Inc.
WEATHER CONDITIONS: O	vercast and wet.			
WORK IN PROGRESS: PI	lacing slurry at station 11+30.			
EQUIPMENT ON SITE: Tr	ackhoe .			
INEXPECTED SITE CONDITIONS: M	uddy.			
PERSON NOTIFIED: M	ike and Joe (Recon)			
1.	n site at 10:02 a.m. to test plant a 1+30. Technician requested on s se contractor had mechanical diffi	ite on 3/3/2005 at 1		
, . <b></b>	o contractor mad moonamour anni	· .		
NUMBER OF DENSITY TESTS				
SOILS	PASS	FAIL	RETEST	TOTAL
ASPHALT	PASS	FAIL	RETEST	TOTAL
CONCRETE		·		
	CYLINDERS	SLUMP	AIR	
ECHNICIAN TIME				
TRAVEL TIM	E 0.75STANDBY	RETEST TIME	TEST TIME	1.5
	TOTAL 2.25	5		
REASON FOR STANDBY:				
_ GEOMAT TECHNICIAN	James Simpson		DATE February 23, 20	005
	Michael Curuthers		DATE February 23, 20	
CONTRACTOR SUPERINTENDENT			DATE	
Reviewed by:	S.a. madel			



2060 Afton Place Farmington, NM 87401 Tel (505) 327-7928 Fax (505) 326-5721 Remedial Construction Services, Inc.

9720 Werrington Houston, TX 77064

Attn: Bob Carlson

Project: Bloomfield Giant Refinery Slurry Wall

Location: Bloomfield, New Mexico

Date: 2/23/05

				Backfill D	ata Center				
Station	Time	Unit Wt.	Slump	%>#200	Comments:				
					No backfill d	ue to equip	ment difficul	ties.	
	· · · · · · · · · · · · · · · · · · ·	·			4				1
	<del> </del>		<del> </del>		1				
			·		<u> </u>				
				·					
				Slurry Da	ta Center				
rench			·		Plant		,		·
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pН	Time
11+30	10:00 AM	middle	70 lbs/cu.ft		65 lb/cu.ft	18 ml	43 sec.	88	10:00 AN
11+30	10:00 AM	bottom	72 lbs/cu.ft	1:22 sec.		<del> </del>			.
	<del> </del>		-						
<del></del>	<del> </del>	<del></del>	<del> </del>		<del> </del>		<del> </del>		<del></del> -
	)		1	!	1 1		}		1 .

Reviewed By: 10. Machin



#### **GEOMAT**

2060 Afton Place Farmington, New Mexico USA 87401

Phone: (505) 327-7928 Fax: (505) 326-5721

# DAILY INSPECTION REPORT

DATE: 3/03/2003	5			
PROJECT NAME:	and Ketinery	Sluvu Wall	<u> </u>	
JOB NO:		CLIE	NT: Reisn	
WEATHER CONDITION	18: Oxerat/clas	ili dinte colm		
WORK IN PROGRESS:	Keen is tre	nching and bu	eletilling with	slung law station
14+60 to 15+		<u>.</u>		•
			·	
EQUIPMENT ON SITE:	tracklise,			· · · · · · · · · · · · · · · · · · ·
UNEXPECTED SITE CO	SNOITIONS: _ LL	·	No.	
		<del></del>		· · · · · · · · · · · · · · · · · · ·
PERSON NOTIFIED:	Milce & Ise / Ke	con	<del></del>	
	i		. 1.11	
REMARKS:	· · · · · · · · · · · · · · · · · · ·			e billow of treach
and Bloot Ack		also lat bac		5x 19460, The
	: 1	5		wealth to ear along
r 40 lech	rejudded bud	is onsite on 3	1/9/05 @ 10a	<u> </u>
·			<del></del>	<u> </u>
NO. OF DENSITY TEST	•		A Comment	/
SOILS	PASS	FAIL	RETEST	TOTAL
ASPHALT	PASS	FAIL	RETEST	TOTAL
CONCRETE		<u> </u>		₹ AIR
CONCRETE TRAVEL TIME	OTEMBER	DBY/ RETEST	25	
, MAVEE MINE	<u> </u>	TOTA		TEST TIME 1.75
REASON FOR STANDE	RY WAR	1017	<u> </u>	e e e e e e e e e e e e e e e e e e e
THE ROOM FOR GIVING	<u> </u>	<del></del>		· · · · · · · · · · · · · · · · · · ·
				3
GEOMAT TECHNICIAN	1: Russ Sin	1521	DA ⁻	ΓΕ:
CLIENT REPRESENTA			DA ⁻	
CONTRACTOR SUPÈF	10 / 11	14 1 Cm 21	DA DA	
•	· · · · · · · · · · · · · · · · · · ·			

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

DAILY INSPECTIO	N REPORT		
		DATE: March	n 3, 2005
JOB NUMBER: 51 PROJECT NAME: BI	i-0138 oomfield Giant Refinery Slurry Wall	CLIENT: Remedial Construction	n Services, Inc.
WEATHER CONDITIONS: O	vercast, cloudy, dry, and calm.		
WORK IN PROGRESS: Re	econ is trenching and backfilling with s	lurry from station 14+60 to 15+4	o.
EQUIPMENT ON SITE: Tr	ackhoe		
UNEXPECTED SITE CONDITIONS: No	one.		1
PERSON NOTIFIED: M	ike and Joe (Recon)		
ba	n site at 9:52 a.m. to test slurry in mideackfill at station 14+60. The samples vation 15+40. Technician requested or	vere collected from the bottom a	
NUMBER OF DENSITY TESTS			· · · · · · · · · · · · · · · · · · ·
SOILS	PASSFA	L RETEST	TOTAL
ASPHALT	PASS FA	L RETEST	TOTAL
CONCRETE	CYLINDERS	SLUMPA	IR
TECHNICIAN TIME		· · · · · · · · · · · · · · · · · · ·	
TRAVEL TIME	STANDBY/F	RETEST TIME TEST	TIME 1.75
	TOTAL		
REASON FOR STANDBY:			
GEOMAT TECHNICIAN	James Simpson	DATE March 3,	2005
CLIENT REPRESENTATIVE	Michael Curuthers	DATE	2005
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		5, c. E (Marail 0,	

Distribution: Client (1)

Reviewed by: 12. a. machin

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

	Station   Time   Unit Wt.   Slump   %>#200   Comments:   No backfill due to equipment difficulties.   No backfill due to equipment difficulties.     Slurry Data Center   Plant   Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   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 AM			······································							
Slurry Data Center   Plant   Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time	Slurry Data Center  Tench Station Time Depth Unit Wt. Visc. Unit Wt. Filtrate Visc. pH 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 A 15+40 10:00 AM Bottom 70 lb/cu.ft. 54 sec		<del></del>	·				·			
Slurry Data Center   Plant   Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time	Slurry Data Center   Plant   Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time	Station	Time	Unit Wt.	Slump	%>#200					
Trench         Plant           Station         Time         Depth         Unit Wt.         Visc.         Unit Wt.         Filtrate         Visc.         pH         Time           15+40         10:00 AM         Middle         72 lb/cu.ft.         46 sec         64 lb/cu.ft.         18.5 ml         41 sec         9         10:0	Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time		ļ			·	No backfill d	ue to equip	ment difficu	lties.	
Trench         Plant           Station         Time         Depth         Unit Wt.         Visc.         Unit Wt.         Filtrate         Visc.         pH         Time           15+40         10:00 AM         Middle         72 lb/cu.ft.         46 sec         64 lb/cu.ft.         18.5 ml         41 sec         9         10:0	Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time						1				
Trench         Plant           Station         Time         Depth         Unit Wt.         Visc.         Unit Wt.         Filtrate         Visc.         pH         Time           15+40         10:00 AM         Middle         72 lb/cu.ft.         46 sec         64 lb/cu.ft.         18.5 ml         41 sec         9         10:0	Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time								•		•
Trench         Plant           Station         Time         Depth         Unit Wt.         Visc.         Unit Wt.         Filtrate         Visc.         pH         Time           15+40         10:00 AM         Middle         72 lb/cu.ft.         46 sec         64 lb/cu.ft.         18.5 ml         41 sec         9         10:0	Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time				<u> </u>						
Trench         Plant           Station         Time         Depth         Unit Wt.         Visc.         Unit Wt.         Filtrate         Visc.         pH         Time           15+40         10:00 AM         Middle         72 lb/cu.ft.         46 sec         64 lb/cu.ft.         18.5 ml         41 sec         9         10:0	Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time				<u> </u>		1				
Trench         Plant           Station         Time         Depth         Unit Wt.         Visc.         Unit Wt.         Filtrate         Visc.         pH         Time           15+40         10:00 AM         Middle         72 lb/cu.ft.         46 sec         64 lb/cu.ft.         18.5 ml         41 sec         9         10:0	Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time										
Trench         Plant           Station         Time         Depth         Unit Wt.         Visc.         Unit Wt.         Filtrate         Visc.         pH         Time           15+40         10:00 AM         Middle         72 lb/cu.ft.         46 sec         64 lb/cu.ft.         18.5 ml         41 sec         9         10:0	Station   Time   Depth   Unit Wt.   Visc.   Unit Wt.   Filtrate   Visc.   pH   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time   Time					01	4-04				
Station         Time         Depth         Unit Wt.         Visc.         Unit Wt.         Filtrate         Visc.         pH         Til           15+40         10:00 AM         Middle         72 lb/cu.ft.         46 sec         64 lb/cu.ft.         18.5 ml         41 sec         9         10:0	Station         Time         Depth         Unit Wt.         Visc.         Unit Wt.         Filtrate         Visc.         pH         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 A           15+40         10:00 AM         Bottom         70 lb/cu.ft.         54 sec         9         10:00 A	Casash				Slurry Da					
15+40 10:00 AM Middle 72 lb/cu.ft. 46 sec 64 lb/cu.ft. 18.5 ml 41 sec 9 10:0	15+40 10:00 AM Middle 72 lb/cu.ft. 46 sec 64 lb/cu.ft. 18.5 ml 41 sec 9 10:00 A 15+40 10:00 AM Bottom 70 lb/cu.ft. 54 sec		Time	Donth	11-1-1-1014	\ /:		Filtroto	\ \(\frac{1}{2}\)		Time
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15-40 10.00 AM Bottom 70 lb/cu.it. 54 sec			<del></del>				64 ID/CU.IL	10.5 1111	41 Sec	<del></del>	10.00 AI
		15740	10.00 AM	Dollom	70 lb/cu.ft.	54 Sec	<del> </del>		<u></u>		
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Distribution: Client (1)

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

DAILY INSPECTION	REPORT			•	
			DATE: Ma	arch 9, 2005	<u>-</u>
JOB NUMBER: 51-013 PROJECT NAME: Bloom			<b>F:</b> Remedial Constru	ction Services, Inc.	
WEATHER CONDITIONS: Clear,	dry, and calm.				
WORK IN PROGRESS: Backfi	illing at station 23+40.				
EQUIPMENT ON SITE: 3 Trac	khoes				
XPECTED SITE CONDITIONS: None.					•
PERSON NOTIFIED: Mike a	and Joe (Recon)				
REMARKS: On sit	e at 10:00 a.m. to test the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the sta	slurry, but not slurry	was placed in the tre	ench. Only the backfill t	material
sampl	ed and tested at station	11 20 - 10.			
sampl	led and tested at station				
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sampl MBER OF DENSITY TESTS SOILS ASPHALT	PASS	FAIL FAIL	RETEST		
sampl  MBER OF DENSITY TESTS  SOILS  ASPHALT  NCRETE	PASSPASS	FAIL FAIL	RETEST	TOTAL	
Sample  MBER OF DENSITY TESTS  SOILS  ASPHALT  NCRETE  CHNICIAN TIME	PASSPASS	FAIL FAIL SLUI	RETEST	TOTAL AIR	
Sample  MBER OF DENSITY TESTS  SOILS  ASPHALT  MCRETE	PASS PASS CYLINDERS	FAIL FAIL SLUI	RETEST	TOTAL AIR	
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MBER OF DENSITY TESTS SOILS ASPHALT NCRETE CHNICIAN TIME TRAVEL TIME	PASS PASS CYLINDERS  0.75 X STAN TOTAL  ames Simpson	FAIL SLUP NDBY/RETEST	RETEST	TOTALAIR ST TIME0.5	



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

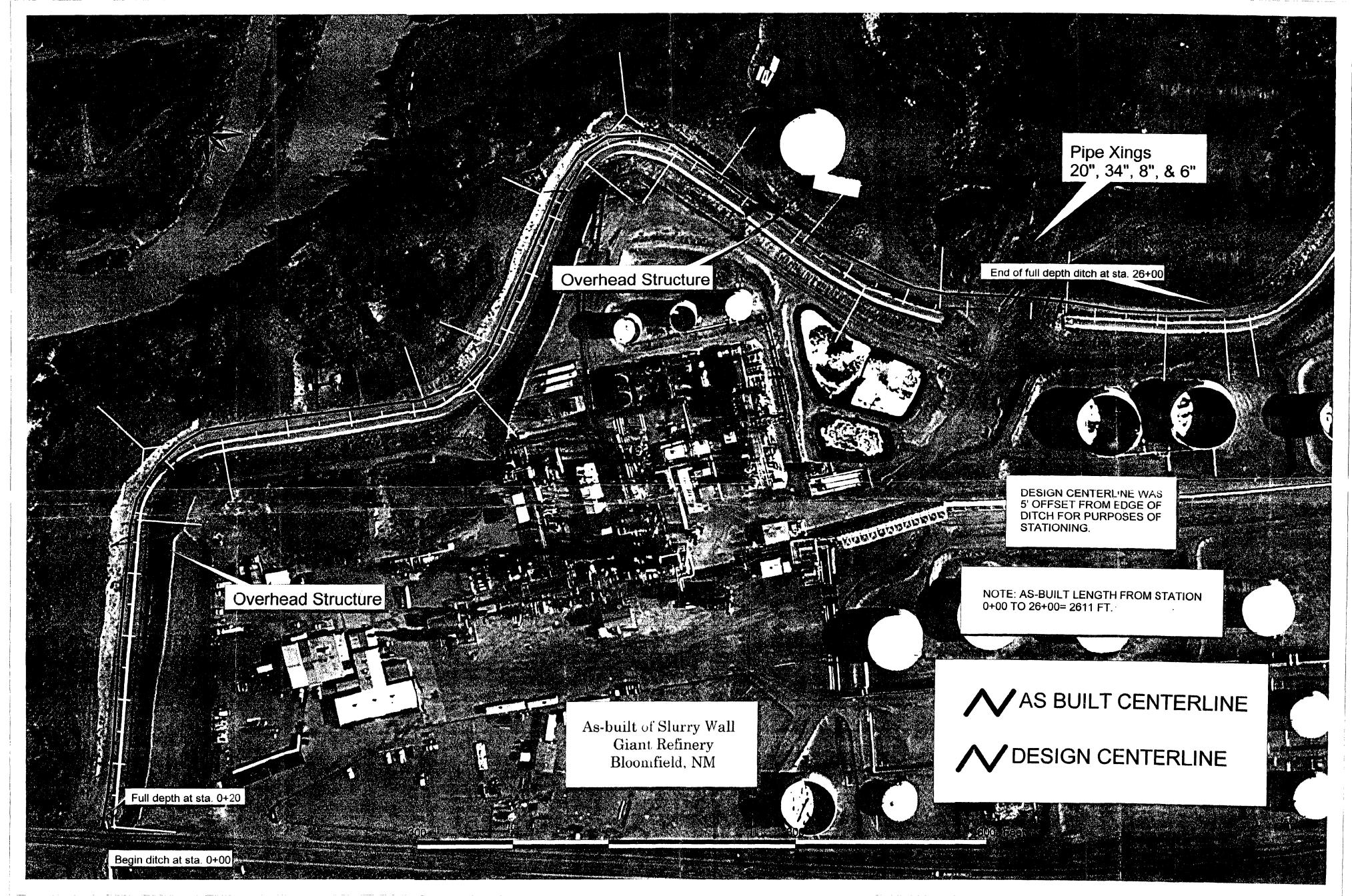
Date: 3/3/05

A			-	Backfill D	ata Center				
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	· · · · · · · · · · · · · · · · · · ·		·	Slurry Da	ta Center	· ·	<del></del>		
ench					Plant				
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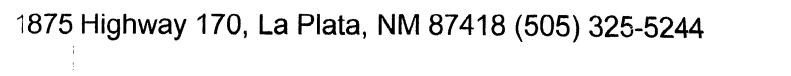
Reviewed By: 1.a. Mashul

# APPENDIX D

As-Built Slurry Wall Drawing









# APPENDIX E

Barrier Profile - Actual

*006-05-31 15:35:45 | 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 | ≥0 # Bond | plotdpi 400 | scaling=100 %

# APPENDIX D

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

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

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

1	Δ	C)T	TX/I	FTI	ES

#### General

□ 1/21/05: 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

- ☐ Install remainder of storm water and erosion control structures.
- □ 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.
- □ 1/24 1/29: Expand roadway access area along the north side of the Hammond Ditch to accommodate the staging area required for soil/bentonite mixing.

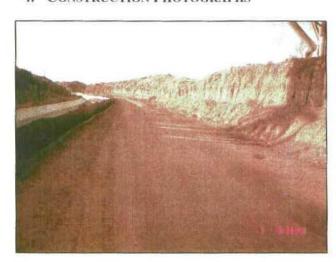
## 2. PLANNED ACTIVITIES

- ☐ 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

- $\Box$  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.
- □ 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.

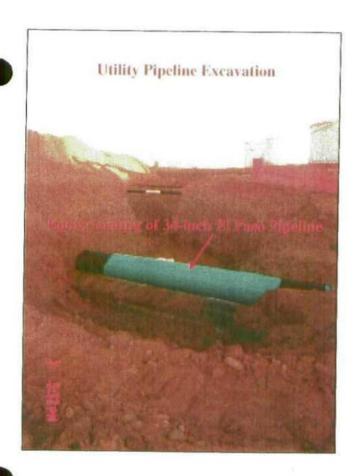
#### 2. PLANNED ACTIVITIES

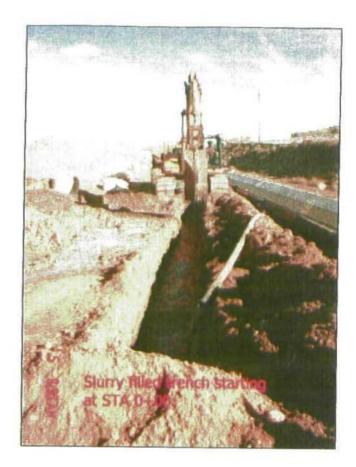
□ Continue construction of North Boundary Barrier at STA 1+15.

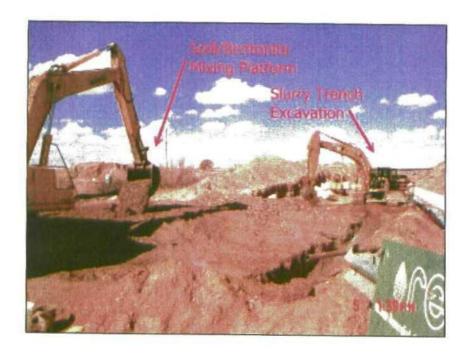
#### 3. SCHEDULE

□ Schedule has not been revised.

#### 4. CONSTRUCTION PHOTOGRAPHS







Task Name Giant North Boundary Barn	rler Project Deadline	Duration 76 days	tion Start Finish 1/2 1/9 1/1 days Mon 1/3/05 Fri 4/15/05	Fin	sh 1/15/05
Contract Award	and a separate	60 days	Mon 1/3/05	Thu 3/24/	居 5
Review/Sign Contract		5 days	Mon 1/3/05	Eri 1/7/0	6.71
Pre-Construction Activities	6	13 days	Mon 1/10/05	Wed 1/26/0	CFL
Award Recon S/C		2 days	Mon 1/10/05	Tue 1/1 1/0/	
Material/Equip Procurer	nent	5 days	Mon 1/10/05	Fri 1/14/05	
Meeting @ Giant		2 days	Thu 1/20/05	Fri 1/21/06	
/lix Design/Permeability	y Testing	12 days	Man 1/10/05	Tue 1/25/0	
Slurry Wall Layout/Cont	rols	2 days	Tue 1/25/05	Wed 1/26/0	CD
Inalize Construction So	chedule	2 дауѕ	Fri 1/21/05	Mon 1/24/0	1.53
Mobilization		5 days	Thu 12/9/04	Wed 12/15/0	44
Giant Project Deadline		7 days	Thu 1/20/05	Fri 1/28/0	Lth
Aobilize Crew and Equi	pment	5 days	Thu 1/20/05	Wed 1/26/0	6.71
Set up Office, Receiving	& Mixing Areas	5 days	Mon 1/24/05	Fri 1/28/0	CT
Site Preparation		8 days	Fri 1/21/05	Tue 2/1/0	CD:
rosion & Sediment Cor	ntrol	6 days	Fri 1/21/05	Fri 1/28/0	CI
Vork Platform & Mixing	Areas	5 days	Wed 1/26/05	Tue 2/1/05	
y Wall Trench Constru	action	38 days	Thu 1/27/05	Fri 3/18/05	
repare/Batch Bentonit	le Sturry-Ongoing	24 days	Mon 1/31/05	Wed 3/2/08	
Construct Trench From	Sta 0+00 to 9+50	15 days	Wed 2/2/05	Mon 2/21/05	
Dry Tie-In @ Sta 9+50		4 days	Thu 1/27/05	Tue 2/1/0	CD
Construct Trench Aroun	d Dry Tie-In @Sta 9+50 to	9+75 2 days	Fri 2/18/05	Sat 2/19/0	Ch
onstruction Trench Fro	om Sta 9+75 to Stat 21+50	11 days	Thu 2/17/05	Wed 3/2//	Ch
3ry Tie-In @ Sta 21+50	10 24+00	5 days	Tue 3/1/05	Mon 3/7/0	G)
Construct Trench From	Sta 24+00 to Sta 26+00	10 days	Mon 3/7/05	Fri 3/18/0	L21
Final Protective Cover		8 days	Wed 3/16/05	Fri 3/25/0	Ch
djust Top of Bentonite	to Designated Elevation	4 days	Wed 3/16/05	Mon 3/21/0	(J)
Install Geotextile		4 days	Thu 3/17/05	Tue 3/22/0	CTI
lace Bank-Run Gravel	to Grade	5 days	Man 3/21/05	Fri 3/25/0	101
Site Restoration		6 days	Frl 3/25/05	Fri 4/1/0	CPI .
lemove Access Benton	ite-Soil Mix	5 days	Fn 3/25/05	Thu 3/31/0	Ch
ill/Grade/Slope Service	Road	5 days	Mon 3/28/05	Fn 4/1/0	CR.
Demobilization		5 days	Fri 4/1/05	Thu 4/7/05	
temave Office Complex	x & Equipment from site	2 days	Fri 4/1/05	Mon 4/4/05	
Make Final Site Cleanup	b	4 days	Mon 4/4/05	Thu 4/7/0	(21)
		Milestone	•	_	36
		Summary	1		28
	TIPES	Project Summary	ary Same	Deadline	
0 11 5 8 8 5 3 8 5 3 5 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	ID G Task Name  1 Giant North Boundary Bar  2 Contract Award  3 V Review/Sign Contract  4 Pre-Construction Activities  5 V Award Recon S/C  6 Fill Material/Equip Procure  7 V Meeting @ Giant  8 Fill Siury Wall Layout/Con  10 V Mobilization  11 Giant Project Deadline  13 Fill Site Preparation  15 Site Preparation  16 Fill Site Preparation  17 Fill Construction Trench Construct  19 Fill Construct Trench Construct  20 Construct Trench From  21 Construct Trench From  22 Construct Trench From  24 Construct Trench From  25 Fill Construct Trench From  26 Project Bank-Run Gravel  37 Fill Restoration  38 Fill Protective Cover  Adjust Top of Bentonite  29 Fill Remove Access Benton  31 Fill Remove Office Compile  32 Fill Remove Office Compile  33 Demobilization  34 Fill Remove Office Compile  35 Fill Remove Office Compile  36 Spill  17as	ary Barrier Project Dead  ary Barrier Project Dead  clivities  C  Procurement  It  meability Testing put/Controls ccition Schedule  ine  ine  ine  ine  control construction  Bentonite Slumy-Ongoing h From Sta 0+00 to 9+50  a 9+50  Bentonite 10 Designated Ele pervice Road  Service Road  Cleanup  Task  Split  Progress	ary Barrier Project Deadline  ary Barrier Project Deadline  50  60  60  60  60  60  60  60  60  60	Any Barrier Project Deadline  ary Barrier Project Deadline  50  60  60  60  60  60  60  60  60  60	Any Barrier Project Deadline  any Barrier Project Deadline  50  60  60  61  61  61  62  62  63  64  65  65  66  66  67  67  67  67  67  67

# 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

- □ 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.
- □ 2/8/05: Resumed construction of the North Boundary Barrier at STA 2+90.
  - ✓ 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.
- □ 2/9/05: Resumed construction of the North Boundary Barrier at STA 4+20.
  - ✓ 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.
- □ 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.
- □ 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.

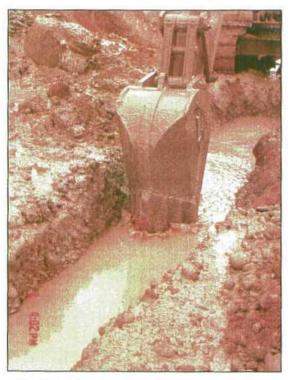
# 2. PLANNED ACTIVITIES

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

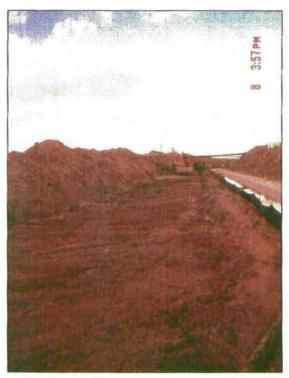
#### 3. SCHEDULE

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

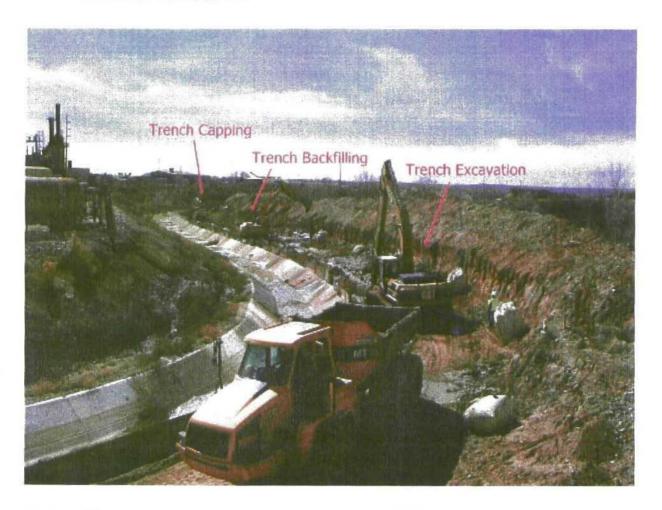
#### 2. PLANNED ACTIVITIES

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.

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

# 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  $\rightarrow$  Permeability = 2.12 x 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  $\rightarrow$  Permeability = 2.01 x 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.
  - ✓ Excavation activities scheduled to resume Tuesday, March 1st, 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.
  - ✓ 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.
  - ✓ Trench backfilling completed through STA 16+10.

- 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

Sample Depth, ft.: N/A

Sample Type: SB Backfill Material

Remarks:

#### **TEST RESULTS**

Permeability, cm/sec.: 2.12E-08

Average Hydraulic Gradient: 10.7

Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

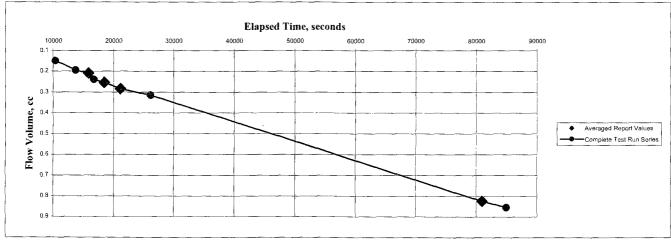
**Before Test** 

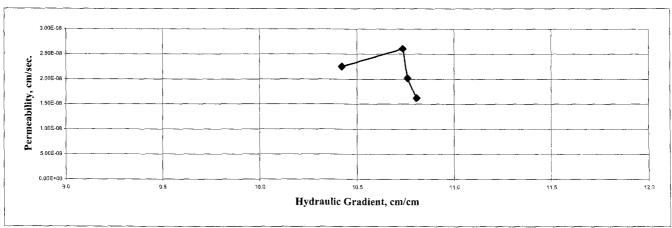
Specimen Height, cm: 7.37 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 73.3 Moisture Content, % 48.2

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





Test Method: ASTM D5084 Method C February 24, 2005

SIERRA TESTING LABORATORIES, INC.

