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REPORTS

YEAR(S):

2006

MALCOLM PIRNIE

INDEPENDENT ENVIRONMENTAL
ENGINEERS, SCIENTISTS
AND CONSULTANTS

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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 L. Tucker

Dennis Tucker, P.E., BCEE
Senior Associate

Enclosure

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

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1.0 INTRODUCTION

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 river-side 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 2.01×10^{-8} cm/s to 6.90×10^{-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

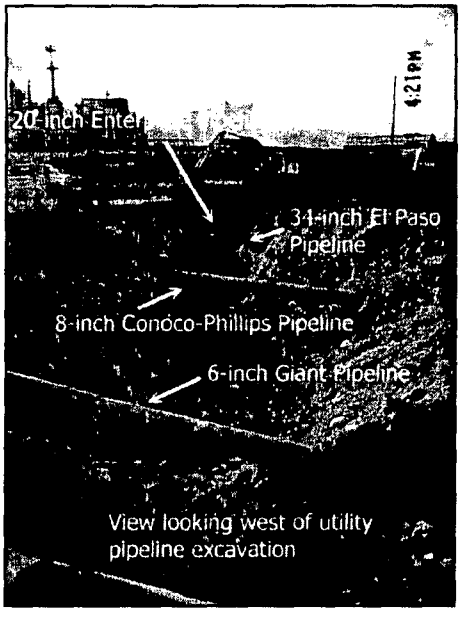
The original intent was to first expose all utility pipelines that crossed the barrier alignment, and encase them in concrete. This is referred to as a "dry tie-in" approach. The concrete encasement was to protect the utilities from damage during excavation of the trench. This procedure was used for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

3.0 FLUIDS COLLECTION SYSTEM

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 separate-phase 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.

4.0 REFERENCES

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

Table 1: Summary of T[redacted]h Spoils Analytical Results

Interim Measures Implementation Report
Giant Refinery - Bloomfield, New Mexico

		EPA Method 8015B			EPA Method 418.1	EPA Method 8021B						
		Diesel Range Organics (DRO) (mg/kg)	Motor Oil Range Organics (MRO) (mg/kg)	Gasoline Range Organics (GRO) (mg/kg)	Petroleum Hydrocarbons, TPH (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl benzene (mg/kg)	Xylenes, Total (mg/kg)	p,m-Xylene (mg/kg)	o-Xylene (mg/kg)	Methyl tetra-butyl ether (MTBE) (mg/kg)
New Mexico SSLs -->		1120 mg/kg [1]	890 mg/kg[1]	NA		8.08 mg/kg[2]	252 mg/kg[2]	128 mg/kg[2]	132 mg/kg[2]			.00667 mg/kg[2]
Sample Date	**Sample ID**											
2/9/2005	0' - 300'	17	< 50	260	NA	NA	NA	NA	NA	NA	NA	NA
2/10/2005	300' - 600'	68	< 50	350	NA	NA	NA	NA	NA	NA	NA	NA
2/10/2005	600' - 900'	150	< 50	76	NA	NA	NA	NA	NA	NA	NA	NA
2/22/2005	900' - 1200'	11	< 50	40	NA	< 0.025	< 0.025	< 0.025	0.5	NA	NA	NA
3/5/2005	1500' - 1800'	15	< 50	120	NA	0.12	0.29	0.92	6.2	NA	NA	NA
3/6/2005	1800' - 2100'	< 10	< 50	130	NA	0.36	0.33	1.7	8	NA	NA	NA
3/16/2005	2100' - 2300'	NA	NA	NA	< 20	<0.025	< 0.025	< 0.025	< 0.025	NA	NA	< 0.1
3/6/2005	2300' - 2600'	< 10	< 50	7.4	NA	< 0.025	< 0.025	< 0.025	0.079	NA	NA	NA
9/16/2005	Slurry Wall Comp.	< 0.1	NA	1.5	NA	0.0041	0.016	0.08	NA	0.72	0.19	NA

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

Interim Measures Implementation Report
Giant Refinery - Bloomfield, New Mexico

Well ID	Measuring Point Elevation Prior to February 2006 (above msl)	Measuring Point Elevation 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

Interim Measures Implementation Report
Giant Refinery - Bloomfield, New Mexico

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

Interim Measures Implementation Report
Giant Refinery - Bloomfield, New Mexico

Well ID	Date of Sample	Conductivity (mmhos/cm)	pH (Std. Units)	Temperature (° F)	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	55	1023
CW 1+50	5/10/05	1463	6.86	56	1084
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

Interim Measures Implementation Report
Giant Refinery - Bloomfield, New Mexico

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

Notes:

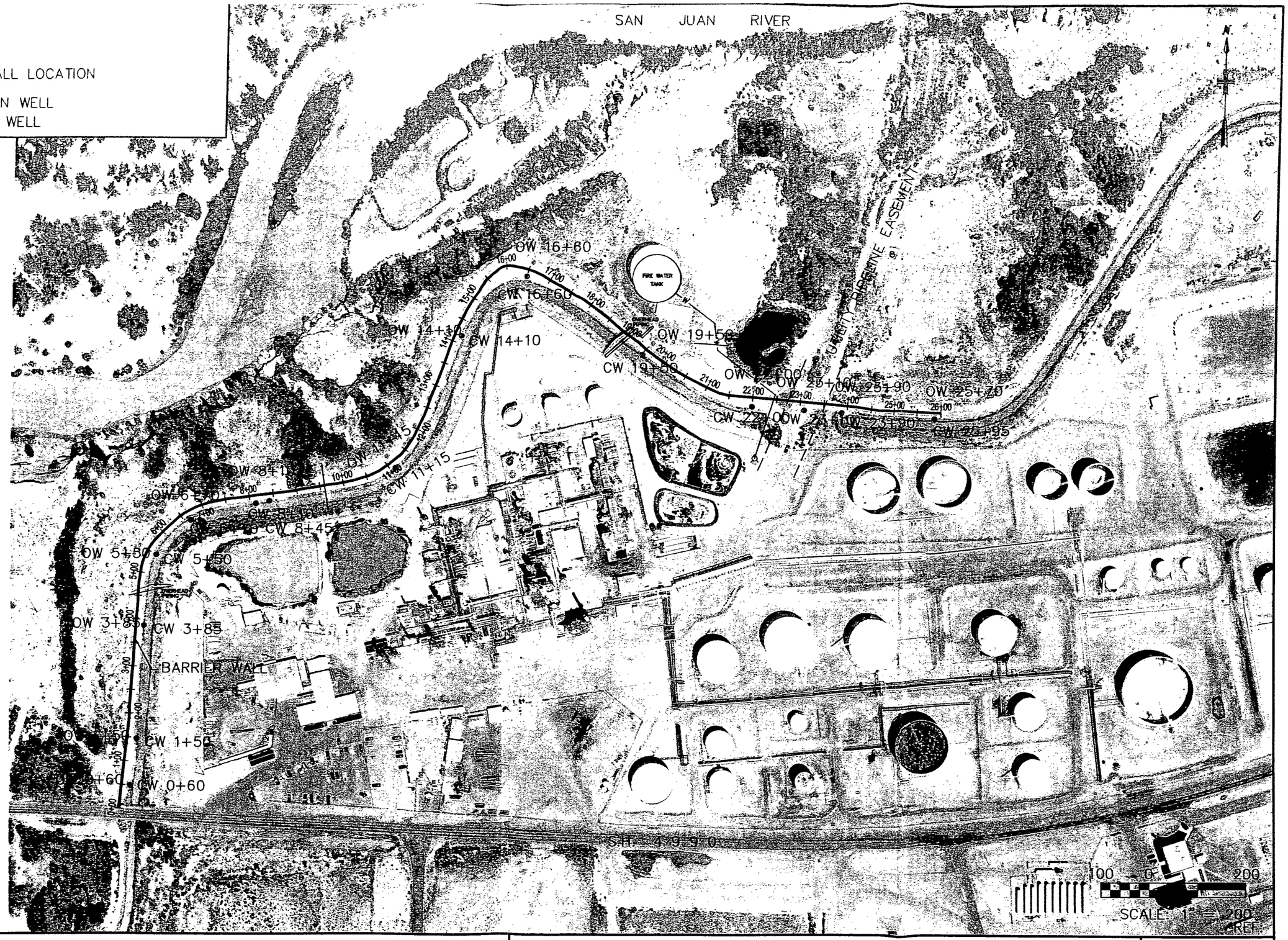
SPH = Well Contains Separate Phase Hydrocarbon - No Sample
NA = Not Enough Water in the Well to Sample - Not Analyzed
NS = Well is Dry - No Sample

LEGEND:

BARRIER WALL LOCATION

OBSERVATION WELL

COLLECTION WELL



MALCOLM PIRNIE

GIANT REFINERY
BLOOMFIELD, NEW MEXICO

INTERIM MEASURES IMPLEMENTATION REPORT

OBSERVATION AND COLLECTION WELL LOCATION MAP

SCALE: 1"=200'

MALCOLM PIRNIE, INC.

JUNE 2006

FIGURE-1

NACIMIENTO SURFACE PROFILE

100 0 200

SCALE: 1" = 200'

REF:

MALCOLM PIRNIE

GIANT REFINERY
BLOOMFIELD, NEW MEXICO

INTERIM MEASURES IMPLEMENTATION REPORT

FLUIDS PROFILE ALONG BARRIER ALIGNMENT

SCALE: 1"=200'

MALCOLM PIRNIE, INC.

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

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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

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

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.

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 (Ft^2/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

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 (ft)	Hydraulic Conductivity (cm / sec)
12 - 12.5	6.0×10^{-7}
9.5 – 10.5	1.2×10^{-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.

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 No.	**Transmissivity** (ft^2 / day)	**Hydraulic Conductivity** (ft/day)	**Storativity** (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:

$$Q = \frac{K\ I\ A}{\eta}$$

where

K = 150 ft/day

η = 40% porosity

I = .002ft/ft gradient

A = 2600 feet x 2 feet saturation

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

5.5 ADDITIONAL MONITORING PLAN

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

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.

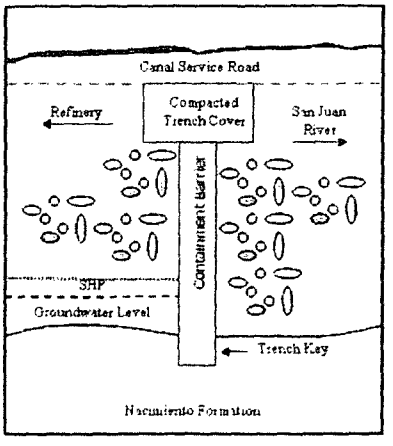
6.0 PROPOSED CORRECTIVE ACTION PLAN

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.

Barrier Concept



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

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:

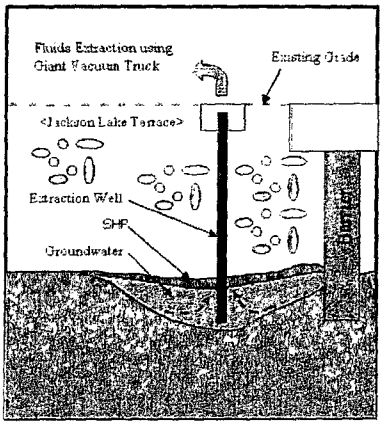
- Tank 37 (French Drain Collection System), located approximately 50 feet east of SB1-0704,
- Fire water supply pipeline, located approximately 100 feet west of the El Paso Pipeline easement, and
- El Paso Natural Gas Pipelines, located within a 100-foot easement west of P8 (SB7-1103).

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.

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 Collection System



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.

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.

TABLES

TABLE 1

Groundwater and Phase-Separated Hydrocarbon (PSH) Level Data

Well ID	Date of Data Collection	Field Data			Data Interpretation		
		Total Boring Depth Below Grade (ft)	Depth to Water Below Grade (ft)	Depth to SPH Below Grade (ft)	Depth to Nacimiento Below Grade (ft)	Water Depth on top of Nacimiento (ft)	SPH Depth on Top of Groundwater (ft)
MW-47	8/16/2004	14.28	8.86	7.68	10.2	1.34	1.18
	10/13/2004	14.28	8.59	7.54	10.2	1.61	1.05
MW-46	8/16/2004	10.39	ND	ND	6.5	0	0
	10/13/2004	10.39	ND	ND	6.5	0	0
SB1-0704	9/1/2004	10	7.67	ND	8	0.33	0
	10/13/2004	10	7.59	ND	8	0.41	0
SB2-0704	8/30/2004	11.5	7.47	ND	10	2.53	0
	10/13/2004	11.5	7.4	ND	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	(2)	(2)
SB4-0704	9/1/2004	11	8.21	ND	9.5	1.29	0
	10/13/2004	11	7.96	ND	9.5	1.54	0
SB5-0704	9/1/2004	10.5	Not Measured	Not Measured	9.25	Not Measured	Not Measured
	10/13/2004	10.5	7.46	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 (SB8-1103)	8/30/2004	11	9.98	9.62	11	1.02	0.36
	10/13/2004	11	9.81	9.48	11	1.19	0.33
SB6-0704	8/30/2004	10.5	7.44	ND	8	0.56	0
	10/13/2004	10.5	7.17	ND	8	0.83	0
SB7-0704	8/30/2004	10.5	7.35	6.78	9	1.65	0.57
	10/13/2004	10.5	6.77	6.44	9	2.23	0.33
P7 (SB9-1103)	8/30/2004	14	6.84	ND	12	5.16	0
	10/13/2004	14	6.68	ND	12	5.32	0
P8 (SB7-1103)	8/30/2004	12	9.42	9.32	10.5	1.08	0.1
	10/13/2004	12	9.38	9.28	10.5	1.12	0.1
SB8-0704	9/1/2004	10.5	6.6	ND	9	2.4	0
	10/13/2004	10.5	6.55	ND	9	2.45	0
P9 (SB6-1103)	8/30/2004	10.5	7.13	ND	8	0.87	0
	10/13/2004	10.5	7.08	ND	8	0.92	0

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

LEGEND:

SITE BOUNDARY

RIVER

SAN JUAN

APPROXIMATE PROPERTY BOUNDARY

HAMMOND DITCH

GAS FIELD

MALCOLM PIRNIE	GIANT REFINERY BLOOMFIELD, NEW MEXICO CORRECTIVE ACTION PLAN	SITE LOCATION NOT TO SCALE	MALCOLM PIRNIE, INC. NOVEMBER 2004 FIGURE 1

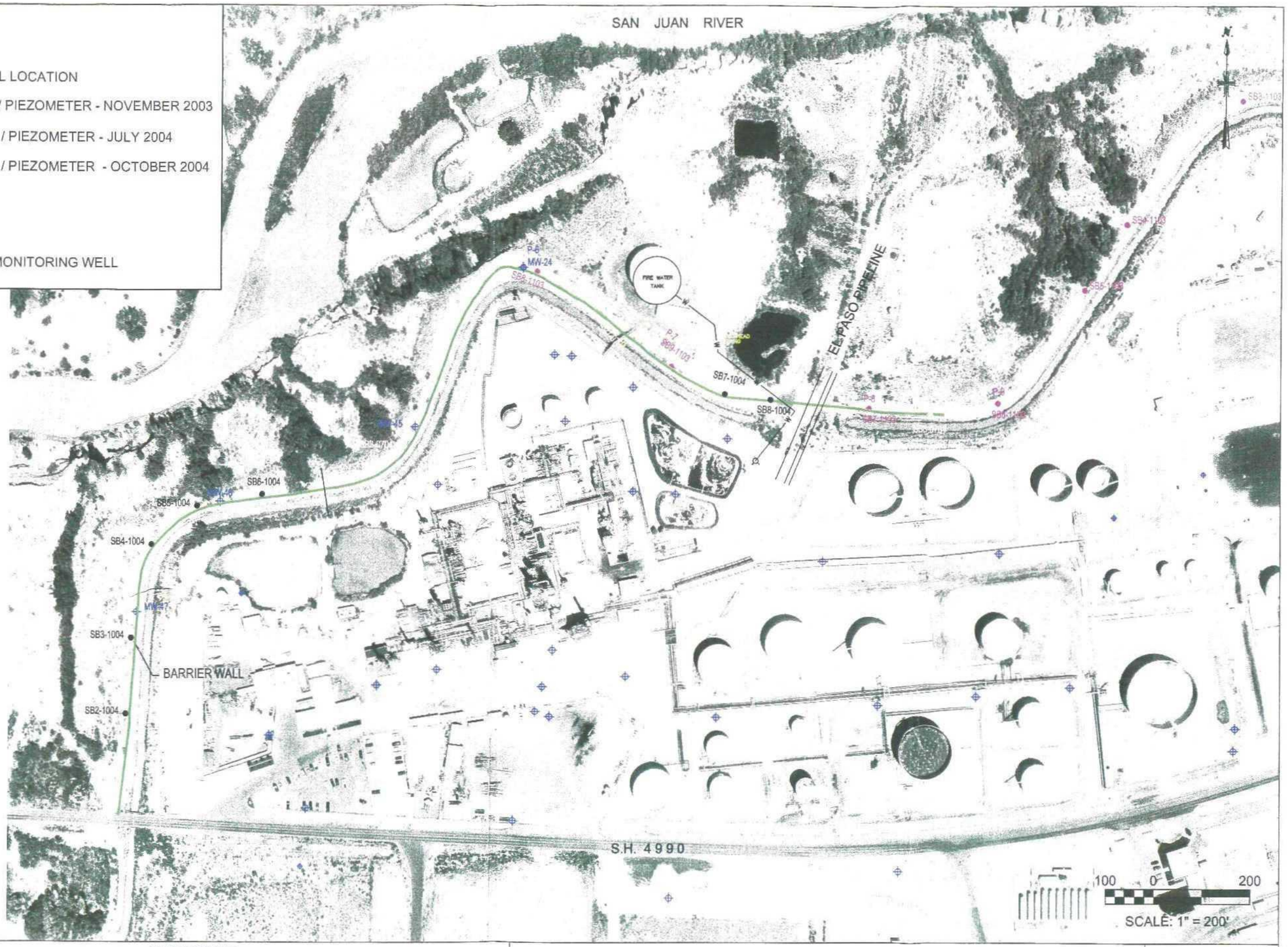
LEGEND:

- 5492 — EXISTING NACIMIENTO FORMATION 2' CONTOUR INTERVAL
- 5500 — EXISTING NACIMIENTO FORMATION 10' CONTOUR INTERVAL
- SOIL BORING / PIEZOMETER
- RECOVERY / MONITORING WELL

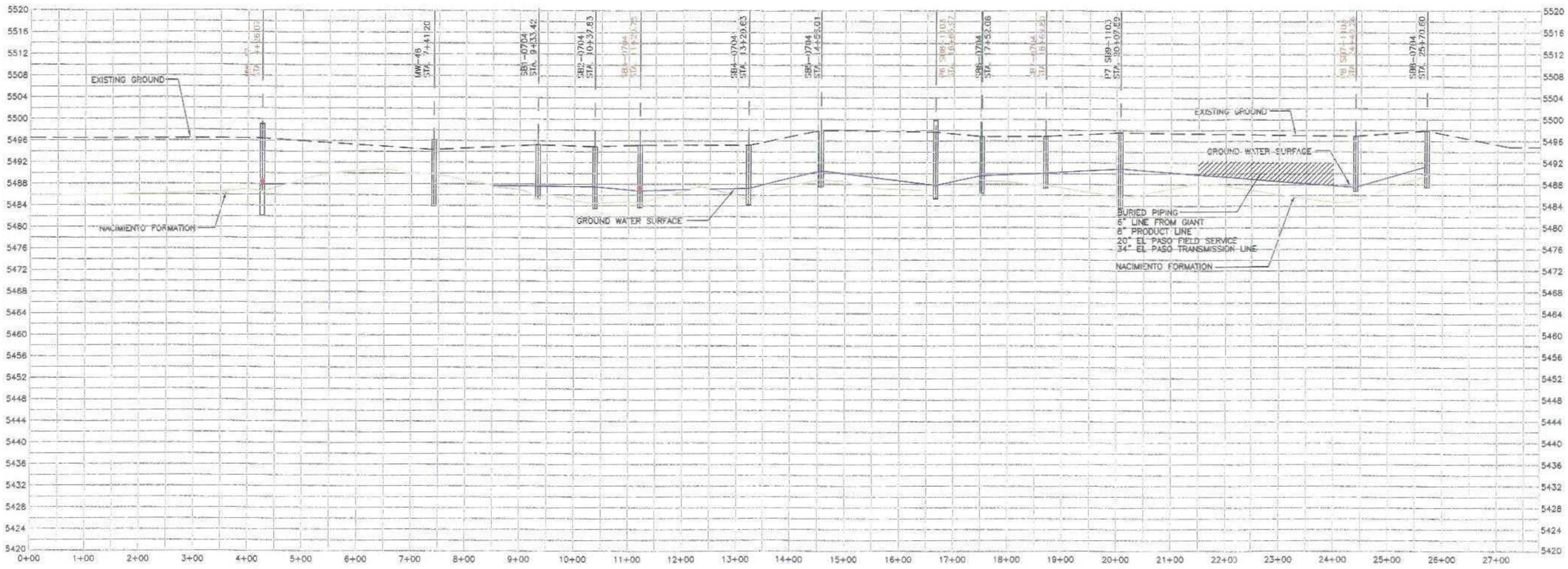
MALCOLM PIRNIE	GIANT REFINERY BLOOMFIELD, NEW MEXICO CORRECTIVE ACTION PLAN	JULY 2004 - NACIMIENTO FORMATION SURFACE CONTOUR MAP SCALE:1"=200'	MALCOLM PIRNIE, INC. NOVEMBER 2004 FIGURE 2

LEGEND:

- BARRIER WALL LOCATION
- SOIL BORING / PIEZOMETER - NOVEMBER 2003
- SOIL BORING / PIEZOMETER - JULY 2004
- SOIL BORING / PIEZOMETER - OCTOBER 2004
- SOIL BORING
- PIEZOMETER
- RECOVERY / MONITORING WELL



MALCOLM PIRNIE	GIANT REFINERY BLOOMFIELD, NEW MEXICO CORRECTIVE ACTION PLAN	NORTH BOUNDARY SOIL BORING LOCATION MAP SCALE:1"=200'	MALCOLM PIRNIE, INC. NOVEMBER 2004 FIGURE 3



(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

100 0 200

SCALE: 1" = 200'

MALCOLM PIRNIE

GIANT REFINERY
BLOOMFIELD, NEW MEXICO

CORRECTIVE ACTION PLAN

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

SCALE:1"=200'

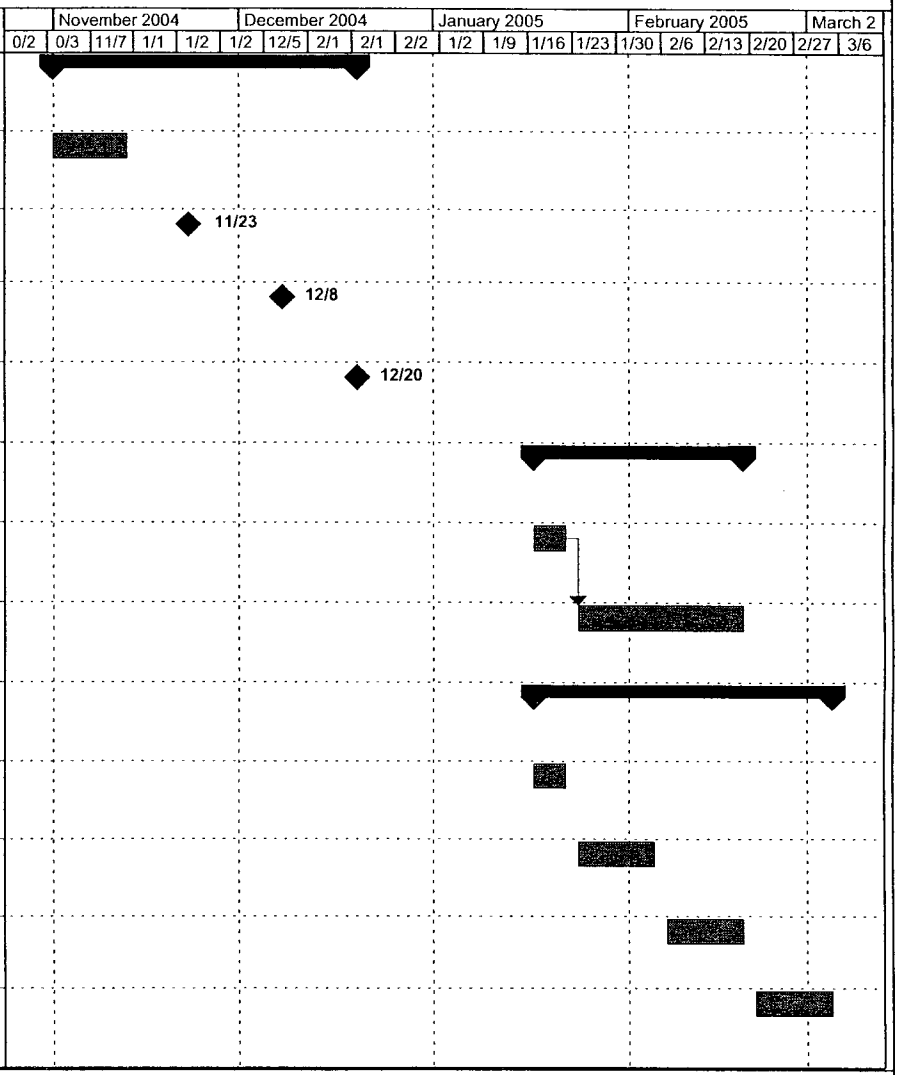
MALCOLM PIRNIE, INC.

NOVEMBER 2004

FIGURE 5

FIGURE 6
Giant Refining Company
Bloomfield Refinery
Estimated Corrective Action Implementation Schedule

ID	Task Name	Duration	Start	Finish
1	**Contractor Selection Process**	35 days	Mon 11/1/04	Mon 12/20/04
2	Prepare Construction Documents	10 days	Mon 11/1/04	Fri 11/12/04
3	Pre-Bid Site Walk	0 days	Tue 11/23/04	Tue 11/23/04
4	Bid Due Date	0 days	Wed 12/8/04	Wed 12/8/04
5	Contract Award	0 days	Mon 12/20/04	Mon 12/20/04
6	**Construction of Containment Barrier**	25 days	Mon 1/17/05	Fri 2/18/05
7	Contractor Mobilization	5 days	Mon 1/17/05	Fri 1/21/05
8	Barrier Wall Construction	20 days	Mon 1/24/05	Fri 2/18/05
9	**Fluids Collection System**	35 days	Mon 1/17/05	Fri 3/4/05
10	Review Additional Monitoring Data	5 days	Mon 1/17/05	Fri 1/21/05
11	Design Fluids Collection System	10 days	Mon 1/24/05	Fri 2/4/05
12	Engage Installation Contractor	10 days	Mon 2/7/05	Fri 2/18/05
13	Install Collection System	10 days	Mon 2/21/05	Fri 3/4/05



Project: Estimated CA Schedule_1109
Date: Sat 7/9/05

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

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.

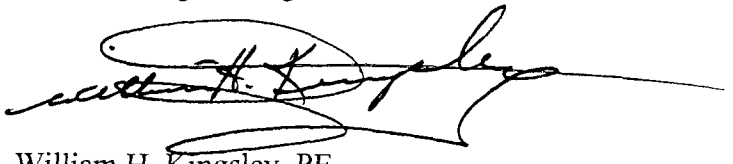
Where present, overlying the Jackson Lake Terrace at this site is a silty fine sand eolian origin. The sand has a significant amount of material in the silt as well as clay size range. It should be noted that along the Hammond Ditch this unit is typically very thin or absent in most locations.