05-103

Giant Refinery Co

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762

Phone: (916) 939-3460 FAX: (916) 939-3507

#### SAMPLE DATA

Sample Identification: Sta 4+00, 2/10/05

Sample Depth, ft.: N/A

Visual Description: N/A

Sample Type: SB Backfill Material

Remarks:

#### **TEST RESULTS**

Permeability, cm/sec.: 6.93E-08

Average Hydraulic Gradient: 8.4

Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

#### **Before Test**

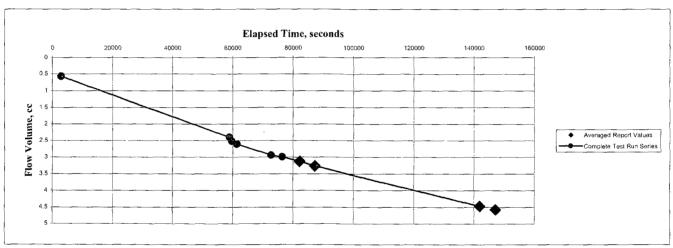
Specimen Height, cm: 5.84 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 80.3 Moisture Content, % 40.3

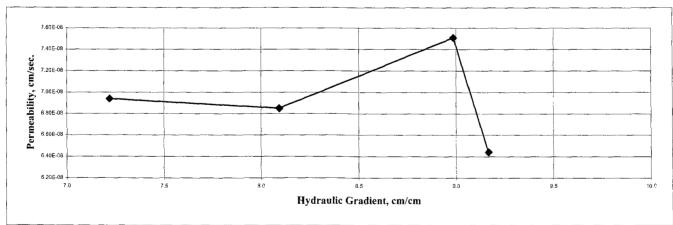
Specific Gravity, Assumed

Percent Saturation:

# **After Test**

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





Test Method: ASTM D5084 Method C

February 11, 2005

05-103

Giant Refinery, 2-1780

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762

Phone: (916) 939-3460 FAX: (916) 939-3507

#### SAMPLE DATA

Sample Identification: STA 6+00

Visual Description: N/A

Sample Depth, ft.: N/A

Sample Type: SB Backfill Material

Remarks:

## **TEST RESULTS**

Permeability, cm/sec.: 2.08E-08

Average Hydraulic Gradient: 8.6

Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

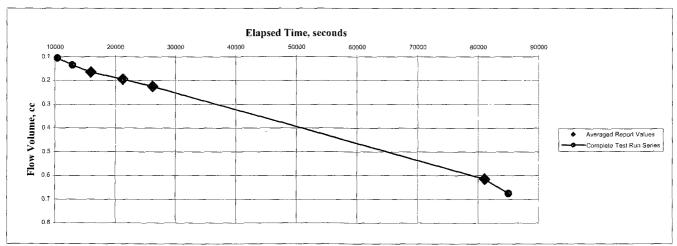
#### **Before Test**

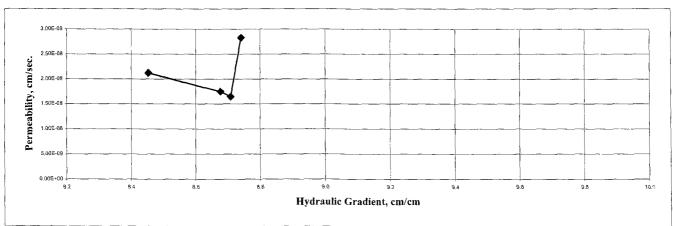
Specimen Height, cm: 7.21 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 71.1 Moisture Content, % 49.4

Specific Gravity, Assumed Percent Saturation:

#### After Test

Specimen Height, cm: 6.27 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 81.8 Moisture Content, % 36.9





Test Method: ASTM D5084 Method C

February 24, 2005

05-103

**Giant Refinery Co** 

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762

Phone: (916) 939-3460 FAX: (916) 939-3507

#### SAMPLE DATA

Sample Identification: STA 8+00

Visual Description: N/A

Sample Depth, ft.: N/A

Sample Type: SB Backfill Material

Remarks:

#### **TEST RESULTS**

Permeability, cm/sec.: 2.01E-08

Average Hydraulic Gradient: 8.3

Effective Cell Pressure, psi: 5

#### **TEST SAMPLE DATA**

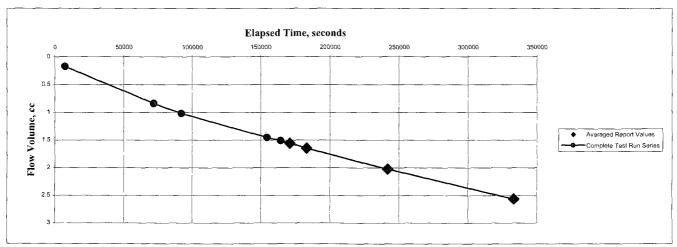
#### **Before Test**

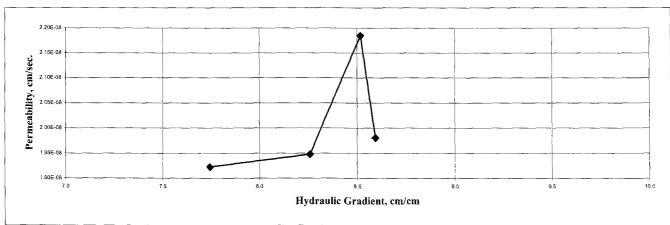
Specimen Height, cm: 7.11 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 65.6 Moisture Content, % 55.2

Specific Gravity, Assumed Percent Saturation:

#### After Test

Specimen Height, cm: 5.94 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 78.5 Moisture Content, % 40.6





Test Method: ASTM D5084 Method C

February 17, 2005

05-103

Giant Refinery Co

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

#### SAMPLE DATA

Sample Identification: STA 10+00

Visual Description: N/A

Sample Depth, ft.: N/A

Sample Type: SB Backfill Material

Remarks:

#### TEST RESULTS

Permeability, cm/sec.: 2.71E-08

Average Hydraulic Gradient: 8.1

Effective Cell Pressure, psi: 5

#### TEST SAMPLE DATA

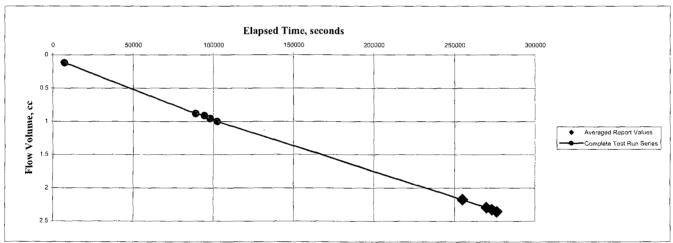
Before Test

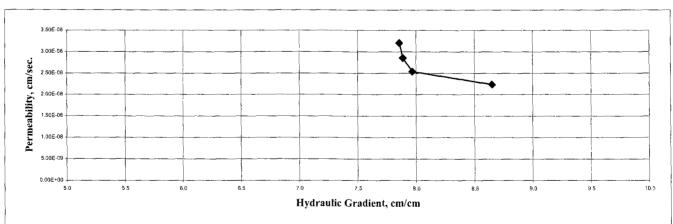
Specimen Height, cm: 7.49 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 70.2 Moisture Content, % 48.8

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





Test Method: ASTM D5084 Method C

February 24, 2005

05-103

Giant Refinery Co

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762

Phone: (916) 939-3460 FAX: (916) 939-3507

#### 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

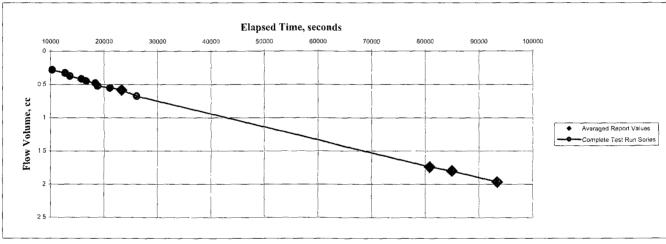
#### **Before Test**

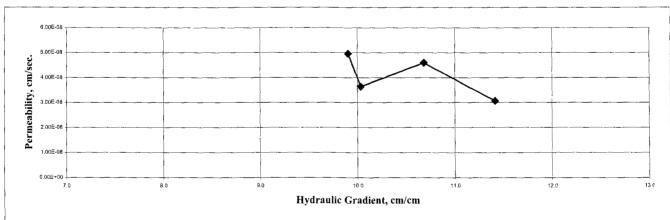
Specimen Height, cm: 6.99 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 84.4 Moisture Content, % 27.6

#### After Test

Specimen Height, cm: 5.79 Specimen Diameter, cm: 7.11 Dry Unit Weight, pcf: 101.8 Moisture Content, % 22.9

Specific Gravity, Assumed Percent Saturation:





Test Method: ASTM D5084 Method C

PROJECT NUMBER:

05-103

March 2, 2005

**Giant Refinery Co** 

SIERRA TESTING LABORATORIES, INC Destes bedisal and insterdal a lightly at 1975.

5040 Robert J. Mathews Blvd., El Dorado Hills, CA 95762

Phone: (916) 939-3460 FAX: (916) 939-3507

0				Duration	Start	Finish	April 1/2 1/9 1/16 1/23 1/30 2/6 2/13 2/20 2/27 3/6 3/13 3/20 3/27 4/3
[3]		Giant North Boundary Barrier Project Deadline	eadline	76 days	Mon 1/3/05	Fri 4/15/05	200 0200 020 020 020 020 020 020 020 02
	Contract Award			60 days	Mon 1/3/05	Thu 3:24/05	1/3
>	Review/Sign Contract	act		5 days	Mon 1/3/05	Fri 1/7/05	
_	Pre-Construction Activities	Activities		13 days	Mon 1/10/05	Wed 1/26/05	
>	Award Recon S/C	S/C		2 days	Mon 1/10/05	Tue 1/11/05	
>	Material/Equip Procurement	Procurement		5 days	Man 1/10/05	Fri 1/14/05	American 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 Control of the Control of the Control of the Control of t
>	Meeting @ Giant	ut		2 days	Thu 1/20/05	Fri 1/21/05	
		Mix Design/Permeability Testing		12 days	Mon 1/10/05	Tue 1/25/05	
19	Sturry Wall Layout/Controls	out/Controls		2 days	Tue 1/25/05	Wed 1/26/05	
>		Finalize Construction Schedule		2 days	Fri 1/21/05	Mon 1/24/05	
	Mobilization			5 days	Thu 12/9/04	Wed 12/15/04	Property 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 Control of the Control of the Control of the Control of t
>	Glant Project Deadline	lline		7 days	Thu 1/20/05	Fri 1/28/05	1
>	Mobilize Crew and Equipment	and Equipment		5 days	Thu 1/20/05	Wed 1/25/05	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the 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
>		Set up Office, Receiving & Mixing Areas	38	5 days	Mon 1/24/05	Fri 1/28/05	
	Site Preparation			8 days	Frl 1/21/05	Tue 2/1/05	
	Erosion & Sediment Control	ment Control		6 days	Fri 1/21/05	Fri 1/28/05	
13	Work Platform & Mixing Areas	& Mixing Areas		5 days	Wed 1/26/05	Tue 2/1/05	
	Slurry Wall Trench Construction	Construction		38 days	Thu 1/27/05	Fri 3/18/05	
		Prepare/Batch Bentonite Slurry-Ongoing		27 days	Mon 1/31/05	Mon 3/7/05	
>	Construct Trenc	Construct Trench From Sta 0+00 to 9+50	-50	15 days	Wed 2/2/05	Mon 2/21/05	
>	Dry Tie-In @ Sta 9+50	(a 9+50		4 days	Thu 1/27/05	Tue 2/1/05	
>	Construct Trenc	Construct Trench Around Dry Tie-In @Sta 9+50 to 9+75	Sta 9+50 to 9+75	3 days	Fri 2/18/05	Mon 2/21/05	
		Construction Trench From Sta 9+75 to Stat 21+50	Stat 21+50	11 days	Mon 2/21/05	Mon 3/7/05	
		Dry Tie-In @ Sta 21+50 to 24+00		5 days	Tue 3/1/05	Mon 3/7/05	
>	Construct Trenc	Construct Trench From Sta 24+00 to Sta 26+00	Na 26+00	10 days	Mon 3/7/05	Fri 3/18/05	
	Final Protective Cover	ver		26 days	Mon 2/14/05	Fri 3/18/05	
		Adjust Top of Bentonite to Designated Elevation	Elevation	26 days	Mon 2/14/05	Fri 3/18/05	
m	Install Geotextile	Ð		26 days	Mon 2/14/05	Fri 3/18/05	
		Place Bank-Run Gravel to Grade		26 days	Mon 2/14/05	Fri 3/18/05	
	Site Restoration			e days	Fri 3/25/05	Fri 4/1/05	
	Remove Bentonite-Soil Mix	nte-Soil Mix		5 days	Fri 3/25/05	Thu 3/31/05	
	Fill/Grade/Slope Service Road	e Service Road		5 days	Mon 3/28/05	Fri 4/1/05	
	Demobilization			5 days	Fri 4/1/05	Thu 4/7/05	
m		Remove Office Complex & Equipment from site	from site	2 days	Fn 4/7/05	Mon 4/4/05	
[3]	Make Final Site Cleanup	Cleanup		4 days	Mon 4/4/05	Thu 4/7/05	
		Task		Milestone	*	Extr	External Tasks
Giani	Project:Grant Construction Schedule	Split	F F S S S S S S S S S S S S S S S S S S	Summary		P	External Miestone
		Progress		Project Summan	W. SERVICE CO.	1000	Deadine

### 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.
  - ✓ 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.

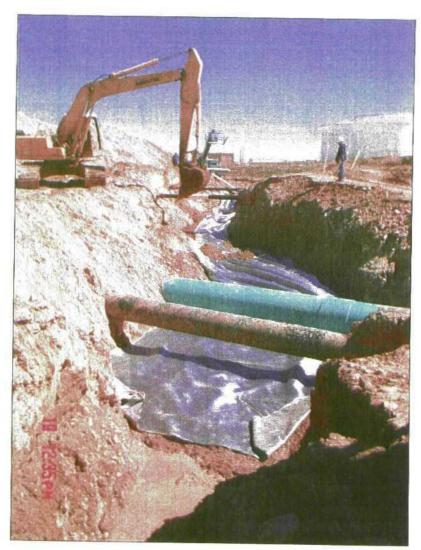
## 2. PLANNED ACTIVITIES

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.
  - ✓ 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.

# APPENDIX E

**Agency Correspondence on Barrier Construction Activities** 

### Randy Schmaltz

From:

Price, Wayne [WPrice@state.nm.us]

ent:

Friday, February 11, 2005 9:37 AM

o:

'Robinson, Kelly'; Price, Wayne; Foust, Denny; 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:

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,

On 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.

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### Randy Schmaltz

From:

Randy Schmaltz

ient:

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:

Chad King; David Kirby; Randy Schmaltz; Ed Riege; Cindy Hurtado; Tucker, Dennis;

jonbruton@san.rr.com

Subject:

RE: Weekly Status Report - North Boundary Barrier

#### Responses to OCD's concerns:

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.

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

fope_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,

on 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

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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.

2. 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 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 Page 1

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.

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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



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,
- 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 Monzeglio Project Leader

Hazardous Waste Bureau

Hope Monzeytto

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.

Dennis Tucker, P.E.

Senior Associate

Enclosure

Cc:

Wayne Price - OCD

is L. Jucke

Denny Foust - OCD Aztec Office

Bob Wilkinson - EPA

Ed Riege - Giant

Randy Schmaltz - Giant

Dave Cobrain - NMED

# 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

	INTRODUCTION 1  PURPOSE 1.1.1 Purpose of North Boundary Barrier 1.1.2 Purpose of Fluids Collection System 1  FACILITY DESCRIPTION 1  BACKGROUND SUMMARY 1  RELATIONSHIP OF PARTIES 1
2.0	NORTH BOUNDARY BARRIER CONSTRUCTION
_	CONSTRUCTION MONITORING ACTIVITES, REPORTS, AND MEETINGS  BARRIER CONSTRUCTION SEQUENCE
3.0	FLUIDS COLLECTION SYSTEM
3.3 3.4 3.5 3	COLLECTION SYSTEM WORK PLAN       3         WELL CONSTRUCTION AND INSTALLATION       3         .2.1 Collection Wells       3         .2.2 Observation Wells       3         SURVEYING       3         WELL DEVELOPMENT       3         BASELINE MONITORING       3         5.1 Fluid Levels       3         5.2 Groundwater Sampling       3         PERFORMANCE MONITORING PLAN       3
	LIST OF FIGURES
Figur	es Description
1	Observation and Collection Well Location Map
2	Fluids Profile along Barrier Alignment
	LIST OF TABLES
Table	s 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



BILL RICHARDSON GOVERNOR

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www.nmenv.state.nm.us



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 Monzeglio

Hope Manzatio

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

#### 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

Dear Cindy Hurtado:

Order No.: 0502121

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



## Hall Environmental Analysis Laboratory

Date: 16-Feb-05

CLIENT:

San Juan Refining

Client Sample ID: 0'-300'

Lab Order:

0502121

Collection Date: 2/9/2005 3:50:00 PM

Project:

Stockpile

Lab ID:

0502121-01

Matrix: SOIL

Analyses	Result	PQL Q	ual Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANG					Analyst: SCC
Diesel Range Organics (DRO)	17.7	10	mg/Kg	1	2/14/2005 8:11:24 PM
Motor Oil Range 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 8015B: GASOLINE RA	NGE				Analyst: NSB
Gasoline Range Organics (GRO)	280	50	mg/Kg	10	2/14/2005 5:37:34 PM
Surt. BFB	118	78.3-120	%REC	10	2/14/2005 5:37:34 PM

- * Value exceeds Maximum Contaminant Level
- S Spike Recovery outside accepted recovery limits
- R RPD outside accepted recovery limits
- E Value above quantitation range

B - Analyte detected in the associated Method Blank

# Hall Environmental Analysis Laboratory

Date: 16-Feb-05

CLIENT:

San Juan Refining

0502121

Client Sample ID: 300'-600'

Lab Order:

Stockpile

Collection Date: 2/10/2005 2:00:00 PM

Project: Lab ID:

0502121-02

Matrix: SOIL

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE O					Analyst: SCC
Diesel Range Organics (DRO)	68	10	mg/Kg	1	2/14/2005 8:41:00 PM
Motor Oil Range 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 RANGI					Analyst: NSB
Gasoline Range 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

B - Analyte detected in the associated Method Blank

^{* -} Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

# Hall Environmental Analysis Laboratory

Date: 16-Feb-05

CLIENT:

San Juan Refining

0502121

Lab Order: Project:

Stockpile

Lab ID:

0502121-03

Client Sample ID: 600'-900'

Collection Date: 2/10/2005 2:15:00 PM

Matrix: SOIL

Analyses	Result	PQL	Qual U	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANG	E ORGANICS					Analyst: SCC
Diesel Range Organics (DRO)	150	10	n	ng/Kg	1	2/14/2005 9:11:20 PM
Motor Oil Range Organics (MRO)	ND	50	n	ng/Kg	1	2/14/2005 9:11:20 PM
Surr: DNOP	104	60-124	9,	%REC	1	2/14/2005 9:11:20 PM
EPA METHOD 8015B: GASOLINE RA	NGE		-			Analyst: NSB
Gasoline Range Organics (GRO)	78	25	п	ng/Kg	5	2/15/2005 9:58:39 AM
Surr. BFB	114	78.3-120	وه	%REC	5	2/15/2005 9:58:39 AM

* - Value exceeds Maximum Contaminant Level

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

San Juan Refining 0502121 Stockwile

CLIENT:

Work Order: Project:

Date: 16-Feb-05

QC SUMMARY REPORT

Method Blank

Project: Stockpile	ile										
Sample ID MB-7412 Cllent ID:	Batch ID: 7412	Test Code Run ID:	est Code: SW8015 Units: tun ID: FID(17A) 2_050214A	Units: mg/Kg 50214A		Analysis SeqNo:	Analysis Date 2/14/2005 12:11:43 PM SeqNo: 339696	2:11:43 PM	Prep Da	Prep Date 2/14/2005	
Analyte	Result	POL	SPK value	SPK value SPK Ref Val	%REC	LowLimit	%REC LowLimit HighLimit RPD Ref Val	Ref Val	%RPD	%RPD RPDLImit	Qual
Diesel Range Organics (DRO) Motor Oil Range Organics (MRO) Surr: DNOP	) ND RO) ND 9.768	10 50 0	10	0	7.78	09	124	0			1
Sample ID MB-7411 Cilent ID:	Batch ID: 7411	Test Code: Run ID:	est Code: SW8015 Un tun ID: PIDFID_050214A	Units; mg/Kg :14A		Analysis SeqNo:	Analysis Date 2/14/2005 3:37:41 PM SeqNo: 339601	:37:41 PM	Prep Da	Prep Dale 2/11/2005	
Analyte	Result	Pol	SPK value	SPK value SPK Ref Val	%REC	LowLimit	%REC LowLimit HighLimit RPD Ref Val	Ref Val	%RPD	%RPD RPDLimit	Qual
Gasolina Range Organics (GRO) Surr: BFB	RO) ND 1042	15 C	1000	0	104	78.3	120	0		:	

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

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

B - Analyte detected in the associated Method Blank

Hall Environmental Analysis Laboratory

 OC SIMMARY REPORT		Laboratory Control Spike - Benefic
San Juan Refining	0502121	Stockpile
CLIENT:	Work Order:	Project:

Sample ID LCS-7412	Batch ID: 7412	Test Code: SW8015	SW8015	Units: mg/Kg		Analysis	Date 2/14/2	Analysis Date 2/14/2005 12:42:24 PM	Prep Date 2/14/2005	/14/2005	1
Client ID:		Run ID:	FID(17A) 2_050214A	50214A		SeqNo:	339697				
Analyte	Result	Pal	SPK value	SPK Ref Val	"REC	LowLimit	LowLimit HighLimit RPD Ref Val	RPD Ref Val	%RPD RPI	RPDLimit	Qual
Diesel Range Organics (DRO)	54.31	10	50	0 .	鲁	67.4	117	0			
Sample ID LCSD-7412	Batch ID: 7412	Test Code: SW8015	SW8015	Units: mg/Kg		Analysis	Date 2/14/2	Analysis Date 2/14/2005 1:12:18 PM	Prep Date 2/14/2005	114/2005	
Client ID:		Run ID:	FID(17A) 2_050214A	50214A		SeqNo:	339699				
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD RP	RPDLimit	Qual
Diesel Range Organics (DRO)	45.33	5	50	0	90.7	67.4	117	54,31	18,0	20	
Sample ID LCS-7411	Batch ID: 7411	Test Code:	est Code: SW8015	Units: mg/Kg		Analysis	Date 2/14/2	Analysis Date 2/14/2005 4:07:36 PM	Prep Date 2/11/2005	2/11/2005	
Client ID:		Run 10:	PIDFID_050214A	14A		SeqNo:	339602	Α.			
Analyte	Result	Pa	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD RP	RPDLImit	Qual
Gasoline Range Organics (GRO)	(28.01	co.	25	0	112	25	120	0		:	
Sample ID GRO std 2.5ug	Batch ID: 7411	Test Code: SW8015	SW8015	Units: mg/Kg		Analysis	Date 2/15/2	Analysis Date 2/15/2005 10:28:29 AM	Prep Date		
Client ID:		Run (D:	PIDFID_050215A	15A		SeqNo:	340005	in			
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD RP	RPDLimit	Qual
Gasoline Range Organics (GRO)	77.22 (C	Ω.	25	0	95.1	84	120	0		:	

## Sample Receipt Checklist

Client Name SJR				Date and Time	Received:	2/	11/2005
Work Order Number 0502121				Received by	AT		
Observing assemble 11							
Checklist completed by Signature			Date		<del></del>		
Malrix	Carrier name	UPS					
			•				
Shipping container/cooler in good condition?		Yes	V	No 🗆	Not Present		
Custody seals intact on shipping container/cool	er? .	Yes		No 🗆	Not Present	Not Shipped	$\mathbf{\nabla}$
Custody seals intact on sample bottles?		Yes	$\checkmark$	No 🗆	N/A		
Chain of custody present?		Yes	$\mathbf{V}$	No 🗀			
Chain of custody signed when relinquished and	received?	Yes	$\mathbf{\nabla}$	No 🗆		•	
Chain of custody agrees with sample labels?		Yes	abla	No 🗆			
Samples in proper container/bottle?		Yes	$\checkmark$	No 🗆			
Sample containers intact?		Yes	$\checkmark$	No 🗆			
Sufficient sample volume for indicated test?		Yes	V	No 🗆			
All samples received within holding time?		Yes	$\overline{\mathbf{v}}$	No 🗆			
Water - VOA vials have zero headspace?	No VOA vials subπ	ilted	$ \mathbf{Z} $	Yes 🗌	No 🗆		
Water - pH acceptable upon receipt?		Yes		No 🗆	N/A 🗹		
Container/Temp Blank temperature?				4° C ± 2 Accepta	ble		
				If given sufficient	time to cool.		
COMMENTS:							
Client contacted	Date contacted:			Perso	n contacted	 	
Contacted by:	Regarding					 	
Comments:							
							•
Corrective Action							
	······································			· · · · · · · · · · · · · · · · · · ·		,	

	HALL ENVIRONMENTAL ANALYSIS I ABODATODY	4901 Hawkins NE. Suite D	Albuquerque, New Mexico 87109 Tal. 505,345,3975 Fax 505,345,4107	www.hallenvironmental.com	ANALYSIS REQUEST	(A)	(les (les (log)	esiO\ae	4,1) H) H)	+ 38 FOB L OG bo SOB bo SOB bo SOB bo SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SOB DO SO	+ Mitcha Metha Metha Metha (PNA 8 Metha 8 Metha 15, CF, C 9 (F, C 9 (F, C 16, C	### ### ### ### ### ### ### ### #### ####		X						Remarks:	
Accreditation Applied.	NELAC U USACE	Other:	Project Name:	Stock Pile	Project #:		Project Manager:		Sampler. Pandy, Schmaltz	indy StufTADO	Presavative	Numberyvolume HgCl ₂ HNO ₃ HEAL No.	1-40xx	2- //	7					Received By: (Signature)	
		CHAIN-UT-CUS I UD Y RECORD	Clent: SAN Juan Refining		Address: # 50 RI 4990	Bloomfield NM 89413			Phone #:505-632-4161	FBX#: 505-632-3911	Bits Imo Marie Commission		2/09/05/330p 50il 0'to 300"	3/10/05 200p 300' to 600'	340/05 215p 1 600' to 900'					 3/p/05 2402 (www. Hunter) Date: Time: Relinquished By: (Signature)	

r f



### **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



CLIENT:

San Juan Refining

Lab Order: Project: 0502235

Stockpile

Lab ID:

0502235-01

Date: 04-Mar-05

Client Sample ID: 900'-1200'

Collection Date: 2/22/2005 2:45:00 PM

Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANG	SE ORGANICS					Analyst: SCC
Diesel Range Organics (DRO)	£11.7	10		mg/Kg	1	3/3/2005 3:39:53 AM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	3/3/2005 3:39:53 AM
Surr: DNOP	109	60-124		%REC	1	3/3/2005 3:39:53 AM
EPA METHOD 8015B: GASOLINE RA	ANGE					Analyst: NSB
Gasoline Range Organics (GRO)	40 7	5.0		mg/Kg	1	2/28/2005 10:52:08 PM
Surr: BFB	119	78.3-120		%REC	1	2/28/2005 10:52:08 PM
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	2/28/2005 10:52:08 PM
Toluene	ND	0.025		mg/Kg	1	2/28/2005 10:52:08 PM
Ethylbanzene	ND	0.025		mg/Kg	1	2/28/2005 10:52:08 PM
Xylenes, Total	0.50	0.025		mg/Kg	1	2/28/2005 10:52:08 PM
Surr: 4-Bromofluorobenzene	93.8	87.4-116		%REC	1	2/28/2005 10:52:08 PM

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

Date: 04-Mar-05

CLIENT: San Juan Refining Work Order: 0502235 Project: Stockpile	Refining							QC SUM	QC SUMMARY REPORT  Method Blank	IRT Ilank
Sample ID MB-7480 Cilent ID:	Batch ID: 7480	Test Code: SW8015 Run ID: FID(17A)	SW8015 Units: FID(17A) 2_050225A	Units: mg/Kg 50225A		Analysis SeqNo:	Date 2/25/20 341574	Analysis Date 2/25/2005 8:20:27 AM SeqNo: 341574	Prep Dale 2/24/2005	
Analyte	Result	PaL	SPK value	SPK Ref Val	%REC	LowLimit	LowLimit HighLimit RPD Ref Val	RPD Ref Val	%RPD RPDLimit	Qual
Diesel Range Organics (DRO) Motor Oll Range Organics (MRO) Surr. DNOP	UD UD 9.539	05 0	10	0	95.4	09	124	O		:
Sample ID MB-7477 Client ID:	Batch ID: 7477	Test Code: Run ID:	rest Code: SW6015 U	Units: mg/Kg 28A		Analysis SeqNo:	Date 2/28/20 341948	Analysis Date 2/28/2005 8:22:47 PM SeqNo: 341848	Prep Dale 2/24/2005	
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	LowLimit HighLimit RPD Ref Val	RPD Ref Val	WRPD RPDLIMI	Qual
Gasoline Range Organics (GRO) Surr: BFB	ON ()	ru O	1000	0	97.8	78.3	120	0		: į
Sample ID MB-7477 Client ID:	Batch ID: 7477	Test Code: SW8021 Run ID: PIDFID	SW8021 U	Units: mg/Kg 28A		Analysis SeqNo:	Date 2/28/20 341961	Analysis Date 2/28/2005 8:22:47 PM SeqNo: 341961	Prep Date 2/24/2005	
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RPD Ref Val	RPD Ref Val	%RPD RPDLimit	Qual
Methyl tert-butyl ather (MTBE) Benzene Toluene Eihylbenzene Xylenes, Total Surr: 4-Bromofluorobenzene	ON ON ON ON ON ON ON ON	0.1 0.025 0.025 0.025 0.025	<b></b>		97.2	87.4	116	0		; ; !

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

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

B - Analyte detected in the associated Method Blank

QC SUMMARY REPORT

# Hall Environmental Analysis Laboratory

San Juan Refining 0502235 CLIENT: Work Order:

Work Order: 0502235 Project: Stockpile				-				Laboratory Control Spike - generic	Control Sp	pike - gen	eric
Sample ID LCS-7480 Client ID:	Batch ID: 7480	Test Code: SW8015 Run ID: FID(17A)	SW8015 Units: FID(17A) 2 050225A	Units: mg/Kg 50225A		Analysis SeqNo:	Date 2/25/20	Analysis Dale 2/25/2005 8:51:03 AM SeqNo: 341581	Prep Date	Prep Date 2/24/2005	
Analyte	Result	PQL	SPK value	SPK value SPK Ref Val	%REC	LowLimit	LowLimit HighLimit RPD Ref Val	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	52.98	10	50	0	106	67.4	117	0			İ
Sample ID LCSD-7480 Client ID:	Balch ID: 7480	Test Code: SW8015 Run ID: FID(17A)	: SW8015 Units: FID(17A) 2_050225A	Units: mg/Kg 50225A		Analysis SeqNo:	. Date 2/25/20 341585	Analysis Data 2/25/2005 9:20:39 AM SeqNo: 341585	Prep Date	Prep Date 2/24/2005	l
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	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	Test Code; SW8015	Units: mg/Kg		Analysis	3 Date 2/28/2	Analysis Date 2/28/2005 8:52:42 PM	Prep Date	Prep Date 2/24/2005	
		Run 10:	PIDFID_050228A	128A		SeqNo:	341949	<b>a</b>			
Analyte	Result	Pa	SPK value	SPK Ref Val	%REC	LowLimit		HighLimit RPD Ref Val	%RPD	RPOLimit	Quai
Gasoline Range Organics (GRO)	5) 24.7	S	25	0	98.8	84	120	0			,
Sample ID LCS-7477	Batch ID; 7477	Test Code	ist Code; SW8021	Units: mg/Kg		Analysis	5 Date 2/28/2	Analysis Date 2/28/2005 8:52:42 PM	Prep Dat	Prep Date 2/24/2005	
Client ID:		Run (D:	PIDFID_050228A	128 <b>A</b>		SeqNo:	341962	2			
Analyta	Result	Po	SPK value	SPK Ref Vai	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	0.3979	0.025	0.41	0	97.1	83.4	113	0		:	
Toluene	1.986	0.025	1.9	0	105	86.3	118	0			
Elhylbenzene	0.3774	0.025	0.4	0	94.3	81.7	113	0			
Xylenes, Total	1.991	0.025	1.9	0	105	86.9	112	a			

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

Sam	iple Receipt Cl	necklist		
Client Name SJR		Date and Tim	e Received:	2/24/2005
Work Order Number 0502235		Received b	y AT	
Checklist completed by Signalure	Date	2/24/0	5	
Matrix Carrier na	me <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 🗹	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	submitted 🗹	Yes 🗆	No 🗆	
Water - pH acceptable upon receipt?	Yes 🗌	No 🗆	N/A ☑	
Container/Temp Blank temperature?	2°	4° C ± 2 Accept		
COMMENTS:				
				=
Client contacted Date contacted:		Pen	son contacted	
Contacted by: Regarding			****	
Comments:				
		1		
			<del></del>	
			<del></del>	
Corrective Action				



### **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

Dear Cindy Hurtado:

Order No.: 0503084

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 Manager

Nancy McDuffie, Laboratory Manager



Date: 17-Mar-05

CLIENT:

San Juan Refining

Project:

Stockpile

Lab 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.

Date: 17-Mar-05

CLIENT:

San Juan Refining

Client Sample ID: 1500-1800

Lab Order:

0503084

Collection Date: 3/5/2005 2:20:00 PM

Project:

Stockpile

Lab ID:

0503084-01

Matrix: SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANG	E ORGANICS					Analyst: SCC
Diesel Range Organics (DRO)	15	10		mg/Kg	1	3/15/2005 1:36:38 PM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	3/15/2005 1:36:38 PM
Surr: DNOP	118	60-124		%REC	1	3/15/2005 1:36:38 PM
EPA METHOD 8015B: GASOLINE RA	NGE					Analyst NSB
Gasoline Range 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: NSB
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
Surr: 4-Bromofluorobenzene	123	87.4-116	S	%REC	1	3/10/2005 5:01:45 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

Date: 17-Mar-05

CLIENT:

San Juan Refining

Client Sample ID: 1800-2100

Lab Order:

0503084

Collection Date: 3/6/2005 2:30:00 PM

Project:

Stockpile

Lab ID:

0503084-02

Matrix: SOIL

Analyses	Result	PQL	Qunl	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE	ORGANICS					Analyst: SCC
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	3/15/2005 3:41:47 PM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	3/15/2005 3:41:47 PM
Surr: DNOP	113	60-124		%REC	1	3/15/2005 3:41:47 PM
EPA METHOD 8015B: GASOLINE RAN	IGE					Analyst: NSB
Gasoline Range Organics (GRO)	130	5.0		mg/Kg	1	3/10/2005 5:32:00 PM
Surr: 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-Bromofluorobenzene	116	87.4-116		%REC	1	3/10/2005 5:32:00 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

Date: 17-Mar-05

CLIENT:

San Juan Refining

Lab Order:

0503084

Stockpile

Project: Lab ID:

0503084-03

Client Sample ID: 2300-2600

Collection Date: 3/6/2005 2:00:00 PM

Matrix: SOIL

Analyses	Result	PQL	Qual	Unit <b>s</b>	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANG	E ORGANICS					Analyst: SCC
Diesel Range Organics (DRO)	ND	10	1	mg/Kg	1	3/15/2005 4:13:05 PM
Motor Oil Range Organics (MRO)	ИD	50	ı	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 RA	NGE					Analyst: NSB
Gasolina Range Organics (GRO)	7.4	5.0	1	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: NSB
Benzene	ND	0.025	ı	mg/Kg	1	3/10/2005 6:02:12 PM
Toluene	ND	0.025	1	mg/Kg	1	3/10/2005 6:02:12 PM
Ethylbenzene	ПN	0.025	i	mg/Kg	1	3/10/2005 6:02:12 PM
Xylenes, Total	0.079	0.025	1	mg/Kg	1	3/10/2005 6:02:12 PM
Surr: 4-Bromofluorobenzene	113	87.4-116		%REC	1	3/10/2005 6:02:12 PM

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

	San Juan Refining	fining							QC SUMMARY REPORT	MAR	Y REPO	RT
work Order: Project:	0503084 Stockpile			ļ	3						Method Blank	lank
Sample ID MB-7553 Client ID:		Batch (D: 7553	Test Code:	Code: SW8015 Units: ID: FID(17A) 2 050310A	Units: mg/Kg 50310A		Analysis SeqNo:	Date 3/11/20	Analysis Date 3/11/2005 7:12:31 PM SeqNo: 344498	Prep Da	Prep Date 3/10/2005	
Analyte		Result		SPK value	SPK value SPK Ref Val	%REC	LowLimit	HighLimit	WREC LowLimit HighLimit RPD Ref Val	%RPD	%RPD RPDLimit	Qual
Diesel Range Organics (DRO) Motor Oil Range Organics (MRO) Surr: DNOP	ilcs (DRO) janics (MRO)	DN DN 779.8	0 0 0	10	0	99.8	90	124	0			<u>:</u>
Sample ID MB-7545 Client ID:		Batch ID: 7545	Test Code; SW8015 Run ID: PIDFID_	SW8015 U	Units: mg/Kg		Analysis SeqNo:	. Date 3/10/20 343992	Analysis Date 3/10/2005 3:30:27 PM SeqNo: 343992	Prep Da	Prep Date 3/9/2005	
Analyte		Result	Pal	SPK value	SPK value SPK Ref Val	%REC	LowLimit	HighLimll	%REC LowLimit HighLimit RPD Ref Val	%RPD	%RPD RPDLimit Qual	Qual

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

Gasoline Range Organics (GRO) Sur: BFB Oual

%RPD RPDLimit

LowLimit HighLimit RPD Ref Val

%REC

SPK value SPK Ref Val

Б

Result

PIDFID_050310A

Run ID:

0

116

87.4

99.1

0

0.025

Xylenes, Total Surr: 4-Bromofluorobenzene

Ethylbenzene

0.025

ON ON ON ON ON O.9907

0.025

Prep Date 3/9/2005

Analysis Date 3/10/2005 3:30:27 PM

Units: mg/Kg

Test Code: SW8021

Batch ID: 7545

Sample ID MB-7545

Client ID: Analyte Benzene Toluene

343960

SeqNo:

0

120

78.3

94.6

0

1000

**S** C

ND 946.3

CLIENT: San Juan Refining Work Order: 0503084	Refining						QC SI Laborato	UMIMA ry Contr	QC SUMMARY REPORT Laboratory Control Spike - generic	ORT eneric
Sample ID LCS-7553	Batch ID: 7553	Test Code: SW8015	SW8015	Units: mg/Kg		Analysis	Analysis Date 3/11/2005 7:42:07 PM		Prep Date 3/10/2005	05
Client ID:		Run ID:	FID(17A) 2_050310A	50310A		SeqNo:	344499			
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RPD Ref Val	%RPD	2D RPDLimit	Qual
Diesel Range Organics (DRO)	51.43	10	50	O	103	67.4	117 0			
Sample ID LCSD-7553	Batch ID: 7553	Test Code:	est Code: SW8015	Units: mg/Kg		Analysk	Analysis Date 3/15/2005 1:05:20 PM		Prep Date 3/10/2005	0.5
Client (D:		Run ID:	FID(17A) 2_050315A	50315A		SeqNo:	344580			
Analyte	Result	Po	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RPD Ref Val	%R	%RPD RPDLIMI	Qual
Diesel Range Organics (DRO)	57.01	10	50	0	114	67.4	117 51.43	<del>-</del>	10.3 17.4	
Sample ID LCS-7545	Batch ID: 7545	Test Code: SW8015	SW8015	Units: mg/Kg		Analysi	Analysis Date 3/10/2005 4:00:50 PM		Prep Date 3/9/2005	25
Client ID:		Run ID:	PIDFID_050310A	10A		SeqNo:	343993			
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RPD Ref Val	%RPD	D RPDLimit	Qual
Gasoline Range Organics (GRO)	) 24.13	co.	25	0	96.5	84	120 0	u 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1 tabe 1, 1		
Sample ID LCSD-7545	Batch ID: 7545	Test Code: SW8015	SW8015	Units: mg/Kg		Analysi	Analysis Date 3/10/2005 4:31:17 PM		Prep Date 3/9/2005	15
Client ID:		Run ID:	PIDFID_050310A	10A		SedNo:	343994			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RPD Ref Val	%R	%RPD RPDLimit	Qual
Gasoline Range Organics (GRO)	24.97	5	25	0	99.9	84	120 24.13	E	3.42 11.6	:
Sample ID GRO los 2.5ug Client ID:	Batch ID: 7545	Test Code: SW8015 Run ID: PIDFID_(	SW8015 U	Units: mg/Kg 11A		Analysis SeqNo:	Analysis Date 3/11/2005 3:53:36 PM SeqNo: 344199		Prep Date	

6/8

ND - Not Detected at the Reporting Limit

Qualifiers:

J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits

B - Analyre detected in the associated Method Blank

R - RPD outside accepted recovery limits

_

Oual

%RPD RPDLimit

%REC LowLimit HighLimit RPD Ref Val

SPK value SPK Ref Val

ם

Result

Gasoline Range Organics (GRO)

Analyte

25

120

84

90.2

San Juan Refining OC SUMMARY REPORT	•	tockpile	
CLIENT: San Juan	Work Order: 0503084	Project: Stockpile	

Sample ID LCS-7545	Batch ID: 7545	Test Code:	est Code: SW8021	Units: mg/Kg		Analysis	Date 3/10/	Analysis Date 3/10/2005 4:00:50 PM	Prep Da	Prep Date 3/9/2005	
Client ID;		Run ID:	PIDFID_050310A	10A		SeqNo:	343962	Ċ,			
Analyte	Result	PaL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Oual
Benzene	0.4062	0.025	0.42	0	7.96	83.4	113	0			
Toluene	2.083	0.025	1.9	0	110	86.3	118	0			
Ethylbenzene	0.3847	0.025	0.41	0	93.8	81.7	113	0			
Xylenes, Total	2.005	0.025	1.9	0	108	86.9	112	0			
Sample ID LCSD-7545	Batch ID: 7545	Test Code: SW8021	SW8021	Units: mg/Kg		Analysis	Date 3/10/	Analysis Date 3/10/2005 4:31:17 PM	Prep Da	Prep Date 3/9/2005	
Client ID:		Run ID:	PIDFID_050310A	10A		SeqNa:	343969	6			
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
Вепzеле	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	5	
Xylenes, Total	1.967	0.025	1,9	0	104	86.9	112	2.005	1.89	13	
Sample ID BTEX Ics 100ng	Batch ID: 7545	Test Code	Test Code: SW8021	Units: mg/Kg		Anafysis	Date 3/11/	Analysis Date 3/11/2005 4:23:49 PM	Prep Date	ale	
Client ID:		Run (D:	PIDFID_050311A	11A		SeqNo:	344196	96			
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	LowLimit HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	1.013	0.025	-	0	101	83.4	113	0	ĺ		
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	n	G	101	86.9	112	O			

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

	Sample	Rece	eipt Ch	ecklist				
Client Name SJR				Date and Time	Received:		3	3/8/2005
Work Order Number 0503084	$\cap$			Received by	AT			
Checklist completed by Signature	)(	- [	Dale	31810	<u> </u>			
Matrix	Carrier name	Clien	l drop-ol	<u>II</u>				
Shipping container/cooler in good condition?		Yes	V	No 🗆	Not Present			
Custody seats intact on shipping container/cooler	?	Yes		No 🗆	Not Present		Not Shipped	V
Custody seals intact on sample bottles?		Yes		No 🗹	N/A			
Chain of custody present?		Yes	$\checkmark$	No 🗆				
Chain of custody signed when relinquished and re	eceived?	Yes	$ \mathbf{\nabla}$	No 🗆				
Chain of custody agrees with sample labels?		Yes	$\checkmark$	No 🗆				
Samples in proper container/bottle?		Yes	$ \mathbf{V} $	No 🗆				
Sample containers intact?		Yes	$ \mathbf{Z} $	No 🗆				
Sufficient sample volume for indicated test?		Yes	$ \mathbf{Z} $	No 🗆				
All samples received within holding time?		Yes	$oldsymbol{ olimits}$	No 🗆				
Water - VOA vials have zero headspace?	No VOA vials subm	nitted		Yes 🗹	No 🗆			
Water - pH acceptable upon receipt?		Yes		No 🗆	N/A ☑			
Container/Temp Blank temperature?		3	3°	4° C ± 2 Acceptable If given sufficient I				
COMMENTS:								
		Version testific			·			
Client contacted	Date contacted:			Perso	n contacted			
Contacted by:	Regarding							<del></del>
Comments:						··· <u></u>		
		······						<del></del>
Corrective Action								

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	oesoline Only (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\si (lassiO\	+ TPH (68/9)	TEX + MTBE TEX + MTBE TH Method 8 TO (Method 6 TO (Method 6 TO (Method 6 TO (Method 6 TO (Method 6 TO (Method 6 TO (Gemi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-V TO (Semi-	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	X	X					Remarks:
Accreditation Applied:  NELAC ID USAGE ID  Other:  Project Name:  Sfack Pile	Project #:	Project Manager:	Sampler Randy Schmoltz.	Number/Volume HgCl., HND.,	1-40m 05050841	1	5	<b>1</b>				Received By: (Signature)
CHAIN-OF-CUSTODY RECORD  Client: SAN Juan Refining	Address: 50 Road 4990 Gloom Field, NM	87413	Phone #: 505-632-4161 Fax #: 505-622-2911	Clate Time Matrix Sample I.D. No.		230pm	3/04/05 2002/600				2/Pate/nc Time: Refinduished By: (Signature)	Date: Time: Relinquished By: (Signature)



### **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



CLIENT:

San Juan Refining

Lab Order:

Project: Lab ID: 0503184

Stockpile

0503184-01

Date: 24-Mar-05

Client Sample ID: 2100'-2300'

Collection Date: 3/16/2005 9:00:00 AM

Matrix: SOIL

Analyses	Result	PQL Q	ual Units	DF	Date Analyzed
EPA METHOD 418.1: TPH					Analyst: JT
Petroleum Hydrocarbons, TR	ND	20	mg/Kg	1	3/21/2005
EPA METHOD 8021B: VOLATILES					Analyst: NSB
Methyl tert-butyl ether (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	ND	0.025	mg/Kg	1	3/23/2005 8:13:18 PM
Ethylbenzene	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-Bromofluorobenzene	110	87.4-116	%REC	1	3/23/2005 8:13:18 PM

B - Analyte detected in the associated Method Blank

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

San Juan Refining 0503184 Work Order: CLIENT:

Stockpile

Project:

Date: 24-Mar-05

Method Blank QC SUMMARY REPORT

Sample ID MB-7613	Batch (D: 7613	Test Code: E418.1	E418.1	Units: mg/Kg		Analysis	Analysis Date 3/21/2005	Prep Date 3/21/2005	
Client ID:		Run ID:	BUCK IR_050321A	0321A		SeqNo:	346101		
Analyte	Result	PaL	SPK value	PQL SPK value SPK Ref Val	%REC	LowLimit	%REC LowLimit HighLimit RPD Ref Val	¥	Qual
Petroleum Hydrocarbons, TR	QN	20							
Sample ID MB-7609	Batch ID: 7609	Test Code: SW8021	SW8021	Units: .mg/Kg		Analysis	Analysis Date 3/23/2005 10:42:54 AM	Prep Date 3/21/2005	
Cllent ID:		Run ID:	PIDFID_050323A	123A		SeqNo:	346735		
Analyte	Result	Pol	SPK value	SPK value SPK Ref Val	%REC	LowLimit	%REC LowLimit HighLimit RPD Ref Val	%RPD RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	QN	0.1					A THE RESIDENCE AND THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY O		
Benzene	Q	0.025							
Toluene	Q	0.025							
Elhylbenzene	ᄝ	0.025							
Xylenes, Total	Q	0.025							

0

116

87.4

103

0

0

1.03

Surr: 4-Bromofluorobenzene

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

Qualifiers:

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

B - Analyte detected in the associated Method Blank

San Juan Refining 0503184 CLIENT:

Work Order:

Stockpile Project:

Laboratory Control Spike - generic

QC SUMMARY REPORT

Sample ID LCS-7613	Batch ID: 7613	Test Code: E418.1	E418.1	Units: mg/Kg		Analysis	Date	ę,	Prep Da	Prep Date 3/21/2005	
Client ID:		Run (D:	BUCK IR_050321A	J321A		SeqNo:	346102				
Analyte	Result	Pa	SPK value	SPK value SPK Ref Val	%REC	LowLimit	%REC LowLimit HighLimit RPD Ref Val	'D Ref Val	%RPD	RPDLimit	Qual
Petroleum Hydrocarbons, TR	92	20	100	0	92.0	82	114	0			
Sample ID LCSD-7613	Batch ID: 7613	Test Code: E418.1	E418.1	Units: mg/Kg		Analysis	Analysis Date 3/21/2005	ž.	Prep Da	Prep Date 3/21/2005	
Client ID;		Run ID:	BUCK IR_050321A	0321A		SeqNo:	346105				
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	LowLimit HighLimit RPD Ref Val	ነዐ Ref Vai	%RPD	RPDLimit	Qual
Petroleum Hydrocarbons, TR	66	20	100	0	0.66	82	114	92	7.33	20	
Sample ID LCS-7609	Batch ID: 7609	Test Code: SW8021	SW8021	Units: mg/Kg		Analysis	Analysis Date 3/23/2005 11:12:58 AM	15 11:12:58 AM	Prep Dz	Prep Date 3/21/2005	
Client ID:		Run ID:	PIDFID_050323A	123A	•	SeqNo:	346736				
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RPD Ref Val	O Ref Val	%RPD	RPDLimit	Qual
Вепzепе	0.4093	0.025	0.42	0	97.5	83.4	113	. 0			:
Toluene	2.071	0.025	1.9	o	109	86.3	118	0			
Ethylbenzene	0.4053	0.025	0.41	0	98.9	81.7	113	0			
Xylenes, Total	1.998	0.025	1.9	0	105	86.9	112	0			

ND - Not Detected at the Reporting Limit

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

Qualifiers:

J - Analyte detected below quantitation limits

3/4

Sa	mple Receipt Cl	hecklist		
Client Name SJR	·	Date and Time F	Received:	3/18/2005
Work Order Number 0503184		Received by	AT	
Checklist completed by Signature Checklist	Date	3(18)	105	
Matrix Carrier n	ame <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 🗹	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	submitted 🗹	Yes 🗌	No 🗆	
Water - pH acceptable upon receipt?	Yes 🗆	No 🗆	N/A 🗹	
Container/Temp Blank temperature?	1°	4° C ± 2 Acceptable of given sufficient to		
COMMENTS:				
Client contacted Date contacted	:	Person	contacted	
Contacted by: Regarding			· · · · · · · · · · · · · · · · · · ·	
Comments:				
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Corrective Action			·	······································

LAIL ENNZOONIMENITAL	ANALYSIS LABORATORY 4901 Hawkins NE, Suite D	Albuquerque, New Mexico 87109 Tel FOR 24K 2075	ww.hallenvironmental.com	ANALYSIS REQUEST		353	3 (808)	bcB. ² NO ⁵ 1 H)	.08 b ale. ale. ON , (sabii (AOV-	Metho (PNA B 8 Met 5 (F, Cl 7 Cl 7 Cl 7 Cl 7 Cl 7 Cl 7 Cl 7 Cl	EDC (6 8310 8081 8081 8250								
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	CHAIN-OF-CUSTODY RECORD	Client: As Train Rolling		Address: #50 R1 4991)	Bloomfeld, NW	87413		Phone #505- 632-4161	Fax#: 505-633-3911			3/16/05 9AM Soil 2100-2300						ette: Ima: Balfanlished Br. fc:h.f-ch)	3/7/05 "Am Landon by. (Signature)

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# APPENDIX G

North Boundary Barrier Collection System Design and Monitoring Plan and Agency Correspondence



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.

## Design Concept for Collection and Monitoring System

Based on the hydraulic properties and limited saturation of the shallow soils (i.e., Jackson 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

FO. BOX 159
BLOOMFIELD
NEW MEXICO

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 to 150 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.

### 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.

## 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,

7...

GIANT REFINING COMPANY

James R. Schmaltz

Environmental Manager

Denny Foust - OCD Aztec Office cc:

Hope Monzeglio – NMED Hazardous Waste Bureau

Bob Wilkinson – EPA

Ed Riege

Chad King



# 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.
- 2. 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,

1)

James R. Schmaltz

Environmental Manager

GIANT REFINING CÓMI

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



### CERTIFIED MAIL # 7099 3220 0010 2242 4740

April 7, 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 – 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 25th 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

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 to 14 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

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

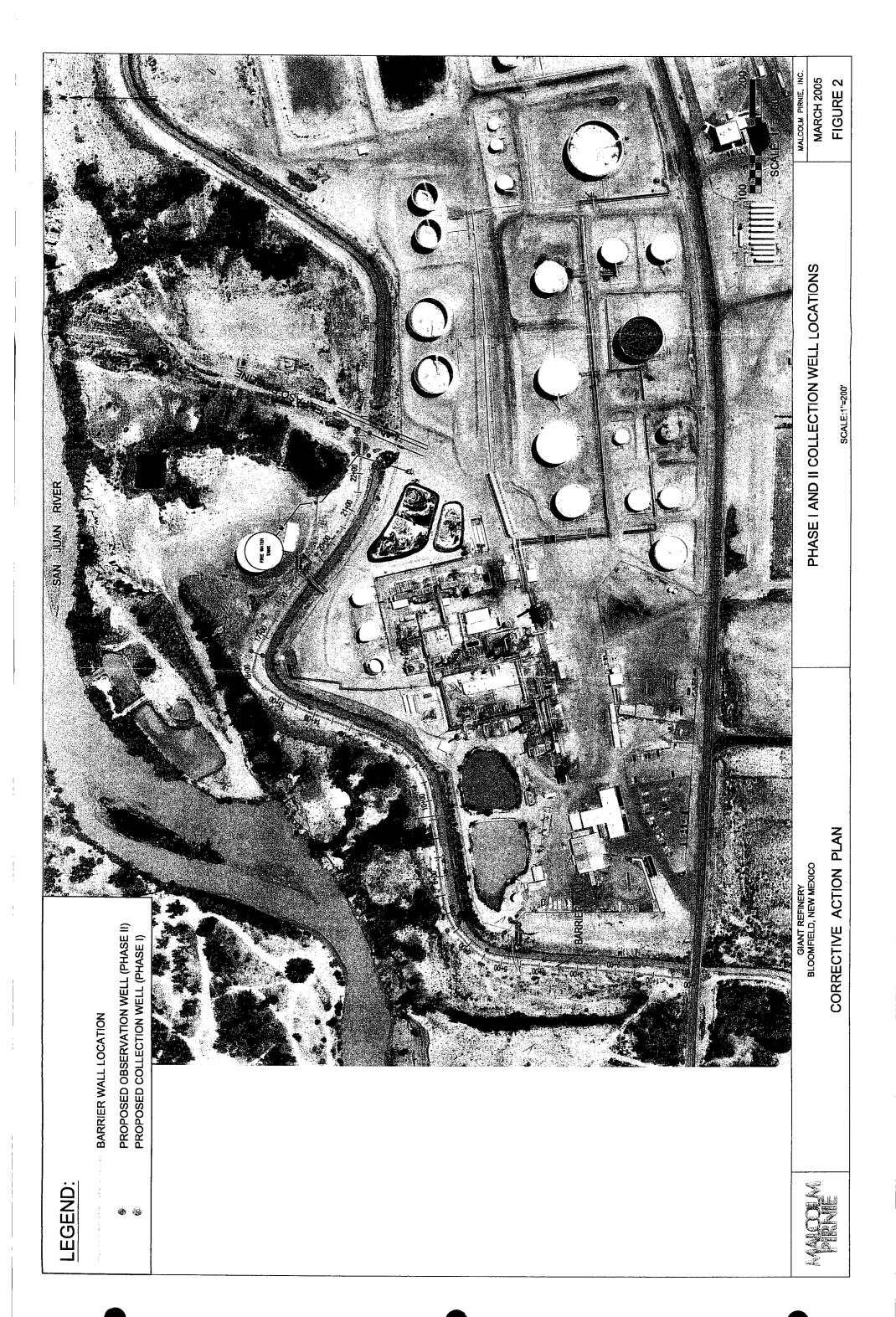
Cc: Denny Foust - OCD Aztec Office

Wayne Price - OCD

Bob Wilkinson – EPA

Ed Riege

Chad King





MARCH 2005 FIGURE 3

SCALE: 1" = 200'

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NACIMIENTO SURFACE PROFILE

GIANT REFINERY BLOOMFIELD, NEW MEXICO COLLECTION SYSTEM PLAN





#### 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



RON CURRY SECRETARY

DERRITH WATCHMAN-MOORE
DEPUTY SECRETARY

# CERTIFIED MAIL RETURN RECEIPT REQUESTED

www.nmenv.state.nm.us

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 Manza Go

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.

If you need additional information, please contact me at (505) 632-4161.

Sincerely,

Cindy Hurtado

**Environmental Coordinator** 

Giant Refining - Bloomfield

Cc: Ed Riege – Environmental Superintendent – Giant Refining Randy Schmaltz – Environmental Manager – Giant Refining

PHONE 505-632-8013 FAX ORIGINAL DOCUMENT LOCATED IN BARRIER WAR COLLECTION SYSTEM FILE

50 ROAD 4990 P.O. BOX 159 BLOOMFIELD

#### Robinson, Kelly

From:

Cindy Hurtado [churtado@giant.com]

Sent:

Monday, June 26, 2006 8:22 AM

To:

Robinson, Kelly

Subject:

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: krobinson@pirnie.com



# 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

GIANT W RESPOND

## CERTIFIED MAIL RETURN RECEIPT REQUESTED

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 Monzeglio Project Leader

Hazardous Waste Bureau

Hope Manseylio

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

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	<u>Conversion Factor</u>
6"	1.50 gal/ft
5"	1.02 gal/ft
4"	0.74 gal/ft
3"	0.367 gal/ft
2"	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,

Cindy Hurtado

Environmental Coordinator - Giant Refining - Bloomfield

Cc: Randy Schmaltz - Environmental Manager - Giant Refining - Bloomfield



#### 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 – 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,

Hope Monzeglio

1dope Marylis

Project Leader Hazardous Waste Bureau

HM

cc:

*D. Cobrain, NMED HWB

W. Price, OCD

D. Foust, OCD Aztec Office

B. Wilkinson, EPA

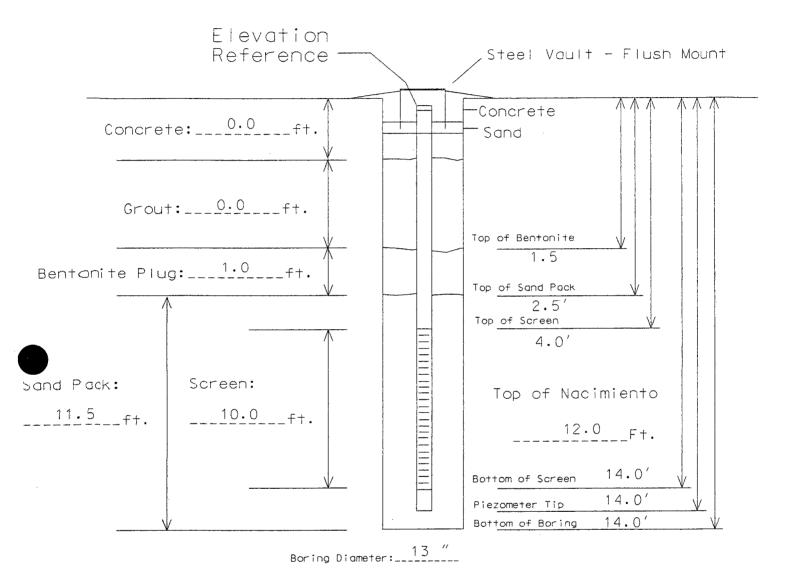
* Denotes electronic copy Reading File and GRCB 2005 File

#### **APPENDIX H**

Observation and Collection Well Diagrams and Observation Well Logs



Monitoring Well No. <u>CW 0+60</u>



Sand Type: 10-20 Silica

Bollards, Type/Size: NA

Bentonite: 3/8" Chips

Screen Type/Size: 6" PVC Sch. 40, 0.40" Slotted

Cement/Grout: NA

Riser Type/Size: 6" PVC Sch. 40

Water: Potable

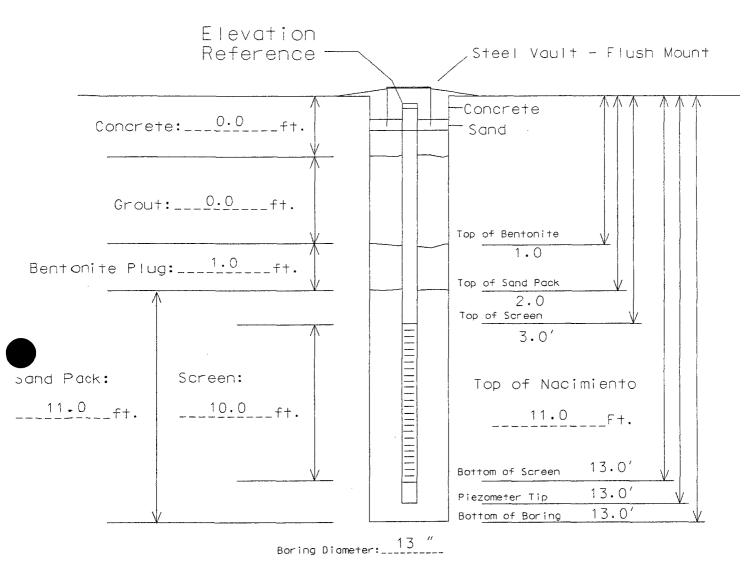
Locking Expandable Casing Plug? Yes Site Northing: TBS