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

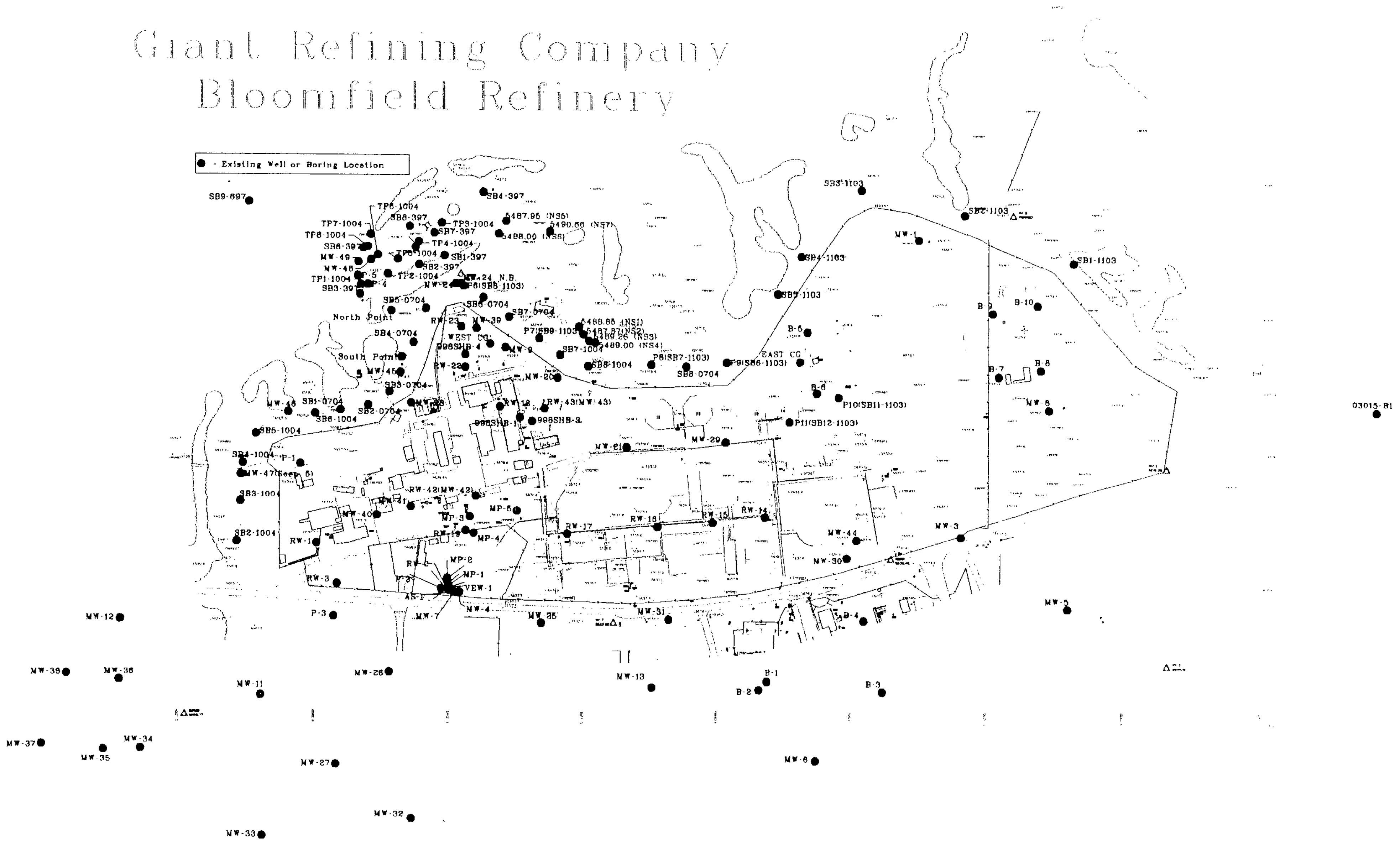
Precision Engineering, Inc.
P.O. Box 422
Las Cruces, NM 88004
505-523-7674

Project Bloomfield-Hammond Ditch File No. 03-122 Date November 2, 2004

			Sieve Analysis %Passing														Atterberg Limits		Moisture	Unit Wt.	Classification	
Boring No.	PEI Lab No.	Depth ft.	3"	2"	1½"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#140	#200	LL	PI	%M	PCF	USCS	AASHTO
	46450	5.0-5.4							100	100	99	97	74	31	10	8.7		N/P	3.8		SP-SM	A-3
	46451	11.0-11.5				100	90	86	85	82	81	73	48	21	6	4.7		N/P	15.6		SP	A-1-b
	46452	9.0-10.0							100	100	71	57	45	37	28	23.8		N/P	5.6		SM	A-1-b
	46458	10.0-11.0				100	89	73	68	64	62	55	25	9	3	2.5		N/P	19.2		SP	A-1-b
	46464	Surface								100	100	100	96	92	80	65.2		N/P	8.6		ML	A-4
	46465	Sruface							100	100	100	99	96	92	79	71.3		N/P	14.8		ML	A-4
	46461	Surface	95	95	93	88	86	83	81	79	78	75	64	52	29	23.7		N/P	2.5		SM	A-2-4
	46462	Surface	96	80	76	64	57	49	44	40	38	31	22	16	8	7.0		N/P	0.9		GP-GM	A-1-a
	46463	Surface	94	86	76	64	54	43	38	32	29	23	14	9	6	5.3		N/P	1.1		GP-GM	A-1-a
	46456	12-12.5	Hydraulic Conductivity: 6.0×10^{-7} cm/sec																13.3	118.7		
	46454	9.5-10.5	Hydraulic Conductivity: 1.2×10^{-9} cm/sec																13.8	117.1		

C:\AAFWFILE\projects\2003\03-122 Bloom\[Grain Size Summary Hammond Ditch.xls]S1 Prepared By:

Giant Refining Company
Bloomfield Refinery



Sheet: 1 OF 1
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

File #: 03-122
Site: Bloomfield
Refinery
Elevation: Exisiting
Date: 11/4/03

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-5.25			5.0	Gravel, very sandy, cobble and bouldersize rock very common. Jackson Lake Terrace				
	5.25-7.5	SPT			Nacimiento Formation Sandstone, very weathered, light brown, moist, dense				
	T.D.			7.5					

SIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger LOGGED BY: KM/NS

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

Sheet: 1 OF 1
Bore Point: Near N E. corner of evaporation lagoon on Hammond Ditch Road
Water Elevation: Not Encountered
Boring No.: SB2-1103

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

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-5.0			5.0	Gravel, very sandy, cobble and bouldersize rock, light brown, moist. Jackson Lake Terrace				
	5.0-7.5	SPT			Nacimiento Formation Sandstone, very weathered, green grey, clayey, (N/P), moist, medium dense (possible trace of water at top of the Nacimiento Formation)				
	T.D.			7.5					

SIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger
LOGGED BY: KM/NS

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

Sheet: 1 OF 1
Bore Point: 80' west of straight on curves

Water Elevation: 6.6'
Boring No.: BB3-1103

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

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-8.5				Gravel, sandy. cobble and bouldersize rock, light brown, (~ old grade?), water bearing at 6.6'. Jackson Lake Terrace				
				5.0					
				7.5					
	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				
	T.D.			9.0					

SIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger LOGGED BY: KM/NS

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

Sheet: 1 OF 1
Bore Point: 365' West of SB3-1103 along Hammond Ditch Road
Water Elevation: Not Encountered
Boring No.: SB4-1103

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

Log of Test Borings

File #: 03-122
Site: Bloomfield Refinery
Elevation: Exisiting
Date: 11/4/03

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-8.5				Gravel, sandy, cobble and bouldersize material common, moist, dense, very difficult to drill 7.5-8.5', dry from 7.5-8.5' Jackson Lake Terrace				
				5.0					
				7.5					
	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					

SIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger
LOGGED BY: KM/NS

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

Sheet: 1 OF 1
Bore Point: West side outfall, north side of Hammond Ditch Road

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

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

Log of Test Borings

File #: 03-122
Site: Bloomfield Refinery

Elevation: Exisiting
Date: 11/4/03

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2.5			2.5	Sand, fine, silty (Qe), brown, moist, loose				
	2.5-8.75			5.0 7.5	Gravel, sandy, cobbles and boulders common, light brown, moist, very dense Jackson Lake Terrace				
	8.75-10.25	9-19-20		10.0	Nacimiento Formation Sandstone, weathered, yellow-brown to light brown, argillaceous, some black inclusions medium-grained				
	T.D.			10.25	(no water bearing zones)				

SIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger LOGGED BY: KM/NS

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

Sheet: 1 OF 1
Bore Point: 275' west of SB5 on Hammond Ditch Road, west side of road
Water Elevation: Not Encountered
Boring No.: SB6-1103

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

Log of Test Borings

File #: 03-122
Site: Bloomfield Refinery
Elevation: Exisiting
Date: 11/4/03

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

SIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger
LOGGED BY: KM/NS

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

Sheet: 1 OF 1
Bore Point: 230' west of SB6 on Hammond Ditch Road, adjacent to siphon on west side of road
Water Elevation: 9 0'
Boring No.: SB7-1103

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

File #: 03-122
Site: Bloomfield Refinery
Elevation: Exisiting
Date: 11/4/03

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2.5			2.5	Sand				
	2.5-10.0			5.0 7.5 10.0	Gravel, sandy, cobbles and boulders, very dense, tan, moist, difficult to drill, water bearing at 9.0', (free product). Jackson Lake Terrace				
	10.5-12.0				Nacimiento Formation Sandstone, weathered, yellow-brown, laminar banded (yellow, brown,red), damp-moist, hard				
	T.D.			12.0	Installed 2" hand slotted PVC (slotted 48")				

SIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger
LOGGED BY: KM/NS

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

Sheet: 1 OF 1
Bore Point: West side of Hammond Ditch Road, 100' east of overhead pipe rack
Water Elevation: Not Encountered
Boring No.: SB8-1103

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

File #: 03-122
Site: Bloomfield Refinery
Elevation: Existing
Date: 11/5/03

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-7.5			5.0	Gravel, sandy, cobbles and boulders, light brown, moist, very dense, difficult drilling, water bearing. Jackson Lake Terrace				
	7.5-10.0	85 (12")		10.0	Nacimiento Formation Sandstone, weathered, not water bearing, very argillaceous, some claystone fragments, hydrocarbon odor at 9.0'				
	10-11.0				Sandstone, weathered, medium grained, slightly argillaceous, yellow-brown, damp-moist, very dense, laminar banded, some red laminae				
	T.D.			11.0	Installed 2" hand slotted PVC (slotted 48")				

SIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger
LOGGED BY: KM/NS

Sheet: 1 OF 1
Bore Point: 260' west of pipe rack crossing on west side of Hammond Ditch Road
Water 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

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

SIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger
LOGGED BY: KM/NS

Sheet:
Bore Point: NO BORING
Water Elevation:
Boring No.: SB10-1103

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

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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS.
					NO BORING				
				5.0					
				7.5					
				10.0					
				15.0					
				20.0					

NO BORING

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER

LOGGED BY:

A:\[B10 0704.xls]Sheet1

Sheet: 1 OF 1
Bore Point: SW corner of fresh-water pond
Water Elevation: Not Encountered
Boring No.: SB11-1103

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

File #: 03-122
Site: Bloomfield Refinery
Elevation: Exisiting
Date: 11/6/03

Log of Test Borings

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

SIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger LOGGED BY: KM/NS

Sheet: 1 OF 2
Bore Point: SW corner of fresh-water pond
Water Elevation: Not Encountered
Boring No.: SB11-1103

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

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	22.5-24.0			22.0	Nacimiento Formation Sandstone, weathered, very light brown, moist-not water bearing, dense				
	T.D.			24.0	Installed 2" hand slotted PVC (slotted 60")				

SIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger
LOGGED BY: KM/NS

C:\AAFWFILE\projects\2003\03-122 Bloom\[B11 1103.xls]Sheet2

Sheet: 1 OF 1
Bore Point: 25' from Tank 14, 25' from centerline of elbow on most easterly pipe on S. side of Tank 14
Water Elevation: Not Encountered
Boring No.: SB12-1103

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

File #: 03-122
Site: Bloomfield Refinery
Elevation: Exisiting
Date: 11/6/03

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-3.5				Sand, very fine, silty, light brown, damp, (Qe)				
	3.5-7.0			5.0	Gravel, sandy, brown, cobbles/boulders common, damp-moist, dense, difficult drilling				
	7.0-11.0			7.0 10.0	Sand, medium, clean, light brown, damp, loose, occasional fine gravel				
	11.0-17.5			15.0	Gravel, sandy, clean, cobbles and boulders boulders are abundant, brown, damp, very dense, difficult to drill				
	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")				

SIZE & TYPE OF BORING: 4-1/4" ID Hollow Stemmed Auger LOGGED BY: KM/NS

C:\AAFWFILE\projects\2003\03-122 Bloom\[B12 1103.xls]Sheet1

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

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

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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2		*-**-*-* *-**-*-* *-**-*-* *-**-*-*		**Sand**, silty, brown, moist				
	2-8.0		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	2.5 5.0 7.5	**Cobbles**, gravel, silty, sand, brown, moist Black with hydrocarbon odor				
	8.0-9.0		= = = = = = = =		**Nacimiento Formation** T.D. 8.0				
				10.0 15.0 20.0	Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings 17.5' N of canal edge				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: WHK

C:\AAFWFILE\projects\2003\03-122 Bloom\[B1 0704.xls]Sheet1

Sheet: 2 of 8
Bore Point: See plan
Water 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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2.5		*-**-*-* *-**-*-* *-**-*-* *-**-*-* *-**-*-*	2.5	**Sand**, fine, silty, brown, moist, moderately dense				
	2.5-9.0		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	5.0 7.5	**Cobbles**, very dense, cobbles to 12", grey, dry				
	9.0-10.0		* * * * * * * * * *	10.0	**Sand**, black, water bearing, hydrocarbon odor, loose				
	10.0-11.5		= = = = = = = = = =		**Nacimiento Formation** T.D. 11.5				
				15.0 20.0	Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings 16' N of canal edge				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: WHK

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

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

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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-4.0		*-**-*-*		**Sand**, fine, silty, brown, damp, loose				
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	2.5					
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
	4.0-8.5		o*o*o*o		**Cobbles**, gravelly, grey, dry, dense-very dense				
			o*o*o*o	5.0					
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o	7.5					
			o*o*o*o						
			o*o*o*o						
	8.5-10.0		* * * * *		**Sand**, fine, black, water bearing, loose				
			* * * * *						
			* * * * *	10.0					
	10.0-11.5		= = = =		**Nacimiento Formation**, mudstone, moist, not				
			= = = =		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					
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: WHK

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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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2.75		*-**-*-* *-**-*-* *-**-*-* *-**-*-* *-**-*-* *-**-*-*	2.5	Sand, silty, some fine gravel, brown, moist, loose				
	2.75-8.0		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	5.0 7.5	Cobbles, gravelly, grey, dry, very dense				
	8.0-9.5		o*o*o*o * * * * * * * * * *		Sand, fine, some fine gravel, clayey, grey				
	9.5-11.0		= = = = = = = = = = = =	10.0	Nacimiento Formation, mudstone, very sandy, grey, moist-wet				
				15.0 20.0	T.D. 11.0 Placed 2" PVC, 4' hand slotted screen, @ 10.5' backfilled with cuttings SPH 7.49 (total .1')				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: WHK

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

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

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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2.5		*-**-*-* *-**-*-* *-**-*-* *-**-*-* *-**-*-*	2.5	**Sand**, fine, silty, brown, damp-moist				
	2.5-8.5		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	5.0 7.5	**Cobbles**, gravelly, grey, dry, very dense				
	8.5-9.25		* * * * * * * * * *		**Sand**, fine, some fine gravel, grey, moist ~~fresh hydrocarbon odor~~				
	9.25-10.5		= = = = = = = =	10.0	**Nacimiento Formation**, mudstone, very sandy, grey, moist-wet				
				15.0	T.D. 10.5 Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings				
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: WHK

Sheet: 6 of 8
Bore Point: See plan
Water 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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-1.0		*-**-*-* *-**-*-*		**Sand**, fine, silty, brown, damp, loose				
	1.0-6.5		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	2.5 5.0	**Cobbles**, some gravel, grey, dry, very dense				
	6.5-8.0		* * * * * * * * * * * * * * *	7.5	**Sand**, fine, black, strong hydrocarbon odor, wet, water bearing @ 7.0'				
	8.0-10.5		= = = = = = = = = = = = = = = = = = = =	10.0	**Nacimiento Formation**, sandstone, green-grey very dense,				
				15.0 20.0	T.D. 10.5 Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: WHK

Sheet: 7 of 8
Bore Point: See plan
Water 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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-1.5		*-**-*-* *-**-*-* *-**-*-*		**Sand**, fine, silty, brown, damp, loose				
	1.5-8.5		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	2.5 5.0 7.5	**Cobbles**, grey, damp, very dense				
	8.5-9.0		* * * * *		**Sand**, fine, black.				
	9.0-10.5		= = = = = = = = = = = =	10.0	**Nacimiento Formation**, mudstone, sandstone, green-grey				
				15.0 20.0	T.D. 10.5 Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: WHK

Sheet: 8 of 8
Bore Point: See plan
Water 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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-5.0		*-**-*-*		**Sand**, fine, silty, brown, moist, loose				
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	2.5					
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	5.0					
	5.0-8.5		o*o*o*o		**Cobbles**, gravelly, grey, dry-damp, very dense				
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o	7.5					
			o*o*o*o						
			o*o*o*o						
	8.5-9.0		* * * * *		**Sand**, clayey, fine, green-grey-black.				
	9.0-11.0		= = = =		**Nacimiento Formation**, mudstone, moist,				
			= = = =	10.0	green-grey				
			= = = =						
					T.D. 10.5				
					Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings				
				15.0					
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: WHK

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

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

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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
				2.5					
				0	Not Drilled				
				7.5					
				10.0					
				15.0					
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: KM

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

Sheet: 2 of 8
Bore Point: 21' 7" W of canal edge
Water Elevation: 8.0' below ground surface
Boring No.: SB2-1004

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5498.87
Date: 10/28/04

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-3.0		*-**-*-* *-**-*-* *-**-*-* *-**-*-* *-**-*-* *-**-*-*	2.5	**Sand**, fine to coarse, silty, damp, tan				
	3.0-5.0		***o*** o*o*o*o o*o*o*o o*o*o*o	5.0	**Cobbles**, gravel, sand, silty, tan, damp				
46450	5.0-5.4		******** ********		**Sand**, fine to coarse, dry, clean, tan, moderately dense	3.8		N/P	SP-SM A-3
	6.0-7.0		******** ********		**Gravel**, sand, medium, dry, tan,				
	7.0-11.5		******** ******** ******** ******** ******** ******** ********	7.5 10.0	**Sand**, medium, gravel, dark grey, hydrocarbon odor, moist wet at 8'				
46451	11.0-11.5		******** ********		**Sand**, medium, gravel, dark grey, moist	15.6		N/P	SP/A-1-b
46456	11.5-12.0 12.0-12.5		= = = = = = = =		**Nacimiento Formation** mudstone, dry Sample Number HC 1				
				15.0 20.0	Total depth bottom of well 12' 5' of hand slotted screen no water for first 8 hours				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KM

Sheet: 2 of 8
Bore Point: 17' 7" W of canal edge
Water 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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-1		*-**-*-* *-**-*-*		**Silt**, sandy, very fine to fine, brown, moist				
	1-8.0		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	2.5 5.0 7.5	**Cobbles**, gravel, sand, fine, silty, moist, brown				
	8-10.5		**o**o** **o**o** **o**o** **o**o** **o**o**	10.0	**Sand**, fine to coarse, gravel, dark grey, wet, hydrocarbon odor				
	10.5-11.5		******** ********		**Sand**, medium, argillaceous, damp				
	12.0		= = = =		**Nacimiento Formation**, mudstone				
				15.0 20.0	Total depth 11' 9" 5' of hand slotted screen 8' 5" top of pipe no water for first 8 hours				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: KM

Sheet: 4 of 8
Bore Point: 16' 2" W of canal edge
Water 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

Log of Test Borings

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

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KM

Sheet: 5 of 8
Bore Point: 16' 10" W of canal edge
Water Elevation: 8.7' below ground surface
Boring No.: SB5-1004

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5497.21
Date: 10/28/04

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-6.0		*-**-*-*		Silt, sandy, very fine to fine, brown, moist				
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	2.5					
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	5.0					
			*-**-*-*						
			*-**-*-*						
	6.0-9.0		o*o*o*o		Cobbles, gravel, sand, fine to medium, silty,				
			o*o*o*o		brown, moist				
			o*o*o*o	7.5	hydrocarbon odor				
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
46452	9.0-10.0		********		Sand, medium, brown, wet	5.6		N/P	SM/A-1-b
			********	10.0					
46453	10.0-10.5		= = = =		Nacimiento Formation, mudstone, moist	16.1			
46454	9.5-10.5				Sample Number HC 2				
					Total depth 10' 7"				
					5' of hand slotted screen				
				15.0	no water for first 8 hours				
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KM

Sheet: 6 of 8
Bore Point: 22' 7" W of canal edge
Water 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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-0.5		*-**-*-*		**Silt**, sandy, very fine to fine, brown, damp				
	0.5-7.0		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	2.5 5.0	**Cobbles**, gravel, sand, very fine to medium, silty, brown, damp				
	7.0-7.5		********	7.5	**Sand**, medium to coarse, brown, occasional gravel, damp, slight hydrocarbon odor				
46455	7.5-8.5		= = = = = = = = = = = =		**Nacimiento Formation**, mudstone, moist very compact, grey to black	9.3			
				10.0					
					Total depth 8' 6" 5' of hand slotted screen				
				15.0					
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KM

C:\AAFWFILE\projects\2003\03-122 Bloom\[B6 1004.xls]Sheet1

Sheet: 7 of 8
Bore Point: 12' 11" N of canal edge
Water Elevation: 8.6' below ground surface
Boring No.: SB7-1004

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5497.37
Date: 11/1/04

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-0.5		*-**-*-*		Silt, sandy, very fine to fine, brown, damp				
	0.5-9.0		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	2.5 5.0 7.5	Cobbles, gravel, sand, fine to coarse, silty, brown, moist Sand, fine to coarse, brown, occasional gravel, wet, slight hydrocarbon odor				
	9.0-9.5		******** ********	10.0	Sand, fine to coarse, grey, occasional wet, slight hydrocarbon odor				
46457			= = = = = = = =		Nacimiento Formation, mudstone, moist gray to black	11.8			
				15.0 20.0	Total depth 10' 2" 5' of hand slotted screen does not produce water in the first 8 hours				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: KM

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

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

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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-0.5		*-**-*-*		**Silt**, sandy, very fine to fine, brown, damp				
	0.5-10.0		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	2.5 5.0 7.5 10.0	**Cobbles**, gravel, sand, fine to coarse, silty, brown, moist				
46458	10.0-11.0		******** ********		**Sand**, fine to coarse, grey, strong hydrocarbon odor, water bearing	19.2		N/P	SP/A-1-b
46459 46460	11.0-12.5 12-12.5		= = = = = = = = = = = =		**Nacimiento Formation**, argillaceous sandstone moist, gray to green gray Sample number HC3	16.5 5.5			
				15.0 20.0	Total Depth 12.5' 5' of hand slotted screen				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED 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 1×10^{-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.

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

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

BILL RICHARDSON
GOVERNOR

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.

3. The final barrier wall type shall be submitted to NMED for approval before installation. GRCB shall demonstrate to NMED that the barrier wall type and design will meet any structural requirement and hydraulic conductivity (k) of 1 x 10^{-7} cm/sec.

4. Detailed "as built drawings" and photo documentation shall be supplied at the completion of construction. At least one of the drawings shall show a cross section along the entire wall.

5. Daily logs shall be kept during the construction phase. All pertinent information shall be logged such as contamination observed, soil characteristics, water levels, depth to Nacimiento Formation, progress made each day, dewatering or contaminant removal activities, general weather, and all other pertinent information that should be logged that may cause a deviation of the approved design and/or any anomalies found in the trench which may cause GRCB to deviate from the plan or be of a concern. GRCB shall notify NMED of any deviations from the plan within one business day of making the change.

6. GRCB shall submit a weekly progress report and photos via E-mail on Monday morning.

7. GRCB shall submit the fluid collection system design for approval before actual installation. This should include a map identifying the locations of recovery wells or trenches and all other pertinent information. The Permittee may remove fluids during the course of the project for logistic and safety reasons. All fluids and waste removed shall be disposed or recycled in an approved manner.

8. GRCB shall maintain a qualified technical person on site during the construction phase to ensure quality assurance and control of the project. This person shall be experienced in identifying the Nacimiento Formation. Ample confirmation bottom hole soil samples shall be collected in areas where the proposed collection systems may be placed. Samples shall be collected and preserved to properly identify/classify the soils.

9. GRCB will notify the NMED at least 72 hours in advance of the start of construction and all scheduled sampling activities throughout the construction process such that the NMED has the opportunity to witness the events and/or collect split samples during NMED's normal business hours.

10. GRCB shall submit a plan for NMED approval to evaluate the effectiveness of the barrier wall. This plan should include monitoring points on both sides of the barrier wall.

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.

12. Boring log SB1-0704 states "[b]lack with hydrocarbon odor," the term black is also used in other boring logs SB2-0704, SB3-0704, SB6-0704, and SB7-0704. GRCB must clarify the use of the term "black" in the boring logs. (e.g. is black referring to hydrocarbon staining or is black the actual mineral color in the sand).

13. The CAP, Sections 4.2 contains a table presenting the hydraulic properties from a slug test. GRCB must provide the results of the slug test and the associated calculations. Include graphs as necessary.

14. The CAP, Section 4.3 states "[e]ach boring installed during the October 2004 drilling campaign was drilled 3 to 5 feet into the Nacimiento Formation. Soil samples were collected every 2.5 ft and submitted to a geotechnical laboratory for grain size analysis to estimate the properties important for the design of the barrier and collection system. Samples collected of the Nacimiento Formation were also submitted to the lab for hydraulic conductivity testing."

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

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

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

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

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

17. Appendix A 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.

18. The barrier wall installation may cause the displacement of hydrocarbons. In the future, NMED may require additional sampling and monitoring from the monitoring wells located in the southern portion of the refinery (e.g. MW-32, 33, 34, 35, 36, 36, and 38) and the three outfall locations.

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

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

Sincerely,

Hope Monzeglio

Hope Monzeglio
Project Leader
Hazardous Waste Bureau

HCM:hcm

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

Reading File and GRCB 2004 File

GIANT
REFINING COMPANY

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 1×10^{-7} cm/sec and a minimum thickness of 30 inches.

Response to OCD Conditions of Approval

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

1. Condition accepted by Giant.

PHONE
505-632-8013
FAX
505-632-3911

50 ROAD 4990
P.O. BOX 159
BLOOMFIELD
NEW MEXICO
87413

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 6×10^{-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).

   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 1×10^{-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 1×10^{-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

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

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

Dear Mr. Schmaltz:

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

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

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

3. OCD shall be part of the approval process.

Staging of soils in the old bentonite fresh water ponds will be allowed.
OCD will require proof of clean-up after completion of project.

GIANT
REFINING COMPANY

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 1×10^{-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 1×10^{-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

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

Project Bloomfield-Hammond Ditch File No. 03-122 Date November 2, 2004

	Boring No.	PEI Lab No.	Depth ft.	Sieve Analysis %Passing														Atterberg Limits		Moisture	Unit Wt.	Classification	
				3"	2"	1½"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#140	#200	LL	PI	%M	PCF	USCS	AASHTO
SB2-1004		46450	5.0-5.4							100	100	99	97	74	31	10	8.7		N/P	3.8		SP-SM	A-3
SB3-1004		46451	11.0-11.5				100	90	86	85	82	81	73	48	21	6	4.7		N/P	15.6		SP	A-1-b
SB8-1004		46452	9.0-10.0							100	100	71	57	45	37	28	23.8		N/P	5.6		SM	A-1-b
SAND PILE @ GRVL PIT		46458	10.0-11.0				100	89	73	68	64	62	55	25	9	3	2.5		N/P	19.2		SP	A-1-b
		46464	Surface								100	100	100	96	92	80	65.2		N/P	8.6		ML	A-4
		46465	Sruface							100	100	100	99	96	92	79	71.3		N/P	14.8		ML	A-4
	A.	46461	Surface	95	95	93	88	86	83	81	79	78	75	64	52	29	23.7		N/P	2.5		SM	A-2-4
	B.	46462	Surface	96	80	76	64	57	49	44	40	38	31	22	16	8	7.0		N/P	0.9		GP-GM	A-1-a
	C.	46463	Surface	94	86	76	64	54	43	38	32	29	23	14	9	6	5.3		N/P	1.1		GP-GM	A-1-a
SB2-1004		46456	12-12.5	Hydraulic Conductivity: 6.0×10^{-7} cm/sec																13.3	118.7		
SB4-1004		46454	9.5-10.5	Hydraulic Conductivity: 1.2×10^{-9} cm/sec																13.8	117.1		

A. HILLSIDE - 70 FEET NORTH OF MW-47 (APPROX. STA 5+20)
B. HILLSIDE - 60 FEET SOUTH OF MW-47 (APPROX. STA 3+90)
C. UNCLEAR - NORTHSIDE AT SYPHON - NEAR EAST END OF ALIGNMENT?