Bottom Cap Used? Yes Site Easting: TBS

Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS



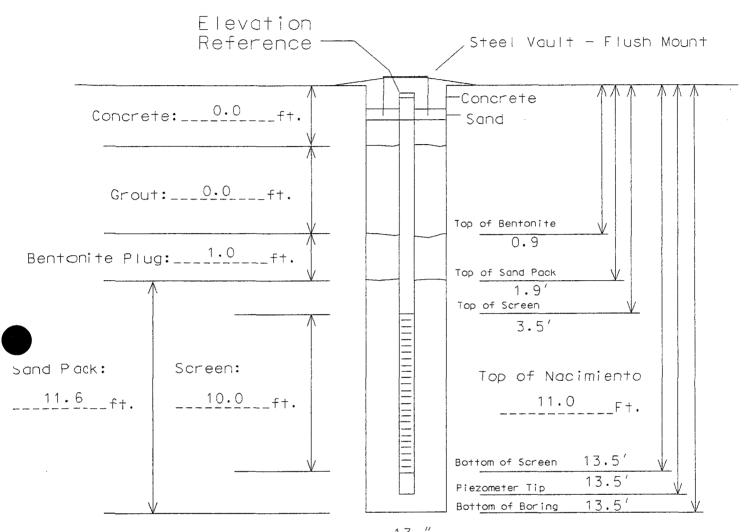
Monitoring Well No. <u>CW 1+50</u>



Sand Type. 10-20 Silica	Bollards, Type/Size:NA	
Bentonite: 3/8" Chips	Screen Type/Size: 6" PVC Sch. 40	. 0.40" Slotted
Delit () () (		
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



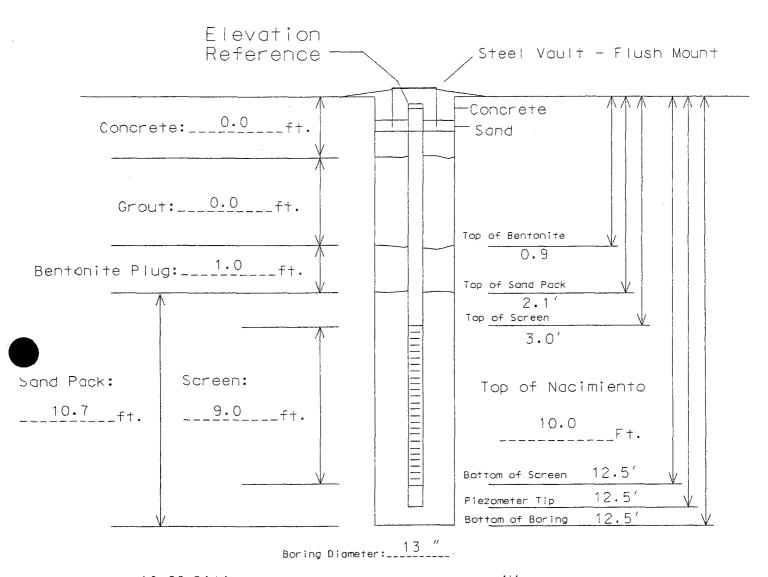
Monitoring Well No. <u>CW 3+85</u>



Bor	ing Diameter:	
Sand Type: 10-20Silica	Bollards, Type/Size:NA	
Bentonite: 3/8" Chips	Screen Type/Size: 6" PVC Sch. 40	. 0.40" Slotted
2011011110-1111111111111111111111111111		
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



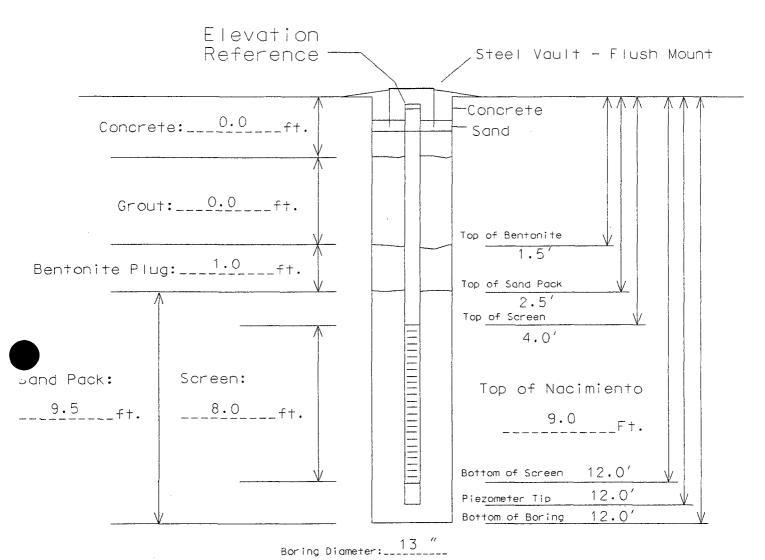
Monitoring Well No. <u>CW 5+50</u>



Sand Type. 10-20 Silica	Bollards, Type/Size:NA	
Bentonite: 3/8" Chips	Screen Type/Size: 6" PVC Sch. 40	. 0.40" Slotted
benfonite:		
Cement/Grout:NA	Riser Type/Size: 6" PVC Sch. 40	
water: Potable	Locking Expandable Casing Plug?	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 6+70</u>



Sand Type: 10-20 Silica

Bollards, Type/Size: NA

Bentanite: 3/8" Chips

Screen Type/Size: 6" PVC Sch. 40, 0.40" Slotted

Cement/Grout: NA

Riser Type/Size: 6" PVC Sch. 40

Water: Potable

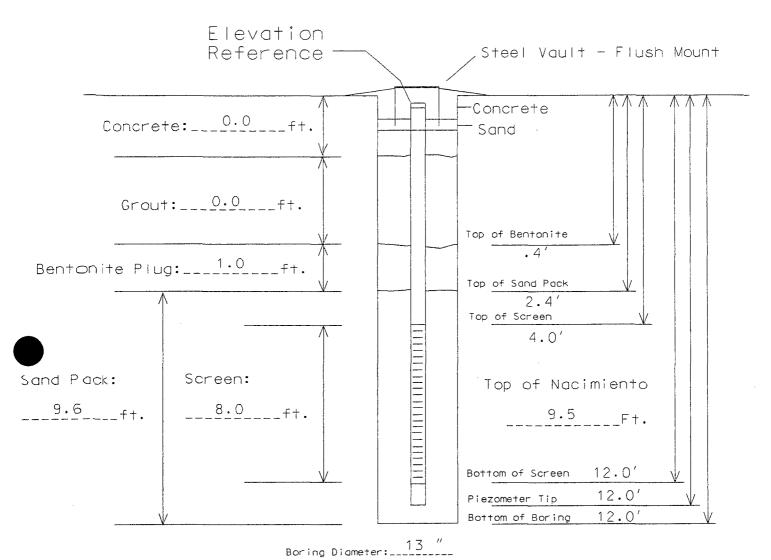
Locking Expandable Casing Plug? Yes Site Northing: TBS

Bottom Cap Used? Yes Site Easting: TBS

Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS



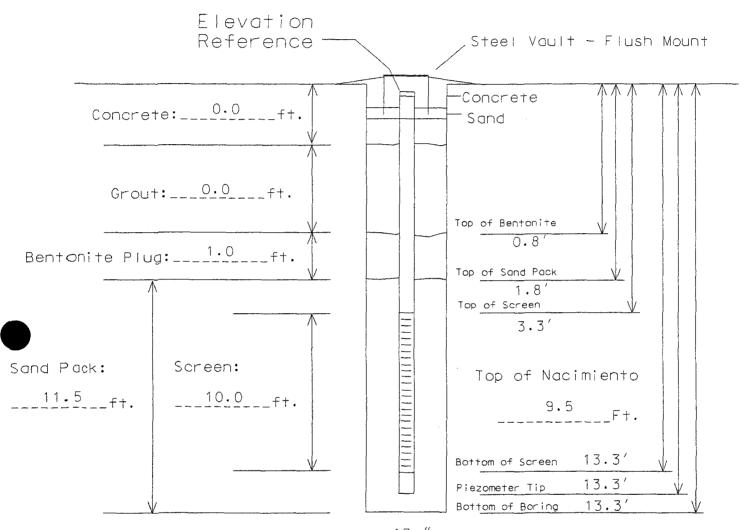
Monitoring Well No. <u>CW 8+10</u>



Sand Type: 10-205ilica	Bollards, Type/Size:NA	
Bentonite: 3/8" Chips	Screen Type/Size: 6" PVC Sch. 40	, 0.40" Slotted
Cement/Grout: NA	Riser Type/Size: 6" PVC Sch. 40	
water: Potable	Locking Expandable Casing Plug?YeS	Site Northing:TBS
Other:	Bottom Cap Used?Yes	Site Easting:TBS
		TDC
Project #: $05-038$ Project Name:	Bloomfield Refinery	Elevation: TBS



Monitoring Well No. <u>CW 8+45</u>

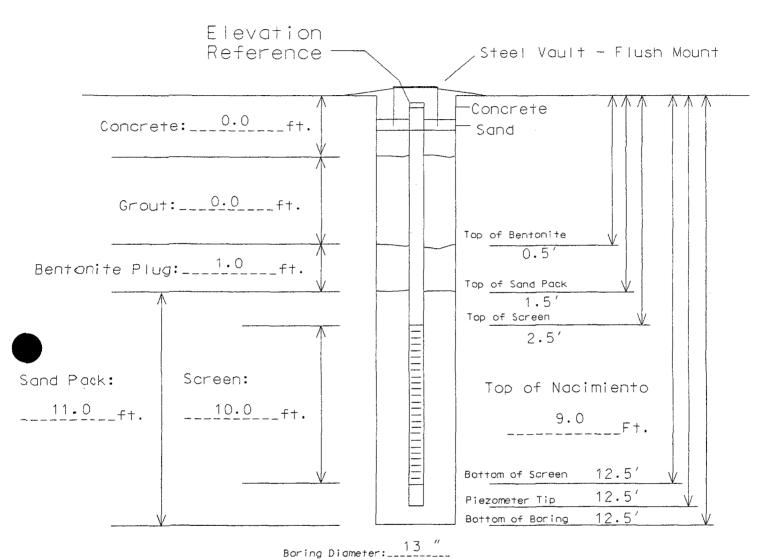


Boring Diameter: _____13 "

501	The brancie filling	
Sand Type: 10-20 Silica	Bollards, Type/Size:NA	
Bentonite: 3/8" Chips	Screen Type/Size: 6" PVC Sch. 40	. 0.40" Slotted
Cement/Grout:NA	Riser Type/Size: 6" PVC Sch. 40	
water: Potable	Locking Expandable Casing Plug?	Site Northing:TBS
<b>5</b>	Bottom Cap Used?YeS	Site Easting:TBS
Other:		
Project #. 05-038 Project Name:	Bloomfield Refinery	Elevation: TBS



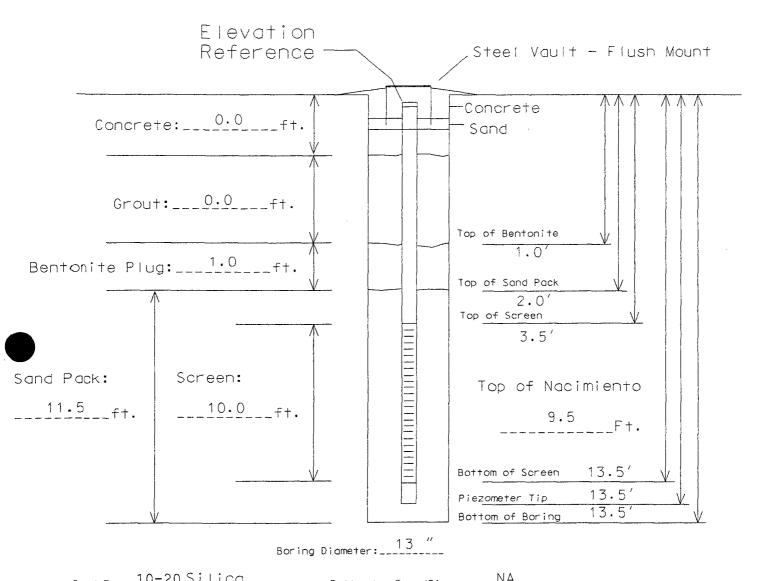
Monitoring Well No. <u>CW 11+15</u>



	-	
Sand Type: 10-20 Silica	Bollards, Type/Size:NA	
Bentonite: 3/8" Chips	Screen Type/Size: 6" PVC Sch. 40	, 0.40" Slotted
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: IBS



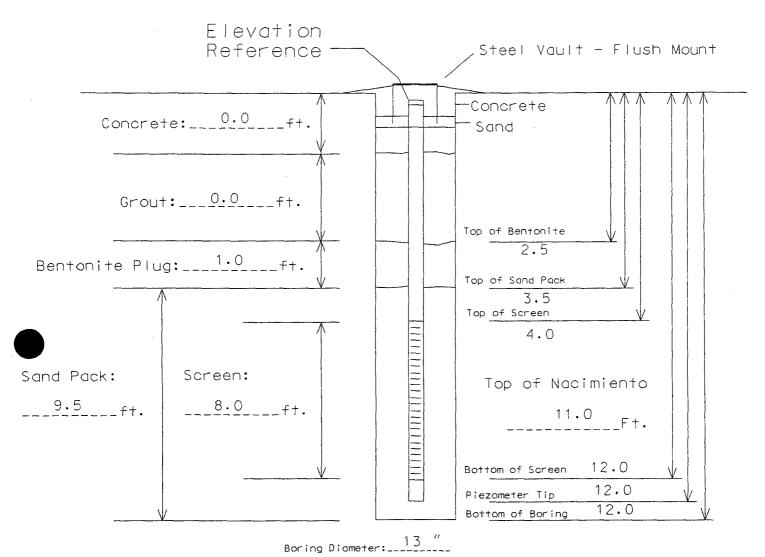
Monitoring Well No. <u>CW 14+10</u>



Sand Type: 10 20 3111 Cd	Bollards, Type/Size:	
Bentonite: 3/8" Chips	Screen Type/Size: 6" PVC Sch. 40	. 0.40" Slotted
Cement/Grout:NA	Riser Type/Size: 6" PVC Sch. 40	
woter:_Potable	Locking Expandable Casing Plug?YeS	Site Northing: TBS
	Bottom Cap Used?YeS	Site Easting:TBS
Otner:		
Project #: 05-038 Project Name:	Bloomfield Refinery	Elevation: TBS



Monitoring Well No. <u>CW 23+90</u>



Sand Type: 10-20Silica

Bollards, Type/Size: NA

Bentonite: 3/8" Chips

Screen Type/Size: 6" PVC Sch. 40, 0.40" Slotted

Cement/Grout: NA

Riser Type/Size: 6" PVC Sch. 40

Water: Potable

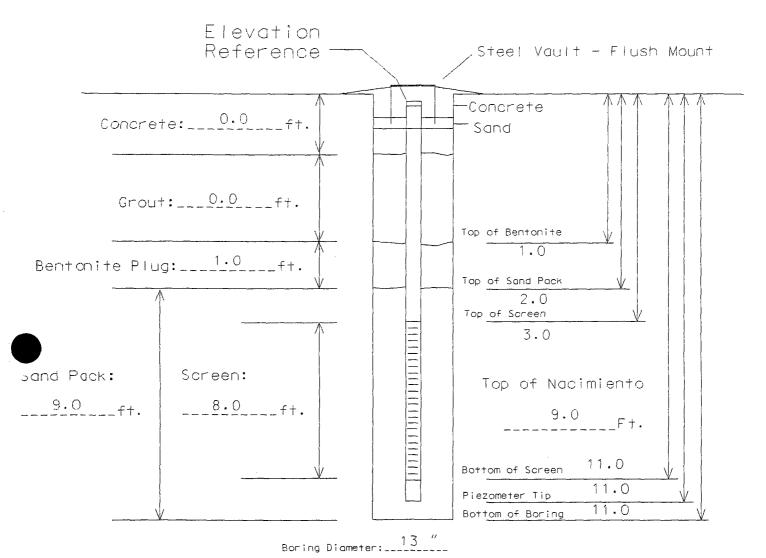
Locking Expandable Casing Plug? Yes Site Northing: TBS

Bottom Cap Used? Yes Site Easting: TBS

Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS



Monitoring Well No. <u>CW 25+95</u>



Bentonite: 3/8" Chips

Screen Type/Size: 6" PVC Sch. 40, 0.40" Slotted

Riser Type/Size: 6" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? Yes Site Northing: TBS

Bottom Cap Used? Yes Site Easting: TBS

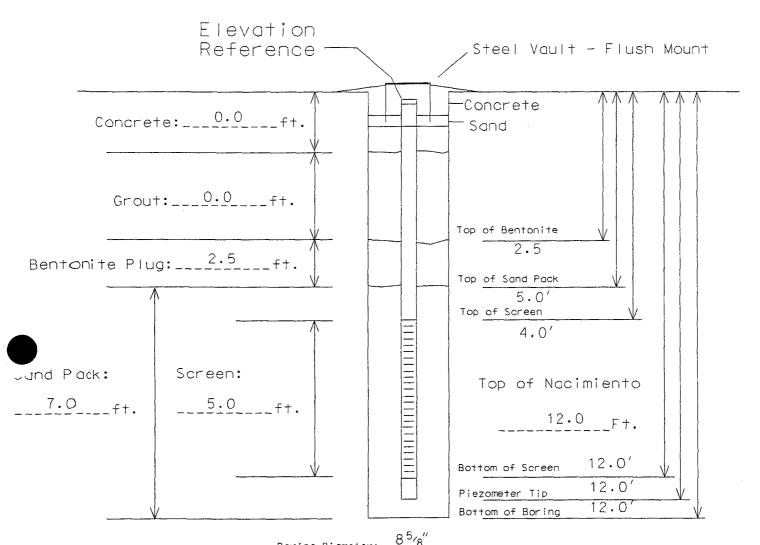
Other:

Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS

Sand Type: 10-20 Silica Bollards, Type/Size: NA



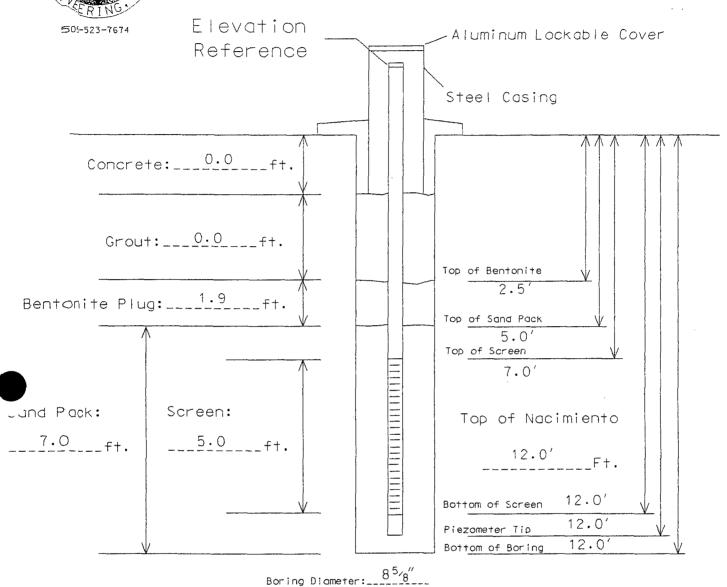
Monitoring Well No. <u>OW 0+60</u>



BC	oring Diameter:	
Sand Type: 10-20 Silica	Bollards, Type/Size:NA	
Bentonite: 3/8" Chips	Screen Type/Size: 2" PVC Sch. 40	. 0.40" Slotted
551151111111111111111111111111111111111		
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



Monitoring Well No. <u>OW 1+50</u>

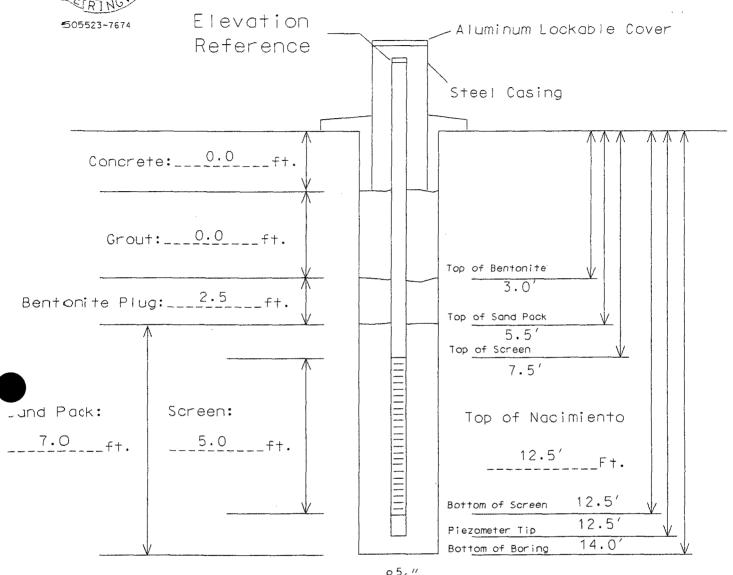


В	oring Diameter: $8^{5}/8''$	
Sand Type: 10-20 Silica	Bollards, Type/Size: NA	
Bentonite: 3/8" Chips	Screen Type/Size: 2" PVC Sch. 40	. 0.010" Slotted
Cement/Grout:NA	Riser Type/Size: 2" PVC Sch. 40	
water: Potable	Locking Expandable Casing Plug?YeS	Site Northing:TBS
•	Bottom Cap Used?Yes	Site Easting:TBS

Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS



Monitoring Well No. <u>OW 3+85</u>



Boring Diameter:____85/8"

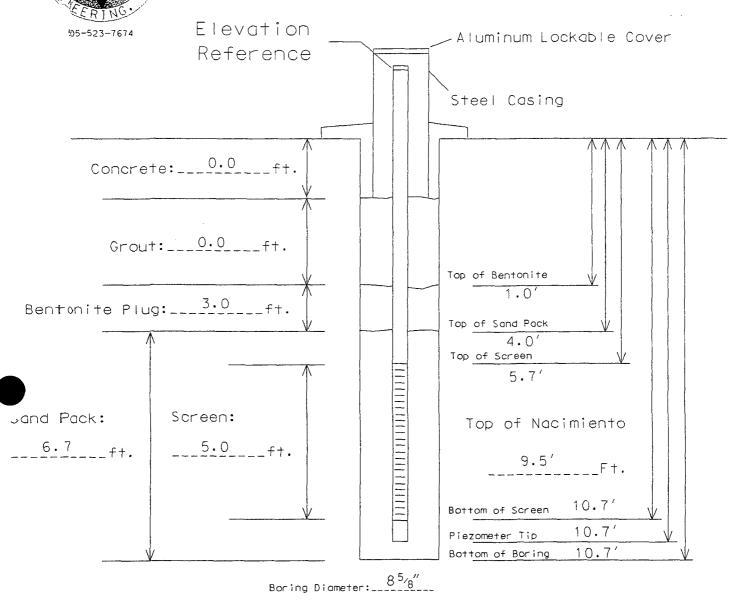
Sand Type: 10-20 Silica	Bollards, Type/Size:NA
Bentonite: 3/8" Chips	Screen Type/Size: 2" PVC Sch. 40, 0.010" Slotted
Cement/Grout:NA	Riser Type/Size: 2" PVC Sch. 40

water: Potable Locking Expandable Casing Plug? Yes Site Northing: TBS

Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS



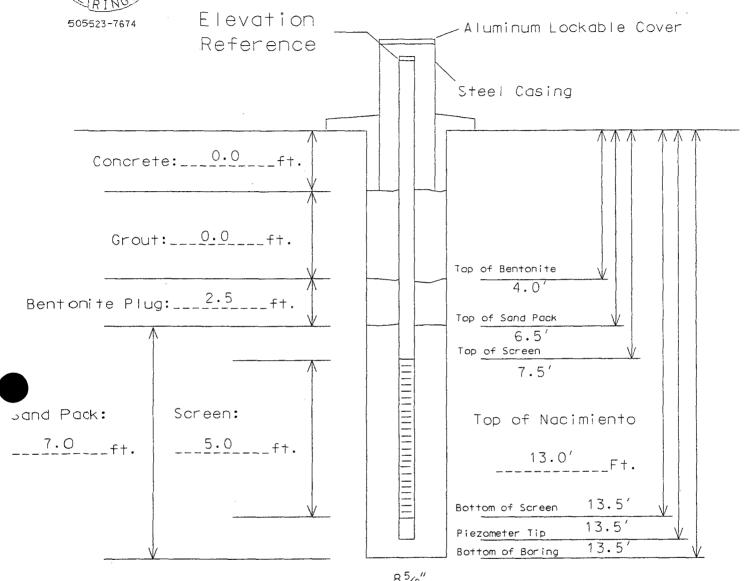
Monitoring Well No. <u>OW 5+50</u>



Sand Type: 10-20 Silica	Bollards, Type/Size:NA	
Bentonite:	Screen Type/Size: 2" PVC Sch. 40	• 0.010" Slotted
	Riser Type/Size: 2" PVC Sch. 40	
Cement/Grout:NA	Riser Type/Size: 4	
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



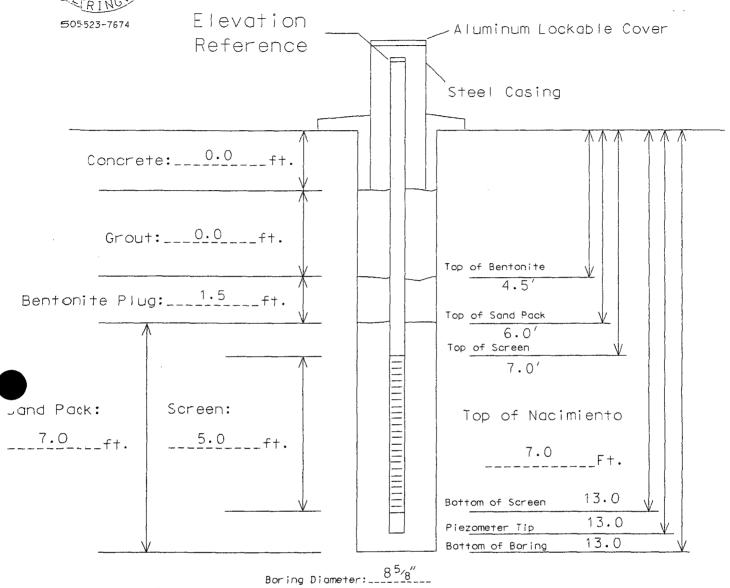
Monitoring Well No. <u>OW 6+70</u>



Вс	oring Diameter:8	
sand Type: 10-20 Silica	Bollards, Type/Size:NA	
Bentonite: 3/8" Chips	Screen Type/Size: 2" PVC Sch. 40	. 0.010" Slotted
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



Monitoring Well No. OW 8+10



Sand Type: 10-20 Silica

Bollards, Type/Size: NA

Bentonite: 3/8" Chips

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

Cement/Grout: NA

Riser Type/Size: 2" PVC Sch. 40

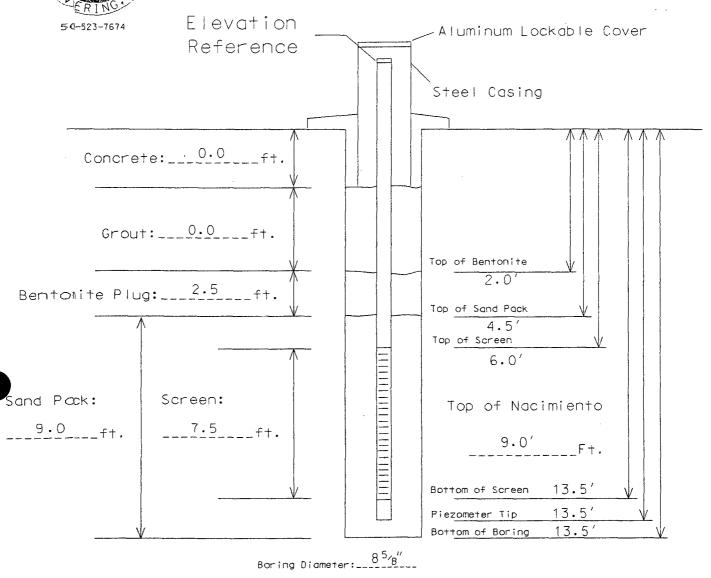
Water: Potable Locking Expandable Casing Plug? Yes Site Northing: TBS

Bottom Cap Used?___YeS_____Site Easting:__TBS___

Other:______Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS



Monitoring Well No. <u>OW 11+15</u>

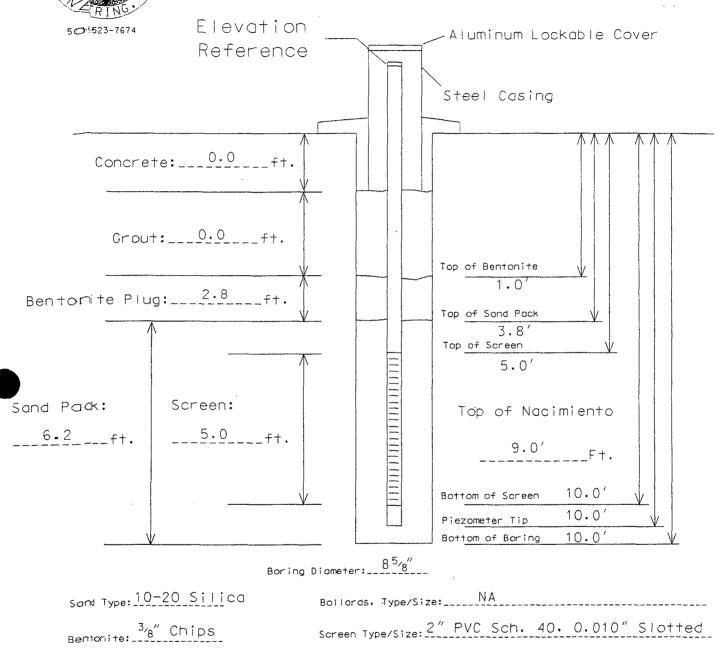


Sand Type: 10-20 Silica	Bollards, Type/Size:NA	
Bentonite: 3/8" Chips	Screen Type/Size: 2" PVC Sch. 40	
Delitoriste:		
ement/Grout:NA	Riser Type/Size: 2" PVC Sch. 40	
Water: Potable	Locking Expandable Casing Plug? Yes	Site Northing: TBS
•	Bottom Cap Used?YeS	Site Easting: TBS
Other:		

Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS



Monitoring Well No. <u>OW 14+10</u>



Cement/Grout: NA Riser Type/Size: 2" PVC Sch. 40

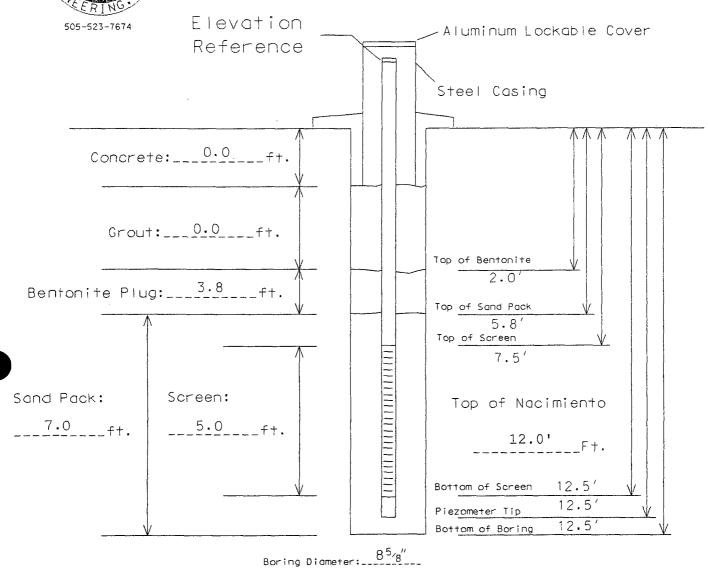
Water: POTABLE Locking Expandable Casing Plug? Yes Site Northing: TBS

Bottom Cap Used? Yes Site Easting: TBS

Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS



Monitoring Well No. <u>DW 16+60</u>



Bentonite: 3/8" Chips Screen Type/Size: 2" PVC Sch. 40, 0.010" Slotted

Cement/Grout: NA Riser Type/Size: 2" PVC Sch. 40

Sand Type: 10-20 Silica

water: Potable Locking Expandable Casing Plug? Yes Site Northing: TBS

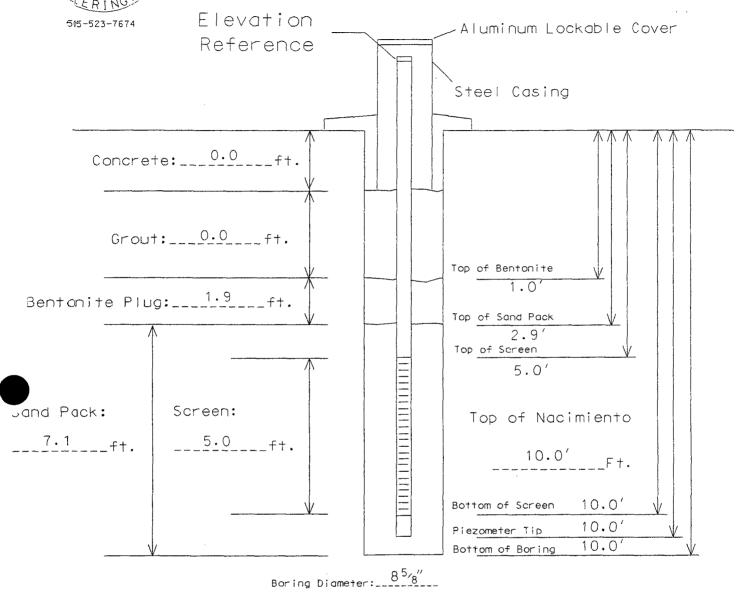
Bottom Cap Used? Yes Site Easting: TBS

Bollards, Type/Size:____NA

Project #: 05-038 Project Name: Bloomfield Refinery Elevation: TBS



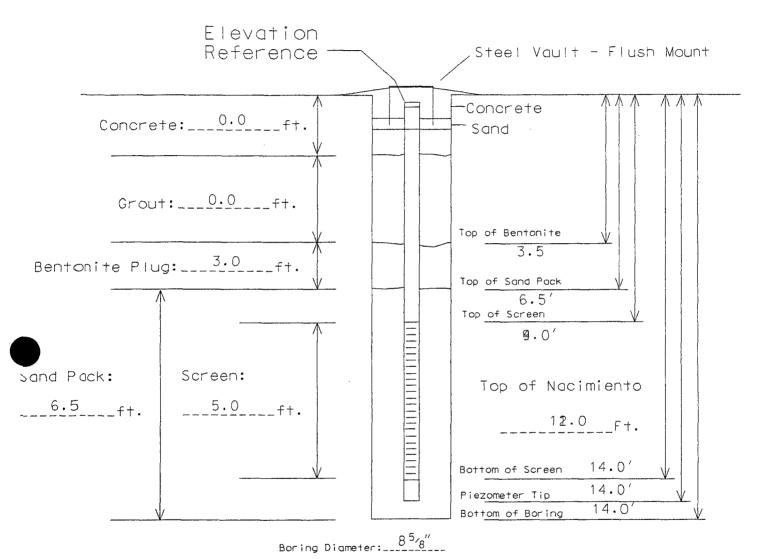
Monitoring Well No. <u>OW 19+50</u>



Sand Type: 10-20 Silica	Bollards, Type/Size:NA	
Bentonite: 3/8" Chips	Screen Type/Size: 2" PVC Sch. 40	, 0.010" Slotted
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



Monitoring Well No. <u>OW 22+00</u>

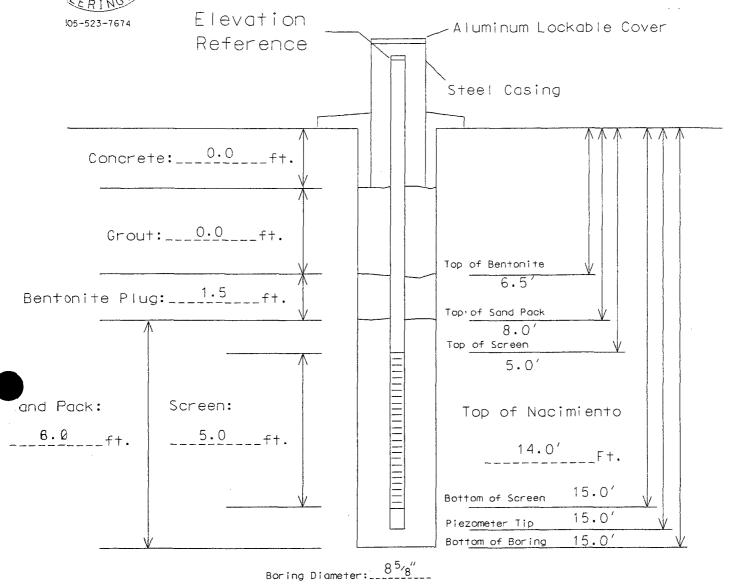


Sond Type:	Bollards: Type/312e:	
Bentonite: 3/8" Chips	Screen Type/Size: 2" PVC Sch. 40	. 0.40" Slotted
Cement/Grout:NA	Riser Type/Size: 2" PVC Sch. 40	
Water: Potable	Locking Expandable Casing Plug?Yes	Site Northing:TBS
	Bottom Cap Used?YeS	Site Easting:TBS
Other:		
Project #: 05-038 Project Name:	Bloomfield Refinery	Elevation: TBS

10-20 Silica



Monitoring Well No. <u>OW 23+10</u>



Sand Type: 10-20 Silica

Bollards, Type/Size: NA

Bentonite: 3/8" Chips

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

Cement/Grout: NA

Riser Type/Size: 2" PVC Sch. 40

Water: Potable

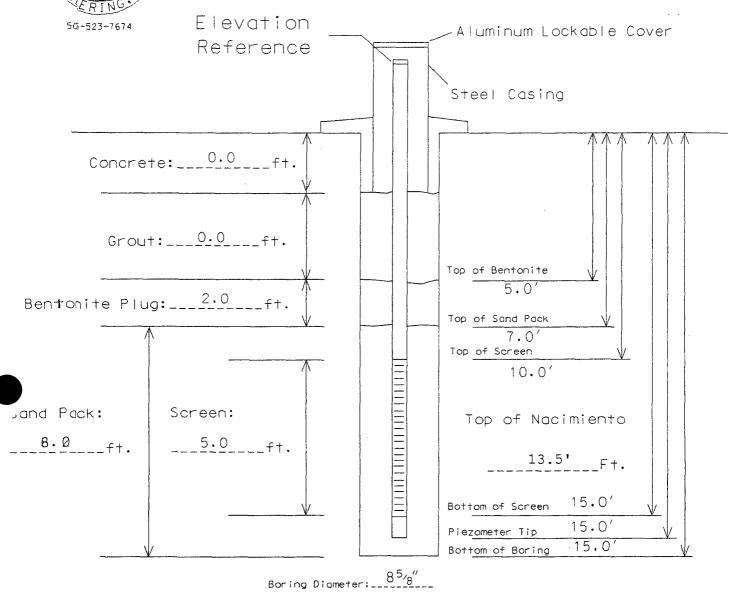
Locking Expandable Casing Plug? Yes Site Northing: TBS

Other: Project #: 05-038 Project Name: Bloomfield Refinery

Elevation: TBS



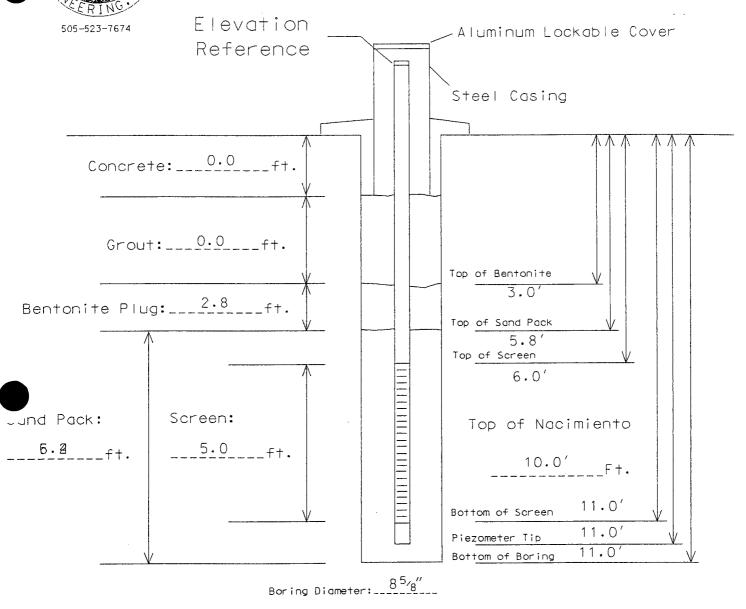
Monitoring Well No. <u>OW 23+90</u>



Sand Type: 10-20 Silica	Bollards, Type/Size:NA	
Bentonite: 3/8" Chips	Screen Type/Size: 2" PVC Sch. 40	, 0.010" Slotted
bernom re.	•	
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	Bloomfield Refinery	Elevation: TBS



Monitoring Well No. <u>OW 25+70</u>



Sand Type: 10-20 Silica	Bollards, Type/Size:NA	
Bentonite: 3/8" Chips	Screen Type/Size: 2" PVC Sch. 40	
Benton(Te:		
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

Sheet: 1 OF 15
Bor: Point: See Plan
Water El vation: 10.7'

Borig No.: OW 0+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: 4/20/2005

		BLOW			MATERIAL CHARACTERISTICS	T			
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	PI	CLASS
	0.0-2.0		***//***		Sand, very fine to fine, brown,				
		•	***//***		moist				
			***//***						
	20-3.5		***00***		Gravel, cobbles, to boulder size, grey, moist				
			***00***	<u>2.5</u>	very dense,				
			***00***						
			***00***						
	3.5-8.0		******		Sand, silty, clayey, yellow-brown, damp,				
			******		moderately dense				
			******	<u>5.0</u>					
			******						
			*****						
]			*****						•
			*****	<u>7.5</u>					
			*****	1.5					
	8.0-11.5		*****		Sand, silty, grey-black, hydrocarbon odor,				
			*****		dense, moist,				
			*****						
			******	<u>10.0</u>					
			*****		Water Level 10.7'				
İ			*****						
			******						
	12.0		*****						
	12.5		====		Nacimiento Formation				
			====		Friable Sandstone, silty, yellow-brown, dense, damp, no odor				
	14.0				TD				
	14.0								
-				<u>15.0</u>					
1				<u> </u>					
			<u>.</u>						
									,
		,			Set 2" Well @ 12.0'				
}					5' of Screen, 7' of Riser				
Į					Top of Sand 5.0'	<u> </u>			
					Top of Bentonite 2.5'				
1									
				<u>20.0</u>					
		•							
SIZE	& TYPE C	OF BORING:		HOLLOW	V STEMMED AUGER	LOGG	ED	<u>BY:</u>	KMM

Sheet: 2 OF 15 Bon Point: See Plan

Water Elevation:

B**⊘**ring 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

		BLOW			MATERIAL CHARACTERISTICS				
LAB#	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	Pl	CLASS
	0.8-0.0		000*00		Gravel, cobbles, to boulder size, brown to				
			000*00		grey rock, slightly sandy, very dense				
Ì			000*00						
ļ			000*00			ļ			
			000*00	<u>2.5</u>					
			000*00						
			000*00						
j			000*00						
1			000*00						
1			000*00	<u>5.0</u>					
1			000*00						
			000*00						
{			000*00						
			000*00			1			
j			000*00	<u>7.5</u>		j			
		····	000*00						
	8.0-11.5		******		Sand, medium, silty, grey/black, wet				
]			******		dense, moist, moderately dense				
			******		Slighty water bearing				• •
			******	<u>10.0</u>	,				
ĺ			******						
	ļ		*****						
			*****		N				
	12.0				Nacimiento Formation				
}			====		Sandstone, degraded, weathered, very dense yellow-brown to light brown, damp	1			
	13.5	<u></u>	+		TD	<del> </del> -			
	13.5								
ł				<u>15.0</u>					
j				10.0					
1									
- 1			1 1						
}					Set 2" Well @ 12.0'				
					5' of Screen, 7' of Riser				
[					Top of Sand 5.0'				
}					Top of Bentonite 2.5'				
ļ								)	
				20.0					
ļ		•					Ì	}	
					• .				
					• •				
SIZE	& TYPF	DE BORING	· 4 1/4" ID	HOLLOW	V STEMMED AUGER	LOGG	FD	BY:	WHK

Sheet: 3 OF 15 Bore Point: See Plan Water Elevation: 10.7'

Boring No.: OW 3+85

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

<del></del>		57.614	,		MATERIAL OLIABAGTERICTIOS	J			<del></del>
LAB#	DEDTU	BLOW	DLOT	CCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
LAD#	DEPTH 0.0-10.5	COUNT	PLOT	SCALE	Gravel, cobbles, to boulder size, brown to	70101	<u> </u>	Г	CLASS.
	0.0-10.5		000*00		grey rock, slightly sandy, very dense				
			0.0*00		grey rock, sugnity salidy, very delise				
			0.00						
			0.0*00						
			0.0*00	<u>z.u</u>					
			0.0*0						
			0.00		·				
			0.0*0						
		ı	0.0*00						
ļ			000*00	<u> </u>					
		l	0.0*0						
1			000*00						
		,	000*00						
			000*00						
			000*00						
			000*00		·		1		
			000*00						
			000*00						
			000*00	<u>10.0</u>					
<u> </u>	10.5		0.0*0.		Water Level 10.7'	ļ			
		1	******		Sand, medium, silty, grey/black, water bearing				
			******		dense, moist, moderately dense	-	ļ		
	12.5				Nacimiento Formation				
					Sandstone, degraded, weathered, fissile,		l		
1			====		very, dense, yellow-brown to light brown, damp				
	14.0		====						
	17.0				TD		_		
				<u>15.0</u>					
						}			,
						.*			
					·	ĺ			
					Set 2" Well @ 12.5'				
					5' of Screen, 7' of Riser				
					Top of Sand 7.0'				
					Top of Bentonite 5.5'				
]		li							
]				20.0					
		•							
			<u> </u>			L	لــــا		
SIZE	& TYPE (	OF BORING	: 4 1/4" ID	HOLLOV	V STEMMED AUGER	LOGO	SED	BY:	WHK

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

		BLOW			MATERIAL CHARACTERISTICS				
_AB #	DEPTH	COUNT	PLOT			%M	LL	PI	CLAS
	0.0-9.0		000*00		Gravel, cobbles, to boulder size, sandy, silty,				
			000*00	l .	brown, very dense				
			0.0*0	J					
]			000*00	t					
			0.0*0						
			000*00						
ľ			000*00	ŀ					
			0.0*0					!	
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}	ļ		000*00 000*00						
ļ			000*00						
			000*00	, —···					
			0.0*0						
			0.0*0	i					
	9.0		******		Sand, fine to medium, greeniish brown,	<u> </u>			
			*****	10.0	damp, dense				
	9.5		====		Nacimiento Formation				
	10.7				TD				
	ĺ								
			1					!	
			1						
j			}	}					
						ļ	<u> </u>		<del></del>
				45.0				}	
				<u>15.0</u>					
					y e				
						ļ			
					  Set 2" Well @ 10.7				
- 1					5' of Screen, 9' of Riser	1			
1					Top of Sand 4.0'				
[				ľ	Top of Bentonite 1.0'			į į	
					Top of Bellevines 1.0				
				<u>20.0</u>					
l				20.0					
		~				1			
			1 .	i		ł		1 1	
	Į			į					

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 505-523-7674 File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING

Date: 4/6/2005

		BLOW			MATERIAL CHARACTERISTICS			•	
4B#	DEPTH	COUNT	PLOT	SCALE		%M	LL	PΙ	CLASS
	0.0-5.5		***_***		Sand, Very Fine to Fine, Silty, Brown, Moist,				
			******		Gravel, Cobbles				
			***_**						
			******						
			******	<u>2.5</u>					
			******						
			***_***						
			******						
			******						
			***_***	5.0					
	5.5-13.0		*o**o*		Sand, Fine, Silty, Light Brown, Damp, Some				
			*0**0*		Small Gravel, (Cobbles @ 12.0')				
			*0**0*						
			*0**0*						
	[		*0**0*	<u>7.5</u>					
			*0**0*						
			*0**0*						
			*0**0*						
			*o**o*						
			*0**0*	<u>10.0</u>	•				
			*0**0*						
			*0**0*			1			
			*0**0*			ŀ	ļ		
			*0**0*			ļ			
			*0**0*						
			*0**0*						
	13.0'		====		Nacimiento Formation				
			====	1		-			
			====						
			====	<u>15.0</u>		<u> </u>	 		
ļ	15.0		1		TD				
			}	•					
					1.5' of Bentonite (Bottom of Hole)				
ĺ					Set 2" Well @ 13.5'				
					5' of Screen				
					12.5' of Riser				
					Top of Sand 6.5'				
					Top of Bentonite 4.0'				
	]			<u>20.0</u>					
		•							
ļ									
			1						

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

					•				
		BLOW			MATERIAL CHARACTERISTICS			- 1	
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	РΙ	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				
	7.0-10.0		====	<u>7.5</u>	Hydrocarbon Odor				
					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
			====						
			====						
			-===,=						
	,		====	<u>10.0</u>					
			====						
			====						_
			====						,
			====						
			====					ĺ	
	13.0'		====	<u> </u>	TD				<u> </u>
	13.0					}			
			·		  Set 2" Well @ 13.0'				
				<u>15.0</u>	5' of Screen				
					11.0' of Riser	,			•
					Top of Sand 6.0'		ŀ		
					Top of Bentonite 4.5'				
			1						
				<u>20.0</u>					
		~	-						
0175	0 TVDE	DE DODINO		1101101	WOTENMACD ALICED	1000	ED	DV.	KNANA
SIZE	C A I Y P E	OF BOKING	4 1/4" [	HOLLOV	V STEMMED AUGER	LOGO	コロリ	<u> </u>	LZIALIAI

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

Site: Bloomfield

Out

Giant Refining

Elevation: EXISTING

File #:

Date: 4/7/2005

05-038

					Log of Test Borings				
		BLOW			MATERIAL CHARACTERISTICS				
LAB#	DEPTH	COUNT	PLOT	SCALE		%M	LL	PΙ	CLASS.
	0.0-9.0		**o**O**		Sand, Very Fine to Medium, Brown, Damp,				
			**0**0**		Gravel, Cobbles, Hydrocarbon Odor @ 5.0'				
			**o**O**						
1			**o**O**						
			**o**O**	<u>2.5</u>					
			**o**O**						
			**o**O**						
			**o**O**						
			**o**O**						
[			**o**O**	<u>5.0</u>					
			**o**O** **o**O**						
			**o**O**						
]			**o**O**						
[ ]			**0**0**	<u>7.5</u>					
]			**0**0**	7.0					
			**0**0**						
	9.0-13.5		******		Sand, Very Fine to Medium, Black/Grey,				
	9.4		*****	:	Damp, Strong Hydrocarbon Odor, Water 9.4'				
		•	*****	<u>10.0</u>					
			*****						
			******						
			*****						,
1			******						
			******						
			====		Nacimiento Nacimiento				
	13.5				TD		<del> </del>		
	10.0								
]				<u>15.0</u>	Set 2" Well @ 13.5'				
					7.5' of Screen, 9' of Riser				
].					Top of Sand 4.5'				
					Top of Bentonite 2.0'				
									,
1									
]				20.0					
		-							
				·					
SIZE	& TVDE	DE BODINO	1 1/4" 15	HOLLOW	L V STEMMED AUGER	LOGO	L	pv.	KMM
	<u> </u>	N DOMING.	. 4 1/4 IL	, I OLLOW	A O I FININIED VOOFV	2000	<u> </u>	. ו ע	LZIVIIVI

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

		·							
		BLOW			MATERIAL CHARACTERISTICS			·	
LAB#	DEPTH	COUNT				%M	LL	ΡI	CLASS
	0.0-8.5		000*00		Gravel, cobbles, to boulder size, sand fine				
			000*Od		to coarse, damp dense				
	}		0.0*00						
			000*00						
			0.040						
			0.0*00						
J			0.0*00						
			0.0*0.						
ļ			0.0*00						
			0.0*0						
			0.0*0.				1		
ľ			0.0*0.						
			0.0*00						
			0.0*0						
			0.0*0						
i			0.0*0.						
	8.5		******		Sand, fine to coarse, some gravel, grey, moist	<del> </del>			
			******		<u></u>				
	9.0		====		Nacimiento Formation				
ļ	10.0				TD				
1				İ					
•	}								
				}			[		
							1		
				<u>15.0</u>					
				10.0			<u> </u>		
				,	·				,
					Set 2" Well @ 10.0				
					5' of Screen, 8' of Riser				
					Top of Sand 3.8'				
				1	Top of Bentonite 1.5'				
				20.0					
						1	1		
								<u></u>	
SIZE	& TYPE (	OF BORING	: 4 1/4" ID		V STEMMED AUGER	LOGO	GED	BY:	WHK

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

	₁	Di CVA	<del>,</del>		MATERIAL CHARACTERISTICS	1			
LAB#	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	ΡI	CLASS.
LAD#	0.0-5.0	COUNT	***//***	SCALE	Sand, Very Fine to Fine, Clayey, Brown,	70101	<u> </u>		CLASS.
	0.0-0.0		***//***		Moist, Gravel, Cobbles				
			***//***		iniciat, Ciavel, Connection				
			***//***						
			***//***	<u>2.5</u>					
			***//***						
			***//***						
			***//***						
			***//***						
			***//***	<u>5.0</u>					
:	5.0-10.0		*****		Sand, Fine to Coarse, Black, Moist, Gravel,				
·			*****		Some Cobbles, Hydrocarbon Odor @ 5.0'				
			*****						
			*****	<u>7.5</u>					
			*****	1.5		{			
			*****	i					
			******			ĺ			
		•	*****						
	9.5		******	<u>10.0</u>	Water Level 9.5'				
	10.0-12.0		******		Same as Above, No Gravel or Cobbles, Black				
			******		Strong Hydrocarbon Odor				
	100		*****		N	<del> </del> -			
	12.0 12.5		====		Nacimiento TD				
	12.5		}						
					Set 2" Well @ 12.5'				
					5' of Screen, 10' of Riser				
					Top of Sand 5.8'				
				<u>15.0</u>	Top of Bentonite 3.5'				
			}		·				
					* #				
				i					
				20.0					
				20.0					
		•							
			[	1					
	ļ				ı				
SIZE	& TYPE C	OF BORING	4 1/4" IC	HOLLOV	V STEMMED AUGER	LOGG	ED	BY:	KMM

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

		BLOW			MATERIAL CHARACTERISTICS			·	,
LAB#	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	ΡI	CLASS.
	0.8-0.0		***0***0		Sand, Fine to Medium, Tan, Damp, Gravel,				•
			***o***O		Cobbles				
			***o***O						
]			***0****						
			***0***0	<u>2.5</u>					
			***0****	•					
			***0***0	•					
			***0***0						
			***0***0						
			***0***0	<u>5.0</u>					
			***0*****						
			****0****						
į			***0*****						
			***0***0	7.5					
<b> </b>	8.0-10.0		***0***0*	7.5	Sand, Fine to Medium, Grey/Black, Moist,				
	0.0-10.0		***0***0*		Hydrocarbon Odor, Small Gravel				
			*******		Trydrodarbon Guor, Cinan Graver				
!			***0***0*						
			***0***0	10.0					
	10.0		====		Nacimiento				
·				-					
					Set 2" Well @ 10.0'				
					5' of Screen				
					8.0' of Riser	1			
					Top of Sand 2.9'		1		
					Top of Bentonite 1.0'		1		
		J							' I
				<u>15.0</u>					
					,				
1									
				20.0					
			1 1	20.0					
		-							
					,				
SIZE	ዴ TVPF (	DE BORING	· <u> </u>	HOLLOW	V STEMMED AUGER	LOGO	L FD	BV.	KMM
	ر سا "ا انحب ر	O' DO'VING	. マ 1/サ 1レ		A O I FININCED VOOFIV			٠ ۽ ب	LAUALIAI

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

Т		BLOW	T 1		MATERIAL CHARACTERISTICS				
   LAB #	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	ΡI	CLASS.
L) (D #	0.0-11.0	000111	***0****	OOTILL	Gravel, cobbles, to boulder size, brown to	70111			<u> </u>
	0.0-77.0		*******		grey rock, slightly sandy, very dense				
			*******						
			*******						
			***0***0	<u>2.5</u>					
			*******	2.0					
			*******						
			***o***O						
			********						
			***0***0	5.0					
			***0***0						
			***0***0						
1			***0***0						
			***0***0						•
j .			***0***0	<u>7.5</u>					
			***0***0*						
			***0***0*						
			***0***0*						
<u>'</u>			***0***0*						
			***0***0	<u>10.0</u>			ļ		•
			***0***0*						
			***0***0*						
	11.0-14.0		**-**0**		Sand, Fine to Medium, some clay, some				
			**-**0**		gravel, damp dense				
			**-**0**						
			**-**0**						
			**-**0**		·				
ļ			**-**o**						
	14.0				TD				
				<u>15.0</u>	0-100000-00000				
					Set 2" Well @ 14.0'	}			
					5' of Screen				
		;			9.5' of Riser				
		:			Top of Sand 6.5'				•
					Top of Bentonite 3.5'				
				20.0					
				20.0					
		*							
J	- 0 TVDE (	DE DODINO	. 4 4 (41) 15	1101101	L V STEMMED AUGER	LOGO		DV.	LAANA

Sheet: 12 OF 15 Bore Point: See Plan Water Elevation: Not Encountered

Boring No.: OW23+10

Precision Engineering, Inc.