Prepared By:

ATTACHMENT B

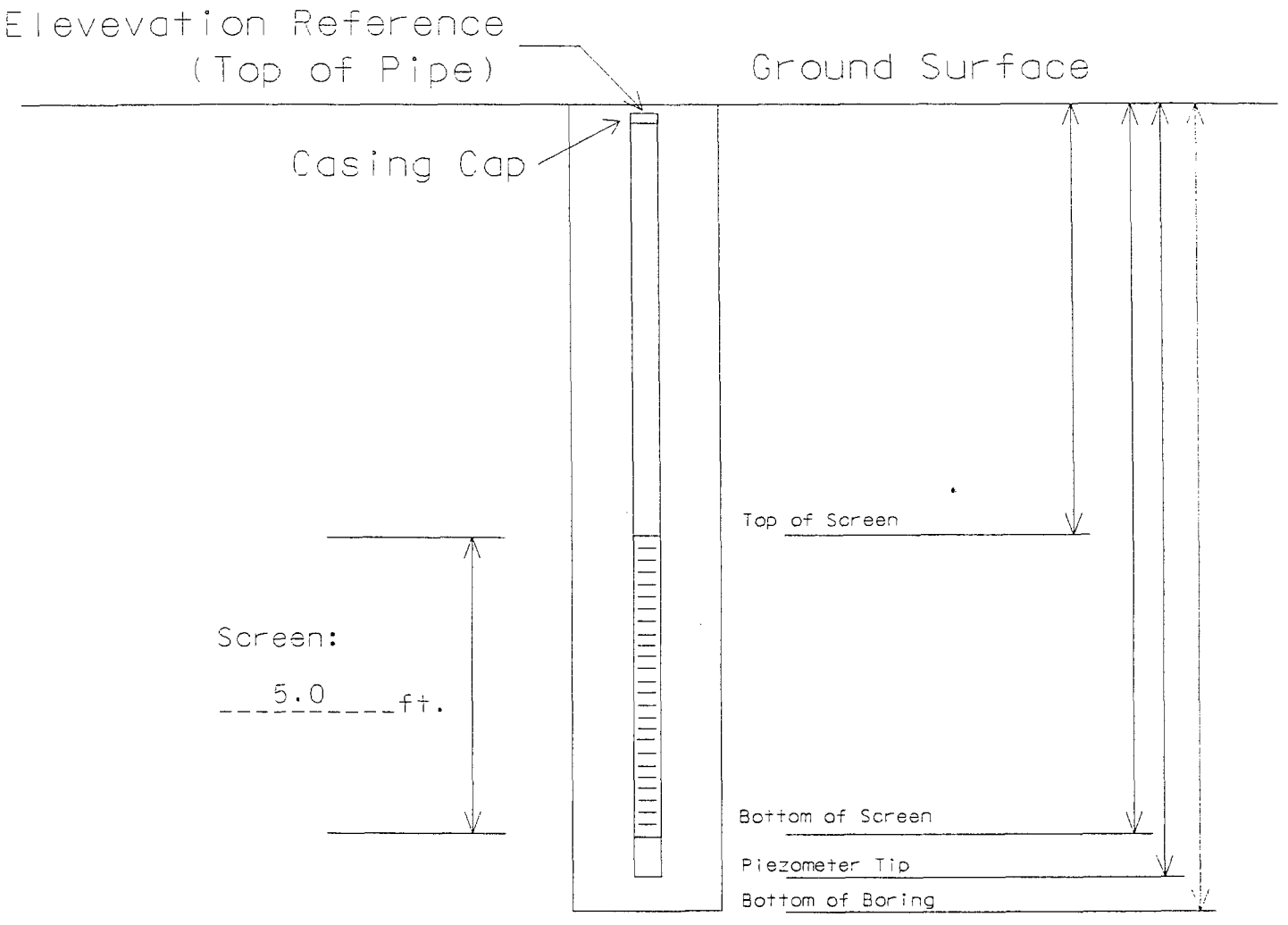
Typical Piezometer Log

PRECISION ENGINEERING, INC.

505-523-7674

Temporary Piezometer Installation - Typical

See Logs for Depth Details



Boring Diameter: 8 5/8"

Sand Type: Native Backfill

Bollards, Type/Size: None

Bentonite: 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 (Slip Cap)

Site Northing: _____

Other: N/A

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

(1) PSH = Phase-Separated Hydrocarbon

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

r = 0.083 ft
R = 0.083 ft
L = 10 ft

Therefore:

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

K = 32 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 1×10^{-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 Funnel)	API RP 13B-1	1. At time of mixing 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 C143/C143M	Twice daily
Fines Content	ASTM D1140	Daily
Density	ASTM D698 & Para. C.2	Daily

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

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

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

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.

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 1×10^{-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

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.

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,

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

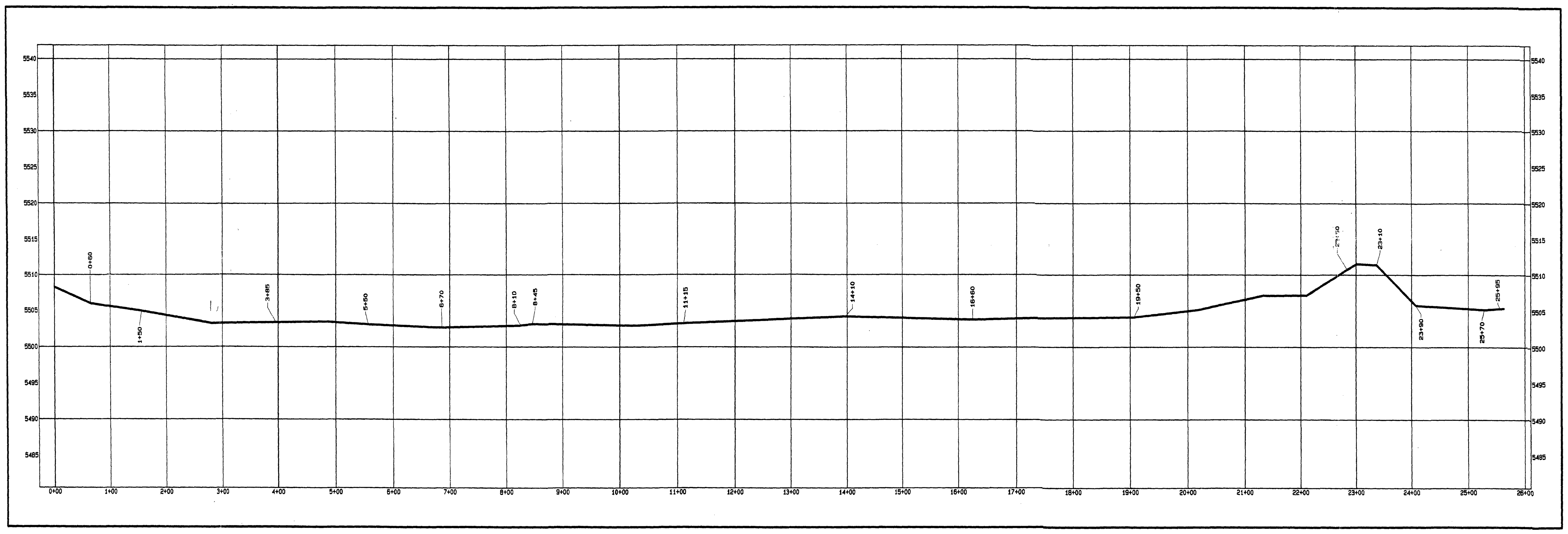
Canal service road shall be restored to its original grade and condition by placing a minimum 6-inch layer of compacted General Fill material. Finished grade of the service road shall slope away from the canal a minimum of 1/8-inch per foot.

+ + 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



SHEET
OF
0

DRAWING

PROFILE ROAD ABOVE BARRIER WALL

Bloomfield Refinerty

San Juan County, New Mexico

Vertical Scale: 1"= 10'
Horizontal Scale: 1"= 100'

Elevations based on NGS CORS Network.

ACCOUNT:
DATE: *May, 16, 2005*
DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

INTERMOUNTAIN MAPPING SERVICES, LLC

1875 Highway 170 La Plata New Mexico 87418 (505) 325-5244

PROJECT MANAGER:
ENGR. of RECORD:
REG. NO:
SRVYR of RECORD: Scott Andrae
REG. NO: 9625

REVISION	DATE
1	
2	
3	
4	
5	


LEGEND:
BARRIER WALL LOCATION
OBSERVATION WELL
COLLECTION WELL
SAN JUAN RIVER
FIRE WATER TANK
OVERHEAD PIPING
OVERHEAD WIRES
BARRIER WALL
EL PASO NATURAL GAS LINES
HAMMOND DITCH
COUNTY ROAD 4990
SEE SHEET C3 FOR SECTION A-A
OW 0+60
CW 0+60
OW 1+50
CW 1+50
OW 3+85
CW 3+85
OW 5+50
CW 5+50
OW 6+70
CW 6+70
OW 8+10
CW 8+10
CW 8+45
OW 11+15
CW 11+15
OW 14+10
CW 14+10
OW 16+60
CW 16+60
OW 19+50
CW 19+50
OW 22+00
CW 22+00
OW 23+10
CW 23+10
OW 23+90
CW 23+90
OW 25+70
CW 25+95
TANKS
SCALE: 1" = 100'
RECORD DRAWINGS
This document reflects changes from the original Contract Document. The information provided, has been developed by the Engineer or provided to the Engineer by the Construction Contractor(s).
MALCOLM PIRNIE, INC.
Date 6/28/06 By
RECORD DRAWING

MALCOLM PIRNIE

REVISIONS			
NO.	BY	DATE	REMARKS
1	KR	6-27-06	RECORD DRAWINGS

DES KR
DWN HMF
CKD KR

GIANT REFINERY
BLOOMFIELD, NEW MEXICO

NORTH BOUNDARY BARRIER

CIVIL

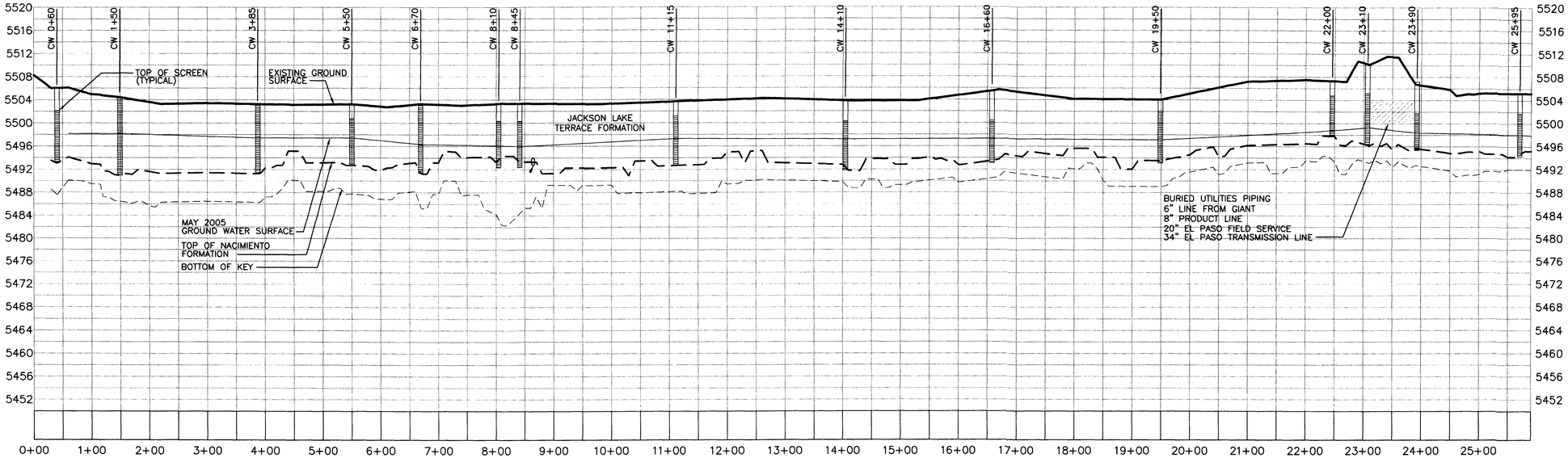
BARRIER ALIGNMENT

SCALE: 1"=100'

DATE JUNE 2006

C SHEET 1 OF 2

CAD REF. NO. 5127C02.DWG

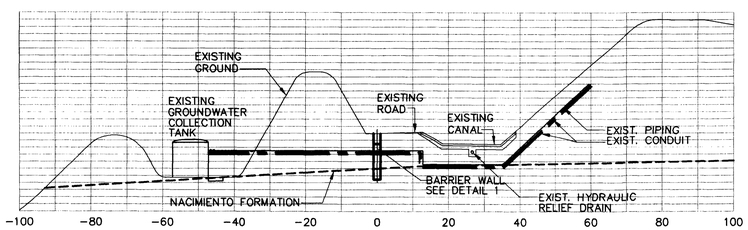


SECTION A–A'

SCALE: 1"=100' HORIZONTAL
1"=10' VERTICAL

5 0 5 10 — SCALE: 1" = 10'

50 0 50 100 — SCALE: 1" = 100'



SECTION 1 / C2 | C3

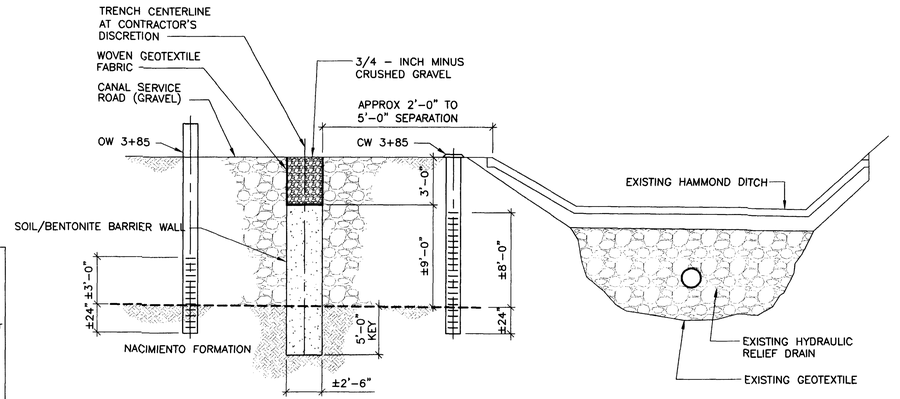
SCALE: 1"=20'

RECORD DRAWINGS

This document reflects changes from the original Contract Document. The information provided, has been developed by the Engineer or provided to the Engineer by the Construction Contractor(s).

MALCOLM PIRNIE, INC.

Date 6/28/06 By Kelly Rowan



SOIL–BENTONITE BARRIER WALL DETAIL 1 / C3 | C3

RECORD DRAWING

REVISIONS			
NO.	BY	DATE	REMARKS
1	KR	6-27-06	RECORD DRAWINGS

DES KR
DWN HMF
CKD KR

GIANT REFINERY
BLOOMFIELD, NEW MEXICO

NORTH BOUNDARY BARRIER

CIVIL

BARRIER PROFILE

SCALE: AS SHOWN

DATE JUNE 2006

C SHEET 2 OF 2

CAD REF. NO. 5127C03

APPENDIX C

RECON – Final Report and QC Test Data

RECON
Remedial Construction Services, L.P.

Remedial Construction Services, L.P.
P.O. Box 690708
Houston, TX 77269
9720 Derrington
Houston, TX 77064
tel 281.955.2442
fax 281.890.5172
sales@recon-net.com
www.recon-net.com

4/20/05

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

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

Dear Mr. Schmaltz:

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

As indicated in enclosed report, Recon achieved required pemeabilities of $1x10^{-7}$ 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

Bob Carlson
Project Manager

FINAL REPORT AND TEST DATA
FOR

GAINT REFINERY COMPANY

BLOOMFIELD REFINERY NORTH BOUNDARY BARRIER

PREPARED BY:
Bob Carlson
RECON

PREPARED FOR:
MR. RANDY SCHMALTZ
GAINT REFINERING COMPANY

APRIL 2005

TABLE OF CONTENTS

Introduction

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

Reason for the Barrier Wall

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

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

RECON developed a design capable of attaining 1 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 Pirnie and Recon, to detect and confirm when adequate bedrock was encountered and that appropriate key-in depths were maintained. Recon also conducted daily testing and reporting throughout the project to assure that required testing criteria were met and/or exceeded during the project. Recon's testing requirements consisted of monitoring Viscosity, Filtrate, Density, pH, Fines Content and Density for the bentonite slurry and soil bentonite backfill including conducting slumps of the soil bentonite backfill. Sierra Testing Laboratories conducted permeability tests. See Appendix A for RECON Daily Quality Control Reports

Laboratory Testing

Recon contracted Sierra Testing Laboratories to perform mix designs and perform permeability studies during the project. Representative samples were collected from the Giant site and sent to Sierra for mix design development. During the project, permeability testing was conducted by Sierra Testing Laboratories in accordance with Giants conformance testing requirements. As indicated in enclosed reports, all permeability's were $1x10^{-7}$ 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.

APPENDIX A

Daily Quality Control Sheets

Project:		Job Name: GIANT REFINING
		Job Number: J-1790
		Date: 9-5-05

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	11,771.5				SFTD	11,713.5			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
0+00	8						
0+20	16.5						
0+40	18.5						
0+60	16						
0+80	15.5						
1+00	14.5						
1+15	14.5						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments: MOISTURE 37.10
0+00		131	5"		33.85	

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
0+20	1010	MIJ	1.5	41	1.04	17	37	8	0830
					1.04	17	40	8	1040
0+20	1430	MIJ	1.4	40	1.04	17	37	8	1315
					1.04	17	37	7	1640

Comments:

Client: GIANT REFINING	Remedial Construction Services, L.P.
By:	By:

Project:					Job Name:				
					Job Number:				
					Date:				

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF					SFTD				

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments:

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time

Comments:

Client:	Remedial Construction Services, L.P.
By:	By:

Project:		Job Name:	GIANT
		Job Number:	2-1750
		Date:	9-7-05

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	2145				SFTD	1740			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
2+95	17	5'					
3+00	17	"					
3+10	17						
3+20	17						
3+30	17						
3+46	17						
3+50	17						
3+60	17						
3+70	17						
3+80	17						
3+90	17						
4+00	16						
4+10	16						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments:
2+91	AM	123	5	37	3	Sand 3% AM
						Sand 2.5% PM
3+11	PM	123.5	4½	36	5	

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
2+20	AM	Mid	72	53	64	16	39	9	Dur
		Bottom	75	60					
3+65	PM	Mid	71	52	64.5	15.5	41	9	PM
		Bottom	75	60					

Comments:

Client:	GIANT REFINING	Remedial Construction Services, L.P.
By:		By:

Project:				Job Name:	CIRCUIT			
				Job Number:	3-115			
				Date:	5-7-07			

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	9310.5				SFTD	8763.5			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
4+00	14.5			5+00	14.5		
4+30	14.5						
4+60	14.5						
4+90	13						
5+20	13						
5+50	15						
5+80	15						
6+10	15						
6+40	15						
6+70	15						
7+00	14.5						
7+30	14.5						
7+60	14.5						
7+90	15.5						
8+20	15.5						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments:
4+00	AM	133	4½	26	2	SAND 3.5% AM
4+40	PM	135	5	38	1	SAND 4.0% PM

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
4+30	AM	MID	71	51	14	15.5	37	8	11 AM
		B.T.M	73	57					
4+70	PM	MID	73	53	64.5	14	41	8	12 PM
		B.T.M	75	60					

Comments:

Client:		Remedial Construction Services, L.P.
By:		By:

Project:					Job Name:				
					Job Number:				
					Date:	2-10-05			

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF					SFTD				

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments:

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time

Comments:

Client:		Remedial Construction Services, L.P.
By:		By:

Project:			Job Name: CLIENT
			Job Number: 9-17[illegible]
			Date: 9-15-05 14

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	957.5				SFTD	13542.5			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
7+40	15.5						
7+50	15.5						
7+60	15.5						
7+70	15.5						
7+80	18						
7+70	18.5						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments:
5+60	AM	143	5	37.	9	SAND 4.5" AM
6+60	PM	139	5	36.	9	SAND 4.5" PM

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
7+60	AM	MID	73	57	64	15	39	8	1PM
		BTM	75	60					
7+30	PM	MID	75	60	64.5	17	46	8	1PM
		BTM	76	63					

Comments:

Client: CLIENT REFINING	Remedial Construction Services, L.P.
By:	By:

Project:		Job Name:	Plant
		Job Number:	3-1730
		Date:	3-14-05

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	997.5				SFTD	13540			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
8+00	17						
8+10	21						
8+20	21						
8+30	20						
8+40	17						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments: No backfill
						Sand [redacted]% Hun
						Sand [redacted]% Pun

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
[redacted]	1111	mid	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	8	0m
		bottom	[redacted]	[redacted]					
[redacted]	1111	mid	[redacted]	[redacted]					
		bottom	29	[redacted]					

Comments:

Client: Plant Materials	Remedial Construction Services, L.P.
By:	By:

Project:					Job Name:	GIANT REFINING			
					Job Number:	2-775C	16-05		
					Date:	2-[illegible]-05	17-05		

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	1475				SFTD	15015			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
8+50	12						
8+60	18						
8+70	21						
8+90	18						
8+90	14						
9+00	14						
9+10	14						
9+30	14						
9+30	14						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments: No backfill 2-17-05

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
[illegible]	[illegible]	Mid	65	43	64	18	39	8	AM
		bottom	70	56					
[illegible]		Mid	67	41	64.5	17.5	40	8	PM
		bottom	78	63					

Comments:

Client: GIANT REFINING	Remedial Construction Services, L.P.
By:	By:

Project:					Job Name: Giant				
					Job Number: 2-1780-				
					Date: 2-18-05				

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	1270				SFTD	16'285			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
9+40	15	11					
9+50	14	11					
9+60	14	11					
9+70	14	11					
9+80	14	11					
9+90	14	11					
1+00	14	11					
1+10	14	11					
1+20	14	11					

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments: Sand 7.9 % Mid Sand 10.9% bottom
8+60	PM	119.5	5½	36.9		

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
8+60	PM	Mid	64.5	41	64.5	18	40	8	PM
		bottom	71	57					

Comments: See Geomat Sheet for AM testing

Client:	Remedial Construction Services, L.P.
By:	By: Michael Cavaliere S

Project:					Job Name:	GIANT			
					Job Number:	9-1750			
					Date:	9-30-05			

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	767.5				SFTD	17052.5			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
10+30	15½						
10+40	15½						
10+50	15½						
10+60	15½						
10+70	15½						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments: Sand 9.9%
10+10	AM	119	5½	37.5		

Slurry Data Center

Trench

Station	Time	Depth	Unit Wt.	Visc.
10+30	AM	Mid	68	50
		Bottom	73	62

Plant

Unit Wt.	Filtrate	Visc.	pH	Time
64		40	8	

Comments:

Client:	GIANT REFINING	Remedial Construction Services, L.P.
By:		By:

Sand 9.9%

Project:					Job Name:	GIANT			
					Job Number:	9-1750			
					Date:	2-2/-05			

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	757.5				SFTD	17810			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
10+90	15						
11+90	15						
11+00	15						
11+10	15½						
11+30	15						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments:
10+40		119	5½	36.9		Sand 85%

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
10+40			59	47	64.5	17	40	8	PM
			63	58					

Comments:

Client:	GIANT REFINING	Remedial Construction Services, L.P.
By:		By:

Project:					Job Name:	Valero			
					Job Number:	9-1240			
					Date:	5-11-04			

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	1525				SFTD	19,235			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
11+30	16						
11+40	16						
11+50	16						
11+60	16						
11+70	16						
11+80	16						
11+90	14						
12+00	14						
12+10	14						
12+20	14						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments:
10+70	AM	119	5½	37.3		
10+50	PM	120	5½			

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
11+30	AM	mid	70	41	64.5	18.5	40	8	AM
	AM	bottom	73	75	64	18	39	8	PM
	PM	mid	71	45					
	PM	bottom	73	78					

Comments:

Client:	Valero Refining	Remedial Construction Services, L.P.
By:		By:

Project:					Job Name:	GIANT REFINING			
					Job Number:	3-11780			
					Date:	2-1-05 - 2-23-05			

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	2535				SFTD	21870			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
12+30	14.5	11		13+70	14	11	
12+40	14.5			13+80	14		
12+50	14.5			13+90	14		
12+60	14			14+00	14		
12+70	14						
12+80	14						
12+90	14						
13+00	14						
13+10	14						
13+20	14						
13+30	14						
13+40	14						
13+50	14						
13+60	14						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments:
~~13+60~~	AM	120	5	36.3		AM - Sand Mid 7.5% bottom 9.5%
11+20						
						3-1 PM Sand Mid 7.5% ? bottom 10.0%
13+60		118	5½			

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
12+90	AM	Mid	71	41	64	17.5	39	8	AM
		bottom	72	69					
13+60	PM	Mid	70	42	64.5	18	40	8	PM
		bottom	72	70					

2/23

Comments:

Client:	GIANT REFINING	Remedial Construction Services, L.P.
By:		By: Frank Flum

Project:					Job Name:	Giant Refining			
					Job Number:	2-1750			
					Date:	2-2-05			

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	9085				SFTD	93755			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
14+10	14			15+50	14		
14+20	14						
14+30	14						
14+40	13.5						
14+50	13.5						
14+60	13.5						
14+70	14						
14+80	14						
14+90	14						
15+00	14						
15+10	14						
15+20	14						
15+30	14						
15+40	14						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments:
14+20	AM	118	5	35.9		AM Sand Mid 7% bottom 9.5%
14+40	PM	121	4½			PM Sand Mid 7.5% bottom 10%

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
14+40	AM10	Mid	70	43	64.5	18	40	8	AM
		bottom	72	57					
					64	18.5	39	8	PM
14+60	PM	Mid	69	42					
		bottom	72	62					

Comments:

Client:	Giant Refining	Remedial Construction Services, L.P.
By:		By: Joseph Tyson

Project:

Job Name: GIANT REFINING
Job Number: 3-17-50
Date: 2-3-05

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SFTD 96,275

SF 9220

Excavation Data Center

Station	Depth	Key
15+60	14	
15+70	14	
15+80	14	
15+90	14	
16+00	14	
16+10	15	
16+20	15	
16+30	15	
16+40	15	
16+50	15	
16+60	15	
16+70	15	
16+80	15	
16+90	14	

Comments:

Station	Depth	Key
17+00	14	
17+10	14	

Comments:

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200	
14+80	PM	121	5	31.2	

Comments:
Sand Mid - 9.5%
bottom - 10%

Slurry Data Center

Trench Station	Time	Depth	Unit Wt.	Visc.
15+60	PM	Mid	72	45
		bottom	75	57

Plant Unit Wt.	Filtrate	Visc.	pH	Time
64.5	18	40	9	PM

Comments:

Client: GIANT REFINING
By:

Remedial Construction Services, L.P.
By:

Project:					Job Name: GIANT REFINING				
					Job Number: 3-1750				
					Date: 3-4-05				

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	9135				SFTD	98410			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
17+20	14			18+60	15		
17+30	14			18+70	15		
17+40	14						
17+50	14						
17+60	14						
17+70	14						
17+80	14						
17+90	12						
18+00	12						
18+10	12						
18+20	12						
18+30	12						
18+40	12						
18+50	14						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments:
15+60	AM	120	5	36.3		AM Sand - mid 8% bottom 10%
16+00	PM	121	5.5			PM Sand - mid 8.5% bottom 10%

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
17+00	AM	Mid	70	46	64.5	18	40	8	AM
		bottom	74	70					
17+40	PM	Mid	71	45	64.5	18	40	8	PM
		bottom	75	78					

Comments:

Client: GIANT REFINING	Remedial Construction Services, L.P.
By:	By:

Project:

Job Name: GIANT REFINING
Job Number: 3-1750
Date: 3-15-07

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	11.35				SFTD	300.45			

Excavation Data Center

Station	Depth	Key	Comments:
18+80	15		
18+90	15		
19+00	15		
19+10	15		
19+20	15		
19+30	15		
19+40	15		
19+50	15		
19+60	15		
19+70	14		
19+80	14		

Station	Depth	Key	Comments:

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200	
18+00	AM	119	5	36.3	
18+60	PM	122	4½		

Comments:
AM Sand Mid - 8%
-#200 - 10%
PM Sand Mid - 8.5%
-#200 - 10.5%

Slurry Data Center

Trench Station	Time	Depth	Unit Wt.	Visc.	Plant Unit Wt.	Filtrate	Visc.	pH	Time
18+80	AM	Mid	72	46	64	18.5	39	8	AM
		bottom	76	75					
19+20	PM	Mid	72	46	64.5	18	40	9	PM
		bottom	77	80					

Comments:

Client: GIANT REFINING
By:

Remedial Construction Services, L.P.
By:

Project:		Job Name: GIANT REFINING
		Job Number: 2-1720
		Date: 2-9-05

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	2980				SFTD	36/25			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
93+50	14'			93+70	15'		
94+10	16'			94+60	14'		
94+70	18'			94+10	14'		
94+80	21'			94+30	14'		
93+90	20'			94+30	14'		
93+60	20'			94+40	14'		
93+10	21'			94+50	14'		
93+20	21'			94+60	10'		
93+30	24'						
93+40	22'						
93+50	24'						
93+60	24'						
93+70	22'						
93+50	18'						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments: Sand AM Mud 7% bottom 8.5% Sand PM Mud 8.5% bottom 10%
24+00	AM	130	4½			
				36.5		
24+20	PM	125	5			

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
22+60	AM	Mud	70	44	1.04 5	18	40	9	AM
		bottom	73	50					
24+00	PM	Mud	72	45	1.04	18.5	39	8	PM
		bottom	75	1.05					

Comments:

Client: GIANT REFINING	Remedial Construction Services, L.P.
By:	By:

Project:		Job Name: Giant Refining
		Job Number: 2-1750
		Date: 3-29-05

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	3835				SFTD	35780			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
32+50	14			33+90	15		
32+60	16			34+00	14		
32+70	18			34+10	14		
32+80	21			34+20	14		
32+90	20			34+30	14		
33+00	20			34+40	14		
33+10	21			34+50	14		
33+20	21						
33+30	24						
33+40	22						
33+50	24						
33+60	24						
33+70	22						
33+80	18						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments: SAND AM MID 7% BOT 8.5% SAND PM MID 8.5% BOT 9.5%
33+60	AM	130	4.34			
				36.5		
34+30	PM	135	5			

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
32+60	AM	MID	70	44	64.5	18	40	9	AM
		BOTTOM	73	50					
34+60	PM	MID	72	45	64	18.5	39	8	PM
		BOTTOM	75	60					

Comments:

Client: Giant Refining	Remedial Construction Services, L.P.
By:	By:

Project:					Job Name: GIANT REFINING
					Job Number: 2-1750
					Date: 3-11-05

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	1615				SFTD	37575			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
21+40	16						
21+50	16						
21+60	16						
21+70	15						
21+80	15						
21+90	15						
22+00	14						
22+10	14						
22+20	14						
22+30	13						
22+40	13						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments:
21+50	AM	120	5	36.3		Sand AM mid 5.5% bot. 5.5%
21+70	PM	123	4½			Sand PM mid 5.5% bot. 7.6%

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
21+50	AM	Mid	71	46	64.5	15	40	8	AM
		bottom	73	49					
21+90	PM	Mid	71	45	64.5	18	41	9	PM
		bottom	75	52					

Comments:

Client: GIANT REFINING	Remedial Construction Services, L.P.
By:	By:

Project:					Job Name: GIANT REFINING				
					Job Number: 2-1750				
					Date: 3-12-05				

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	1277.5				SFTD	38879.5			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
20+50	15						
20+60	15						
20+70	14						
20+80	14						
20+90	14						
21+00	14						
21+10	14						
21+20	14						
21+30	14						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments:
20+60	AM		4 1/2	21.4		Sand AM Mud 6.5% Bottom 8%
20+90	PM		4 1/4			Sand PM Mud 7% Bottom 10%

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
20+60	AM	Mud	70	43	64.5	18	40	9	AM
		bottom	75.5	58					
20+90	PM	Mud	72	46	64.5	18	40	9	PM
		bottom	76.5	61					

Comments:

Client: GIANT REFINING	Remedial Construction Services, L.P.
By:	By:

Project:					Job Name: GIANT REFINING				
					Job Number: 3-1780				
					Date: 3-14-05				

Remedial Construction Services, L.P.