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

File #: Site: Bloomfield

05-038

Giant Refining Elevation: EXISTING

Date: 5/6/2005

		BLOW			MATERIAL CHARACTERISTICS				<del></del>
LAB#	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PΙ	CLASS.
	0.0-13.5		***0****		Gravel, cobbles, to boulder size, brown to				
			***0***0		grey rock, slightly sandy, very dense				
			***0***0						
			***o***O						
			***0***0	<u>2.5</u>					
			***o***O*						
		·	***o***O*	•					
			***o***O						
			***0****	<b>.</b>					
			***o***O	<u>5.0</u>					
			****0****						
			********						
			********	•					
			***0****	<u>7.5</u>					
			***0***0	<del></del>					
	,		***o***O						
			***0****0						
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			***0****	<u>10.0</u>					
1			****0*****						
			***o***O						
			***0****		·				
			***0***0						
	13.5		*******	·					
L			*****		Sand, Fine to coarse, dark brown, moist,				
			*****		dense				
			*****						
	14.0		====		Nacimiento Formation				
	15.0			15.0	TD	1			
				•					
					2 . 2				
					Set 2" Well @ 15.0'				
					5' of Screen				
					10.5' of Riser Top of Sand 8.0'				
					Top of Sand 6.0				
				<u>20.0</u>	1 top of Dentoffite 1.0				
				20.0					
		-							
1									
						<u> </u>			
SIZE	& TYPE	OF BORING	: 4 1/4" IE	HOLLOV	V STEMMED AUGER	LOGG	ED	BY:	KMM

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

		BLOW			MATERIAL CHARACTERISTICS				
LAB#	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-12.0		***o***O		Gravel, cobbles, to boulder size, brown to				
			***0***0		grey rock, slightly sandy, very dense				
			***0***0						
			***0***0						
			***o***O	<u>2.5</u>			[		
			***o***O						
			***o***O						
			***o***O						
			***o***O						
			***o***O	<u>5.0</u>					
			***o***O	•			1		
			***0****	•		ŀ			
}			***o***O						
			***o***O						
			***0****	<u>7.5</u>					
			*********	•					
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l			*********			1.	ļ		
			***0****	10.0					
			***0****	10.0					
1			********						
			*********				İ		
	12.0		***0***0			Ì		1	
			*****		Sand, Fine to coarse, dark brown, moist,				
			******		dense				
	13.5		====		Nacimiento Formation				
					TD				
		1		<u>15.0</u>					
						1			
				i			-		
j					Set 2" Well @ 15.0'				
					5' of Screen				
1					7.0' of Riser				
					Top of Sand 7.0'				
}					Top of Bentonite 5.0'				
				<u>20.0</u>					
		-							
<u> </u>	0.70	05.000		11011 =::	LOTEIMED ALICED	1000		DV.	LA AA A
SIZE	& IYPE	<u>OF ROKING</u>	: 4 1/4" IE	HOLLOV	V STEMMED AUGER	LOGO	ュロリ	DY:	VIAIN

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

		BLOW			MATERIAL CHARACTERISTICS				,
LAB#	DEPTH	COUNT	PLOT	SCALE	(MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	ΡI	CLASS.
	0.0-10.5		******		Sand, Very Fine to Medium, Brown, Damp				
	•		******		Gravel, Cobbles				,
			******						
			******						
			*****	<u>2.5</u>					
			******						
			******						
			******						
			*****	5.0					;
			*****	<u>5.0</u>					
			*****						
1			*****						
			*****					}	
			*****	<u>7.5</u>					
			*****	7.0			-		
			*****						
	8.4		*****		Water Level 8.4'				
		_	*****						
		·	*****	<u>10.0</u>					
			*****						
	10.0		====		Nacimiento Formation				
			====						
	11.0				TD				
					Set 2" Well @ 11.0'				
					5' of Screen 9.0' of Riser				
				150	Top of Sand 5.8'				
				<u>15.0</u>	Top of Bentonite 3.0'				
					·				
				,					
				20.0					
		-							
l									
SIZE	& TYPE (	OF BORING	: 4 1/4" IE	HOLLOV	V STEMMED AUGER	LOGO	GED	BY:	KMM

## **APPENDIX I**

**Baseline Groundwater Analytical Laboratory Reports** 



#### **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

Dear Cindy Hurtado:

Order No.: 0505104

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,

Andy Freeman, Business Manager Nancy McDuffie, Laboratory Manager



Date: 27-May-05

CLIENT:

San Juan Refining

Client Sample ID: CW 6 + 70

Lab Order:

0505104

0505104-01

Collection Date: 5/11/2005 9:15:00 AM

Project: Lab ID: Phase II Monitoring

Matrix: AQUEOUS

Analyses	Result	PQL (	Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: MAP
Fluorida	ND	0.50	mg/L	5	5/24/2005
Chloride	2400	10	mg/L	100	5/24/2005
Phosphorus, Orthophosphate (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/L	1	5/16/2005 4:54:42 PM
Toluene	ND	0.50	μg/L	1	5/16/2005 4:54:42 PM
Ethylbenzene	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-Bromofluorobenzene	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: TOTAL RECOVERABLE N	ETALS		**		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

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

CLIENT:

San Juan Refining

Lab Order:

0505104

Phase II Monitoring

Project: Lab ID:

0505104-02

Date: 27-May-05

Client Sample ID: CW 8 + 10

Collection Date: 5/11/2005 10:30:00 AM

Matrix: AQUEOUS

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, Orthophosphate (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-Bromofluorobenzene	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: TOTAL RECOVERABLE M	ETALS	•				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
Cadmium	ND	0.0020		mg/L	†	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

CLIENT:

San Juan Refining

Lab Order:

0505104

Client Sample ID: OW 11 + 15

Collection Date: 5/11/2005 11:45:00 AM

Date: 27-May-05

Project:

Phase II Monitoring

Lab ID:

0505104-03

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 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, Orthophosphate (As P)	ND	0.50	mg/L	1	5/12/2005
Sulfate	130	5.0	mg/L	10	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	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
Sur: 4-Bromofluorobenzene	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: TOTAL RECOVERABLE M	ETALS				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
Chromium	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

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

CLIENT:

San Juan Refining

Lab Order:

0505104

Phase II Monitoring

Project: Lab ID:

0505104-04

Date: 27-May-05

Client Sample ID: CW 14 + 10

Collection Date: 5/11/2005 1:45:00 PM

Matrix: AQUEOUS

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, Orthophosphate (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	ha\r	50	5/16/2005 6:28:57 PM
Xylenes, Total	1300	25	μg/L	50	5/16/2005 6:28:57 PM
Surr: 4-Bromofluorobenzene	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: TOTAL RECOVERABLE ME	ETALS				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

CLIENT: Lab Order: San Juan Refining

0505104

Client Sample ID: OW 14 + 10

Collection Date: 5/11/2005 2:15:00 PM

Date: 27-May-05

Project:

Phase II Monitoring

Lab ID:

0505104-05

Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: MAP
Fluoride	0.53	0.10		mg/L	1	5/24/2005
Chloride	73	2.0		mg/L	20	5/24/2005
Phosphorus, Orthophosphate (As P)	ND	0.50	-	mg/L	1	5/12/2005
Sulfate	350	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	10000	50		µg/L	100	5/16/2005 8:02:40 PM
Toluene	ND	50		μg/L	100	5/16/2005 8:02:40 PM
Ethylbenzene	3900	50		µg/L	100	5/16/2005 8:02:40 PM
Xylenes, Total	3200	50		μg/L	100	5/16/2005 8:02:40 PM
Surr. 4-Bromofluorobenzene	106	83.3-121		%REC	100	5/16/2005 8:02:40 PM
EPA METHOD 7470: MERCURY	,					Analyst: CMC
Mercury	ND	0.00020		mg/L	1	5/17/2005
EPA 6010: TOTAL RECOVERABLE N	IETALS					Analyst: CMC
Arsenic	0.11	0.020		mg/L	1	5/16/2005 2:30:31 PM
Barium	11	0.40		mg/L	20	5/16/2005 3:35:50 PM
Cadmium	ND	0.0020		mg/L	1	5/16/2005 2:30:31 PM
Chromium	0.090	0.0060		mg/L	1	5/16/2005 2:30:31 PM
Lead	0.73	0.0050		mg/L	1	5/16/2005 2:30:31 PM
Selenium	ND	0.050		mg/L	1	5/16/2005 2:30:31 PM
Silver	ND	0.0050		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

Page 5 of 7

CLIENT:

San Juan Refining

Lab Order:

0505104

Project: Lab ID: Phase II Monitoring 0505104-06

Date: 27-May-05

Client Sample ID: CW 16 + 60

Collection Date: 5/11/2005 3:00:00 PM

Matrix: AQUEOUS

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, Orthophosphate (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 B:33:39 PM
Sur: 4-Bromofluorobenzene	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: TOTAL RECOVERABLE N	IETALS				Analyst: CMC
Arsenic	ND	0.020	mg/L	7	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
Chromium	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

Date: 27-May-05

CLIENT:

San Juan Refining

Client Sample ID: Trip Blank

Lab Order:

0505104

0505104-07

Collection Date:

Project: Lab ID: Phase II Monitoring

Matrix: TRIP BLANK

Analyses	Result	PQL Qu	al Units	<b>D</b> F	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-Bromofluorobenzene	98.2	83.3-121	%REC	1	5/16/2005 9:04:43 PM

- * Value exceeds Maximum Contaminant Level
- S Spike Recovery outside accepted recovery limits
- R RPD outside accepted recovery limits
- E Value above quantitation range

B - Analyte detected in the associated Method Blank

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Hall	

Hall Environmen	Hall Environmental Analysis Laboratory	tory							Date: 2	Date: 27-May-05	
CLIENT: San Juan Work Order: 0505104 Project: Phase II	San Juan Refining 0505104 Phase II Monitoring							QC SUMMARY REPORT Method Blank	IMAR	Y REPORT Method Blank	ORT Slank
Sample ID MBLK Client ID: Analyte	Batch ID: R15380 Result	Test Code: E300 Run ID: LG_0 PQL SPI	: E300 L.C_050512A SPK value	Units: mg/L SPK Ref Val	%REC	Analysis SeqNo: LowLimit	Analysis Date 5/12/2005 SeqNo: 361748 wLimit HighLimit RPD Ref Vai	5 D Ref Val	Prep Date	ate RPDLImit	Qual
Fluoride Chloride Phosphorus, Orthophosphate (As P) Sulfate Nitrate (As N)+Nitrite (As N)	ND ND (e (As P) ND ND	0.1 0.5 0.5 0.5 0.1									
Sample ID MB Client ID:	Batch ID: R15380	Test Code: E300 Run ID: LC_0	E300 LC_050512A	Units: mg/L	1	Analysis SeqNo:		10	Prep Date	ep :	
Fluorida Chloride Phosphorus, Orthophosphate (As P) Sulfate Nitrate (As N)+Nitrite (As N)	ND ND ND ND ND ND ND ND ND ND ND ND ND N	0.1 0.1 0.5 0.5	OF N VAILE	STR RGI VAI	oke.	FONCE	THE PROPERTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF TH	RTD KBI VAI	UAN.	RADEMI	Cual
Sample ID MB Client ID: Analyte	Batch ID: R15380 Result	Test Code: E300 Run ID: LC_0 PQL SPI	E300 LC_050512A SPK value	Units: mg/L SPK Ref Val	%REC	Analysis i SeqNo: LowLimit	Analysis Date 5/14/2005 SeqNo: 362063 W.Lmil High.Limit RPD	2005 3 RPD Ref Val	Prep Date	te RPDLImit	Qual
Fluoride Chloride Phosphorus, Orthophosphate (As P) Sulfate Nitrate (As N)+Mirite (As N)	ND ND ND ND 0.1124 ND	2.0 2.0 2.0	0 0 0	0000	0000	00000	0000	0000		·	, ¬

B - Analyte detected in the associated Method Blank

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

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

Qualifiers:

	San Juan Refining							QC SUMMARY REPORT	MAR	Y REPO	)RT
Work Order: 0505104 Project: Phase II	0505104 Phase II Monitoring									Method Blank	3lank
Sample ID MBLK Cilent ID:	Batch ID: R15492	Test Code: E300 Run ID: LC_0	: E300 LC_050524A	Units: mg/L		Analysis SeqNo:	Analysis Date 5/24/2005 SeqNo: 365448	<b>.</b>	Prep Date	ate	
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	LowLimit HighLimit RPt	RPD Ref Val	%RPD	RPDLImit	Qual
Fluoride Chlorida Phosphorus, Orthophosphate (As P) Sulfate Nilrate (As N)+Nitrite (As N)	ND ND ND ND ND	0.1 0.5 0.5 0.5									
Sample ID MBLK Cilent ID:	Batch ID: R15502	Test Code: E300 Run ID: LC_0	: E300 LC_050525A	Units: mg/L		Analysis SeqNo:	Analysis Date 5/25/2005 SeqNo: 365704	10	Prep Date	ıte	
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RPC	RPD Ref Val	%RPD	RPDLImit	Qual
Fluoride Chloride Phosphorus, Orthophosphate (As P) Sulfate Nitrate (As N)+Nitrite (As N)	ND ND ND ND· ND·	0.1 0.5 0.5 0.5									
Sample ID MBLK Client ID:	Balch ID: R15517 Recult	Test Code: E300 Run ID: LC_0	: E300 LC_050526A SPK value	Units: mg/L	J=876	Analysis SeqNo:	Analysis Date 5/26/2005 SeqNo: 366186 Mimii Hirali Mii DDD DefVal	) 0 of Val	Prep Date	te con test	<u> </u>
Fluoride Chloride Phosphorus, Orthophosphate (As P) Sulfate Nitrate (As N)+Nitrite (As N)		0.0 1.0 2.0 3.0 1.0						ت ا	2		

B - Analyte detected in the associated Method Blank

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

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

Qualifiers:

San Juan Refining OC SUMMARY REPORT	0505104	Phase II Monitoring
San Juan Refinir	0505104	Phase II Monitor
CLIENT:	Work Order:	Project:

Sample ID Reagent blank our paidi ID. Krosek	Batch ID: R15402	Test Code	est Code: SW8021	Units: pg/L		Analysis	Analysis Date 5/16/2005 7:08:29 AM	7:08:29 AM	Prep Date		
Cllent ID:		Run ID:	PIDFID_050516A	16A		SeqNo:	362600				
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	LowUmit HighLimit RPD Ref Val	Ref Val	%RPD R	RPDLimit	Qual
Benzene	N	0.5									
Toluene	S	0.5									
Ethylbenzene	ON	0.5									
Xylenes, Total	QN	0.5									
Surr: 4-Bromofluorobenzene	20.29	0	20	Ö	101	83.3	121	0			
Sample ID MB-7989	Batch ID: 7989	Test Code	est Code: SW7470	Units: mg/L		Analysis	Analysis Date 5/17/2005		Prep Date	Prep Date 5/17/2005	
Cilent ID:		Run ID:	MI-LA254_050517A	0517A		SeqNo:	362937				
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	LowLimit HighLimit RPD Ref Val	Ref Val	%RPD R	RPDLimit	Qual
Mercury	QN	0.0002									
Sample ID MB-7969	Batch ID; 7969	Test Code	Test Code: SW6010A	Units: mg/L		Analysis [	Analysis Date 5/16/2005 1:06:22 PM	1:06:22 PM	Prep Date	Prep Date 5/13/2005	
Client ID:		Run ID:	ICP_050516B			SeqNo:	362840				
Analyte	Result	PaL	SPK value	SPK Ref Val	%REC	LowLimit	LowLimit HighLimit RPD Ref Val	Ref Val	%RPD R	RPDLimit	Qual
Arsenic	DN .	0.02									
Barlum	QN	0.02									
Cadmium	Q.	0.002									
Chromlum	Q	0.006									
Lead	ON.	0.005									
Sefenlum	N.	0.05									
	!	8									

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

CLIENT: San Juan Refining Work Order: 0505104 Project: Phase II Monitorin	San Juan Refining 0505104 Phase II Monitoring							QC SUMMARY REPORT Sample Duplicate	IMAR Sar	ARY REPORT Sample Duplicate	)RT icate
Sample ID 0505104-018 DUP Batch ID: R15380 Cilent ID: CW 6 + 70	Batch ID: R15380	Test Code: E300 Run ID: LC 0	: E300 LC_050512A	Units: mg/L		Analysis SeqNo:	Analysis Date 5/12/2005 SeqNo: 361758	2005 8	Prep Date	ate.	
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	LowLimit HighLimit RPD Ref Val	%RPD	%RPD RPDLImit	Qual
Phosphorus, Orthophosphate (As P)	s P) ND	0.5	0	0	0	0	0	0	0	20	
Sample ID 0505104-06C DUP Batch ID: 7969	Batch ID: 7969	Test Code	Fest Code: SW6010A	Units: mg/L		Analysi	s Date 5/16/2	Analysis Date 5/16/2005 3:22:52 PM	Prep Da	Prep Date 5/13/2005	
Clent ID: CW 16 + 50		Run ID:	ICP_050516B			SeqNo:	362863	'n			
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	LowLimit HighLimit RPD Ref Val	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.01937	0.02	0	0	0	0	0	0	0	30	٦
Barium	0.5558	0.02	D	0	0	0	0	0.6004	10,4	30	
Cadmlum	Q	0.002	0	0	0	0	0	0	0	30	
Chromlum	QN	0.006	0	0	0	0	0	0	0	30	
Lead	0.01333	0.005	0	0	0	0	0	0.01022	26.4	30	
Selenium	Q	0.05	0	0	0	0	0	0	0	30	
Silver	0.0007985	0.005	0	0	0	0	0	0	p.	33	~

S - Spike Recovery outside accepted recovery limits J - Analyte detected below quantitation limits ND - Not Detected at the Reporting Limit Qualifiers:

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

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Date: 27-May-05

OI HUNT.	Trong	Con Luca Defining										
ler:	0505104 Phase II I	oan Junii Nominii 0505104 Phase II Monitoring							QC SUMMAKY KEPOKT Sample Matrix Spike	Sampl	MAKY KEPOKT Sample Matrix Spike	JKT
Sample ID 0505104-01B MS Client ID: CW 6 + 70	1B MS	Batch ID: R15380	Test Code: E300 Run ID: LC_0	: E300 LC_050512A	Units: mg/L		Analysis SeqNo:	Analysis Date 5/12/2005 SeqNo: 361759	2005 9	Prep Date	316	
Analyte	•	Result	Pol	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	RPDLImit	Qual
Phosphorus, Orthophosphate (As P)	sphate (A	is P) 5.075	0.5	S	0	102	90	120	0			
Sample ID 0505104-01B MSD	1B MSD	Batch ID: R15380	Test Code; E300	: E300	Units: mg/L		Analysi	Analysis Date 5/12/2005	2005	Prep Dale	ale	
Client ID: CW 6 + 70			Run ID:	LC_050512A			SeqNo:	361760	0			
Analyte	,	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Orthophosphate (As P)	sphate (A	s P) 4.964	0.5	က	0	99.3	80	120	5.075	2.22	20	
Sample ID 0505104-01a ms	fa ms	Batch ID: R15402	Test Code:	SWB0Z1	Units: µg/L		Analysis Date	s Date 5/16/2	5/16/2005 9:35:32 PM	Prep Date	ıle	
Cllent ID: CW 6 + 70			Run ID:	PIDFID_050516A	16A		SeqNo:	362634	4			
Analyte		Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLímit	HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
Велгепе		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		20.06	0.5	20	0.4584	98.0	88.6	113	0			
Xylenes, Total		58.06	0.5	90	1.266	94.7	89.4	112	0			
Sun: 4-Bromofluorobenzene	euzeue	23.36	0	24	0	97.3	83.3	121	0			
Sample ID 0505104-01a msd	a msd	Batch ID; R15402	Test Code:	SW8021	Units: µg/L		Analysis	Date 5/16/2	Analysis Date 5/16/2005 10:06:25 PM	Prep Date	fe	
Client ID: CW 6 + 70			Run ID:	PIDFID_050516A	16A		SeqNo:	362635	• 0			
Analyte	=	Result	Pol	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	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	
Ethyfbenzene		20.23	0.5	20	0.4584	98.8	98.6	113	20.08	0.802	5	
Xylenes, Total		57.92	0.5	60	1,266.	94.4	89.4	112	58.06	0.242	13	
Surr: 4-Bromofluorabenzene	enzene	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	S - Spike Recovery outside accepted recovery limits	necepted rec	overy limits		B - Analyte detected in the associated Method Blank	the associa	sted Method B	lank
A - E	\malyte de	J - Analyte detected below quantitation limits	nits	R - RP	R - RPD outside accepted recovery limits	ecovery limit	r.					7
												,

CLIENT:	San Juan	San Juan Refining			MILEO	OC SIIMMARY REPORT
Work Order:	0505104					
Project:	Phase II I	hase II Monitoring				затріе Маттх эріке
Sample ID 0505104-06C MS	34-06C MS	Batch ID: 7969	Test Code: SW6010A Units: mg/L	Units: mg/L	Analysis Date 5/16/2005 2:55:37 PM Prep Date 5/13/2005	Prep Date 5/13/2005

Sample ID 0505104-06C MS	Batch ID: 7969	Test Code:	fest Code: SW6010A	Units: mg/L		Analysis	: Date 5/16/20	Analysis Date 5/16/2005 2:55:37 PM	Prep Da	Prep Date 5/13/2005	
Analyte	Result	Pal.	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	RPDLImit	Qual
Arsenic	0.5693	0.02	0.5	0.02032	110	75	125	0			
Cadmlum	0.5242	0.002	0.5		105	75	125	0			
Chromlum	0.5004	0.006	0.5	0	100	75	125	0			
Lead	0.5047	0.005	0.5	0.01022	98.9	75	125	0			
Selenium	0.4651	0.05	0.5	0	93.0	75	125	0			
Silver	0.5375	0.005	0.5	0	107	75	125	0			
Sample (D 0505104-06C MSD Batch ID: 7969	Batch ID: 7969	Test Code:	est Code: SW6010A	Units: mg/L		Analysis	Date 5/16/	Analysis Dale 5/16/2005 2:59:49 PM	Prep Da	Prep Date 5/13/2005	
Client ID: CW 16 + 60		Run ID:	ICP_050516B			SeqNo:	362857	7			
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	
Cadmlum	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	7.76	75	125	0.5047	1.21	20	
Selenium	0.4678	0.05	0.5	0	93.6	7.5	125	0.4651	0.575	20	
Silver	0.528	0.005	0.5	0	106	75	125	0.5375	1.79	20	

B - Analyte detected in the associated Method Blank	2
S - Spika Recovery outside accepted recovery limits	R - RI'D autsido accepied recovary limits
ND - Not Detected at the Reporting Limit	J - Analyte detected below quantitation limits
Qualifiers:	

Date: 27-May-05

CLIENT: Work Order: Project:	San Juan Refining 0505104 Phase II Monitoring	ឆ្នាំ							QC SUMMARY REPORT Laboratory Control Spike - generic	MIMAR Control	QC SUMMARY REPORT aboratory Control Spike - generic	)RT neric
Sample ID LCS	Batch ID	Batch ID: R15380	Test Code: E300	E300	Units: mg/L		Analysis	Analysis Date 5/12/2005	2005	Prep Date	ste.	
Clent ID:			Run ID:	Run ID: LC_050512A			SeqNa:	361747	11			
Analyte		Result	POL		SPK value SPK Ref Val	%REC	LowLimit	HighLimit	%REC LowLimit HighLimit RPD Ref Val	%RPD	%RPD RPDLIMIT	Qual
Fluoride		0.5047	0.1	0.5	0	101	06	110	0			
Chloride		4.755	0.1	5	0	95.1	90	110	0			
Phosphorus, Orthophosphate (As P)	phosphate (As P)	4.836	0.5	īΩ	0	96.7	90	110	0			
Sulfate		9.669	0,5	10	0	96.7	80	110	0			
Nitrate (As N)+Nitrite (As N)	(As N)	3.386	5	tr.	_	46.7	6	110				

He   He   He   He   He   He   He   He				1	,				,			
10   LCS   Batch ID: R15380   C15   C16   C17   C16   C17   C16   C17   C16   C17   C16   C17   C16   C17   C16   C17   C16   C17   C16   C17   C16   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17   C17	Phosphorus, Orthophosphate (As		0.5	ιυ	0	96.7	90	110	0			
CLCS   Batch ID: R15380   Test Code: E300   Unils: mg/L   Analysis Date 51/2/2005   CLC_050512A   Run ID: LC_050512A   Run ID: LC_050512A   SPK Ref Val   %REC   LowLimit   HighLimit   RPD Ref Val   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5   O.5	Sulfate		0,5	10	0	96.7	06	110	0			
D LCS	Nitrate (As N)+Nitrite (As N)	3.386	0.1	3.5	0	96.7	90	110	0			
Result   PQL   SPK Ref Val   %REC   LowLimit   HighLimit   RPD Ref Val   %REC   LowLimit   HighLimit   RPD Ref Val   0.5	Sample ID LCS	Batch IO: R15380	Test Code	: E300	Units: mg/L		Analysis	Date 5/12/2	005	Prep Date		
Hessult         POL         SPK Ref Val         %REC         LowLlmit         HighLimit         RPD Ref Val           9 0.5233         0.1         0.5         0         105         97.8         90         110         0           9 0.15, 33         0.1         0.5         5         0         104         90         110         0           As N)+Nlirite (As N)         3.485         0.1         3.5         0         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         0         0         0         0         0         0         0         0	Client ID:		Run ID:	LC_050512A			SeqNo:					
19	Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD R	RPDLImit	Qual
3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3 and 3	Fluoride	0.5233	0.1	0.5	0	105	06	110	0			
As N)+Niltile (As N)         5.19         0.5         5         0         104         90         110         0           As N)+Niltile (As N)         3.486         0.1         3.486         0.1         3.486         0.1         3.486         0.1         3.486         0.1         0.1         99.6         90.6         110         0           As N)+Niltile (As N)         Batch ID: R15380         Test Code: E300         Unils: mg/L         Analysis Date 5/14/2005         5/14/2005         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         0         0         0         0         0         0 <td>Chloride</td> <td>4.89</td> <td>0.1</td> <td>5</td> <td>0</td> <td>97.8</td> <td>90</td> <td>110</td> <td>0</td> <td></td> <td></td> <td></td>	Chloride	4.89	0.1	5	0	97.8	90	110	0			
9.994   0.5   10   0.99.9   90   110   0   0   0   0   0   0   0   0	Phosphorus, Orthophosphate (As		0.5	3	0	104	90	110	0			
D LCS   Batch ID: R15380   Test Code: E300   Unils: mg/L   Analysis Date 5/14/2005   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo: 362064   SeqNo:	Sulfate	9.994	0.5	10	0	99.9	06	110	0			
1D LCS Batch ID: R15380 Test Code: E300 Unils: mg/L SeqNo: 362064  3. Run ID: LC_050512A SeqNo: 362064  3. Run ID: LC_050512A SeqNo: 362064  3. Run ID: LC_050512A SeqNo: 362064  3. Run ID: LC_050512A SeqNo: 362064  3. Run ID: LC_050512A SeqNo: 362064  3. Run ID: LC_050512A SeqNo: 36064  3. Run ID: LC_050512A SeqNo: 36069  3. Run ID: LC_050512A SeqNo: 36069  3. Run ID: LC_050512A SeqNo: 36069  3. Run ID: LC_050512A SeqNo: 36069  3. Run ID: LC_050512A SeqNo: 36069  3. Run ID: LC_050512A SeqNo: 36069  3. Run ID: LC_050512A SeqNo: 36069  3. Run ID: LC_050512A SeqNo: 36069  3. Run ID: LC_050512A SeqNo: 36069  3. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 36069  4. Run ID: LC_050512A SeqNo: 3	Nitrate (As N)+Nitrite (As N)	3.485	0.1	3.5	0	93.6	90	110	0			
Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit RPD Ref Val orus, Orthophosphate (As P)   4.845   0.5   0   96.9   90   110   0   0   0   0   0   0   0   0	Sample ID LCS	Batch ID: R15380	Test Code	E300	Units: mg/L		Analysis	Date 5/14/2	305	Prep Date		
Result         PQL         SPK value         SPK Ref Val         %REC         LowLimit         HighLimit         RPD Ref Val           103         0.516         0.1         0.5         0         103         90         110         0           104         0.1         5         0         94.9         90         110         0           105         10         5         0         96.9         90         110         0           As N)+Nifitle (As N)         3.383         0.1         3.5         0         96.7         90         110         0	Client ID:		Run ID:	LC_050512A			SeqNo:	362064				
0.516     0.1     0.5     0     103     90       4.744     0.1     5     0     94.9     90       4.845     0.5     5     0     96.9     90       9.712     0.5     10     0.1124     96.0     90       3.383     0.1     3.5     0     96.7     90	Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	Ref Val	%RPD F	RPDLImit	Qual
4.744     0.1     5     0     94.9     90       4.845     0.5     5     0     96.9     90       9.712     0.5     10     0.1124     96.0     90       3.383     0.1     3.5     0     96.7     90	Fluoride	0.518	0.1	0.5	0	103	66	110	0			
4.845     0.5     5     0     96.9     90       9.712     0.5     10     0.1124     96.0     90       3.383     0.1     3.5     0     96.7     90	Chloride	4.744	0.1	9	0	94.9	90	110	0			
9.712 0.5 10 0.1124 96.0 90 3.383 0.1 3.5 0 0 96.7 90	Phosphorus, Orthophosphale (As		0.5	ល	٥	96.9	80	110	0			·,
3.383 0.1 3.5 0 98.7 op	Sulfate	9.712	0.5	10	0.1124	96.0	90	110	0	•		
	Nitrate (As N)+Nitrite (As N)	3.383	0.1	3.5	0	296.7	6	110	0			

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

CLIENT: Work Order: Project:	San Juan Refining 0505104 Phase II Monitoring				·				QC SUI Laboratory	QC SUMMARY REPORT Laboratory Control Spike - generic	<b>ORT</b> eneric
Sample ID LCS Client ID:	Batch ID: R15492	15492	Test Code: E300 Run ID: LC_0	E300 LC_050524A	Units; mg/L		Analysis SeqNo:	Analysis Date <i>5/24/</i> 2005 SeqNo: 365449	2005	Prep Date	
Analyte		Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLImit	Qual
Fluoride		0.5042	0.1	0.5	0	101	66	110	0		
Chloride		4.586	0.1	ໝ	0	91.7	80	110	0		
Phosphorus, Orthophosphate (As P)	nhosphate (As P)	4,653	0.5	ភេ	0	93.1	8	110	0		
Sulfate		9.322	0.5	10	0	93.2	90	110	0		
Nirate (As N)+Nirite (As N)	e (As N)	3.255	0.1	3.5	0	93.0	06	110	0		
Sample ID LCS	Batch ID: R15502	15502	Test Code: E300	E300	Units: mg/L		Analysis	Analysis Date 5/25/2005	2005	Prep Date	
Client ID:			Run ID:	LC_050525A			SeqNo:	365705	ŭ	÷	
Analyte		Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLímit	RPD Ref Val	%RPD RPDLImit	Qual
Fluoride		0.5249	0.1	0.5	0	105	06	110	0		
Chloride		4.589	0.1	S.	0	91.8	06	110	0		
Phosphorus, Orthophosphate (As P)	hosphate (As P)	4.656	0.5	S	0	93.1	90	110	0		
Sulfate		9.366	0.5	10	, <b>D</b> ,	93.7	8	110	0		
Nitrate (As N)+Nitrite (As N)	e (As N)	3.236	0.1	3,5	0	92.4	90	110	0		
Sample ID LCS	Batch ID: R15517	15517	Test Cade; E300	E300	Units: mg/L		Analysis	Analysis Date 5/26/2005	2005	Prep Date	
Clent ID:		٠	Run ID:	LC_050526A			SeqNo:	366187	7		
Analyte		Result	PaL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLimit	Qual
Fluoride		0.4586	0.1	0.5	0	91.7	06	110	0		
Chloride		4.665	0.1	ស	0	93.3	80	110.	0		
Phosphorus, Orthophosphate (As P)	hosphate (As P)	4.688	0.5	מו	0	93.8	80	110	0		
Sulfate		9,338	0.5	10	0	93.4	06	110	0		
Nitrate (As N)+Nitrite (As N)	e (As N)	3.306	0.1	3.5	0	94.5	90	110	0		t