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

SF	812.5				SFTD	27685			

Excavation Data Center

Station	Depth	Key	Comments:	Station	Depth	Key	Comments:
17+90	13.5						
20+00	13.5						
20+10	13.5						
20+20	13.5						
20+30	13.5						
20+40	13.5						

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200		Comments:
20+00	AM	123	4½	36.1		Sand Am. Mid 7.5% bottom 9%
	PM	122	4½			

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
20+10	AM	Mid	72	46	69.5	18	40	9	AM
		bottom	75	46					

Comments:

Client: GIANT REFINING	Remedial Construction Services, L.P.
By:	By:

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

February 17, 2005

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

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

LABORATORY TEST RESULTS

Dear Mr. Carlson:

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

1) **Flexible Wall Permeability (ASTM D5084)**
2) **Particle Size Analysis, Percent Passing #200 Sieve (ASTM D1140**

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

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

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

Very truly yours,

Chad M. Walker
Project Manager

Enclosures

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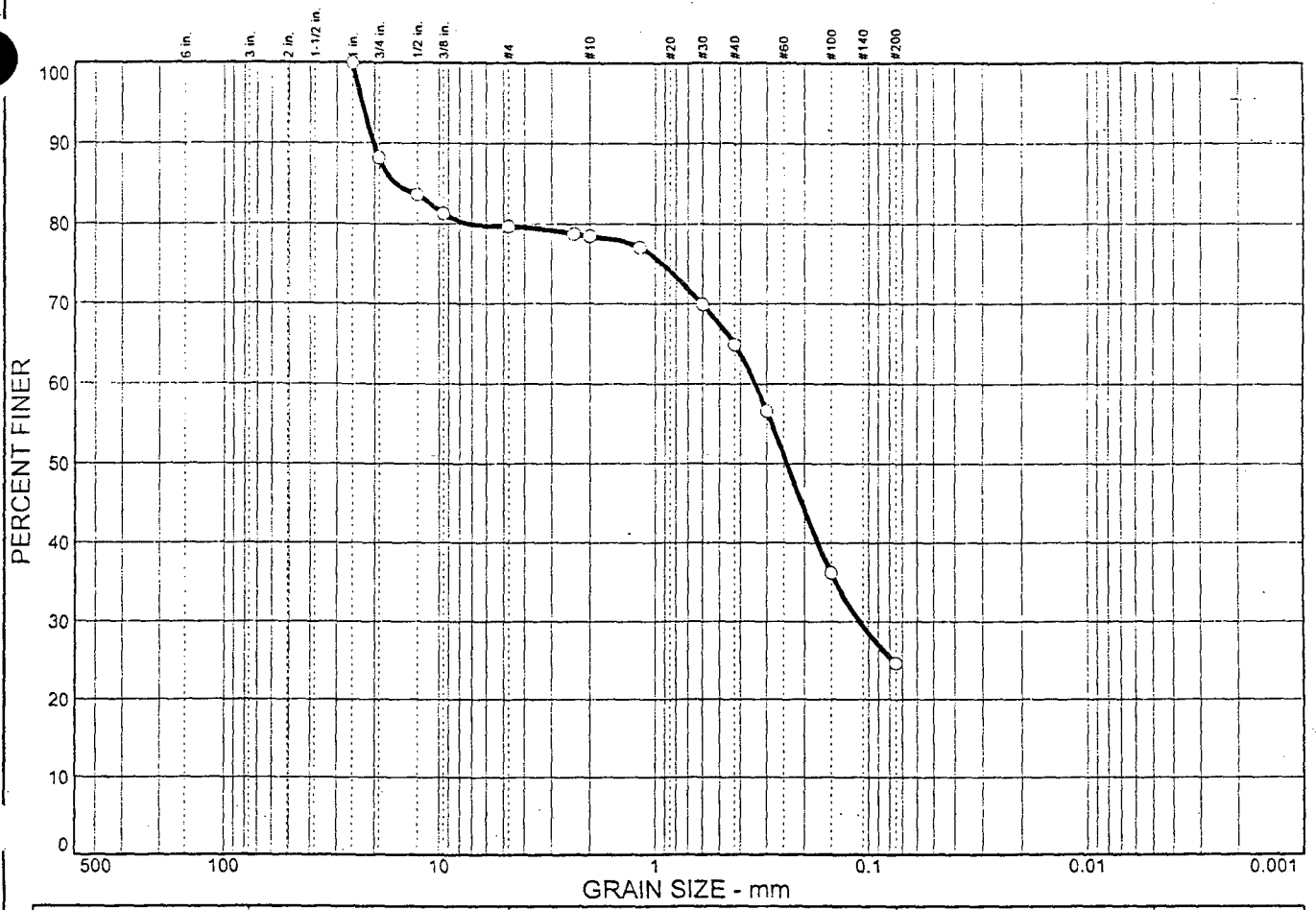
5040 Robert J. Mathews, Suite 1, El Dorado Hills, CA 95762 (916) 939-3460 Fax (916) 939-3507
www.sierratestinglaboratories.com

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	20.3	55.0	24.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	88.2		
1/2 in.	83.6		
3/8 in.	81.3		
#4	79.7		
#8	78.8		
#10	78.5		
#16	77.1		
#30	69.9		
#40	64.9		
#50	56.6		
#100	36.2		
#200	24.7		

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 15.9 D_{60}= 0.340 D_{50}= 0.241
D_{30}= 0.110 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

- * (no specification provided)

Sample No.: STA 4+00 **Source of Sample:** STA 4+00 **Date:** 2-15-05
Location: **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 4+00, 2/10/05
Visual Description: N/A
Remarks:

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

TEST RESULTS

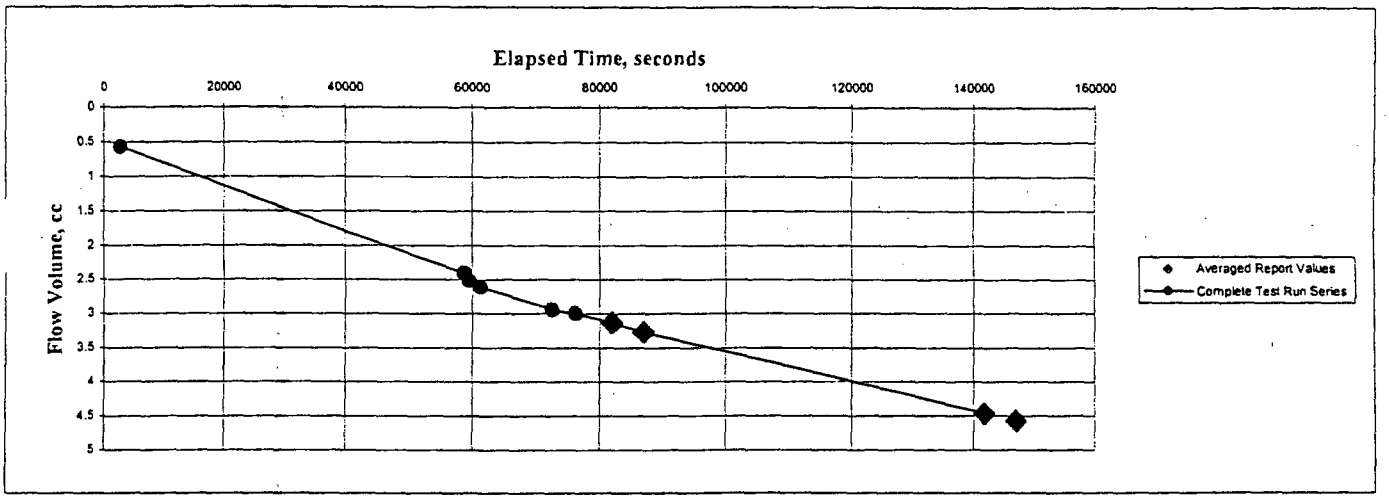
Permeability, cm/sec.: 6.93E-08

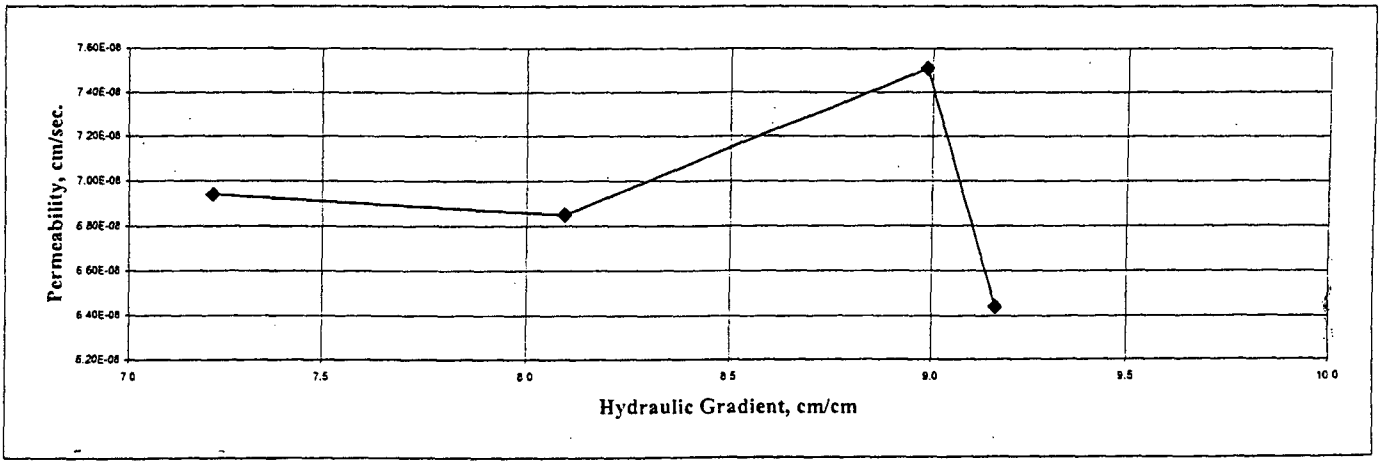
Average Hydraulic Gradient: 8.4

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	5.84	Specimen Height, cm:	4.98
Specimen Diameter, cm:	7.11	Specimen Diameter, cm:	7.11
Dry Unit Weight, pcf:	80.3	Dry Unit Weight, pcf:	94.2
Moisture Content, %	40.3	Moisture Content, %	27.6
Specific Gravity, Assumed			
Percent Saturation:			





Test Method: ASTM D5856

PROJECT NUMBER:	05-103	February 11, 2005

Giant Refinery, 2-1780

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

Table 1

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

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

Notes:

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

February 17, 2005

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

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

LABORATORY TEST RESULTS

Dear Mr. Carlson:

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

1) **Flexible Wall Permeability (ASTM D5084)**
2) **Particle Size Analysis, Percent Passing #200 Sieve (ASTM D1140**

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

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

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

Very truly yours,

Chad M. Walker
Project Manager

Enclosures

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www.sierratestinglaboratories.com

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

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

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

TEST RESULTS

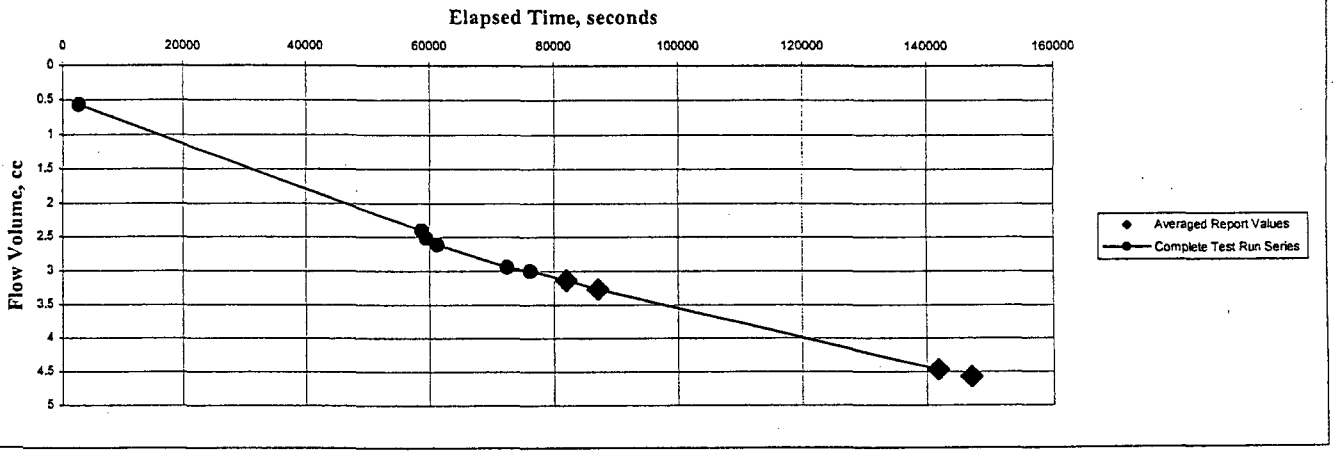
Permeability, cm/sec.: 6.93E-08

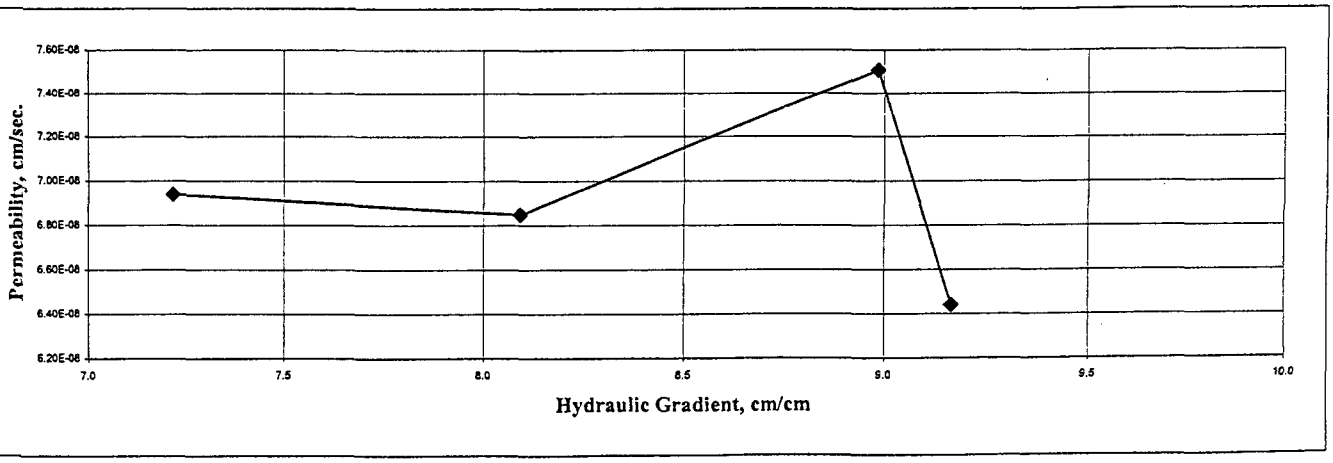
Average Hydraulic Gradient: 8.4

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	5.84	Specimen Height, cm:	4.98
Specimen Diameter, cm:	7.11	Specimen Diameter, cm:	7.11
Dry Unit Weight, pcf:	80.3	Dry Unit Weight, pcf:	94.2
Moisture Content, %	40.3	Moisture Content, %	27.6
Specific Gravity, Assumed			
Percent Saturation:			





Test Method: ASTM D5856

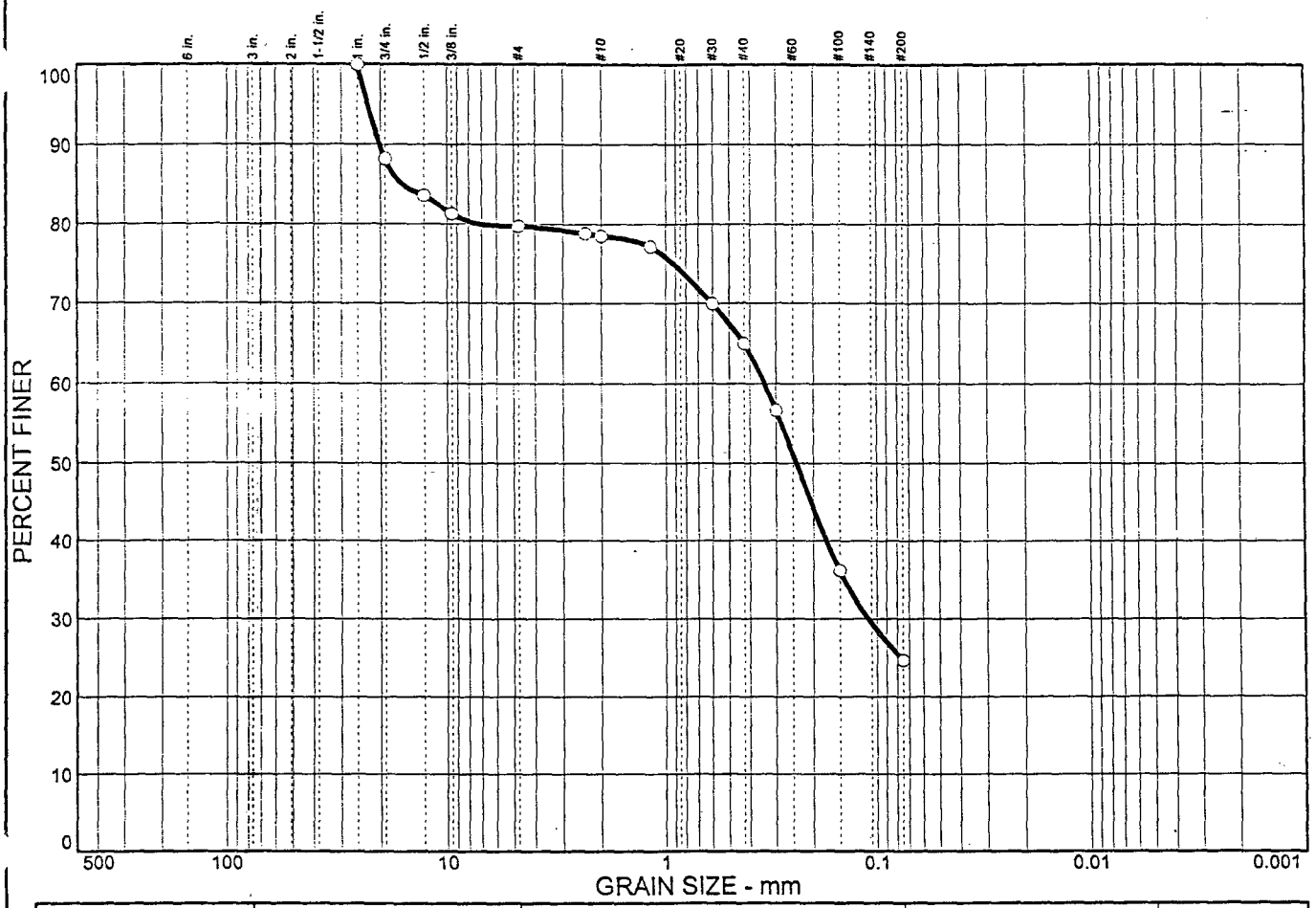
PROJECT NUMBER:	05-103	February 11, 2005

Giant Refinery, 2-1780

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	20.3	55.0	24.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	88.2		
1/2 in.	83.6		
3/8 in.	81.3		
#4	79.7		
#8	78.8		
#10	78.5		
#16	77.1		
#30	69.9		
#40	64.9		
#50	56.6		
#100	36.2		
#200	24.7		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 15.9 D_{60}= 0.340 D_{50}= 0.241
D_{30}= 0.110 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: STA 4+00 **Source of Sample:** STA 4+00 **Date:** 2-15-05
Location: **Elev./Depth:**

SIERRA TESTING LABS, INC.

Client: RECON
Project: Giant Refining Company
Project No: 05-103 **Figure**

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

Table 1

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

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

Notes:

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

February 17, 2005

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

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

LABORATORY TEST RESULTS

Dear Mr. Carlson:

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

1) **Flexible Wall Permeability (ASTM D5084)**
2) **Particle Size Analysis, Percent Passing #200 Sieve (ASTM D1140**

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

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

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

Very truly yours,

Chad M. Walker
Project Manager

Enclosures

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

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

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

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

TEST RESULTS

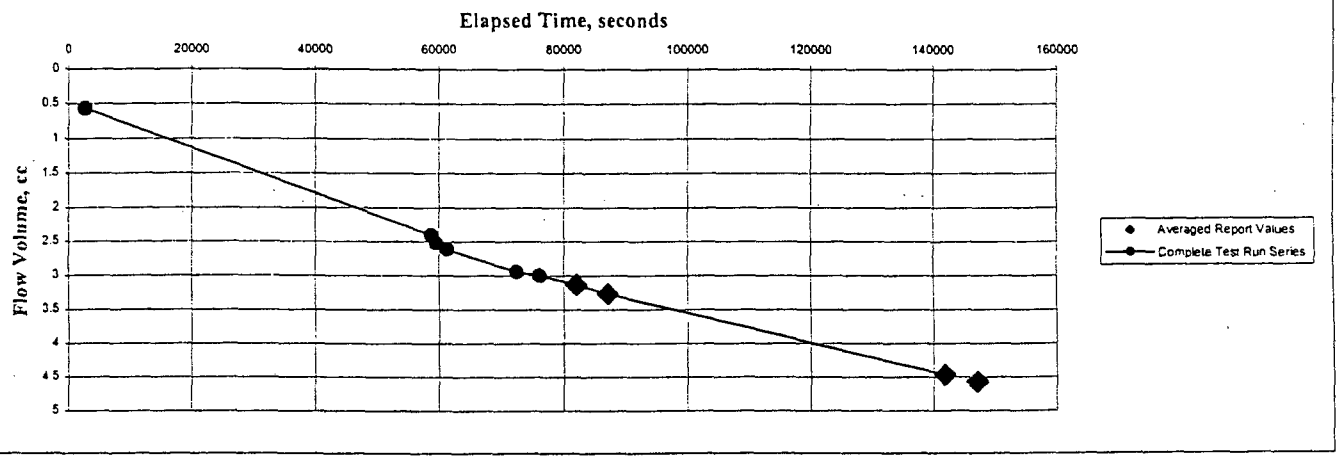
Permeability, cm/sec.: 6.93E-08

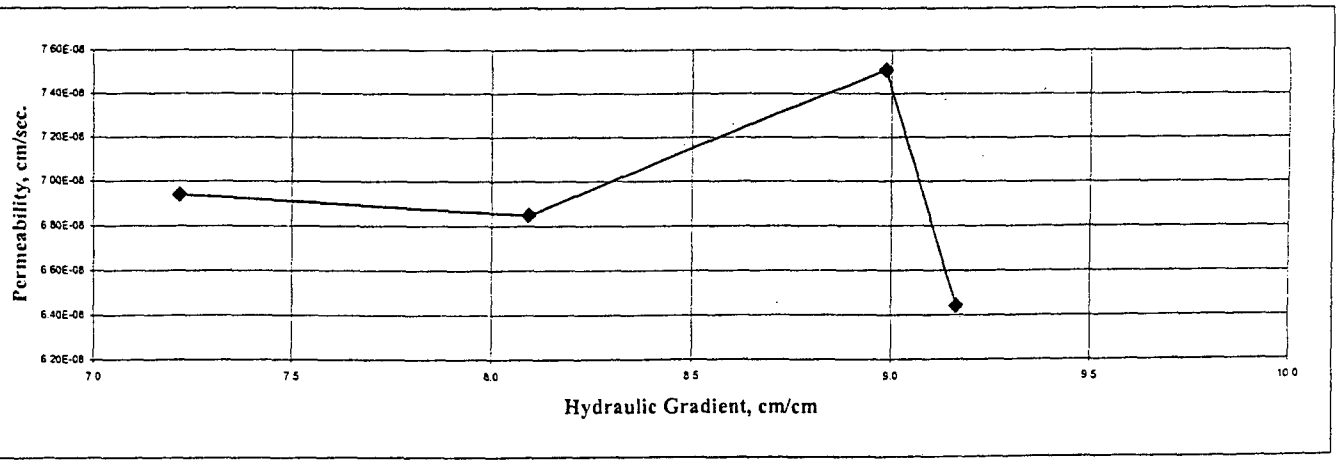
Average Hydraulic Gradient: 8.4

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	5.84	Specimen Height, cm:	4.98
Specimen Diameter, cm:	7.11	Specimen Diameter, cm:	7.11
Dry Unit Weight, pcf:	80.3	Dry Unit Weight, pcf:	94.2
Moisture Content, %	40.3	Moisture Content, %	27.6
Specific Gravity, Assumed			
Percent Saturation:			





Test Method: ASTM D5856

PROJECT NUMBER:	05-103	February 11, 2005

Giant Refinery, 2-1780

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

Table 1

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

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

Notes:

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

March 8, 2005

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

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

LABORATORY TEST RESULTS

Dear Mr. Savage:

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

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

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

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

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

Very truly yours,

Chad M. Walker
Project Manager

Enclosures
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www.sierratestinglaboratories.com

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

Giant Refining Company, SB Slurry Wall

Bloomfield, New Mexico
Recon Job No.:
Sierra Testing Laboratories Job No. 05-103

Composite of Excavated Material

Notes: The excavated material was classified as a brown silty Sand with gravel and cobble (ASTM D2488). Fines content was of no plasticity

Results of ASTM D1140	11.4%
Dry Density ASTM D698 Para C.2	77.6pcf
Moisture Content ASTM D2216	7.4%

Imported Material

Notes: The import material was classified as an orange brown sandy SILT (ASTM D2488). The fines content exibited little plasticity.

Results of ASTM D1140	43.7%
Dry Density ASTM D698 Para C.2	64.7pcf
Moisture Content ASTM D2216	10.7%

Mix Design #1

Notes: The excavated material and the import were mixed inorder to achieve a composite with at least 35% fines.

Results of ASTM D1140	35.9%
Density ASTM D698 Para C.2	71.4pcf
Moisture Content ASTM D2216	9.9%

Notes: 0.5% (by dry wt) Dry Bentonite was added and 40 marsh slurry was then added to achieve slump of the backfill.

Results of ASTM D1140	38.5%	
Density ASTM D698 Para C.2	76.1	
Moisture Content ASTM D2216	23.5%	
Slump ASTM C143	4.5"	
Permeability Sample #1 ASTM D5084	Initial	Final
Perm Rate (cm/sec)	8.12E-08	
Moisture Content (%)	23.5	19.9
Density (pcf)	76.1	106.6
Permeability Sample #2 ASTM D5084		
Perm Rate (cm/sec)	7.49E-08	
Moisture Content (%)	23.8	19.1
Density (pcf)	98.0	108.1

Mix Design #2

Notes: The excavated material and the import were mixed inorder to achieve a composite with at least 35% fines.

Results of ASTM D1140	35.9%
Density ASTM D698 Para C.2	71.4pcf
Moisture Content ASTM D2216	9.9%

Notes: 1.0% (by dry wt) Dry Bentonite was added and 40 marsh slurry was then added to achieve slump of the backfill.

Results of ASTM D1140	39.8%	
Density ASTM D698 Para C.2	92.8pcf	
Moisture Content ASTM D2216	26.5%	
Slump ASTM C143	4.0"	
Permeability Sample #1 ASTM D5084	Initial	Final
Perm Rate (cm/sec)	4.92E-08	
Moisture Content (%)	26.5	20.7
Density (pcf)	92.8	103.8
Permeability Sample #2 ASTM D5084		
Perm Rate (cm/sec)	6.99E-08	
Moisture Content (%)	26.2	21.3
Density (pcf)	95.4	103.5

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

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

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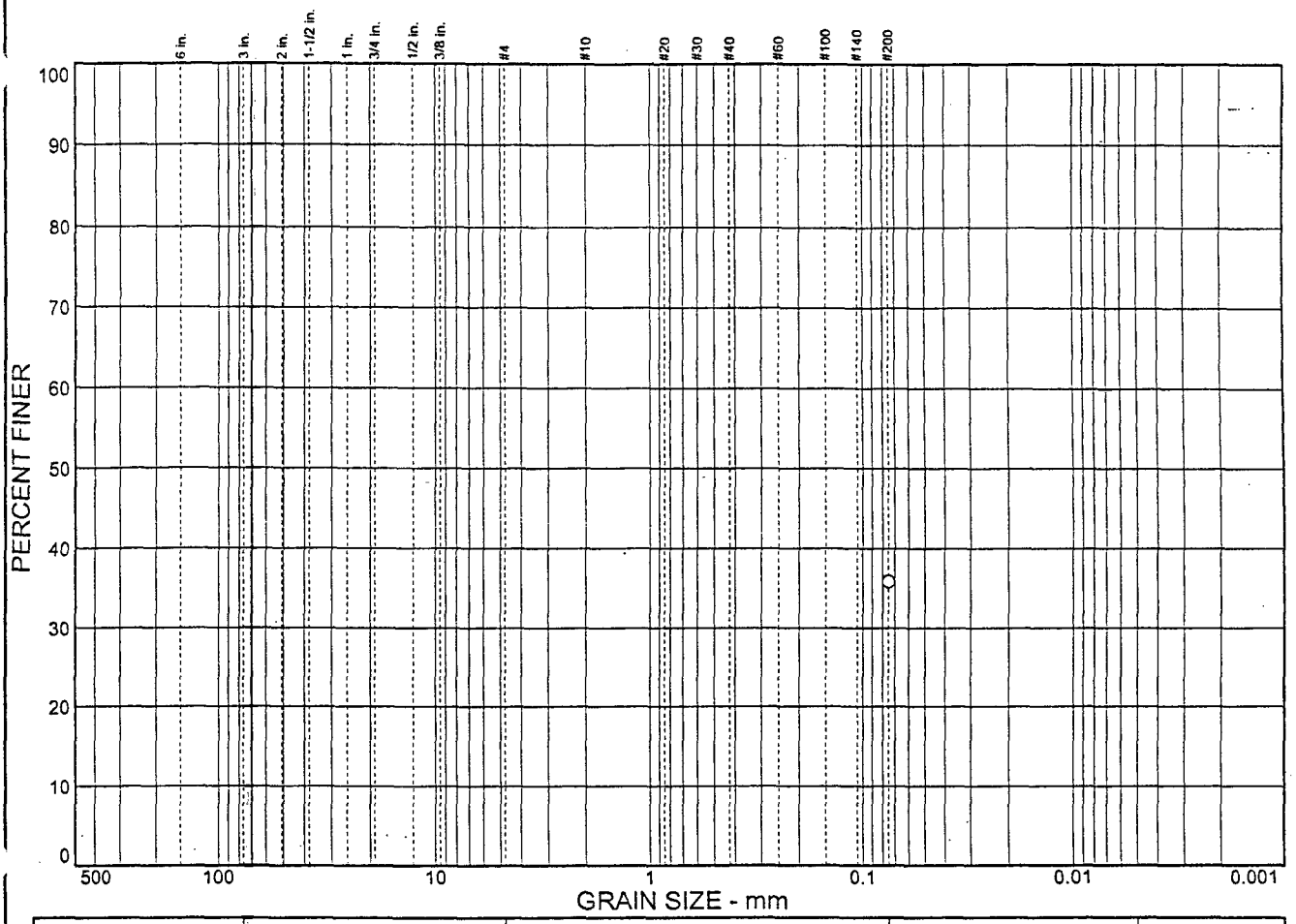
Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			35.9	

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

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

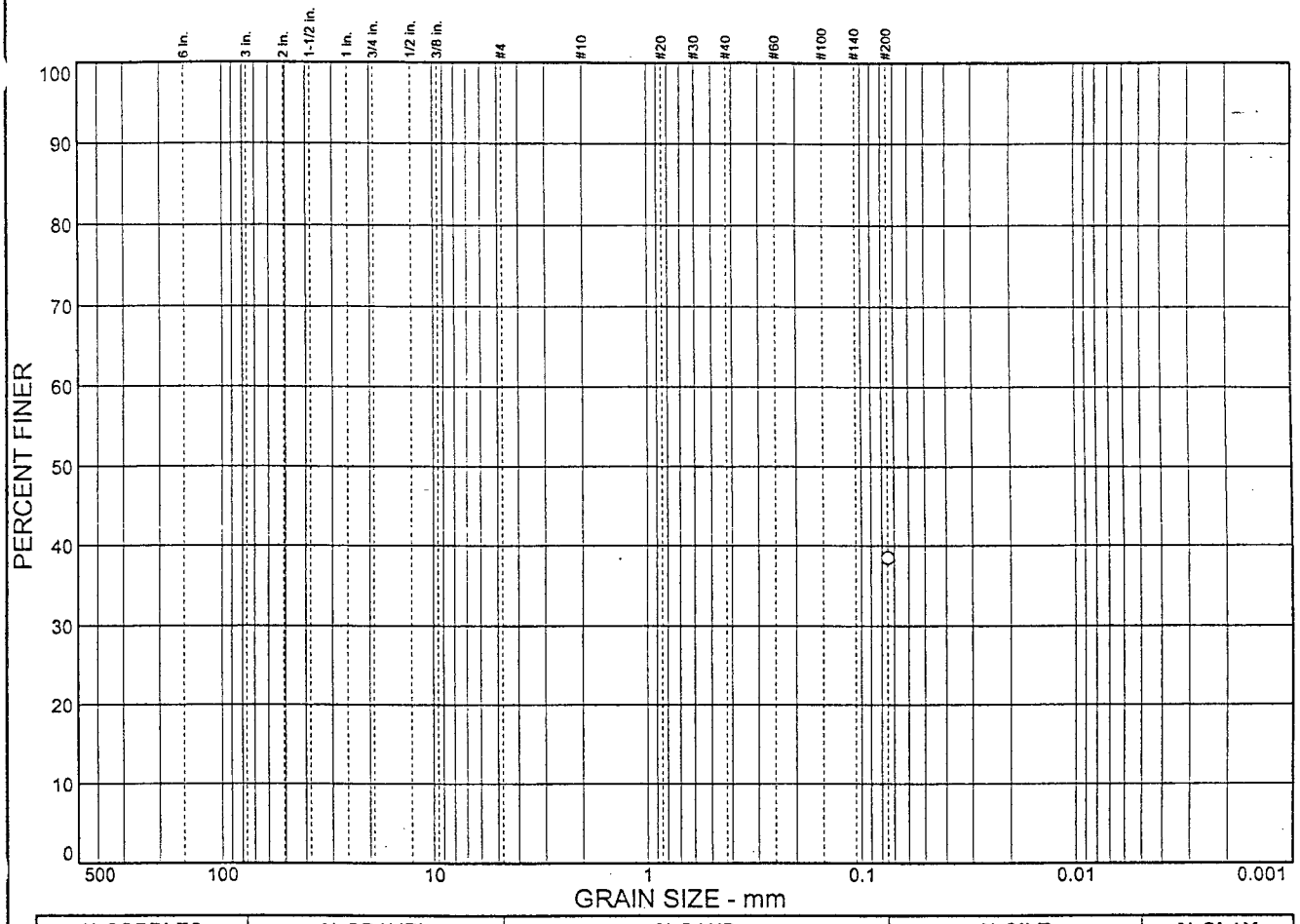
* (no specification provided)

Sample No.: Design Blend **Source 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**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			38.5	

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

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: .5% Ben+Design Blend **Source 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**

HYDRAULIC CONDUCTIVITY TEST REPORT

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:

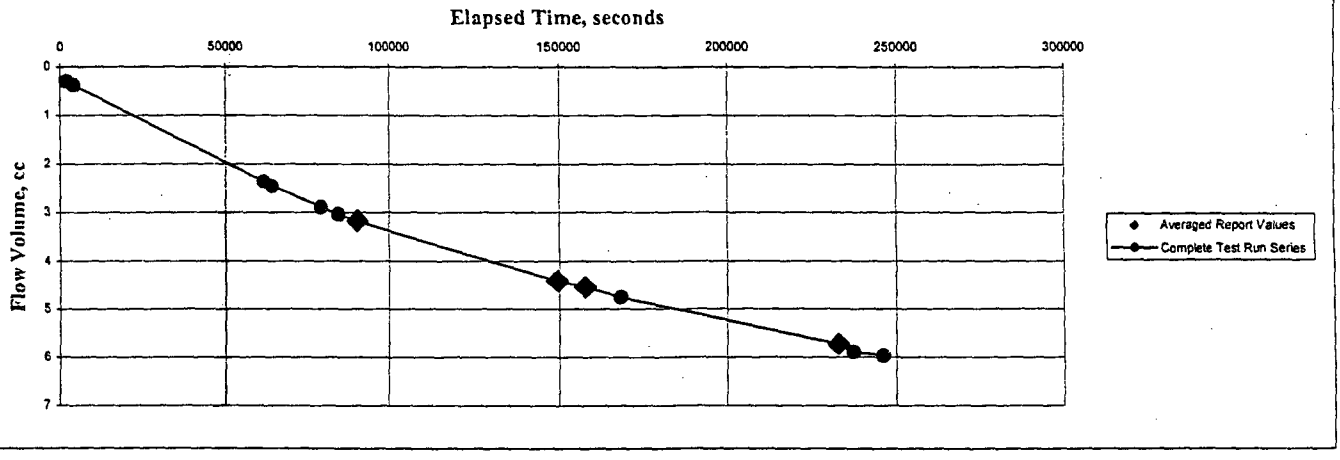
TEST RESULTS

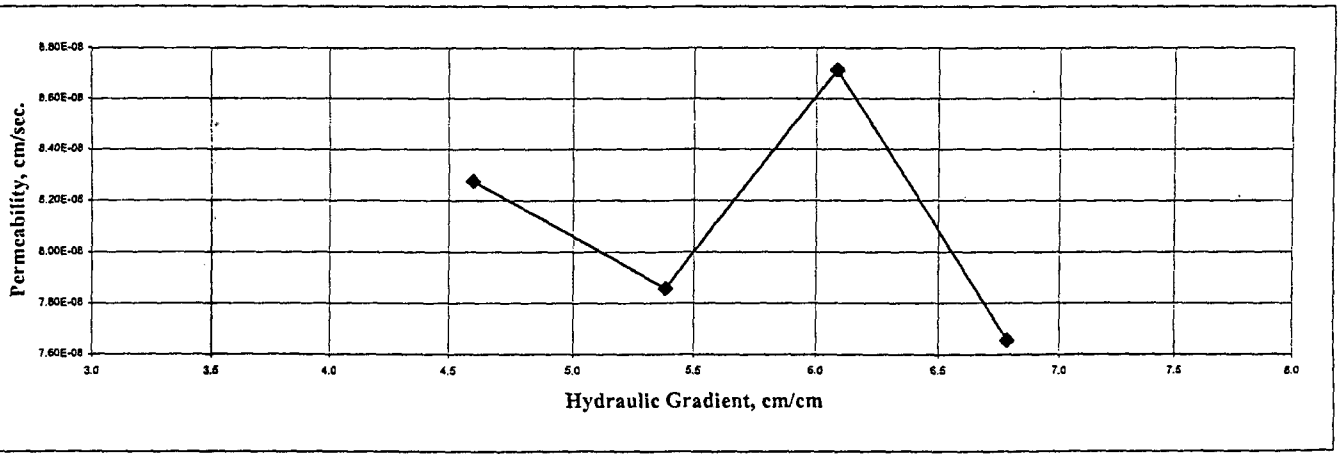
Permeability, cm/sec.: 8.12E-08 **Average Hydraulic Gradient: 5.7**

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.19	Specimen Height, cm:	6.53
Specimen Diameter, cm:	7.11	Specimen Diameter, cm:	7.11
Dry Unit Weight, pcf:	76.1	Dry Unit Weight, pcf:	106.6
Moisture Content, %	23.5	Moisture Content, %	19.9
Specific Gravity, Assumed			
Percent Saturation:			





Test Method: ASTM D5856

PROJECT NUMBER:	05-103	January 5, 2005

Giant Refinery Co

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

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

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

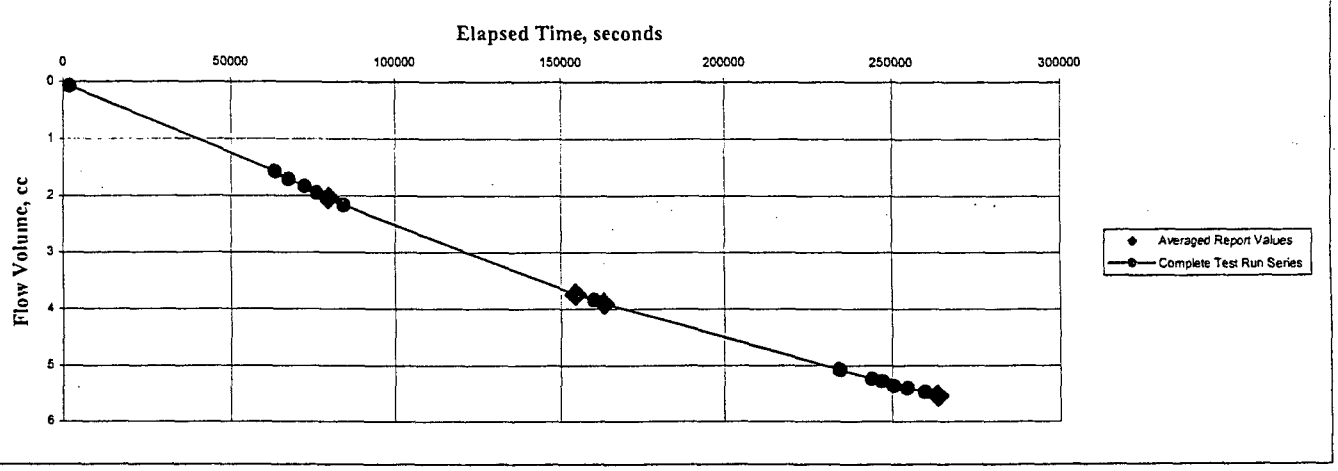
TEST RESULTS

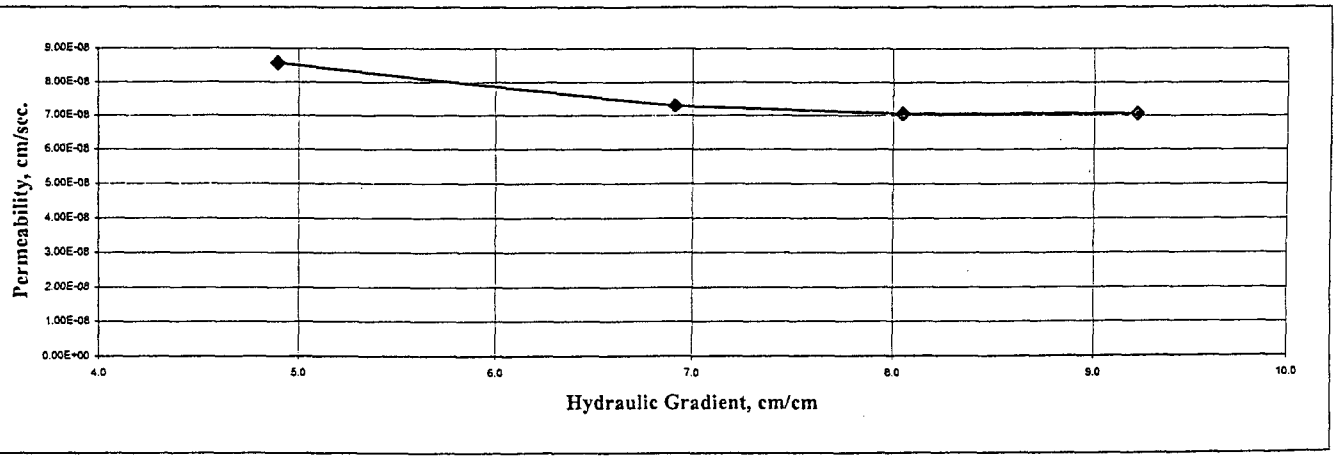
Permeability, cm/sec.: 7.49E-08 **Average Hydraulic Gradient: 7.3**

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5856

PROJECT NUMBER:	05-103	January 5, 2005

Giant Refining Co

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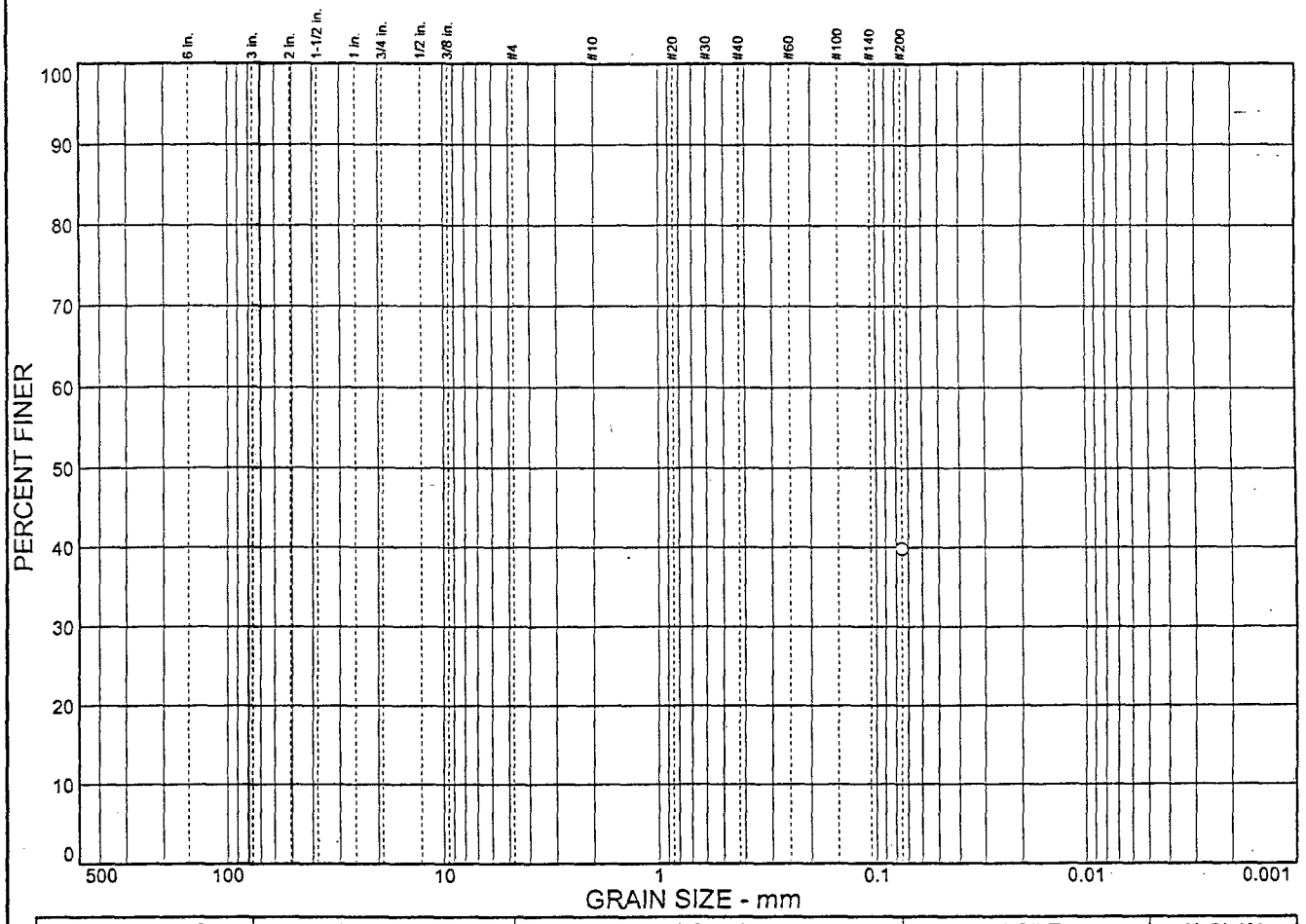
Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			39.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	39.8		

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

* (no specification provided)

Sample No.: -1% Ben+Design Blen **Source 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**

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

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

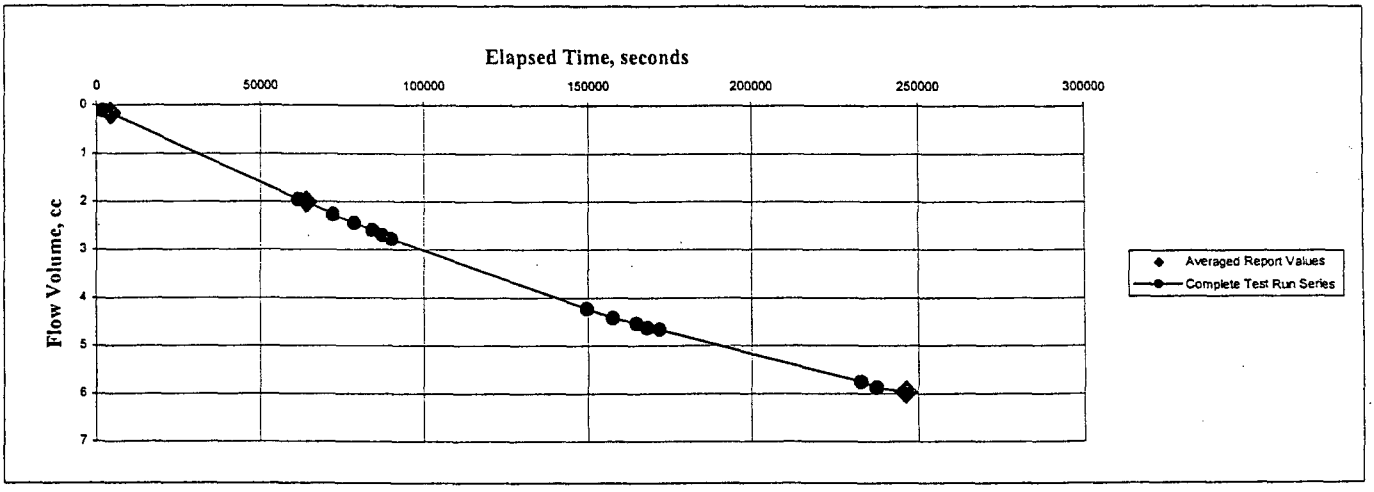
TEST RESULTS

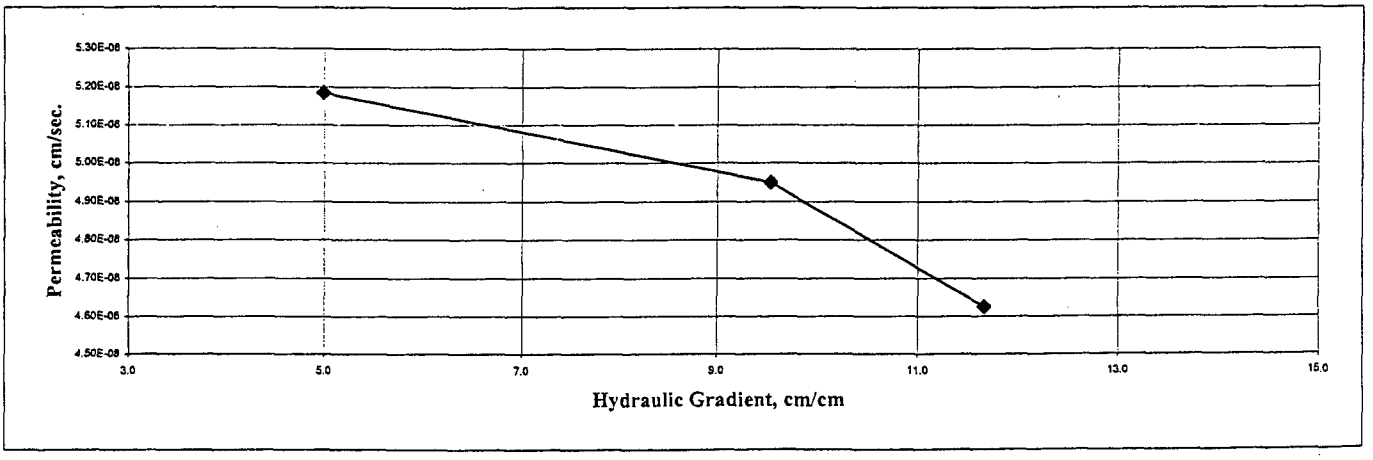
Permeability, cm/sec.: 4.92E-08 **Average Hydraulic Gradient: 8.7**

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5856

PROJECT NUMBER:	05-103	January 5, 2005

Giant Refinery Co.