B - Analyte detected in the associated Method Blank

Work Order: USU: Project: Phas	0505104 Phase II Monitoring							QC SUMMARY REPORT Laboratory Control Spike - generic	TIMAR Control	X REP( Spike - ge	ORT
Sample ID BTEX Ics 100ng Client ID:	ng Batch ID: R15402	Test Code: SW8021 Run ID: PIDFID	SW8021 U	Units: µg/L 16A		Analysis SeqNo:	5 Date 5/17/20 362606	Analysis Date 5/17/2005 2:41:13 AM SeqNo: 362606	Prep Date	ale	
Analyte	Result	PaL	SPK value	SPK Ref Val	%REC	LowLimit		HighLimit RPD Ref Val	%RPD	RPDLImit	Qua
Велгеле	19.62	0.5	20	0	98.1	88.7	114	0			
Taluene	19.42	0.5	20	0	97.1	89.3	112	0			
Ethylbenzene	19.56	0.5	20	0	97.8	88.6	113	0			
Xylenes, Total	58.39	0.5	90	0	97.3	89.4	112	0			
Sample ID LCS-7989	Batch ID: 7989	Test Code: SW7470	SW7470	Unlts: mg/L		Analysis Date	Date 5/17/2005	1005	Prep Da	Prep Date 5/17/2005	2
Cllent ID:		Run ID:	MI-LA254_050517A	0517A		SeqNo:	362938	₩.			
Analyte	Result	Pal	SPK value	SPK Ref Val	"REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLImit	Qual
Mercury	0.004839	0.0002	0.005	0.	96.8	75.2	134	0			
Sample ID LCSD-7989	Batch ID; 7989	Test Code: SW7470	SW7470	Units: mg/L		Analysis	Analysis Date 5/17/2005	005	Prep Da	Prep Date 5/17/2005	15
Cllent ID:		Run ID:	MI-LA254_050517A	3517A		SeqNo:	362962	٥.			
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit F	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.004773	0.0002	0.005	0	95.5	75.2	134	0.004839	1.35	0	
Sample ID LCS-7969	Batch ID: 7969	Test Code: SW6010A	SW6010A	Units: mg/L		Analysis	Date 5/16/2	Analysis Date 5/16/2005 1:09:21 PM	Prep Date	ale 5/13/2005	
Cllent ID:		Run ID:	ICP_050516B			SeqNo:	362841	-			
Analyte	Result	PaL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit F	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	0	102	80	120	0			
Cadmlum	0.5159	0.002	0.5	0	103	88	120	0			
Chromium	0.5079	0.006	0.5	0	102	80	120	0			,
Lead	0.5041	0.005	0.5	0	101	80	120	0			
Selenium	0.5057	0.05	0.5	0	101	80	120	0			
Silver	0,5122	0.005	0.5	0	102	80	120	0			
Qualifiers: ND - N	ND - Not Detected at the Reporting Limit		S - Spil	S - Spike Recovery outside accepted recovery limits	necepted rect	very limits		B - Analyte detected in the associated Method Blank	n the necoci	nted Method B	Innk
				•							

CLIENT: Work Order: Project:	San Juan 0505104 Phase II l	San Juan Refining 0505104 Phase II Monitoring	·						QC SUMMARY REPORT Laboratory Control Spike Duplicate	[MAR]	Y REPO pike Dupli	RT cate
Sample ID LCSD-7969	-7969	Batch ID: 7969	Test Code:	Test Code: SW6010A	Units: mg/L		Analysis	: Date 5/16/	Analysis Date 5/16/2005 1:12:23 PM	Prep Da	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	LowLimit HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic		0.5106	0.02	0.5	0	102	80	120	0.526	2.97	20	
Barlum		0,4946	0.02	0.5	0	98.9	90	120	0,5109	3.23	20	
Cadmlum		0,5016	0.002	0.5	O	9	80	120	0.5159	2.82	20	
Chromium		0.4943	0.006	0.5	0	98.9	80	120	0.5079	2.71	20	
Lead		0.4894	0.005	0.5	D	67.6	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	

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

### Sample Receipt Checklist

Client Name SJR			Date and Tim	e Received:	5/12/2005
Work Order Number 0505104			Received by	y AT	
Checklist completed by Signature	In	Date	5/12,	105	
Matrix	Carrier name	<u>UPS</u>			
Shipping container/cooler in good condition?		Yes 🔽	No 🗆	Not Present	
Custody seals intact on shipping container/cool	er?	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 vials sub	mitted $\square$	Yes 🗹	No 🗆	
Water - pH acceptable upon receipt?		Yes 🗹	No 🗆	N/A □	
Container/Temp Blank temperature?		21°	4° C ± 2 Accep		
COMMENTS:					
Client contacted	Date contacted:		Pe	rson conlacted	
Contacted by:	Regarding	······································			<del></del>
Camments:					
		**************************************	<del> </del>	<u>,</u>	
Corrective Action	······································				
			······································		

ANALYSIS LABORATORY 4901 Hawkins NE, Suite D	Albuquerque, New Mexico 67 103 Tel. 505.345.3975 Fax 505.345.4107 www.hallenvironmental.com	ANAINSISTACUES	(A)	10 enilos (lesei) (seo ₄ ) (seo ₅ )	7/seg	H9T - (1.8 (1.8 (1.9 (1.9 (1.9 (1.9 (1.9 (1.9 (1.9 (1.9	+ 38T O8 bor D2 bor D3 bor O4 o A or C1, O0 C1, C1, C1, C2, C3, C4, C4O	M + X3T8 TEX + M TPH Methr TPH (Meth EDB (Meth EDC (Meth B310 (PN B310 (PN B310 (FN B310 (FN B310 (FN B310 (Sen B320 (Sen	×	X	X	×	×	X -	X				Remarks:	
OA/OC Package: Std □ Level 4 □ Other:	Project Name: Phase II Montorrig	Project #:		Project Manager:		Sample: Aurtado / Angela	pecature: $\mathcal{A} \cup \mathcal{F}o\mathcal{L}\mathcal{R}$	Number/Volume HgCl ₂ HNO ₃ HEAL No.	3-Y0A X 1505104-1	1-25×140, H2504	2	1-500ml X	210A X -2	1-250ml H204	1-250m2	X Som			Received By: (Signature) 5/(2/05 Received By: (Signature)	
CHAIN-OF-CUSTODY RECORD	Client Grant Refiner Sundian	Address 20, CR 4970	Bloomfield, NM 87413			#: 505-632-41cl		Date Time Matrix Sample I.D. No.	5-11-05 915 Hz0 CW 10 + 70			\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	5-11-05 1030 H20 RW 8+10				/		Date: Time: Relinquished By: (Signature) Date: Time: Relinquished By: (Signature)	

12.00

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D	Albuquerque, New Mexico 87109  Tel. 505,345,3975 Fax 505,345,4107  www. hallenvironmental.com				(lasai (sos)	0/se(	81) 105 107 107 107 107 107 107 107 107 107 107	CO8 bor D5 bor D8 bor A9 no A Session, IC ON , IC (AO	Habili Hackfull Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili Habili	4T   19   19   19   19   19   19   19   1		*		X			X	X					
				[^]L					EX + W .EX +- <del>/</del>	<del>   -</del>		•				$\times$	_					Remarks:	
QA/OC Package: Std 🔼 Level 4 🔲 Other:	Project Name:	MASE I Menitorne	Project #:		Project Manager:		Sample: Just Hutzelo Hragela Folk	Sample Temperature: //	Number/Yolume HEAL No.	HgC ₂ HNU ₃	2-10K0C0 X #01/2	1-25ml h254	(mesz-1	1-500 ml		2-104 X - 6	1-250ml H580y	1-25DmD	1-50mg X	7-7		Repeived by: (Signature) S/(2/03-	Received By: (Signature)
CHAIN-OF-CUSTODY RECORD	Client: SAN Than Refining		Address: #50 Rd 4990	Bloom Feld, NM	E1148,		Phone #:505-632-414	Fax#: 505-632-3911	Date Matrix Sample I.D. No.	CH	2-11-5 C/2 1-150 CM 17 F/D				,	511-5 3pm H20 CW 16+60				Trip Blank		Date: Time: Relinguished By: (Bignatchel)	Time: Relinquished By: C



### **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



Date: 27-May-05

CLIENT:

San Juan Refining

Lab Order:

0505088

Client Sample ID: CW 0+60

Collection Date: 5/10/2005 8:30:00 AM

Project:

Phase II Monitoring

Lab ID:

0505088-01

Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					<del>-</del>	Analyst: IC
Fluoride	0.51	0.10	:	mg/L	1	5/11/2005
Chloride	39	0.50		mg/L	5	5/16/2005
Phosphorus, Orthophosphate (As P)	ND	0.50		mg/L	1	5/11/2005
Sulfate	75	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	200	10		μg/L	20	5/13/2005 7:01:46 PM
Toluene	32	10		րց/Լ	20	5/13/2005 7:01:46 PM
Ethylbenzene	180	10		μg/L	20	5/13/2005 7:01:46 PM
Xylenes, Total	1000	10		μg/L	20	5/13/2005 7:01:46 PM
Surr: 4-Bromofluorabenzene	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: TOTAL RECOVERABLE N	IETALS					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	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	ПN	0.0050		mg/L	1	5/16/2005 1:24:22 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

CLIENT:

San Juan Refining

Lab Order:

0505088

Client Sample ID: CW 1+50

Date: 27-May-05

Collection Date: 5/10/2005 9:15:00 AM

Project:

Phase II Monitoring

Lab ID:

0505088-02

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: IC
Fluoride	0.59	0.10	mg/L	1	5/11/2005
Chloride	43	0.50	mg/L	5	5/16/2005
Phosphorus, Orthophosphate (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: NSB
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	µg/L	20	5/13/2005 7:32:51 PM
Xylenes, Total	2300	10	µg/L	20	5/13/2005 7:32:51 PM
Surr: 4-Bromofluorobenzene	109	83.3-121	%REC	20	5/13/2005 7:32:51 PM
EPA METHOD 7470: MERCURY					Analyst: CMC
Mercury	ND	0.00020	mg/L	1	5/17/2005
EPA 6010: TOTAL RECOVERABLE M	ETALS				Analyst: CMC
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

Date: 27-May-05

CLIENT:

San Juan Refining

Client Sample ID: OW 19+50

Lab Order:

0505088

Collection Date: 5/10/2005 10:15:00 AM

Project:

Phase II Monitoring

Lab ID:

0**5**05088-03

Matrix: AQUEOUS

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	290	2.0	mg/L	20	5/16/2005
Phosphorus, Orthophosphate (As P)	ND	0.50	mg/L	1	5/11/2005
Sulfate	290	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: NSB
Benzene	1900	10	μg/L	20	5/13/2005 8:03:34 PM
Toluene	13	10	µg/∟	20	5/13/2005 8:03:34 PM
Ethylbenzene	860	10	µg/∟	20	5/13/2005 B:03:34 PM
Xylenes, Total	3200	10	µg/∟	20	5/13/2005 B:03:34 PM
Surr. 4-Bromofluorobenzene	109	83.3-121	%REC	20	5/13/2005 8:03:34 PM
EPA METHOD 7470: MERCURY					Analyst: CMC
Mercury	ND	0.00020	mg/L	1	5/17/2005
EPA 6010: TOTAL RECOVERABLE M	ETALS	•			Analyst: CMC
Arsenic	ND	0.020	mg/L	1	5/16/2005 1:32:07 PM
Barium	0.23	0.020	mg/L	1	5/16/2005 1:32:07 PM
Cadmium	ND	0.0020	mg/L	1	5/16/2005 1:32:07 PM
Chromium	ND	0.0060	mg/L	1	5/16/2005 1:32:07 PM
Lead	0.024	0.0050	mg/L	1	5/16/2005 1:32:07 PM
Selenium	ND	0.050	mg/L	1	5/16/2005 1:32:07 PM
Silver	ND	0.0050	mg/L	1	5/16/2005 1:32:07 PM

Qualifiers:

ND - Not Detected at the Reporting Limit

 $\boldsymbol{J}$  - 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

_____

CLIENT: Sa

San Juan Refining

Client Sample ID: CW 19+50

Lab Order:

0505088

Collection Date: 5/10/2005 10:45:00 AM

Date: 27-May-05

Project:

Phase II Monitoring

Lab ID:

0505088-04

Matrix: AQUEOUS

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, Orthophosphate (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 NSB
Benzene	4800	100	µg/L	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-Bromofluorobenzene	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: TOTAL RECOVERABLE M	ETALS				Analyst: CMC
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

Lab Order:

0505088

Client Sample ID: CW 3+85

Collection Date: 5/10/2005 1:30:00 PM

Project:

Phase II Monitoring

Lab ID:

0505088-05

Matrix: AQUEOUS

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, Orthophosphate (As P)	ND .	0.50	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/∟	20	5/13/2005 9:04:37 PM
Ethylbenzene	20	10	µg/∟	20	5/13/2005 9:04:37 PM
Xylenes, Totai	250	10	μg/L	20	5/13/2005 9:04:37 PM
Surr: 4-Bromofluorobenzene	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: TOTAL RECOVERABLE N	TETALS				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
Silver	ND	0.0050	mg/L	1	5/16/2005 1:49:03 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

Date: 27-May-05

Collection Date: 5/10/2005 2:15:00 PM

CLIENT:

San Juan Refining

0505088

Client Sample ID: CW 5+50

Lab Order:

Phase II Monitoring

Project: Lab ID:

0505088-06

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Unit	s DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: IC
Fluoride	0.33	0.10	mg/L	1	5/11/2005
Chloride	2700	10	mg/L	100	5/17/2005
Phosphorus, Orthophosphate (As P)	ND	0.50	mg/L	1	5/11/2005
Sulfate	75	50	mg/L	100	5/17/2005
Nitrate (As N)+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 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-Bromofluorobenzene	105	83.3-121	%RE	C 20	5/13/2005 9:35:08 PM
EPA METHOD 7470: MERCURY					Analyst: CMC
Mercury	ND	0.00020	mg/L	. 1	5/17/2005
EPA 6010: TOTAL RECOVERABLE N	METALS				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

Date: 27-May-05

CLIENT: Lab Order: San Juan Refining

0505088

Client Sample ID: Trip Blank

Collection Date:

Project:

Phase II Monitoring

Lab ID:

0505088-07

Matrix: TRIP BLANK

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed
EPA METHOD 8021B: VOLATILES	-				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-Bromofluorobenzene	98.6	83.3-121	%REC	1	5/13/2005 10:05:30 PM

* - Value exceeds Maximum Contaminant Level

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

B - Analyte detected in the associated Method Blank

Date: 27-May-05

CLIENT: Lab Order: San Juan Refining

0505088

Project:

Phase II Monitoring

Lab ID:

0505088-08

Client Sample ID: CW 22+00

Collection Date: 5/10/2005 2:45:00 PM

Matrix: AQUEOUS

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS					Analyst: IC
Fluoride	0.74	0.10	mg/L	1	5/11/2005
Chloride	510	2.0	mg/L	20	5/17/2005
Phosphorus, Orthophosphate (As P)	ND	0.50	mg/L	1	5/11/2005
Sulfate	38	0.50	mg/L	1	5/11/2005
Nitrate (As N)+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-Bromofluorobenzene	106	83.3-121	%REC	20	5/13/2005 10:35:52 PM
EPA METHOD 7470: MERCURY					Analyst: CMC
Mercury	ДИ	0.00020	mg/L	1	5/17/2005
EPA 6010: TOTAL RECOVERABLE M	ETALS	,			Analyst: CMC
Arsenic	ND	0.020	mg/L	1	5/16/2005 1:57:15 PM
Barium	0.61	0.020	mg/L	1	5/16/2005 1:57:15 PM
Cadmium	ND	0.0020	mg/L	1	5/16/2005 1:57:15 PM
Chromium	ND	0.0060	mg/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	1	5/16/2005 1:57:15 PM
Silver	ND	0.0050	mg/L	1	5/16/2005 1:57:15 PM

Qualifiers:

ND - Not Detected at the Reporting Limit

I - 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

CLIENT:

San Juan Refining

Lab Order:

0505088

Client Sample ID: OW 22+00

Collection Date: 5/10/2005 3:10:00 PM

Project:

Phase II Monitoring

Lab ID:

0505088-09

Matrix: AQUEOUS

Date: 27-May-05

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, Orthophosphate (As P)	ND	0.50		mg/L	1	5/11/2005
Sulfate	140	10		mg/L	20	5/17/2005
Nitrate (As 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
Sur: 4-Bromofluorobenzene	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: TOTAL RECOVERABLE N	IETALS					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
Chromium	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

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Laboratory
Analysis
Hall Environmental

CLIENT: Work Order: Project:	San Juan Refining 0505088 Phase Il Monitoring		·	·			QC	SUMM	QC SUMMARY REPORT Method Blank	ORT Blank
Sample ID MBLK Client ID:	Batch ID: R15366	Test Code; E300 Run ID: LC_0	E300 LC_050511A	Units: mg/L		Analysis SeqNo:	Analysis Date 5/11/2005 SeqNo: 361369	a.	l m	
Analyte	Result	PaL	SPK value	SPK Ref Val	%REC	LowLimit	LowLimit HighLimit RPD Ref Val		%RPD RPDLImit	Qual
Fluoride Chloride Phosphorus, Orthophosphate (As P)	ND ND Onosphate (As P)	0.1								
Sulfate Nitrate (As N)+Nitrite (As N)		0.1								
Sample ID MBLK Client ID:	Batch ID: R15404	Test Code: E300 Run ID: LC_0	E300 LC_050516A	Units: mg/L		Analysis SeqNo:	Analysis Date 5/16/2005 SeqNo: 362672	<u>a</u> .	Prep Date	
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RPD Ref Val		%RPD RPDLIMI	Qual
Fluoride Chloride Phosphorus, Orthophosphate (As P) Sulfate NItrate (As N)+NIIrite (As N)	ND 0.05255- 0.05255- O.05265- O.05265- O.05265- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506- O.0506	0.1 0.5 0.5 0.5		·						٦
Sample ID MBLK Client ID:	Batch ID: R15517	Test Code: E300 Run ID: LC_0	E300 LC_050526A	Units: mg/L		Analysis SeqNo:	Analysis Date 5/26/2005 SeqNo: 366186	۵	Prep Date	
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RPD Ref Val		%RPD RPDLImit	Qual
Ftuoride Chloride Phosphorus, Orthophosphate (As P) Sulfate Nitrate (As N)+Milrite (As N)	ND ND ND ND ND ND ND ND ND ND ND ND ND N	0.1 0.5 0.5 0.5								,
Qualifiers:	ND - Not Detected at the Reporting Limit		S - Spi	S - Spike Recovery outside accepted recovery limits	accepted reco	very limits	B - Analyte	detected in the	B - Analyte detected in the associated Method Blank	Blank

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

J - Analyte detected below quantitation limits

	San Juan Refining							QC SUMMARY REPORT	IMAR	Y REPC	RT
Work Order: 0505088 Project: Phase II I	0505088 Phase II Monitoring									Method Blank	lank
Sample ID Reagent Blank 5m	Batch ID: R15378	Test Code	Test Code: SW8021	Units: µg/L		Analysis	Date 5/13	Analysis Date 5/13/2005 8:43:30 AM	Prep Date	le	
Cllent ID:		Run ID:	PIDFID_050513A	13A		SeqNo:	361595	35			
Analyle	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ON	0.5									
Toluene	N	0.5						~			
Elhylbenzene	QN	0.5									
Xylenes, Total	CN	0.5									
Surr, 4-Bromofluorobenzene	19.54	0	20	0	7.78	83.3	121	0			
Sample ID Reagent Blank 5m	Balch ID: R15402	Test Code	Test Code: SW8021	Units: µg/L		Analysis	Date 5/16/	Analysis Date 5/16/2005 7:08:29 AM	Prep Date	e).	
Clent ID:		Run ID:	PIDFID_050516A	16A		SeqNo:	362600	00			
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	LowLimit HighLimit RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	NO	0.5									
Toluene	Q	0.5									
Ethylbenzene	QN	0.5									
Xylenes, Total	QN	0.5									
Surr: 4-Bromofluorobenzene	20.29	0	20	0	101	83.3	121	O			
Sample ID MB-7989	Batch ID: 7989	Test Code	est Code: SW7470	Units: mg/L		Analysis	Analysis Date 5/17/2005	2005	Prep Da	Prep Date 5/17/2005	
Cllent ID:		Run (D:	MI-LA254_050517A	0517A		SeqNo:	362937	7:			
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	LowLimit HighLimit RPD Ref Vai	%RPD	RPOLIMI	Qual
Mercury	QN	0.0002									Ì

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

NT:	San Juan Refining	OC STIMMARY REPORT
Order:	0505088	
		Method Blank

CLIENT:	San Juan Refining						QC SUM	QC SUMMARY REPORT
Work Order:	0505088							Mathad Dial
Project:	Phase II Monitoring					i		IVIGUIOU DIAIIK
Samule ID MB-7969	89 Balch (D: 7969	Test Code	Test Code: SW6010A	Unlls: ma/L		Analysis	Analysis Date 5/16/2005 1:06:22 PM	Prep Date 5/13/2005
Clent ID:		Run ID:	Run ID; 1CP_050516B			SeqNo:	362840	
Analyte	Result	POL		SPK value SPK Ref Val	%REC	LowLimit	%REC LowLimit HighLimit RPD Ref Val	%RPD RPDLImit Qual
Arsenic	ON	0.02						- Address - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer - Transfer -
Barium	QN	0.02						
Cadmlum	ON	0.002						
Chromlum	QN	0.006						
Lead	QN	0.005						
Selenium	QN	0.05						
Silver	QN	0.005						

Cunillers:	NO - Not Detected at the Reporting Limit	C. Spiles Becovery anteids accoming recovery limits	B. Analysis detected in the accoming Markey Blank
,	m gumandan an	chilling transport and a contract to the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contract of the contr	D. America delected in the historiated intention prints
	J - Applyte detected below quantitation limits	R - RPD outside nonenfed recovery limits	6
			<b>n</b>

CLIENT: San Juan Work Order: 0505088 Project: Phase II	San Juan Refining 0505088 Phase II Monitoring							QC SUMMARY REPORT Laboratory Control Spike - generic	MIMAR Control	QC SUMMARY REPORT aboratory Control Spike - generic	)RT neric
Sample ID LCS Cllent ID:	Batch ID: R15366	Test Code: E300 Run ID: LC 0	E300 LC_050511A	Units: mg/L		Analysis SeqNo:	Analysis Date 5/11/2005 SeqNo: 361370	/2005 70	Prep Date	ate	
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD	RPOLimit	Quaf
Fluoride	0.5049	0.1	0.5	0	5	06	110	-			
Chloride		0,1	τυ n	0 6	93,9	06	110	<b>с</b> с			
Prospnorus, Ormopnospnate (AS P) Sulfate	(AS P) 4.781 9.703	0.5	. t	<b>ب</b>	97.0	8 8	110	0 0			
Nitrate (As N)+Nitrite (As N)	3.329	0.1	3,5	0	95.1	06	110	0			
Sample ID LCS	Batch ID: R15404	Test Code: E300	E300	Units: mg/L		Analysis	Analysis Date 5/16/2005	2005	Prep Date	ale	
Cllent ID:		Run ID:	LC_050516A			SeqNa:	362675	5			
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Vai	%RPD	RPDLimit	Qual
Fluoride	0.5306	0.1	0.5	0	106	66	110	0			
Chloride	4.664	0.1	ស	0.05255	92.2	8	110	0			
Phosphorus, Orthophosphate (As P)	(As P) 4.747	0.5	Ċ	0	94.9	8	110	0			
Sulfate	9.524	0.5	10	0	95,2	06	110	0			
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	2005	Prep Date	ite	
Client ID;		Run ID:	LC_050526A			SeqNo:	366187	17			
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDL/mit	Qual
Fluoride	0.4586	0.1	0.5	0	91.7	06	110	0			
Chloride	4.665	0.1	_E	0	93.3	80	110	۵			
Phosphorus, Orthophosphate (As P)	(As P) 4.688	0.5	ທ	0	93.8	90	110	0			
Sulfate	9.338	0.5	10	0	93.4	90	110	0			,
Nitrate (As N)+Nitrite (As N)	3.306	0.1	3.5	0	94.5	90	110	0			

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 Ilmits ND - Not Detected at the Reporting Limit

Qualifiers:

13/16

CLIENT: San Juan Work Order: 0505088 Project: Phase II	San Juan Refining 0505088 Phase II Monitoring							QC SUM Laboratory (	QC SUMMARY REPORT Laboratory Control Spike - generic	EPOR
Sample ID BTEX Ics 100ng Clent ID:	Batch ID: R15378	Test Code: SW8021 Run ID: PIDFID	SW8021 U	Units: µg/L		Analysis SeqNo:	5 Date 5/14/20 362246	Analysis Date 5/14/2005 2:37:48 AM SeqNo: 362246	Prep Date	
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLIMI	Imit Qual
Benzene	20.32	0.5	20	0	102	88.7	114	0		
Toluene	20.41	0.5	20	0	102	89.3	112	0		
Ethylbenzene	21.21	0.5	20	0	106	88.6	113	0		
Xylenes, Total	61.73	0.5	09	0	103	89.4	112	O		
Sample ID BTEX Ics 100ng	Batch ID: R15402	Test Code:	SW8021	Units: pg/L		Analysis Date	Date 5/17/	5/17/2005 2:41:13 AM	Prep Date	
Client ID:		Run ID:	PIDFID_050516A	16A		SeqNo:	362506	£		
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	HighLimit RPD Ref Val	%RPD RPDLIMIt	imit Qual
Benzene	19.62	0.5	20	0	98.1	88.7	114	0		
Toluene	19.42	0.5	20	0	97.1	89.3	112	0		
Ethylbenzene	19.56	0.5	20	0	87.8	88.6	113	0		
Xylenes, Total	58.39	0.5	09	0	97.3	89.4	112	0		
Sample ID LCS-7989	Batch ID: 7989	Test Code: SW7470	SW7470	Units: mg/L		Analysis Date	Date 5/17/2005	2005	Prep Date 5/17/2005	7/2005
Clent ID:		Run ID:	MI-LA254_050517A	0517A		SeqNo:	362938	В		
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDLImit	Imit Qual
Mercury	0.004839	0.0002	0.005	0	96.8	75.2	134	٥		
Sample ID LCSD-7989	Batch ID: 7989	Test Code: SW7470	SW7470	Units: mg/L		Analysie	Analysis Date 5/17/2005	2005	Prep Date 5/17/2005	7/2005 ·
Client ID:		Run ID:	MI-LA254_050517A	0517A		SeqNo:	362962	2		
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD RPDL/mlt	imit Qual
Mercury	0.004773	0.0002	0.005	0	95.5	75.2	134	0.004839	1.35	0
						-				

B - Analyte detected in the associated Method Blank

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

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

Qualifiers:

CLIENT: San Juan Work Order: 0505088 Project: Phase II	San Juan Refining 0505088 Phase II Monitoring							QC SUMMARY REPORT Laboratory Control Spike - generic	[MAR]	X REPO	RT
Sample ID LCS-7969 Cilent ID:	Balch ID: 7969	Test Code: Run ID:	Test Code: SW6010A Run ID: ICP_050516B	Units: mg/L		Analysis SeqNo:	s Date 5/16/29 362841	Analysis Date 5/16/2005 1:09:21 PM SeqNo: 362841	Prep Da	Prep Dale 5/13/2005	
Analyte	Result	Pal	SPK value	SPK Ref Val	"REC	LowLimit	HighLimit F	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	. 0	102	80	120	0			
Cadmlum	0.5159	0.002	0.5	0	103	80	120	0			
Chromium	0.5079	0.006	0.5	0	102	80	120	0			
Lead	0.5041	0.005	0.5	0	101	80	120	0			
Selenlum	0,5057	0.05	0.5	۵	101	90	120	0			
Silver	0,5122	0.005	0.5	0	102	80	120	0			
Sample ID LCSD-7969	Batch ID: 7969	Test Code:	Test Code: SW6010A	Units: mg/L		Analysis	Date 5/16/20	Analysis Date 5/16/2005 1:12:23 PM	Prep Da	Prep Date 5/13/2005	
Cllent ID:		Run ID:	ICP_050516B			SeqNo:	362842				
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit R	RPD Ref Val	%RPD	RPDLlmit	Qual
Arsenic	0.5106	0.05	0.5	0	102	80	120	0.526	2.97	20	
Barlum	0.4946	0.02	0.5	0	0.80	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	9000	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	

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

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## Sample Receipt Checklist

Client Name SJR				Date and Time	Received:		5/1	1/2005
Work Order Number 0505088	. 1 a			Received by	GLS			
Checklist completed by Signature	lloppe_		5-/	11-05	_			
Malrix	Carrier name	<u>UPS</u>						
Shipping container/cooler in good condition?		Yes	abla	No 🗀	Not Present			
Custody seals intact on shipping container/cooler	?	Yes		No 🗆	Not Present	V	Not Shipped	
Custody seals intact on sample bottles?		Yes		No 🗆	N/A	$\checkmark$		
Chain of custody present?		Yes	V	No 🗆				
Chain of custody signed when relinquished and re	eceived?	Yes	V	No 🗀				
Chain of custody agrees with sample labels?		Yes	$\checkmark$	No 🗌				
Samples in proper container/bottle?		Yes	V	No 🗆				
Sample containers intact?		Yes	$\overline{\mathbf{v}}$	No 🗀				
Sufficient sample volume for indicated test?		Yes	$ \mathbf{V} $	No 🗆				
All samples received within holding time?		Yes	$\checkmark$	No 🗆				
Water - VOA vials have zero headspace?	No VOA vials subr	nitted		Yes 🗹	No 🗆	,		
Water - pH acceptable upon receipt?		Yes	$\checkmark$	No 🗀	N/A □			
Container/Temp Blank temperature?				4° C ± 2 Accepta				
COMMENTS:								
							<i>-</i>	
Client contacted	Date contacted:			Pers	on contacted	-		
Contacted by:	Regarding							
Comments:								<del></del>
				·····				<del></del>
			· ·					
					· · · · · · · · · · · · · · · · · · ·	<del></del>		
-								
Corrective Action								
			<del></del>				<del></del>	