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HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: Mixed w/1% Bentonite #2 Sample Depth, ft.: N/A
Visual Description: N/A Sample Type: SB Backfill Material
Remarks:

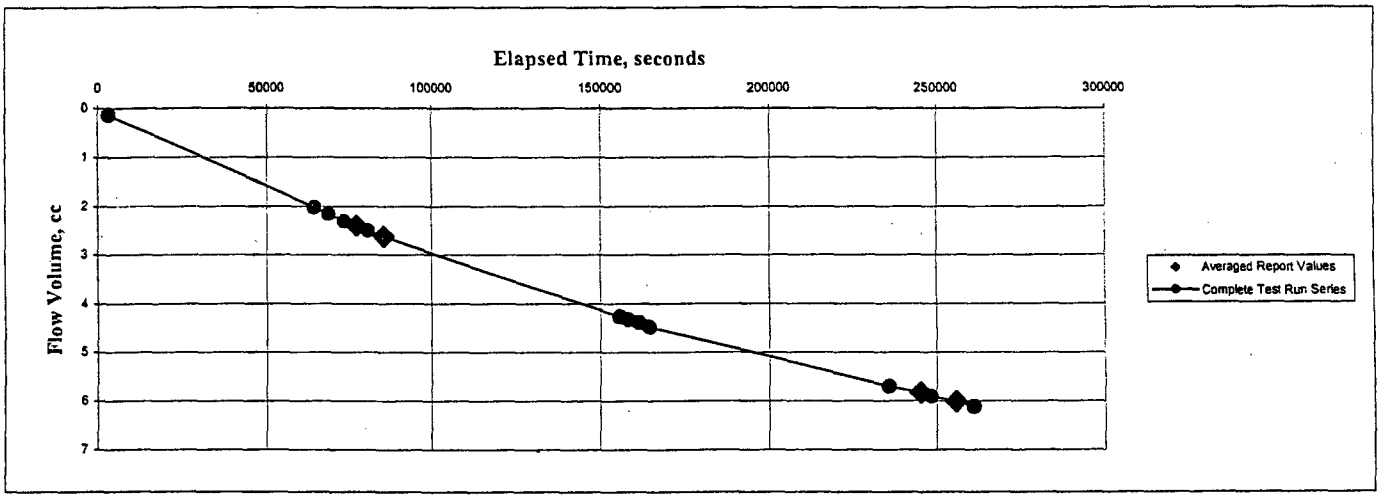
TEST RESULTS

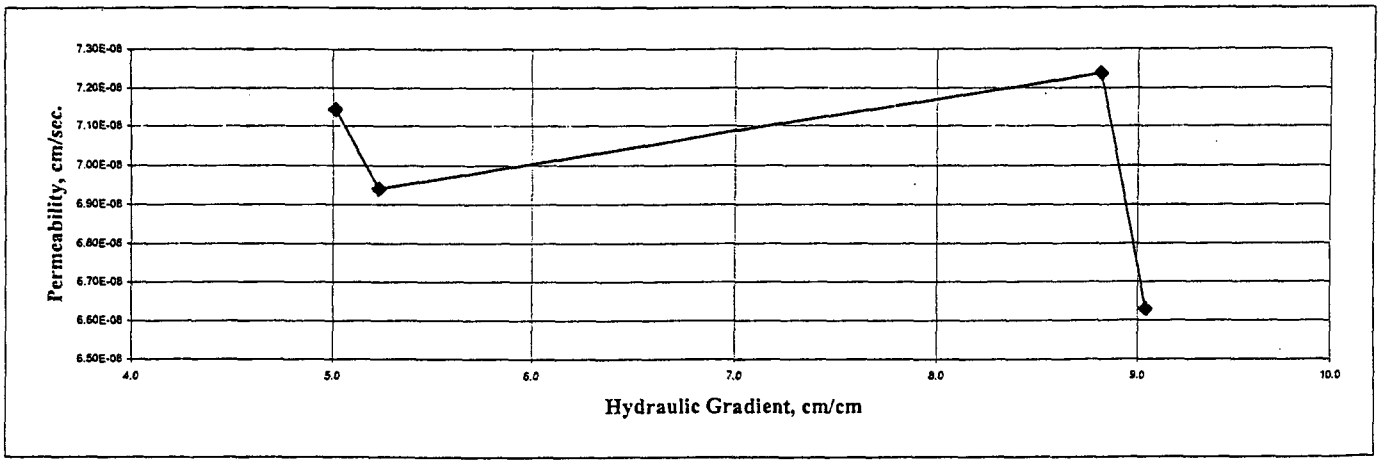
Permeability, cm/sec.: 6.99E-08 **Average Hydraulic Gradient: 7.0**

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	6.48	Specimen Height, cm:	5.97
Specimen Diameter, cm:	7.11	Specimen Diameter, cm:	7.11
Dry Unit Weight, pcf:	95.4	Dry Unit Weight, pcf:	103.5
Moisture Content, %	26.2	Moisture Content, %	21.3
Specific Gravity, Assumed			
Percent Saturation:			





Test Method: ASTM D5856

PROJECT NUMBER:	05-103	January 5, 2005

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HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: STA 8+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

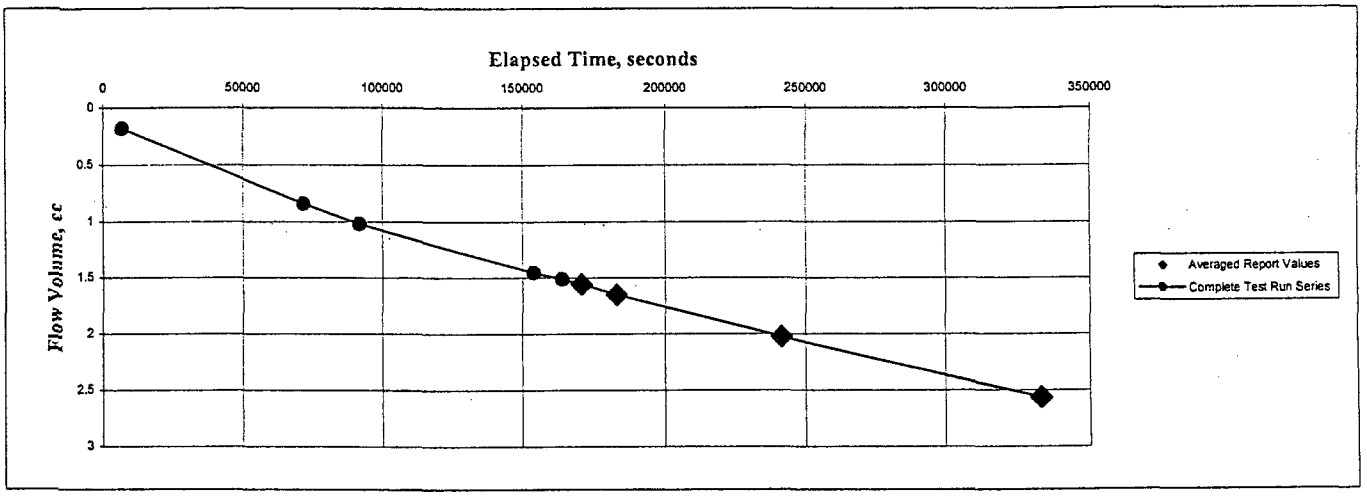
Permeability, cm/sec.: 2.01E-08

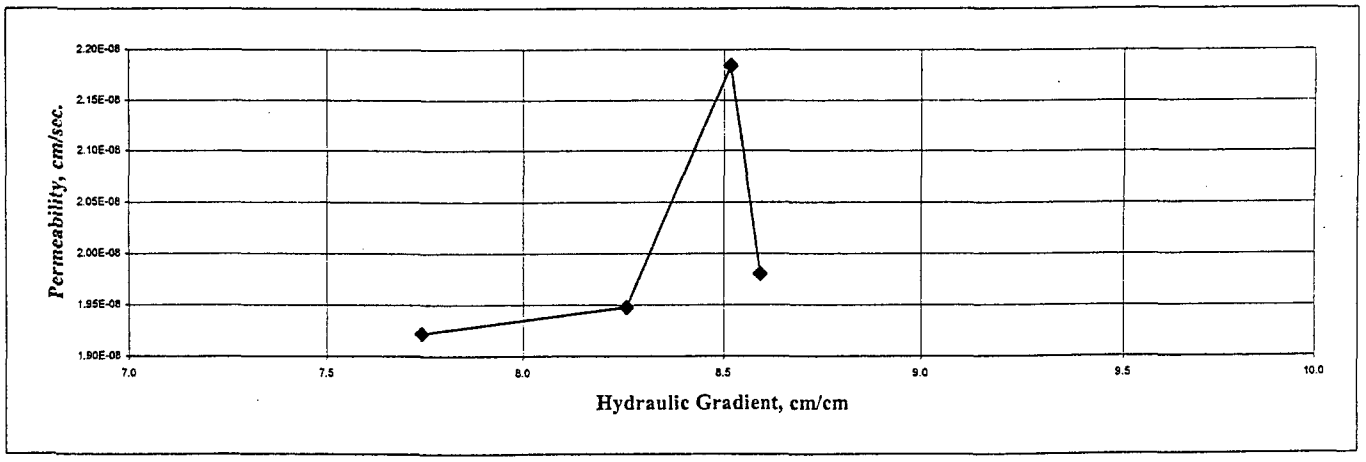
Average Hydraulic Gradient: 8.3

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5856

PROJECT NUMBER:	05-103	February 17, 2005

Giant Refinery Co

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SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

March 8, 2005

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

SLT Project No: **05-103**
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
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HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: STA 8+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

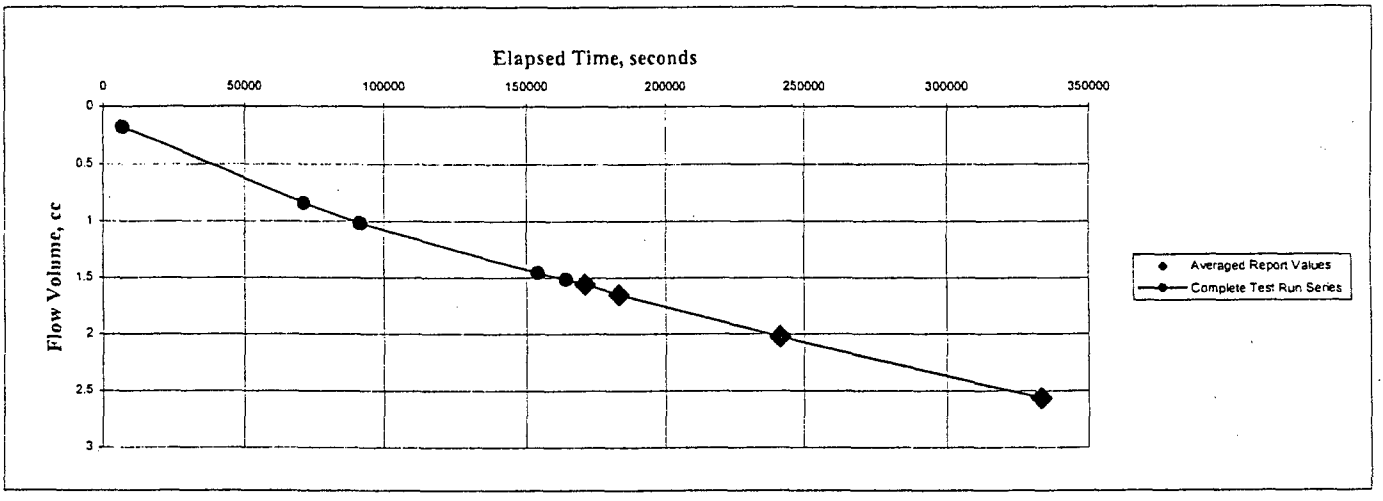
Permeability, cm/sec.: 2.01E-08

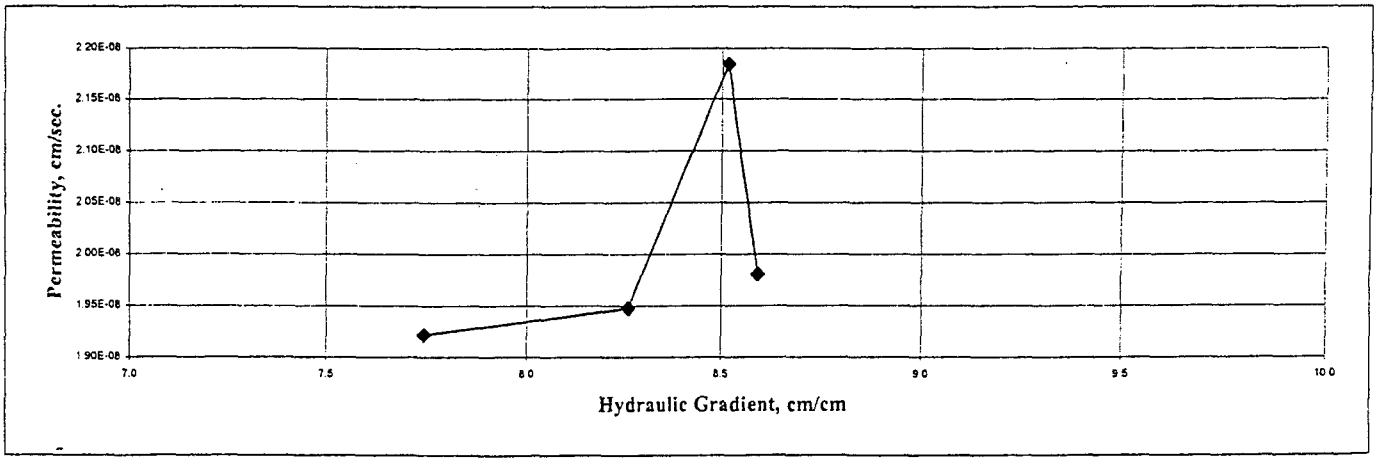
Average Hydraulic Gradient: 8.3

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5856

PROJECT NUMBER:	05-103	February 17, 2005

Giant Refinery Co

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GEOTECHNICAL AND MATERIALS TESTING SERVICES

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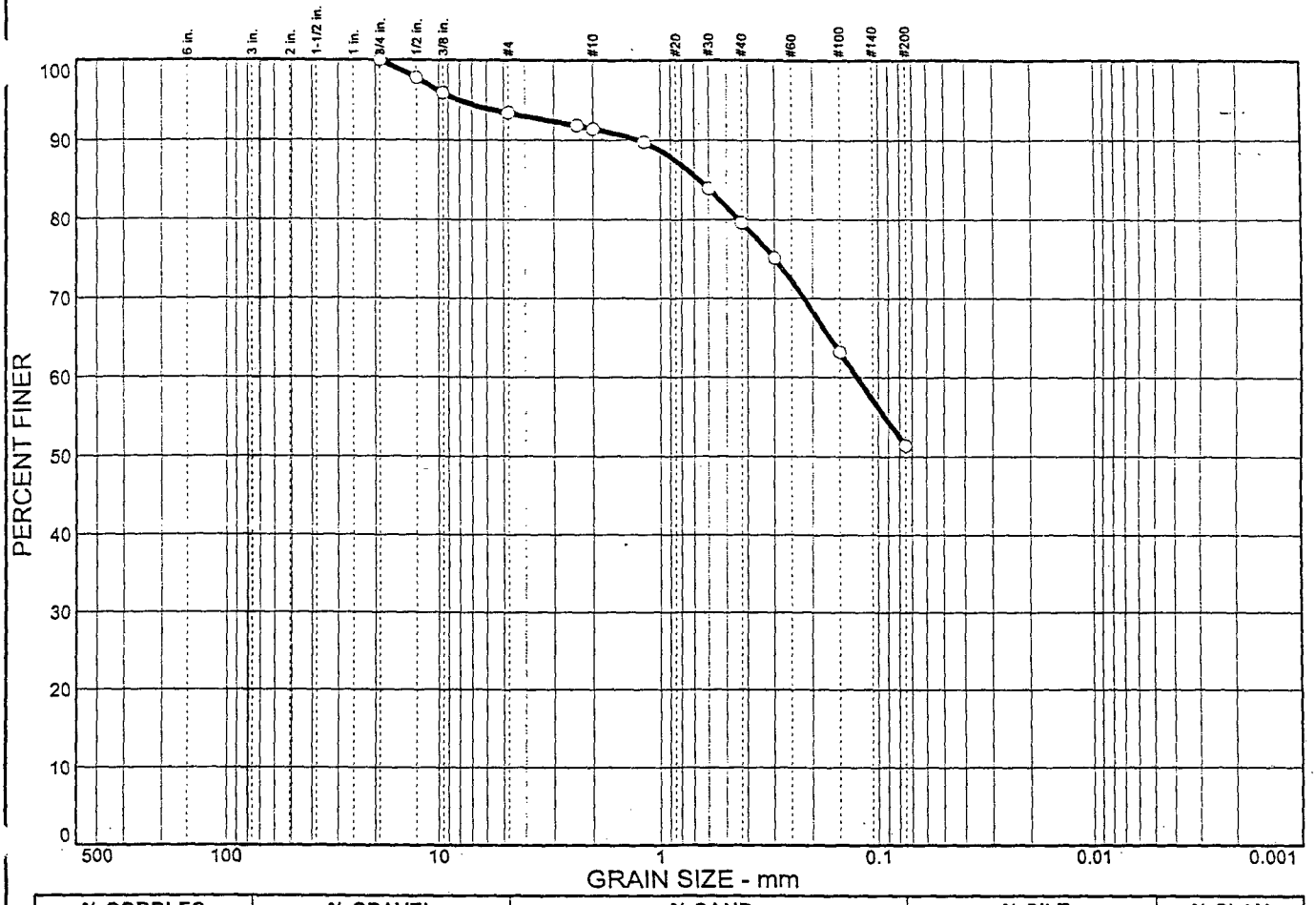
Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	6.6	42.0	51.4	

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

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.661 D_{60}= 0.125 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: STA 8+00 **Source of Sample:** STA 8+00 **Date:** 2-15-05
Location: **Elev./Depth:**

SIERRA TESTING LABS, INC.

Client: RECON
Project: Giant Refining Company
Project No: 05-103 **Figure**

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

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MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

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

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GEOTECHNICAL AND MATERIALS TESTING SERVICES

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Particle Size Distribution Report

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	9.4	46.5	44.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 in.	100.0		
1/2 in.	95.8		
3/8 in.	93.5		
#4	90.6		
#8	89.2		
#10	88.9		
#16	87.8		
#30	82.6		
#40	78.6		
#50	71.7		
#100	57.4		
#200	44.1		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.780 D_{60}= 0.171 D_{50}= 0.102
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

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 **Figure**

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

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

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

TEST RESULTS

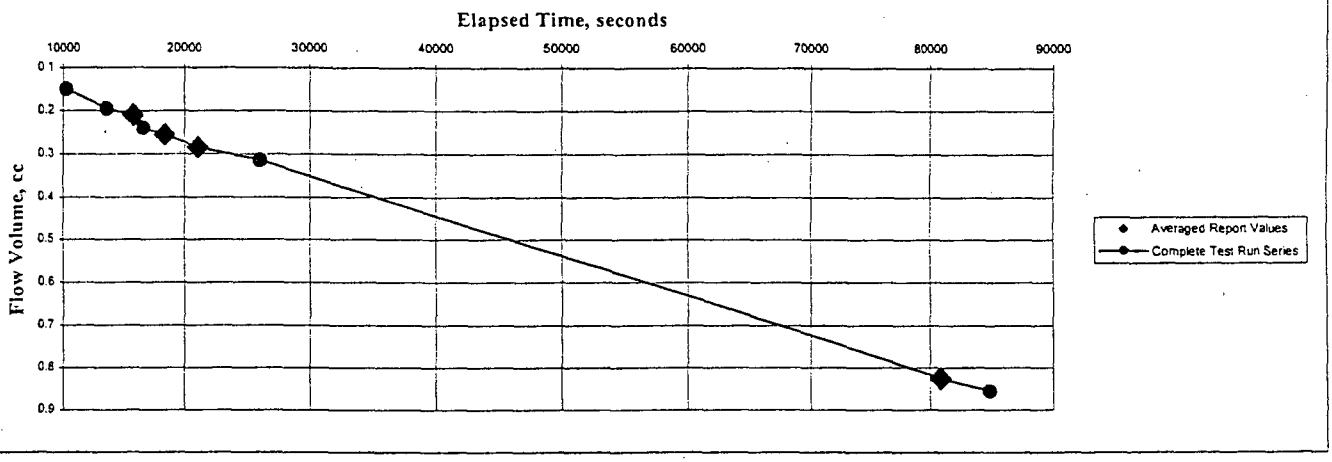
Permeability, cm/sec.: 2.12E-08

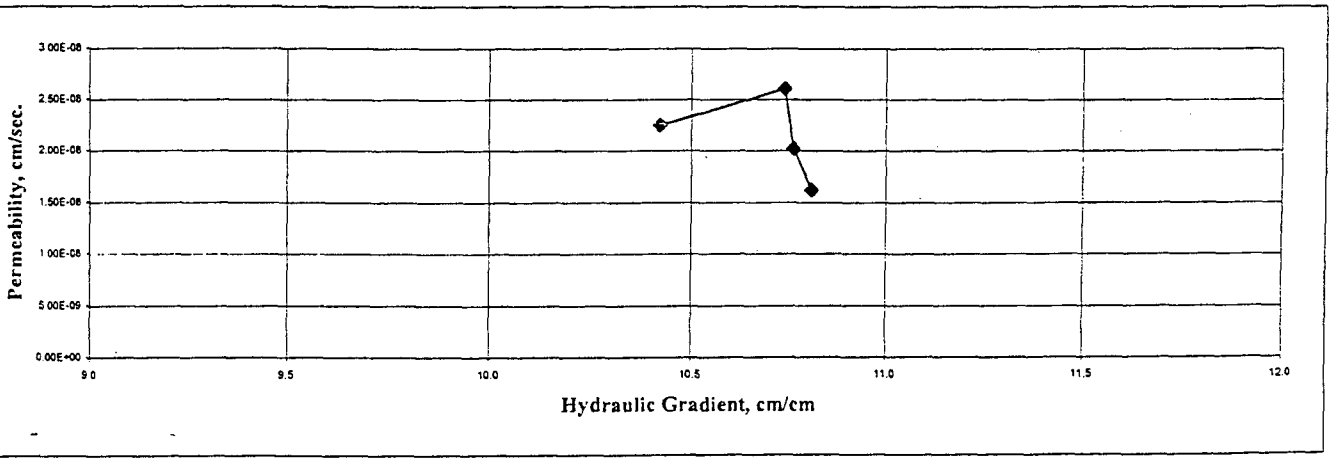
Average Hydraulic Gradient: 10.7

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





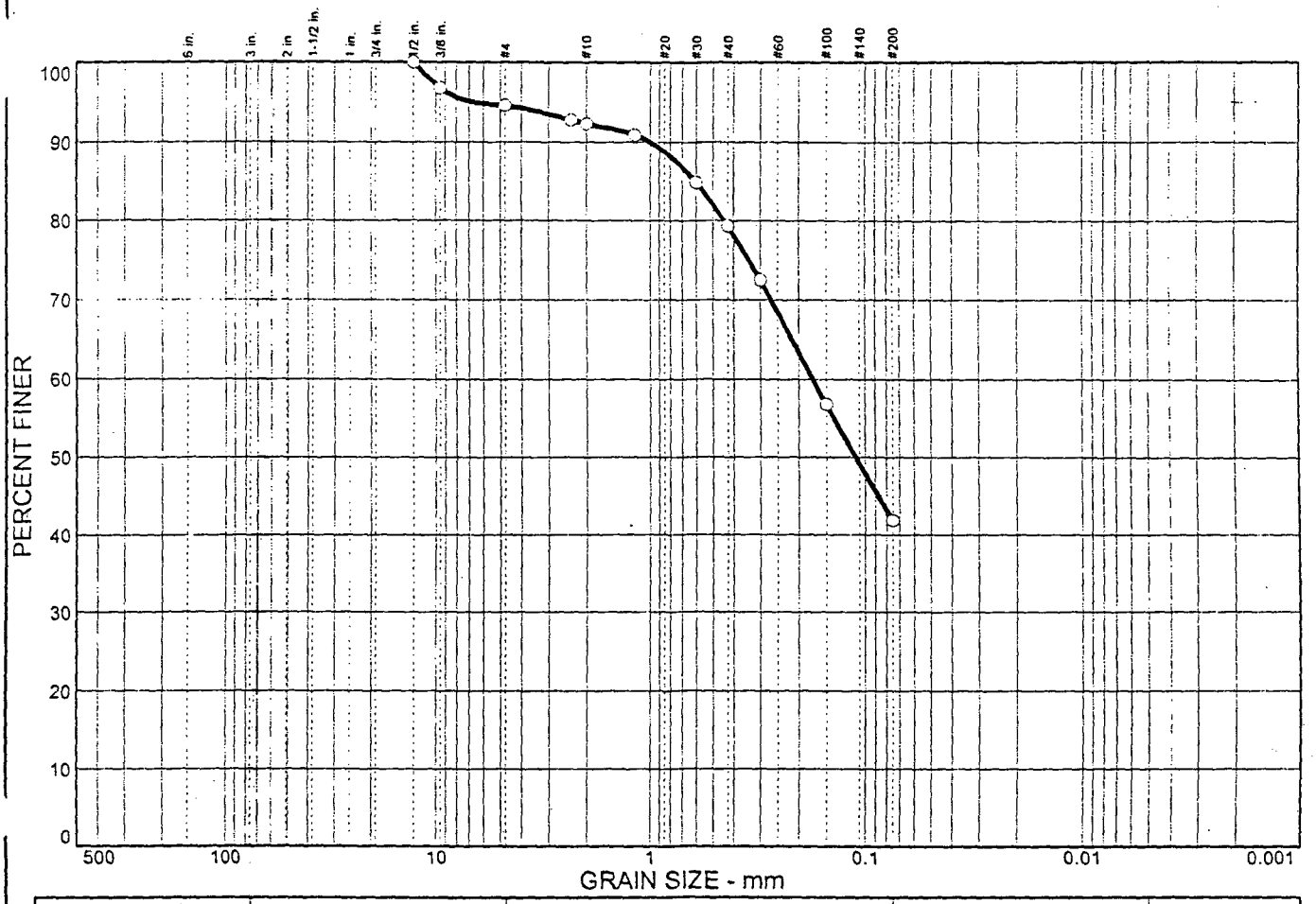
Test Method: ASTM D5084 Method C

PROJECT NUMBER:	05-103	February 24, 2005	Giant Refinery Co

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	5.4	52.7	41.9	

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

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.604 D_{60}= 0.173 D_{50}= 0.110
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: STA 6+00 **Source of Sample:** STA 6+00 **Date:** 2-24-05
Location: **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 6+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

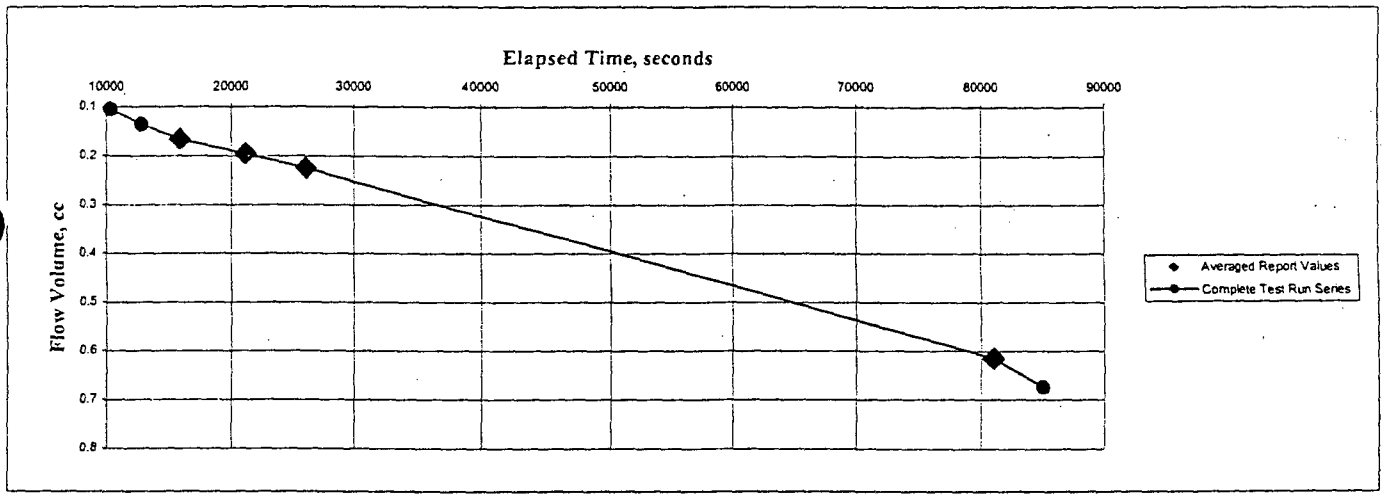
Permeability, cm/sec.: 2.08E-08

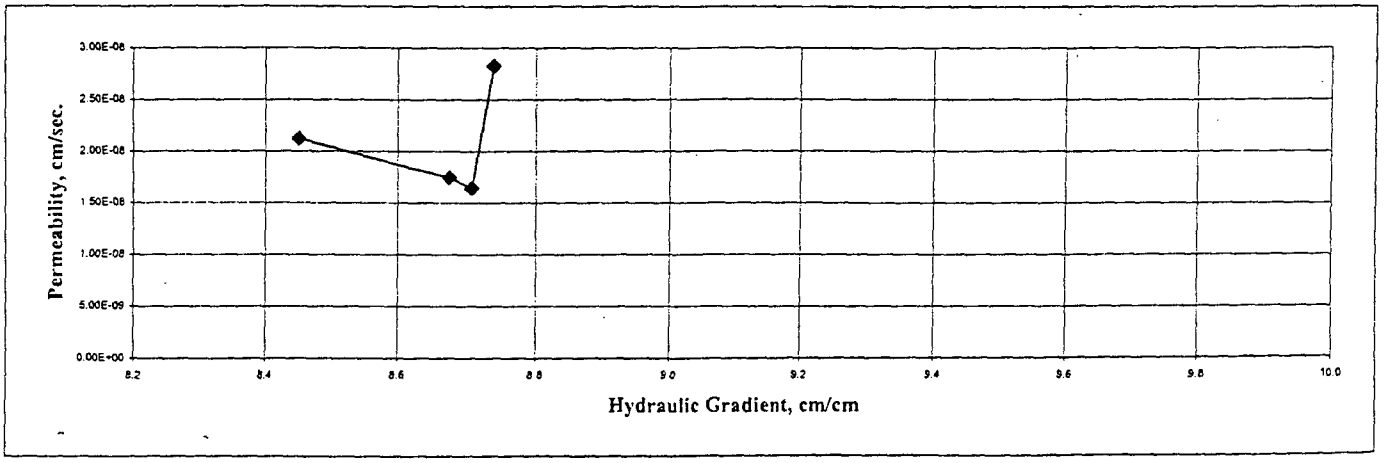
Average Hydraulic Gradient: 8.6

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.21	Specimen Height, cm:	6.27
Specimen Diameter, cm:	7.11	Specimen Diameter, cm:	7.11
Dry Unit Weight, pcf:	71.1	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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	11.2	50.3	38.5	

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

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.21 D_{60}= 0.215 D_{50}= 0.133
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: STA 10+00 **Source of Sample:** STA 10+00 **Date:** 2-24-05
Location: **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 10+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

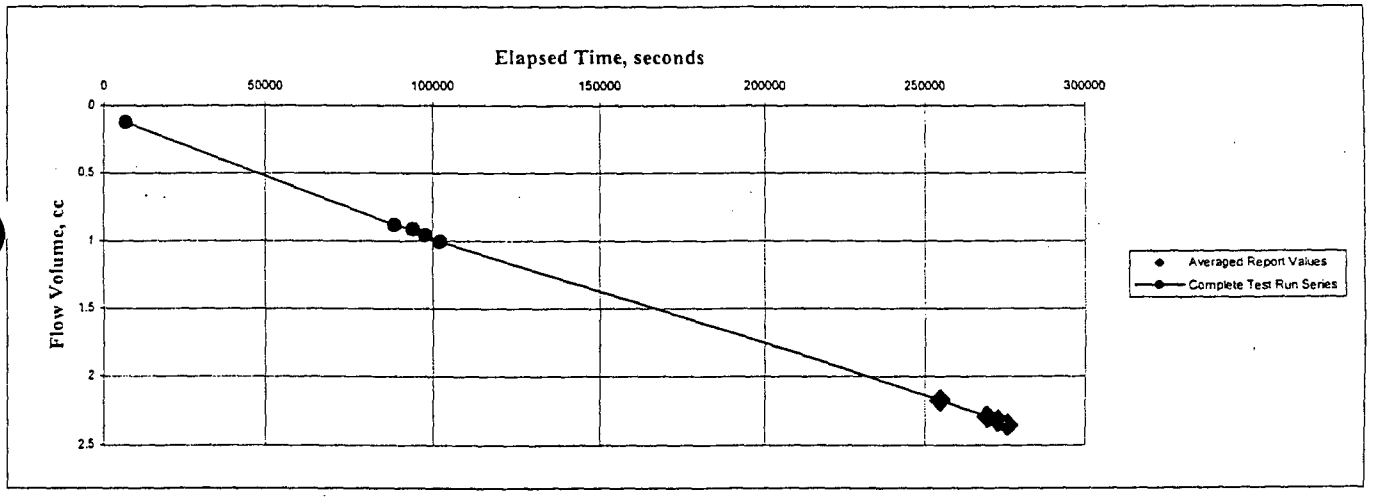
Permeability, cm/sec.: 2.71E-08

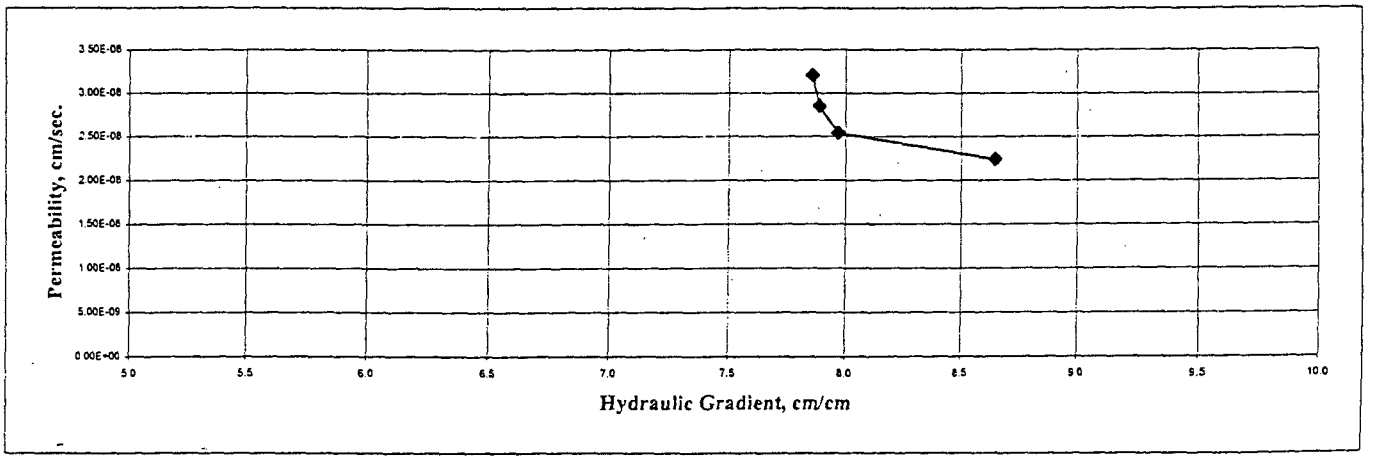
Average Hydraulic Gradient: 8.1

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.49	Specimen Height, cm:	6.30
Specimen Diameter, cm:	7.11	Specimen Diameter, cm:	7.11
Dry Unit Weight, pcf:	70.2	Dry Unit Weight, pcf:	83.5
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.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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
ks

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

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

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

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	05-103	February 24, 2005	Giant Refinery Company

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	9.4	46.5	44.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 in.	100.0		
1/2 in.	95.8		
3/8 in.	93.5		
#4	90.6		
#8	89.2		
#10	88.9		
#16	87.8		
#30	82.6		
#40	78.6		
#50	71.7		
#100	57.4		
#200	44.1		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.780 D_{60}= 0.171 D_{50}= 0.102
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

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 **Figure**

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

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

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

TEST RESULTS

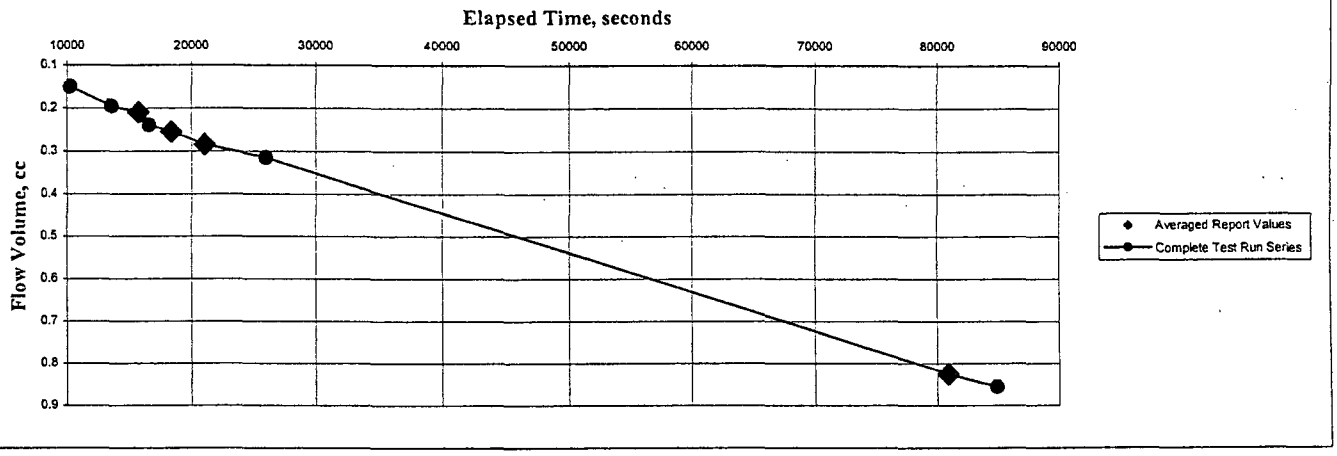
Permeability, cm/sec.: 2.12E-08

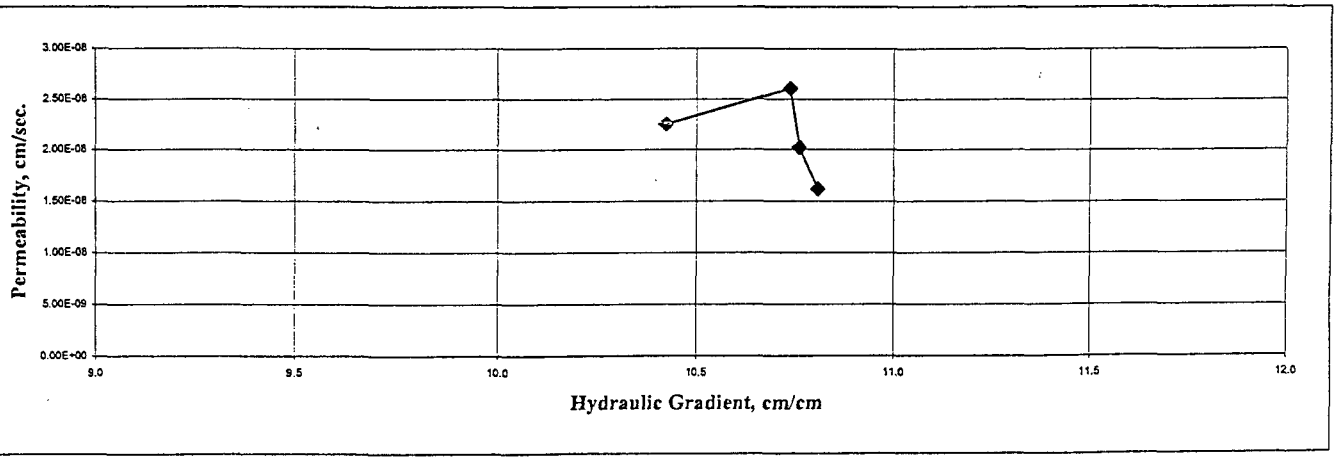
Average Hydraulic Gradient: 10.7

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5084 Method C

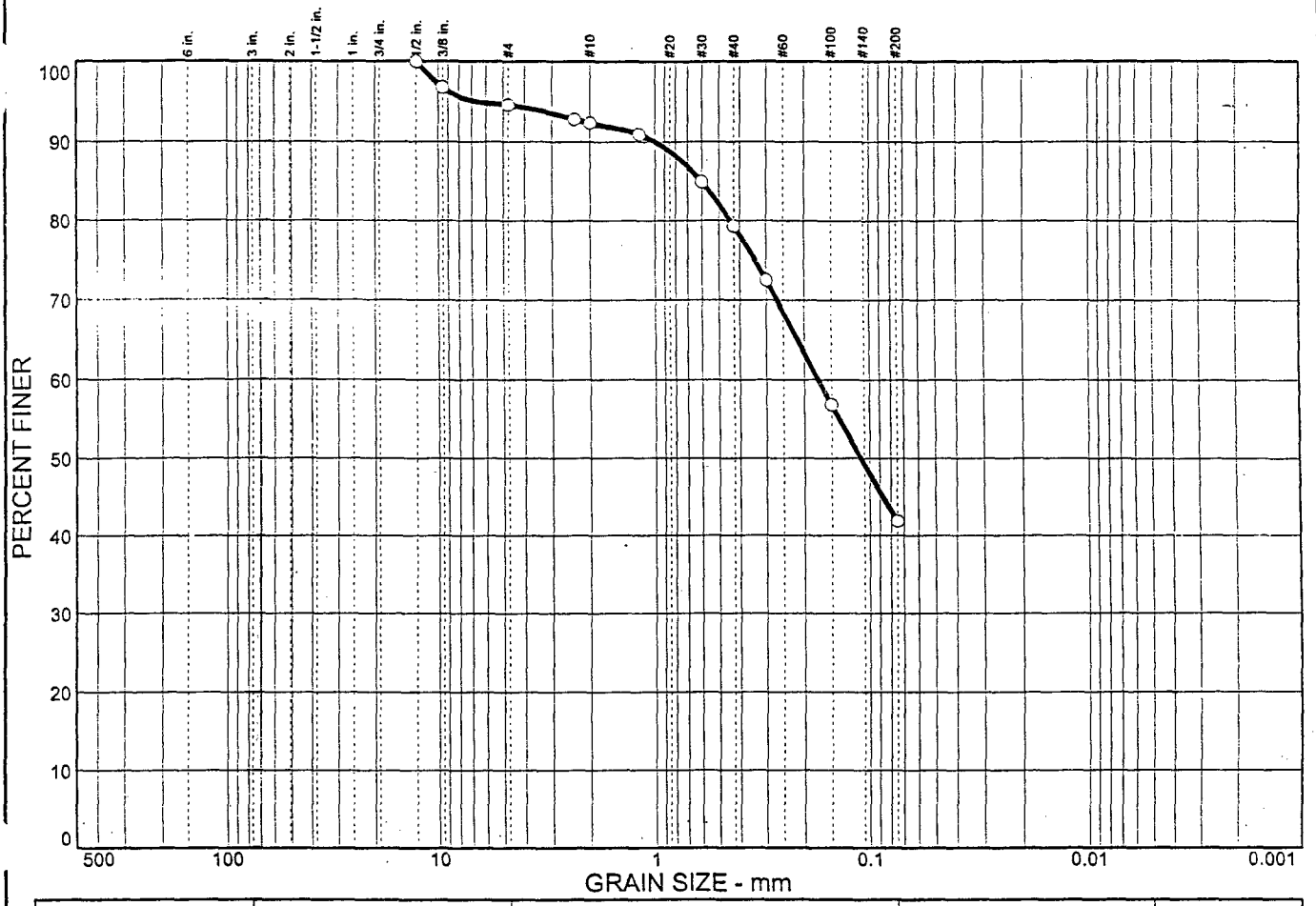
PROJECT NUMBER:	05-103	February 24, 2005

Giant Refinery Co

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	5.4	52.7	41.9	

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

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.604 D_{60}= 0.173 D_{50}= 0.110
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

* (no specification provided)

Sample No.: STA 6+00 **Source of Sample:** STA 6+00 **Date:** 2-24-05
Location: **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 6+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

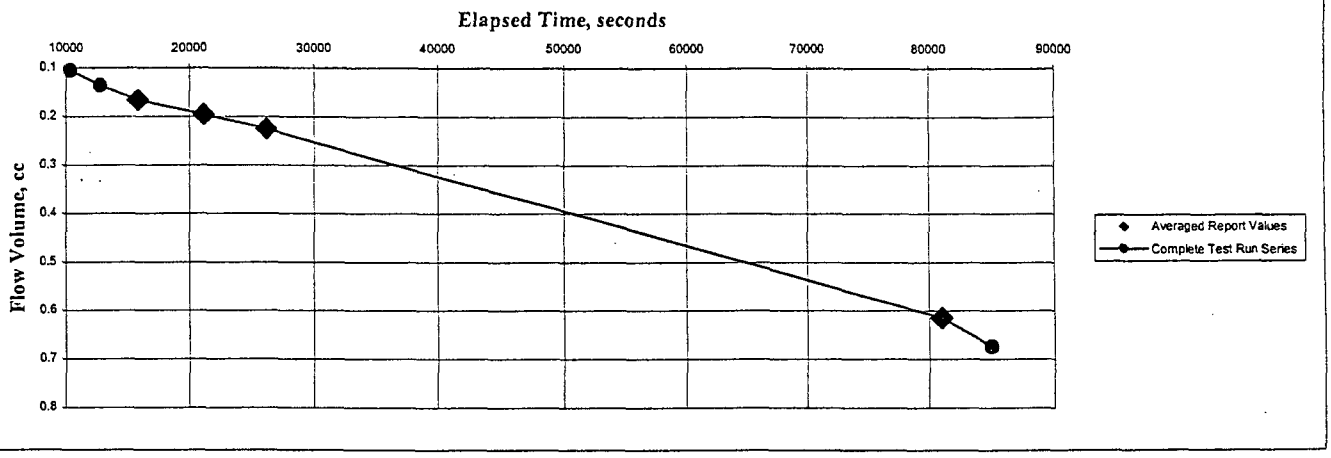
Permeability, cm/sec.: 2.08E-08

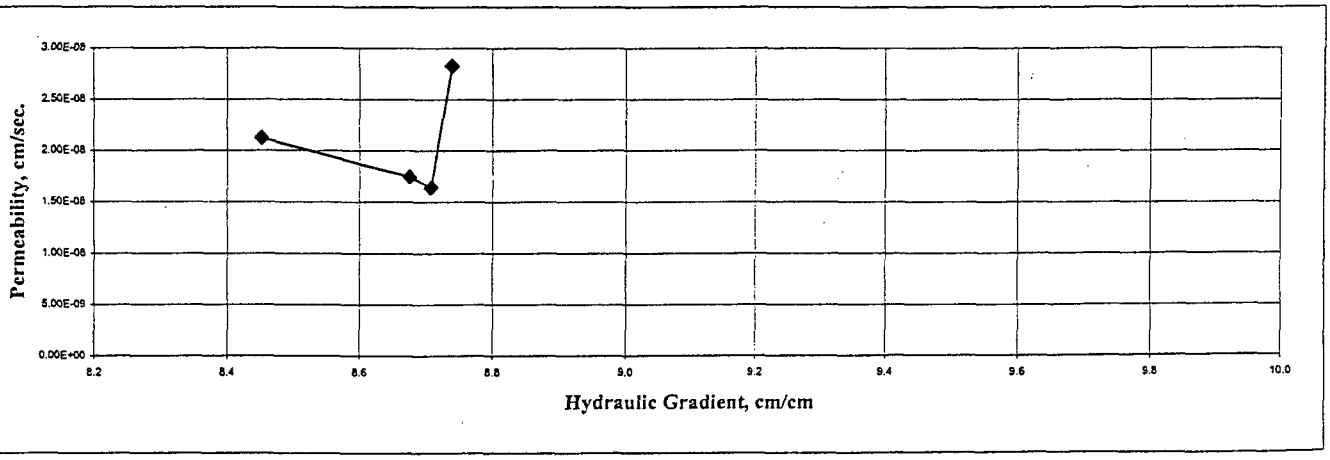
Average Hydraulic Gradient: 8.6

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.21	Specimen Height, cm:	6.27
Specimen Diameter, cm:	7.11	Specimen Diameter, cm:	7.11
Dry Unit Weight, pcf:	71.1	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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	11.2	50.3	38.5	

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

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.21 D_{60}= 0.215 D_{50}= 0.133
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: STA 10+00 **Source of Sample:** STA 10+00 **Date:** 2-24-05
Location: **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 10+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

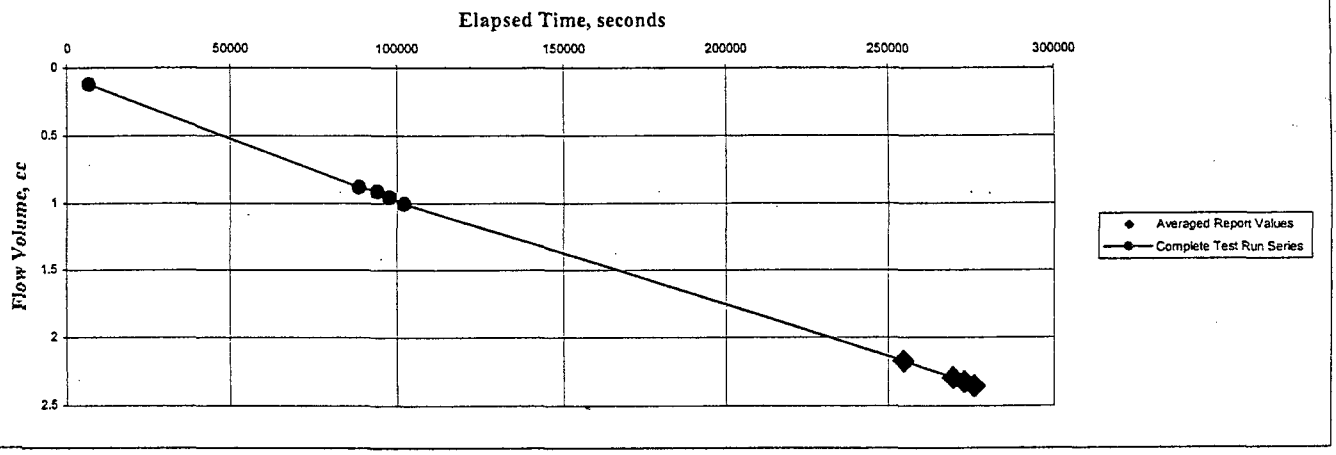
Permeability, cm/sec.: 2.71E-08

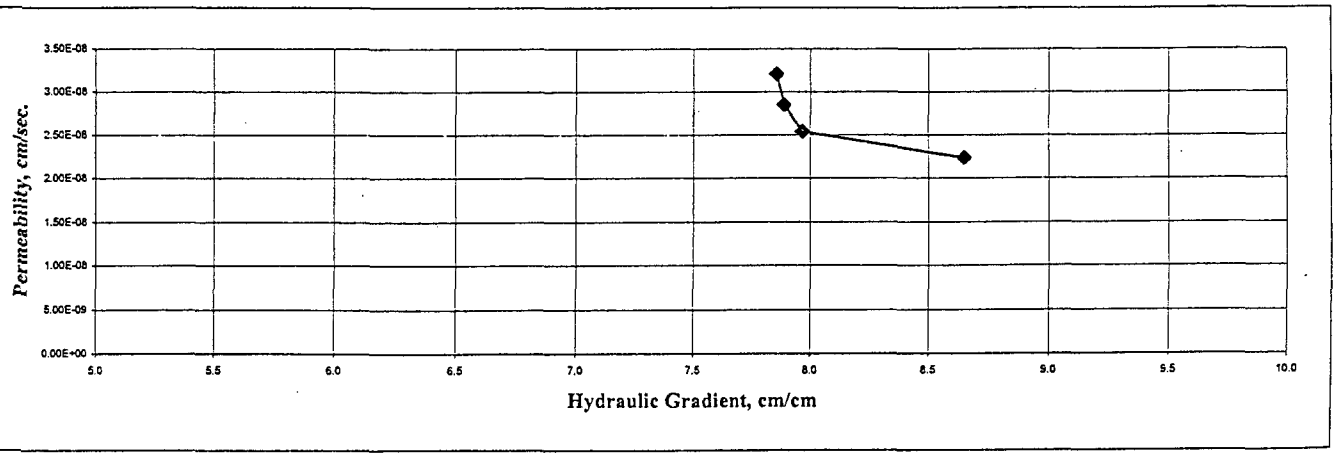
Average Hydraulic Gradient: 8.1

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.49	Specimen Height, cm:	6.30
Specimen Diameter, cm:	7.11	Specimen Diameter, cm:	7.11
Dry Unit Weight, pcf:	70.2	Dry Unit Weight, pcf:	83.5
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.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

March 14, 2005

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

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

LABORATORY TEST RESULTS

Dear Mr. Carlson:

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

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

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

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

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

Very truly yours,

Chad M. Walker
Project Manager

Enclosures
ks

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

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
STA 12+00		122.5	96.0	27.7

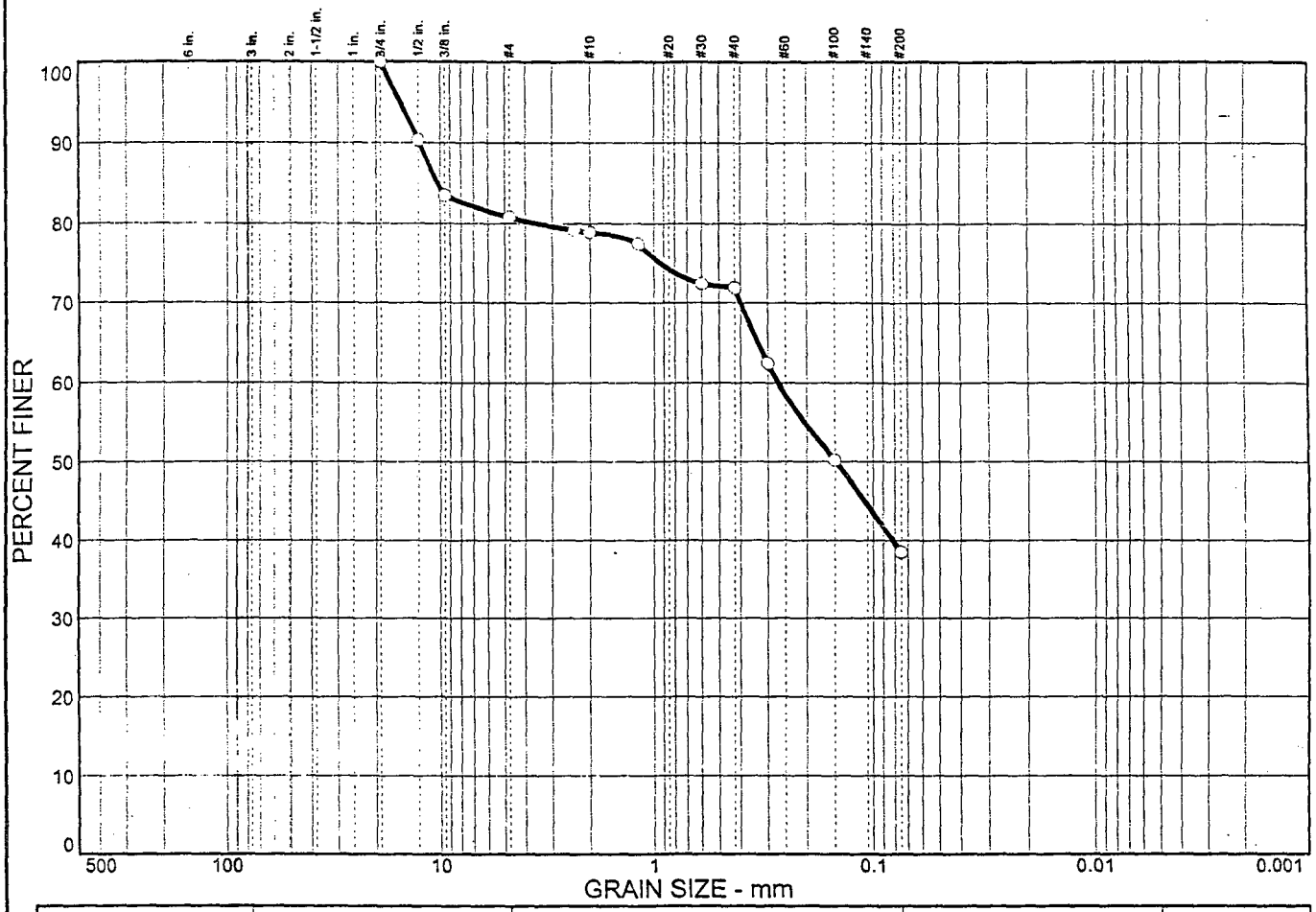
Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	05-103	March 9, 2005	Giant Refinery Company

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	19.2	42.3	38.5	

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

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 10.3 D_{60}= 0.269 D_{50}= 0.148
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: STA 12+00 **Source of Sample:** STA 12+00 **Date:** 3/9/05
Location: **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 12+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

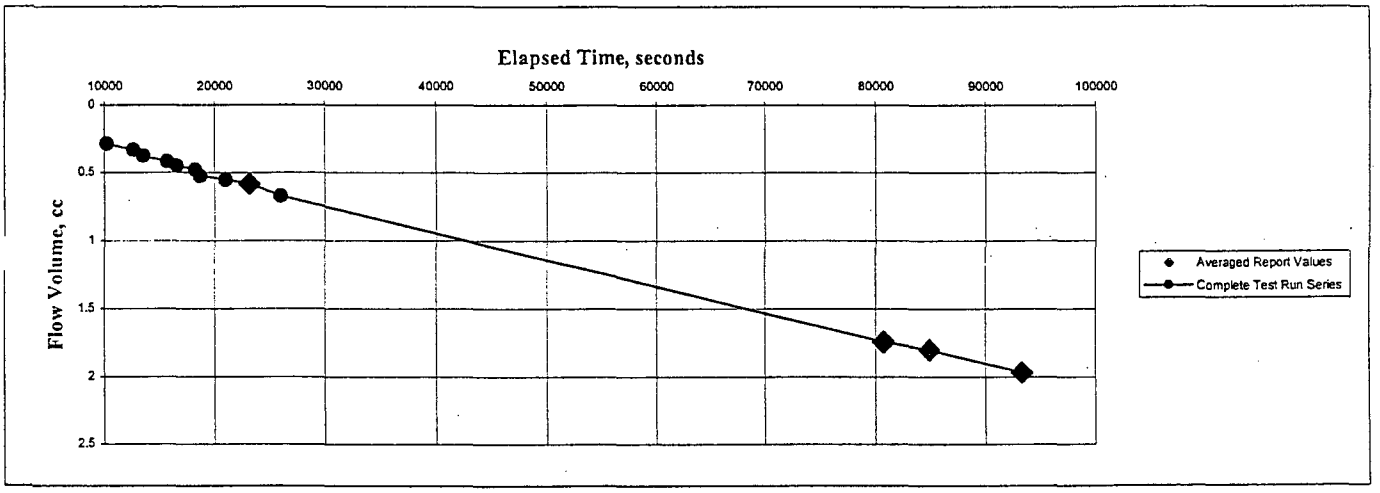
Permeability, cm/sec.: 4.06E-08

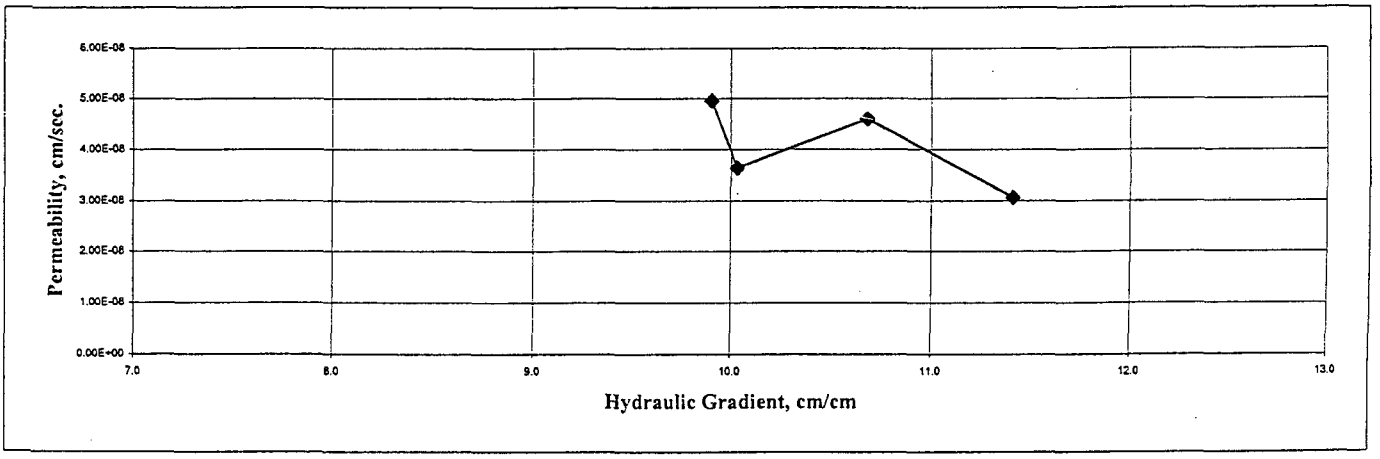
Average Hydraulic Gradient: 10.5

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	6.99	Specimen Height, cm:	5.79
Specimen Diameter, cm:	7.11	Specimen Diameter, cm:	7.11
Dry Unit Weight, pcf:	84.4	Dry Unit Weight, pcf:	101.8
Moisture Content, %	27.6	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.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

March 17, 2005

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

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

LABORATORY TEST RESULTS

Dear Mr. Carlson:

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

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

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

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

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

Very truly yours,

Chad M. Walker
Project Manager

Enclosures
ks

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

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %
STA 14+00		124.6	101.2	23.1