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D Albuquerque, New Mexico 87109 Tel. 505.345.3975 Fax 505.345.4107 www.hallenvironmental.com	ANALYSIS REQUEST	{\delta\line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \line{\delta} \de	10 aniloza6 (lasaiO\s (\overline{\chi_0}, \overline{\chi_0}) (\overline{\chi_0}, \overline{\chi_0})	03 HGT - 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Std [	MASE II Montound		Project Manager:	Sample: - 1 Hutado/Angela Folk	Sample TemperAbure: //c-	Number/Volume HgCl ₂ HNO ₃ HNO ₃ HSAL No.	2-WA X   -1	(-250) H54 -1	1- 1-25.27	1-50ml X -1	2-10A X -2	J- 1984   00052-1	1-250 M	7- X mecs-1		Received By/Sighapurel 5-11-05	Received By: (Signature)
CHAIN-DF-CUSTODY RECORD Client: Sal Juda Rome	Address: #50 R 4990	(3/00mf.je/d, NM 87413		F:575-632-4161	Fax#: 505-632-3411	Date Time Matrix Sample I.D. No.	5-1005 830A 400 CWO+60				5-005 9154 40 CWI+50					Time:	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	s (8082)	alada 21, WO _q , WO _e , sicides / PCB' (AC)	HB310 (PM) HB 8310 (PM) HCRA B MM B ADDA Pest B081 Pest V B2508 (V B250) H PM PEST PEST PEST PEST PEST PEST PEST PEST		X X	X		× ×	×	
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HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D Albuquerque, New Mexico 87109 Tel. 505.345.3975 Fax 505.345,4107 www.hallenvironmental.com		s (8082) 5 (Y or N)	(150) 2° NO° 10° NO°	hod 8 A or F Cl, NC Cl, NC ticide ticide tody	### ##################################		X	*	X		×	×	X			
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	Blom Fill NM	81366	Phone #: 505-632- 4161	Fex#: 505-632-3911	Date Time Matrix Sample I.D. No.	5-10-05 35 Hzo 1 W3+85				5-1005 245pm H20 CW ST50				Trip Blank	Date: Time: Relinquished By: (Signature)  Date: Time: Relinquished By: (Signature)	

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D Albuquerque, New Mexico 87 109 Tel. 505, 345, 3975 Fax 505, 345, 4107			[4]1	(lasaid) (lasaid) (sog, sog)	604.1) PAH) ; 10 ₉ , NO ₂ , F 8s / PCB's	Hand Barbard 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 control of the control of the control of the c	HTEX + H TPH Med TPH (Med EDG (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC (Med PC	+	X	Ŧ	***	×	×	×	×		Remarks:	
QA/GC Package: Std ☐ Level 4 ☐ Other: Project Name:	Phase I Monitans			Project Manager:	Samplery Hutado Arescla Foll	adilipie (grippei atulie).	Number/Volume HgCl ₂ HNO ₃ OS7550 SK	3-164 X N	P- 250m0   華 HSdy - 4	Pund	1-500ml X \ \mathred{Mathrew 1-18}	2-10A X -9	1-250 M251	P-1-550/	1-500al X -09		Received My Mandalde) Z-11-05	Aceived By: (Signatufe)/
CHAIN-OF-CUSTODY RECORD	Ar Jum	OPPLESS: #50 PS 4990	Brown Lietd, UM		Phone #505-632-4/16/	100 - 30 - 632 - 39 11	Date Time Matrix Sample I.D. No.	5-10-05 245m HO (WZZ+00				5-10-05 310, He OWIZ +00					Time: 330pm	Date: Time: Relinquished Py: (Signature)



### **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

Dear Cindy Hurtado:

Order No.: 0505119

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 reeman, Business Manager Nancy McDuffie, Laboratory Manager



CLIENT:

San Juan Refining

Lab Order:

0505119

Client Sample ID: CW 23+10

Collection Date: 5/12/2005 8:30:00 AM

Project:

Phase II Monitoring

Lab ID:

0505119-01

Matrix: AQUEOUS

Date: 31-May-05

Analyses	Result	PQL	Qual Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS		- 1			Analyst: IC
Fluoride	0.59	0.10	mg/L	1	5/14/2005
Chloride	450	2.0	mg/L	20	5/25/2005
Phosphorus, Orthophosphale (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/∟	20	5/16/2005 10:37:05 PM
Xylenes, Total	350	10	µg/∟	20	5/16/2005 10:37:05 PM
Surr. 4-Bromofluorobenzene	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: TOTAL RECOVERABLE M	ETALS				Analyst: 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

CLIENT:

San Juan Refining

Lab Order:

0505119

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Project: Lab ID: Phase II Monitoring 0505119-02 Date: 31-May-05

Client Sample ID: CW 23+90

Collection Date: 5/12/2005 9:20:00 AM

Matrix: AQUEOUS

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, Nitrate (As N)	ПN	0.10	mg/L	1	5/14/2005
Phosphorus, Orthophosphate (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	μ <b>g/L</b>	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	μ <b>g/L</b>	20	5/16/2005 11:07:51 PM
Surr: 4-Bromofluorobenzene	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: TOTAL RECOVERABLE N	IETALS				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

CLIENT:

San Juan Refining

Lab Order:

0505119

0303119

Phase II Monitoring

Project: Lab ID:

0505119-03

Date: 31-May-05

Client Sample ID: CW 25+95

Collection Date: 5/12/2005 10:10:00 AM

Matrix: AQUEOUS

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 (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	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	ПN	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-Bromofluorobenzene	100	83.3-121		%REC	1	5/16/2005 11:38:28 PM
EPA METHOD 7470: MERCURY						Analyst: CMC
Mercury	DN	0.00020	٠.	mg/L	1	5/26/2005
EPA 6010: TOTAL RECOVERABLE N	IETALS				•	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
Silver	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

CLIENT:

San Juan Refining

Lab Order:

0505119

Phase II Monitoring

Project: Lab ID:

0505119-04

Date: 31-May-05

Client Sample ID: OW 25+70

Collection Date: 5/12/2005 10:20:00 AM

Matrix: AQUEOUS

Analyses	Result	PQL	Qual I	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: IC
Fluoride	0.53	0.10	n	ng/L	1	5/14/2005
Chloride	50	1.0	n	ng/L	10	5/25/2005
Nitrogen, Nitrite (As N)	ND	0.10	п	ng/L	1	5/14/2005
Nitrogen, Nitrate (As N)	ND	0.10	п	ng/L	1	5/14/2005
Phosphorus, Orthophosphate (As P)	ND	0.50	n	ng/L	1	5/14/2005
Sulfate	350	5.0	ภ	ng/L	10	5/25/2005
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Benzene	0.79	0.50	ļ	ıg/L	1	5/17/2005 12:09:01 AM
Toluene	ND	0.50	1	ug/L	1	5/17/2005 12:09:01 AM
Ethylbenzene	ND	0.50	}	ug/L	1	5/17/2005 12:09:01 AM
Xylenes, Total	ND	0.50	ļ.	ug/L	1	5/17/2005 12:09:01 AM
Sum 4-Bromofluorobenzene	101	83.3-121	9	%REC	1	5/17/2005 12:09:01 AM
EPA METHOD 7470: MERCURY						Analyst: CMC
Mercury	ND	0.00020	Г	ng/L	1	5/26/2005
EPA 6010: TOTAL RECOVERABLE N	METALS					Analyst: CMC
Arsenic	0.14	0.10	r	mg/L	5	5/18/2005 2:48:09 PM
Barium	25	2.0	r	mg/L	100	5/18/2005 3:22:11 PM
Cadmium	ND	0.010	ſ	mg/L	5	5/18/2005 2:48:09 PM
Chromium	0.44	0.030	Г	mg/L	5	5/18/2005 2:48:09 PM
Lead	0.13	0.025	r	mg/L	5	5/18/2005 2:48:09 PM
Selenium	ND	0.25	Г	mg/L	5	5/18/2005 2:48:09 PM
Silver	ND	0.025		mg/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

Date: 31-May-05

CLIENT: Lab Order: San Juan Refining

0505119

Client Sample ID: OW 23+90

Collection Date: 5/12/2005 12:30:00 PM

Project: Lab ID: Phase II Monitoring

0505119-05

Matrix: AQUEOUS

Analyses	Result	PQL Q	ual 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 (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	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	μ <b>g/</b> 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-Bromofluorobenzene	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

CLIENT:

San Juan Refining

Lab Order:

0505119

Phase II Monitoring

Project: Lab ID:

0505119-06

Date: 31-May-05

Client Sample ID: OW 23+10

Collection Date: 5/12/2005 1:00:00 PM

Matrix: AQUEOUS

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		µg/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 N	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

Date: 31-May-05

CLIENT:

San Juan Refining

Client Sample ID: Trip Blank

Lab Order:

0505119

Collection Date:

Project:

Phase II Monitoring

Lab ID:

0505119-07

Matrix: TRIP BLANK

Analyses	Result	PQL Qua	l Units	DF	Date Analyzed
EPA METHOD 8021B: VOLATILES		-			Analyst: NSB
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
Elhylbenzene	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-Bromofluorobenzene	97.4	B3.3-121	%REC	1	5/17/2005 2:10:51 AM

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

**QC SUMMARY REPORT** 

Date: 31-May-05

Method Blank

Phase II Monitoring San Juan Refining 0505119 Work Order: CLIENT: Project:

Qual %RPD RPDLImit Prep Date Prep Date LowLimit HighLimit RPD Ref Val Analysis Date 5/12/2005 Analysis Date 5/12/2005 361746 361769 SeqNo: SeqNo: %REC Units: mg/L Units: mg/L SPK value SPK Ref Val LC_050512A Test Code: E300 Test Code: E300 Pal 0.1 0.1 Run ID: 0.1 222222 Result Batch ID: R15380 Batch ID: R15380 Phosphorus, Orthophosphale (As P) Nitrate (As N)+Nitrite (As N) Nitrogen, Nitrate (As N) Nitrogen, Nitrite (As N) Sample ID MBLK Client ID: Chloride Analyte Fluoride

SPK value SPK Ref Val LC_050512A 0.5 ם 0.1 Run ID: 9999999 Result Phosphorus, Orthophosphate (As P) Nitrate (As N)+Nitrite (As N) Nitrogen, Nitrale (As N) Nitrogen, Nitrite (As N) Sample ID MB Client ID: Chloride Fluoride Analyte Sulfate

Qual

%RPD RPDLImit

LowLimit HighLimit RPD Ref Val

%REC

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

Qualifiers:

B - Analyte detected in the associated Method Blank S - Spike Recovery outside accepted recovery limits

R - RPD autside accepted recovery limits

CLIENT:	San Juan Refining						0C	SUMIMA	QC SUMMARY REPORT	RT
Work Order: Project:	0505119 Phase II Monitoring					Í			Method Blank	lank
Sample ID MB	Balch ID: R15380	Test Code: E300	E300	Units: mg/L		Analysis	Analysis Date 5/14/2005	Ргар	Prep Date	
Cllent ID:		Run ID:	LC_050512A			SeqNo:	362063			
Analyle	Result	Pal	SPK value	SPK value SPK Ref Val	%REC	LowLimit	%REC LowLimit HighLimit RPD Ref Val		%RPD RPDLImit	Qual
Fluoride	ON.	0.1	0	0	0	0	0			
Chloride	QN	0.1	0	0	0	0	. 0	0		
Nitrogen, Nitrite (As N)	QN (Z	0.1	0	0	0	0	0			
Nitrogen, Nitrate (As N)	ON (N	0.1	0	0	0	0	0	2		
Phosphorus, Orthophosphate (As P)	ND (As P)	0.5	O	0	D	0	0			
Sulfate	0.1124	0.5	0	0	0	0	٥	n		7
Nitrate (As N)+Nitrite (As N)	(As N)	0.1	0	0	0	0	0			
Sample ID MBLK	Batch (D; R15502	Test Code: E300	E300	Units: mg/L		Analysis	Analysis Date 5/25/2005	Prep	Prep Date	
Cllent ID:		Run ID:	Run ID: LC_050525A			SeqNo:	365704			

1	쏲	2
	B - Analyte detected in the associated Method Blan	
	S - Spike Recovery outside accepted recovery limits	R - RPD outside accepted recovery limits
	ND - Not Detected at the Reporting Limit	J - Analyte detected below quantitation limits
	Qualifiers:	

Analyle Fluoride

%RPD RPDLimit Qual

%REC LowLimit HighLimit RPD Ref Val

SPK value SPK Ref Val

Ва

Result

0.1 0.1 0.1 0.5 0.5

9999999

Nitrogen, Nitrate (As N) Phosphorus, Orthophosphate (As P)

Chloride Nilrogen, Nitrite (As N) Sulfate Nitrate (As N)+Nitrite (As N)

CLIENT:	San Juan Refining QC SUMMARY REPORT
Work Order:	0505119 Method Blank
Project:	Phase II Monitoring

Sample ID Reagent Blank 5m	Batch ID: R15402	Test Code: SW8021	:: SW8021	Units: pg/L		Analysis	Date 5/16/2	Analysis Date 5/16/2005 7:08:29 AM	Prep Date	
Cllent ID:		Run ID:	PIDFID_050516A	16A		SeqNo:	362600	0		
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	LowLimit HighLimit RPD Ref Val	RPD Ref Val	%RPD RPDLImit	Imit Qual
Benzene	S	0.5								
Toluene	QN	0.5								
Ethylbenzene	ON	0.5								
Xylenes, Total	ON	0.5								
Surr: 4-Bromofluorobenzene	20.29	0	20	0	101	83.3	121	٥		
Sample ID Reagent Blank 5m	Batch ID: R15413	Test Code: SW8021	: SW8021	Units: µg/L		Analysis	Date 5/17/2	Analysis Date 5/17/2005 8:39:57 AM	Prep Date	
Cilent ID:		Run ID:	PIDFID_050517A	17A		SeqNo:	362968	æ		
Analyte	Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	LowLimit HighLimit RPD Ref Val	RPD Ref Val	%RPD RPDLImit	Imit Qual
Benzene	QN	0.5								
Taluene	₽.	0.5								
Elhylbenzene	QN	0.5								
Xylenes, Total	S	0.5								
Surr; 4-Bromofluorobenzene	19.76	0	20	0	98.8	83.3	121	0		
Sample ID MB-8047	Batch ID; 8047	Test Code: SW7470	: SW7470	Unlfs: mg/L		Analysis	Analysis Date 5/26/2005	.005	Prep Dato 5/26/2005	3/2005
Client ID:		Run ID:	MI-LA254_050526A	3526A		SeqNo:	366067			
Analyte	Result	PaL		SPK value SPK Ref Val	%REC	LowLimit	LowLimit HighLimit RPD Ref Val	RPD Ref Val	%RPD RPDLIMI	imit Qual
Mercury	QN	0.0002								

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

CLIENT: Work Order: Project:	San Juan Refining 0505119 Phase II Monitoring						QC SUM	QC SUMMARY REPORT  Method Blank	Y REPORT Method Blank	F를
Sample ID MB-7986 Clent ID:	36 Batch ID: 7986	Test Code	Test Code: SW6010A Run ID: ICP_050518A	Units: mg/L		Analysis SeqNo:	Analysis Date 5/18/2005 1:00:33 PM SeqNo: 363313	Prep Date 5/17/2005	17/2005	
Analyte	Result	Pal		SPK value SPK Ref Val	%REC	LowLimit	WREC LowLimit HighLimit RPD Ref Val	%RPD RPDLimit		Qual
Arsenic Barlum Cadmlum Chromlum Lead Selenlum Silver	2	0.02 0.002 0.002 0.006 0.005 0.005		·						

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 Qualifiers:

11/16

Date: 31-May-05

Laboratory Control Spike - generic QC SUMMARY REPORT

Hall Environmental Analysis Laboratory

Phase II Monitoring San Juan Refining 0505119 Work Order: CLIENT: Project:

Sample ID LCS	Batch ID: R15380	Test Code: E300	E300	Units: mg/L		Analysis	Analysis Date 5/12/2005	ស	Prep Date	ale	
Cllent ID:		Run ID:	LC_050512A			SeqNo:	361747				
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	LowLimit HighLimit RPD Ref Val	'D Ref Val	%RPD	RPDLinit	Qual
Fluoride	0.5047	0.1	0.5	0	101	06	110	0			
Chloride	4.755	0.1	S	0	95.1	06	110	0			
Nitrogen, Nitrite (As N)	0.9372	0.1	1	0	93.7	06	110	٥			
Nitrogen, Nitrate (As N)	2.449	0.1	2.5	0	98.0	90	110	0			
Phosphorus, Orthophosphate (As P)	(As P) 4.836	0.5	ស	0	96.7	06	110	0			
Sulfate	699.6	0.5	10	0	6.7	06	110	0			
Nitrate (As N)+Nitrite (As N)	3.386	0.1	3.5	o	96.7	06	110	O			
Sample ID LCS	Balch (D: R15380	Test Code: E300	E300	Units: mg/L		Analysis	Analysis Date 5/12/2005	a	Prep Date	le	
Cllent ID:		Run ID:	LC_050512A			SeqNo:	361770				
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit RPD Ref Val	D Ref Val	%RPD	RPOLimit	Qual
Fluoride	0.5233	0.1	0.5	0	105	90	110	0			
Chloride	4.89	0.1	מו	0	97.8	06	110	0			
Nitrogen, Nitrite (As N)	0.978	0.1	-	0	97.8	80	110	0			
Nitrogen, Nitrate (As N)	2.507	0.1	2.5	0	100	86	110	0			
Phosphorus, Orthophosphate (As P)	As P) 5.19	0.5	τυ	0	104	80	110	0			
Sulfate	9.994	0.5	10	0	99.9	90	110	0			
Nitrate (As N)+Nitrite (As N)	3.485	0.1	3.5	0	93.6	90	110	۵			

S - Spike Recovery outside accepted recovery limits R - RPD outside accepted recovery limits J - Annlyte detected below quantitation limits ND - Not Detected at the Reporting Limit Qualifiers:

B - Analyte detected in the associated Method Blank

CLIENT: Work Order: Project:	San Juan Refining 0505119 Phase Il Monitoring	·							QC SUMMARY REPORT Laboratory Control Spike - generic	AIMAR' Control 8	Y REPC	)RT meric
Sample ID LCS Cllent ID:	Batch ID: R15380	08	Test Code: E300 Run ID: LC_0	E300 LC_050512A	Units: mg/L		Analysis SeqNo:	Analysis Date 5/14/2005 SeqNo: 362064	2005	Prep Date	te	
Analyte		Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLImit	Qual
Fluoride	0	0.516	0.1	0.5	0	103	8	110	0			
Chloride	4	4.744	0.1	S	0.	94.9	80	110	0			
Nitrogen, Nitrito (As N)		0.9562	0.1	<del>, -</del>	0	95.6	90	110	0			
Nitrogen, Nitrate (As N)		2.427	0.1	2.5	0	97.1	90	110	0			
Phosphorus, Orthophosphate (As P)		4.845	0.5	5	0	96.9	90	110	O			
Sulfate		9.712	0.5	10	0.1124	96.0	90	110	0			
Nitrate (As N)+Nitrite (As N)		3.383	0.1	3.5	0	200.7	90	110	0			
Sample ID LCS	Batch ID; R15502	12	Test Code:	E300	Units: mg/L		Analysis Dale	s Date 5/25/2005	2005	Prep Date	le	
Cilent ID:			Run ID:	LC_050525A			SeqNo:	365705	ເກ			
Analyte	ũ	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLImit	Qual
Fluoride	0.5	0.5249	0.1	0.5	0	105	90	110	0			
Chloride	4	4,589	0.1	5	0	91.8	90	110	0			
Nitrogen, Nitrite (As N)		0.9075	0.1	-	0	90.8	06	110	0			
Nitrogen, Nitrate (As N)		2.328	0.1	2.5	0	93.1	90	110	0			
Phosphorus, Orthophosphate (As P)		4.656	0.5	5	0	93.1	90	110	0			
Sulfate	6	9.366	0.5	10	0	93.7	90	110	0			
Nitrate (As N)+Nitrite (As N)		3.236	0.1	3.5	٥	92.4	90	110	0			
Sample ID BTEX I	BTEX lcs 100ng Batch ID: R15402		Test Code: SW8021	SW8021	Units: µg/L		Analysis Date		5/17/2005 2:41:13 AM	Prep Date	e	
Cllent ID:			Run ID:	PIDFID_050516A	16A		SeqNo:	362606	10			
Analyte		Result	POL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLImit	Qual
Benzene		19.62	0.5	20	0	98.1	88.7	114	0			
Toluene	-	19.42	0.5	20	0	97.1	89.3	112	0			
Ethylbenzene	<del></del>	19.56	0.5	20	0	97.8	88.6	113	Q			
Xylenes, Total		58.39	0.5	09	0	97.3	89.4	112	0			
Qualifiers:	ND - Not Detected at the Reporting Limit	ng Limit		S - Spi	S - Spike Recovery outside accepted recovery limits	accepted reci	overy limits		B - Analyte detected in the associated Method Blank	in the associa	icd Method B	lenk
	J - Analyte detected below quantitation limits	tation limit	101	R - RP	R - RPD outside accepted recovery limits	ecovery limit					•	2
				<u>:</u>		7	,					4

Sample ID BTEX Ics 100ng Backlient ID: Analyte	9										Laboratory Country Spine Benefit
Analyte Renzene	Balch ID: R15413	Test Code: Run ID:	SW8021 U	Units: µg/L 17A		Analysis Date SeqNo:	Date	5/17/2005 10:39:14 PM 363019	Prep Date	ate	
Наплене	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimIt	RPD Ref Val	%RPD	RPDLImit	Qual
	19.19	0.5	20	0	95.9	88.7	114	0			
Toluene	19.54	0.5	20	0	5.76	89.3	112	0			
Ethylbenzene	19,59	0.5	20	0	97.9	88.6	113	0			
Xylenes, Total	59.19	0.5	90	0	98.7	89.4	112	0			
Sample ID LCS-8047 Ba	Batch ID: 8047	Test Code:	SW7470	Units: mg/L		Analysis Date	s Date 5/26/2005	2005	Prep Da	Prep Date 5/26/2005	
Cllent ID:	•	Run (D:	MI-LA254_050526A	J526A		SeqNo:	366068	92			
Analyte	Result	Pal	SPK value	SPK Ref Val	"REC	LowLimit	HighLimlt	HighLimlt RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.004958	0.0002	0.005	0	99.2	75.2	134	0			
Sample ID LCSD-8047 Ba	Batch ID: 8047	Test Code: SW7470	SW7470	Units: mg/L		Analysis	AnalysIs Date 5/26/2005	2005	Prep Da	Prep Date 5/26/2005	
Cllent ID:		Run ID:	MI-LA254_050526A	)526A		SeqNo:	366084	4			
Analyte	Result	POL	SPK value	SPI¢ Ref Val	%REC	LowLimit	HighLimlt	RPD Ref Val	%RPD	RPDLImit	Qual
Mercury	0.005284	0.0002	0.005	0	106	75.2	134	0.004958	6.36	0	
Sample ID I,CS-7986 Ba	Batch ID: 7986	Test Code: SW6010A	SW6010A	Units: mg/L		Analysis	Date 5/18/2	Analysis Date 5/18/2005 1:03:29 PM	Prep Da	Prep Date 5/17/2005	
Client ID:		Run ID:	ICP_050518A			SeqNo:	363314	4			
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPOLimit	Qual
Arsenic	0.528	0.02	0.5	0.	106	80	120	0			
Barlum	0.5084	0.02	0.5	0	102	80	120	O			
Cadmlum	0.5097	0.002	0.5	0	102	80	120	0			
Chromlum	0.5011	0,006	0.5	0	100	8	120	0			
Lead	0.4976	0.005	0.5	0	99.5	88	120	0			·
Selenium	0.4864	0.05	0.5	0	97.3	80	120	0			
Silver	0.5102	0.005	0.5	D	102	80	120	0			
Qualifiers: ND - Not Detected	ND - Not Detected at the Reporting Limit		S - Spil	S - Spike Recovery outside accepted recovery limits	accepted reco	very limits		B - Annlyte detected in the associated Method Blank	n the associ	ated Method Bl	ank
J - Analyte detected	J - Analyte detected below quantitation limits	ik	R - RP	R - RPD outside negented recovery limits	covery limits						~

Laboratory Control Spike Duplicate QC SUMMARY REPORT Phase II Monitoring San Juan Refining 0505119 Work Order: CLIENT: Project:

Sample ID LCSD-7986	Batch ID: 7986	Test Code:	Fest Code: SW6010A	Units: mg/L		Analysis	Date 5/18/	Analysis Date 5/18/2005 1:06:28 PM	Prep Da	Prep Dale 5/17/2005	
Client ID:		Run ID:	ICP_050518A	-		SeqNo:	363315	22			
Analyte	Result	Pal	SPK value	SPK Ref Val	%REC	LowLimit	HighLimll	LowLimit HighLimit RPD Ref Val	%RPD	RPDLImit	Qual
Arsenic	0.5204	0.02	0.5	0	104	80	120	0,528	1.44	20	İ
Barlum	0.5108	0.02	0.5	0	102	80	120	0.5084	0.483	20	
Cadmlum	0.5099	0.002	0.5	0	102	80	120	0.5097	0.0392	20	
Chromlum	0.5056	0.006	0.5	O	101	80	120	0.5011	0.894	20	
Lead	0.4979	0.005	0.5	0	9.66	80	120	0.4976	0.0656	20	
Selenium	0.4785	0.05	0.5	0	95.7	80	120	0,4864	1.65	20	
Sliver	0.5105	0.005	0.5	0	102	80	120	0.5102	0.0645	20	

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 Qualifiers:

15/16

# Sample Receipt Checklist

Client Name SJR		Date and Time	Received:	5/13/2005
Work Order Number 0505119		Received by	GLS	
Checklist completed by Signature	. Sale	13-05	<u> </u>	
Matrix Carrier	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 🔽	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 via	is submitted	Yes 🗹	No 🗆	
Water - pH acceptable upon receipt?	Yes 🗹	No 🗆	N/A □	
Container/Temp Blank temperature?	1°	4° C ± 2 Accepta		
COMMENTS:				
Client contacted Date contacted	ed:	Pers	on contacted	
Contacted by: Regarding				
Comments:				
Carrective Action	···			

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D Albuquerque, New Mexico 87109	Tel. 505.345.3975 Fax 505.345.4107 www.hallenvironmental.com	ANAWSIS REQUEST		3085)	3) s'8	^{3,} NO	etals sioides (AO) ni-VOv	MAD OFEA MADA OFEA BAND OFEA BAND OFEA OFEA OFEA OFEA OFEA OFEA OFEA OFEA		X	X	X		×	X	X			
		V	ابک	nO anilo:	]/seg	H9T - 1 82 1 (1.81	+ 381 .08 bo 14 bor	BTEX + M TPH (Meth TPH (Meth TPH (Meth	X				X						Remarks:
OA/OC Package: Std 🔲 Level 4 🗀 Other:	Phase I Menitorina			Project Manager:		Sampleri - Affurtido/Angela Folk	Sample Température:	Number/Yolume HgC!2 HND3 OSO5119	2-10A-X -1	1-350ml H250y -1	1-20ml	1-Som   X	5-104 X X	2- 1841 \ Pm 252-1	1-250ml	2- X mas-1			Received By: (Signature)
	WENT SAN JUAN RETINING	Address: #57 Ce 4990	13/00m feld NM 1844/3			1:505-632-4161	Fax#: SDS-632-3911	Date Time Matrix Sample I.D. No.	5-1205 830 MD CWZ3+10				5-12.05 YOMM 1/20 CW 23+90				7		Date: Time: Relinquished By: (Signature)  1-17-06 330 pm (www.) Mul. (2007)  Date: Time: Relinquished By: (Signature)

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HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Sulte D Albuquerque, New Mexico 87109 Tel. 505.345.3975 Fax 505.345.4107 www.hallenvironmental.com	ANAVOE REQUEST	8085)	7 or PAA) Salst Dq. ₁₀ 0 v. ₁₀ 0 v. (2 De '80 V eabioi (AC)	### ##################################		*	X	×		X	×.			
	(	ylnO əniloz	18E + 1MB & (Ga 18E + 1PH (Gas/ 18	BTEX + Methory	٠,				×	,				Remarks:
	Project #:	Project Manager:	Sample Tentperature:	Number/Yolume HgCl ₂ HNO ₃ HEAL No.	2-VOA X -3	1-35ml 1158y -3	1-250m	1-500ml X -3	5-10A-5	1-252-1 Juss-1	1-250 m	1-500mg X 0mgs-1		Repeived By (Significations) S-13-05 F
CHAIN-OF-CUSTODY RECORD	Address: #50 Pd 4990		Phone #: 505-633-4166 Fax #: 505-632-3911	Date Matrix Sample 1.D. No.	51205 1010A+ HO CWZ5+95				5-12-05 1020A HZD OW 25-4-7-0				<	Date: Time: Refinquished By: (Signature)  5-12-05 330 M

HALL ENVIRONMENTAL ANALYSIS LABORATORY 4901 Hawkins NE, Suite D	Anouquerque, New Mexico 67 103 Tel. 505.345.3975 Fax 505.345.4107 www.hallenvironmental.com	(8082)	. (NSO8 bor And no A etals (N NO ₂ , NO ₂ , P sioides / PC8's	### BOC (Met) ####################################		×	×	×		×	×	×		Amount of SAmple - Wellskept up - Do what you Can
	### ### ##############################			><				X				X	Remarks: Limited drying	
Accreditation App, NELAC ☐ USACE ☐ Other:	Project Name: PMSE I Man, Follows Project #:	Project Manager:	Sample Temperature:	Number/Volume HgCl ₂ HNO ₃ D<7757   Cl		1-250ml H2Bcy -5	1-25me -5		2-104 X -6	1-250h   H204 -6	1-2600	1-5mm/ X -6	1-40°C X	Received By: (Signature) S-13-05 A (M/ (M/ (0, 1240) Aeceived By: (Signature)
CHAIN-OF-CUSTODY RECORD	Client: SAN JUAN Refuning Address: #50 Rd 4990		Phone #: 505-632-4 /6/ Fax #: 505-632-3911	Date Time Matrix Sample I.D. No.	57204 128pm 490 0W 23 +90				42-05 1pm H20 0WZ3+10				Hrip blank	Date: Time: Relinquished By: [Signature] Date: Time: Relinquished By: (Signature)

# **APPENDIX J**

Field Sampling Methods

## 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 =  $[(Total\ Well\ Depth) - (Depth\ to\ Liquid)] \times (Conversion\ Factor) \times 3$ 

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.

# Soil Sampling

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±2° 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-of-custody 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-of-custody 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 Ouality 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** 

# 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.

## Field Testing

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					
рН	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 lbs/ft³
- 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  $10^{-7}$  cm/sec. Results reported by Sierra Testing Laboratories are included in Appendix C of this IM Implementation Report.