Test Method: ASTM D2216, ASTM D2937

PROJECT NUMBER:	05-103	March 9, 2005	Giant Refinery Company

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	25.3	47.1	27.6	

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

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 22.3 D_{60}= 0.387 D_{50}= 0.277
D_{30}= 0.0870 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: STA 14+00 **Source of Sample:** STA 14+00 **Date:** 3/4/05
Location: **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 14+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

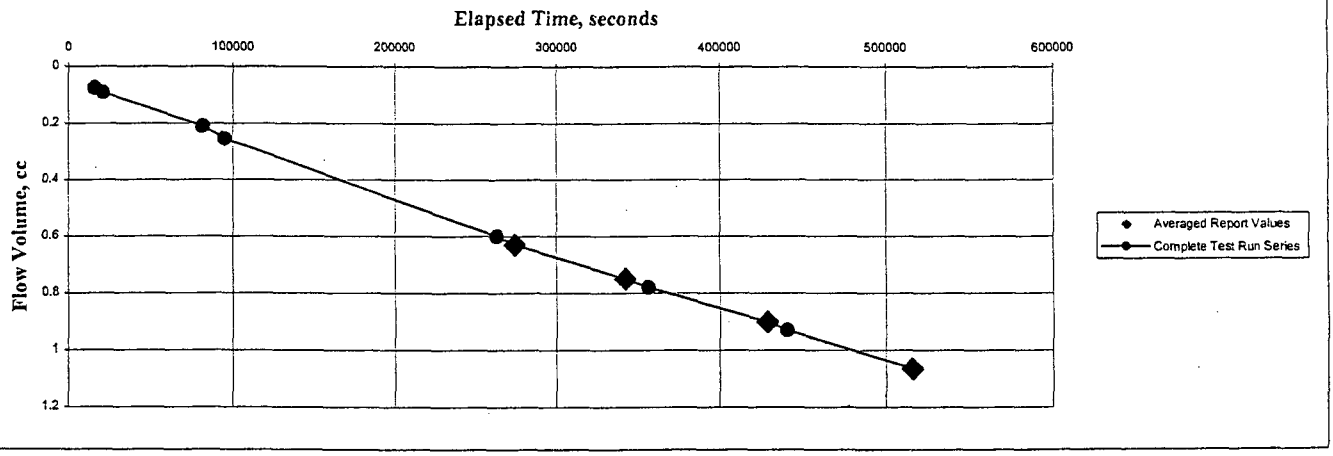
Permeability, cm/sec.: 2.38E-08

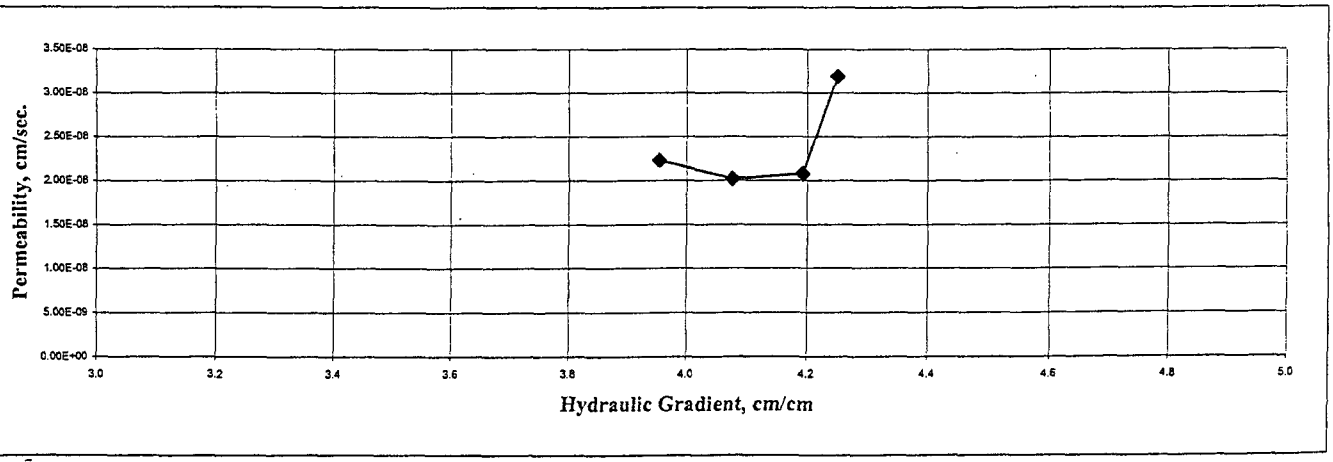
Average Hydraulic Gradient: 4.1

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5084 Method C

PROJECT NUMBER:	05-103	March 7, 2005

Giant Refining Company

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

March 15, 2005

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

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

LABORATORY TEST RESULTS

Dear Mr. Carlson:

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

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

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

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

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

Very truly yours,

Chad M. Walker
Project Manager

Enclosures
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www.sierratestinglaboratories.com

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report

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

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2 in.	100.0		
1 in.	87.2		
3/4 in.	78.2		
1/2 in.	75.5		
3/8 in.	74.7		
#4	71.4		
#8	70.1		
#10	69.8		
#16	68.5		
#30	62.0		
#40	59.7		
#50	52.2		
#100	39.3		
#200	27.9		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 23.9 D_{60}= 0.435 D_{50}= 0.272
D_{30}= 0.0852 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: STA 16+00 **Source of Sample:** STA 16+00 **Date:** 3/8/05
Location: **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 16+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

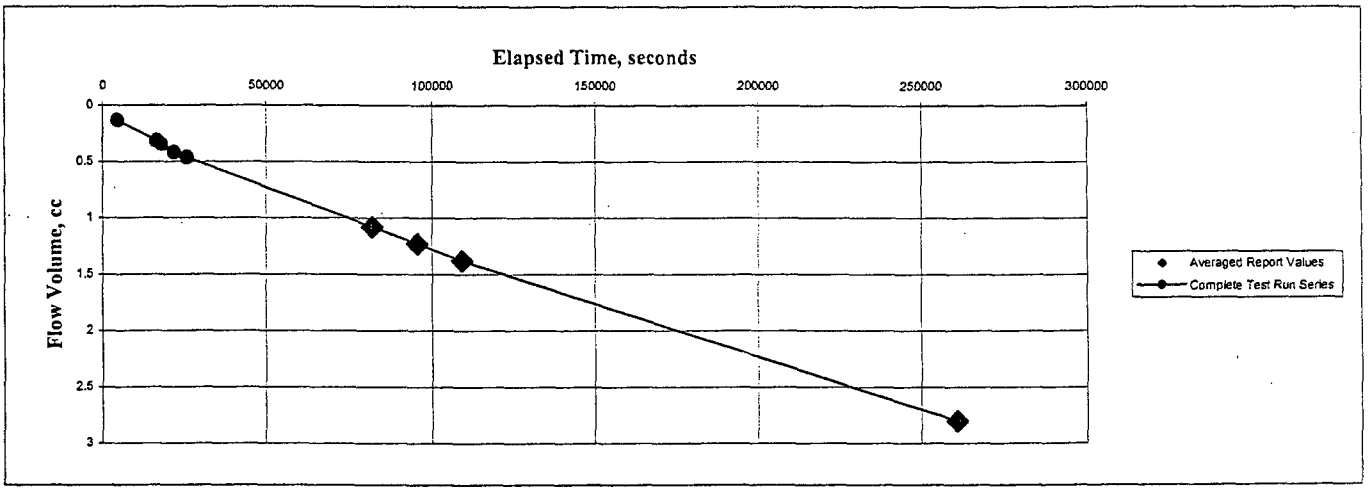
Permeability, cm/sec.: 3.09E-08

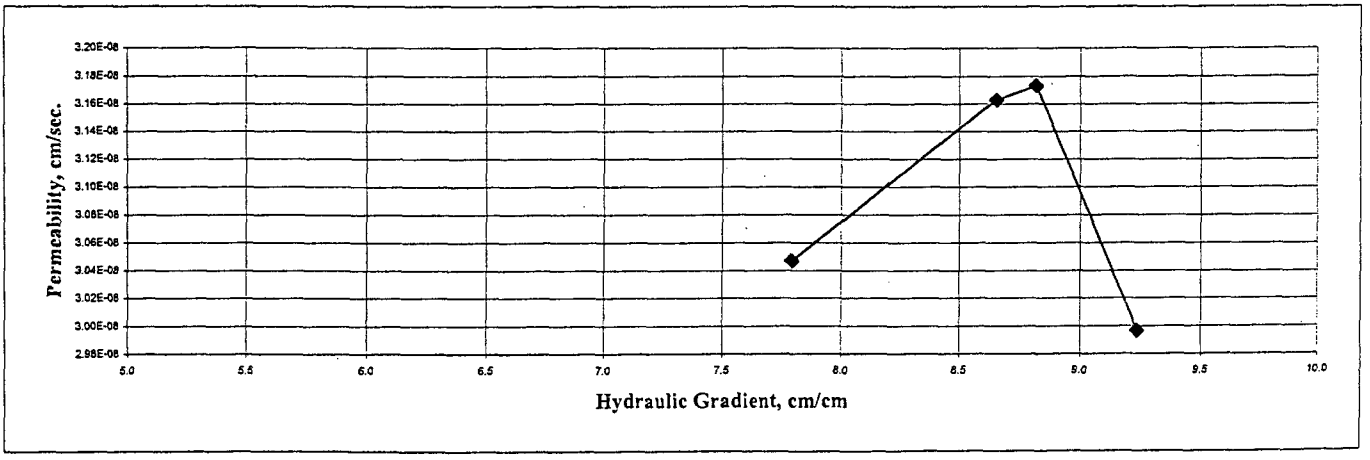
Average Hydraulic Gradient: 8.6

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5084 Method C

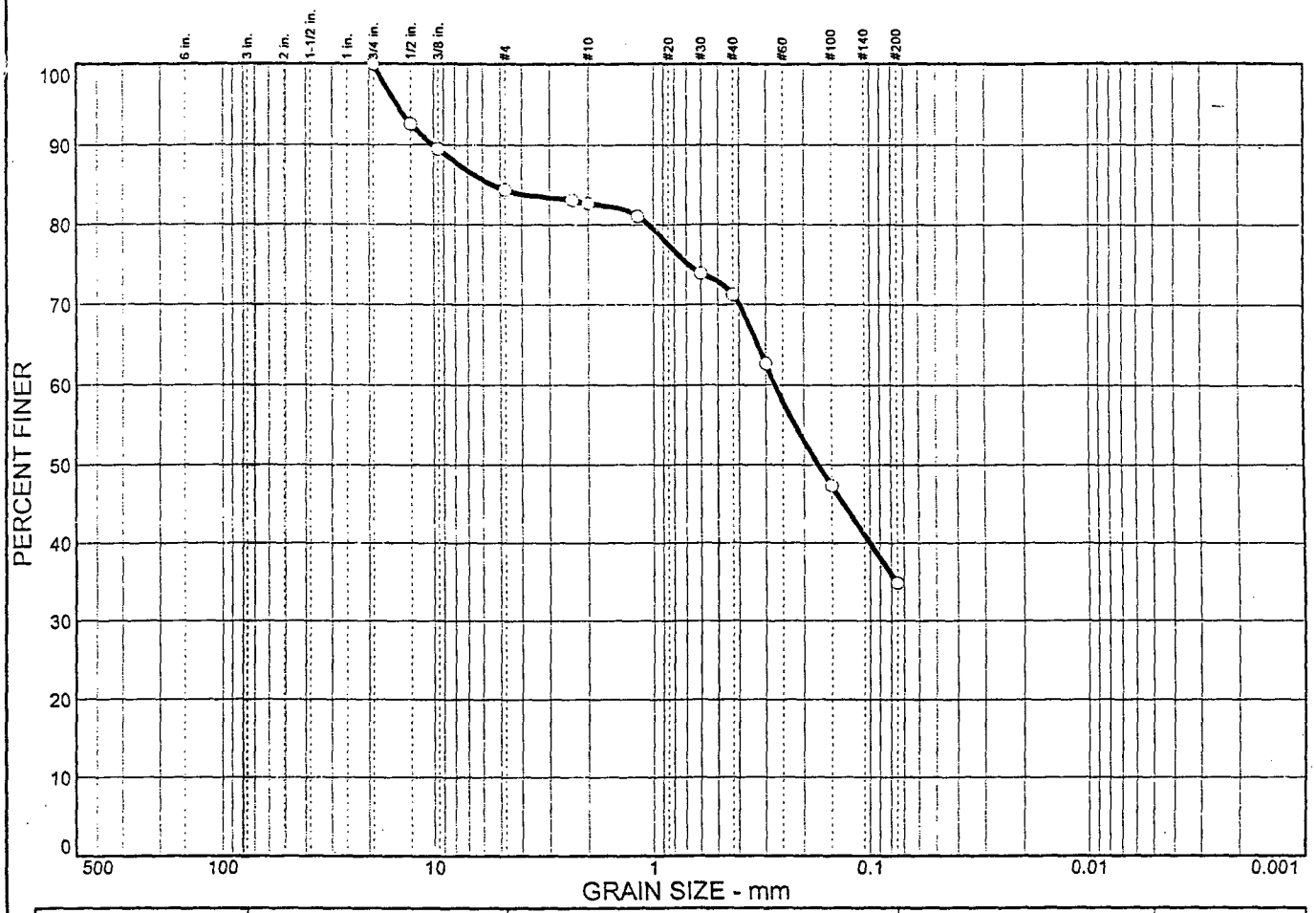
PROJECT NUMBER:	05-103	March 8, 2005

Giant Refinery Company

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	15.6	49.5	34.9	

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

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 5.38 D_{60}= 0.272 D_{50}= 0.172
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: STA 18+00 **Source of Sample:** STA 18+00 **Date:** 3/8/05
Location: **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 18+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

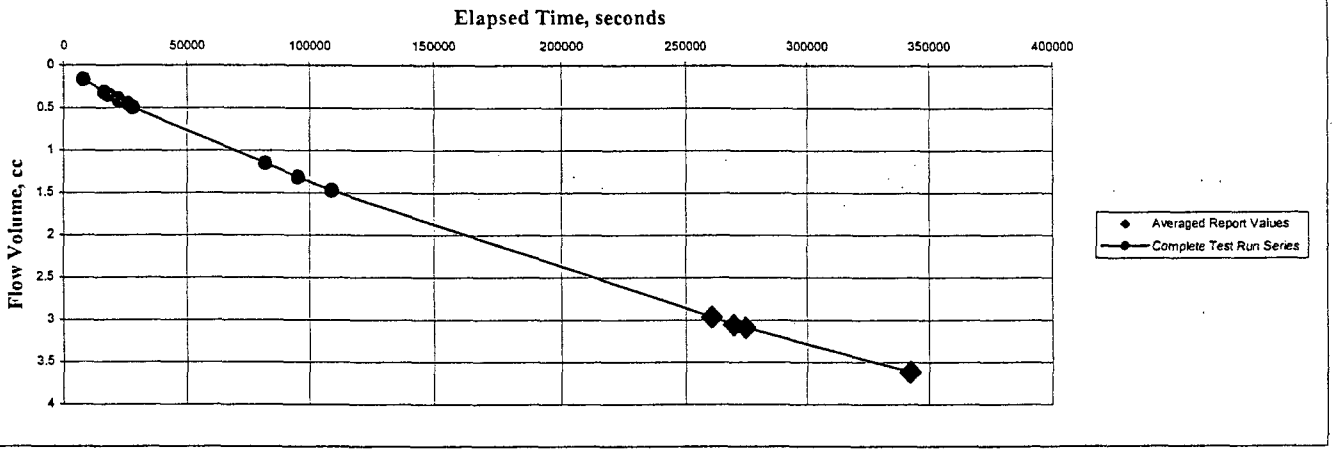
Permeability, cm/sec.: 3.62E-08

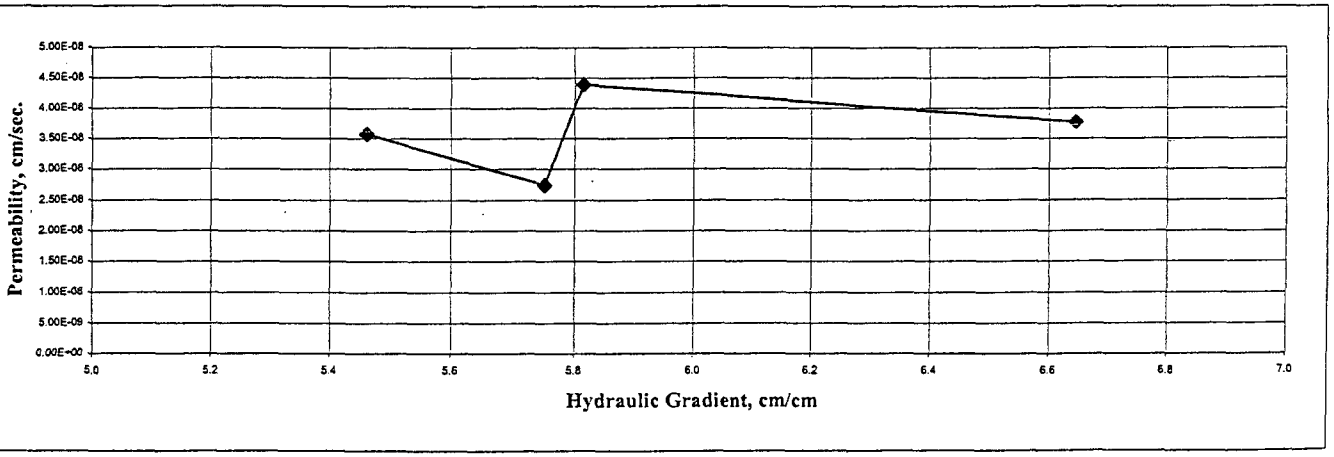
Average Hydraulic Gradient: 5.9

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5084 Method C

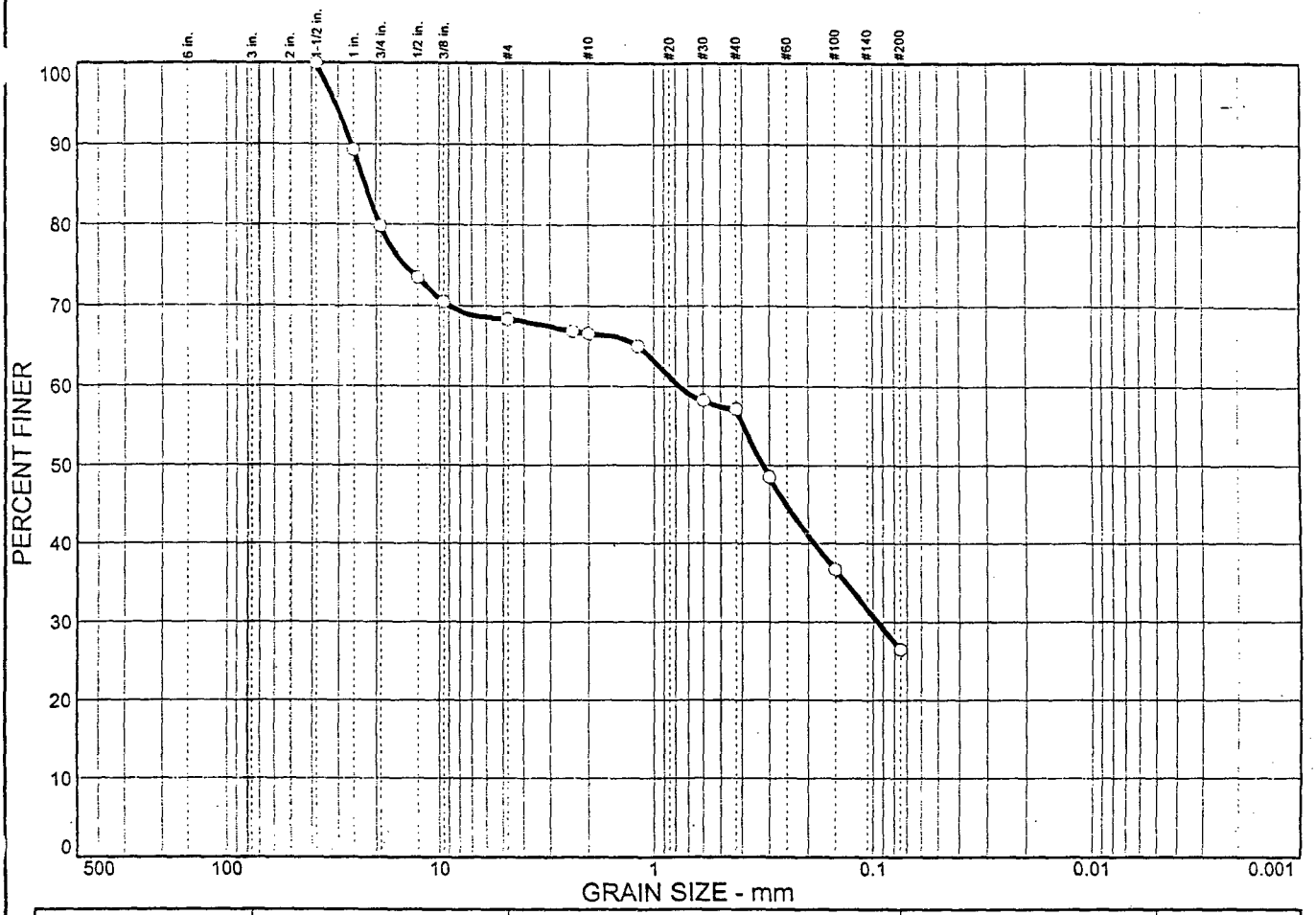
PROJECT NUMBER:	05-103	March 8, 2005

Giant Refinery Company

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	31.6	41.9	26.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2 in.	100.0		
1 in.	89.3		
3/4 in.	79.8		
1/2 in.	73.5		
3/8 in.	70.5		
#4	68.4		
#8	66.9		
#10	66.6		
#16	65.0		
#30	58.2		
#40	57.1		
#50	48.5		
#100	36.7		
#200	26.5		

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 22.4 D_{60}= 0.767 D_{50}= 0.321
D_{30}= 0.0951 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

* (no specification provided)

Sample No.: STA 20+00 **Source of Sample:** STA 20+00 **Date:** 3/8/05
Location: **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 20+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

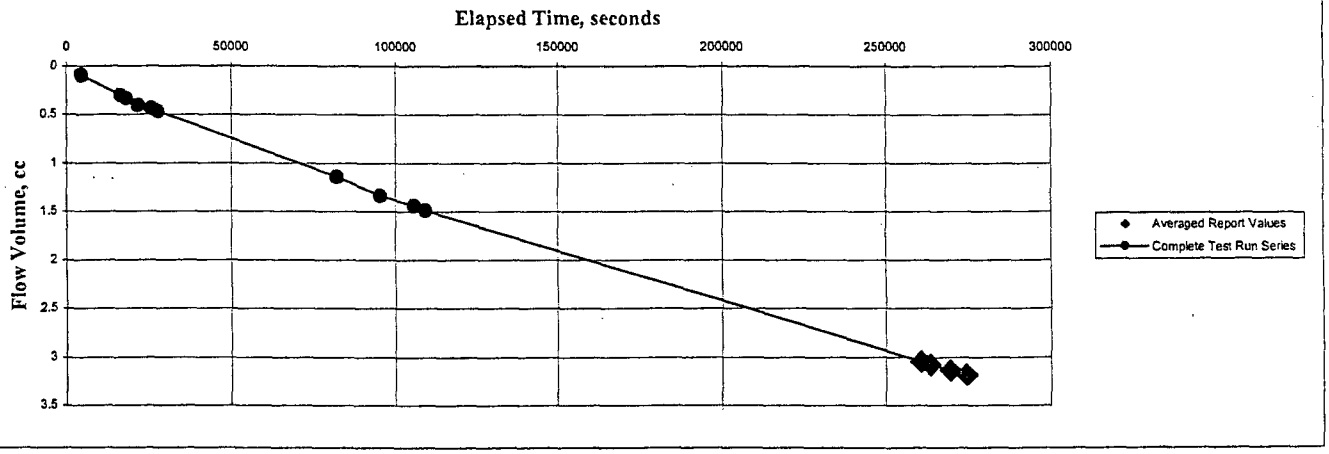
Permeability, cm/sec.: 4.58E-08

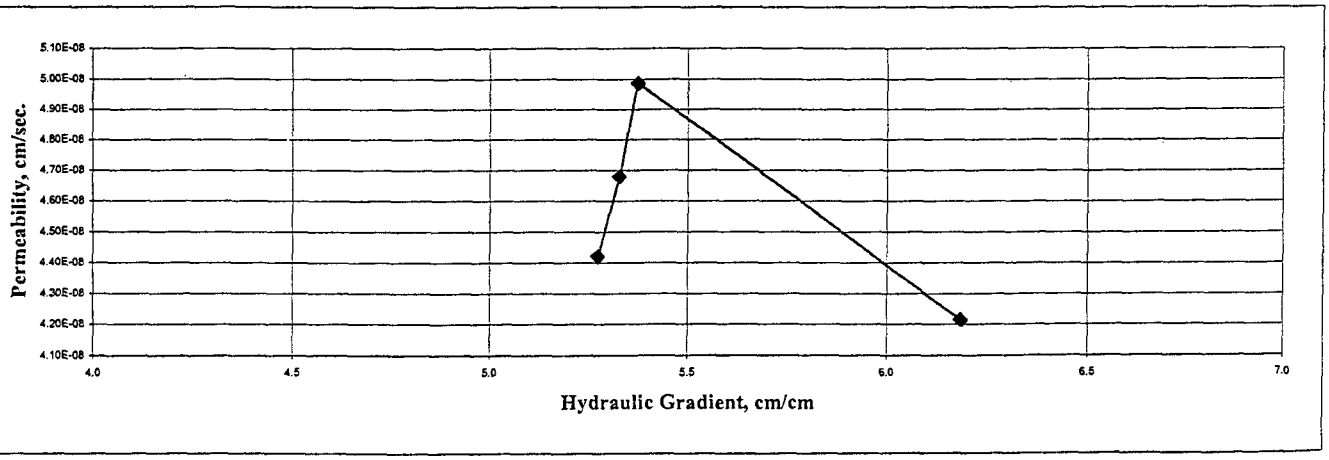
Average Hydraulic Gradient: 5.5

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5084 Method C

PROJECT NUMBER:	05-103	March 8, 2005

Giant Refinery Company

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

March 24, 2005

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

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

LABORATORY TEST RESULTS

Dear Mr. Carlson:

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

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

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

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

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

Very truly yours,

Chad M. Walker
Project Manager

Enclosures
ks

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

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture 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 Identification	Depth, ft.	Visual Classification
STA 22+00		0.0
STA 24+00		0.0
STA 26+00		0.0

Test Method: ASTM D2216, ASTM D2937, ASTM D2487

PROJECT NUMBER: 05-103 | March 15, 2005

Giant Refining Company

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	9.5	55.4	35.1	

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

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.951 D_{60}= 0.219 D_{50}= 0.144
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

* (no specification provided)

Sample No.: STA 22+00 **Source of Sample:** STA 22+00 **Date:** 3/15/05
Location: **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 22+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

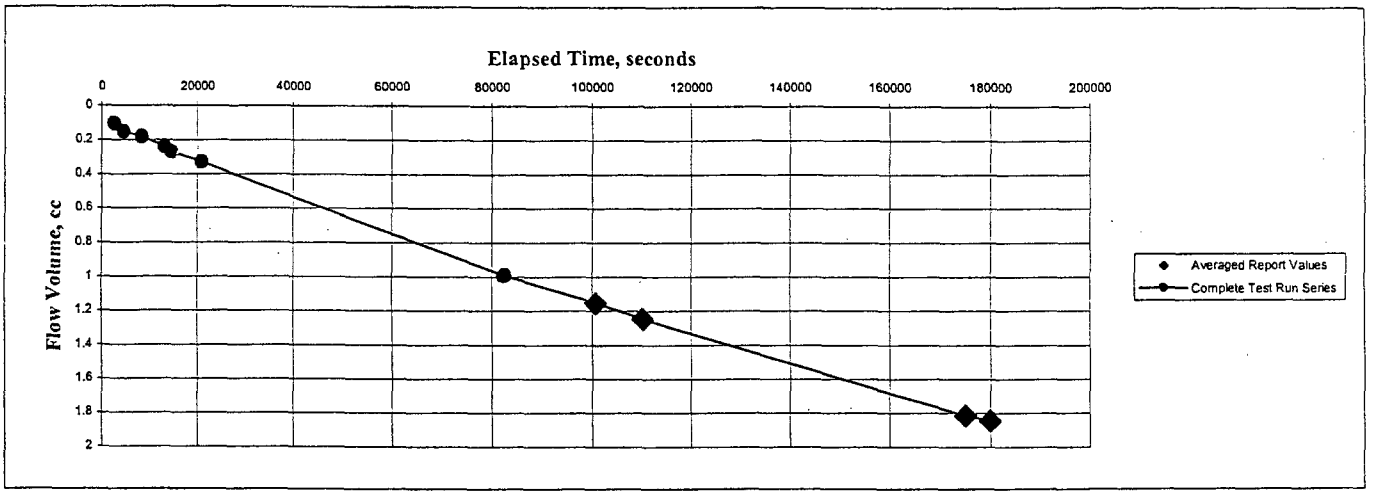
Permeability, cm/sec.: 2.71E-08

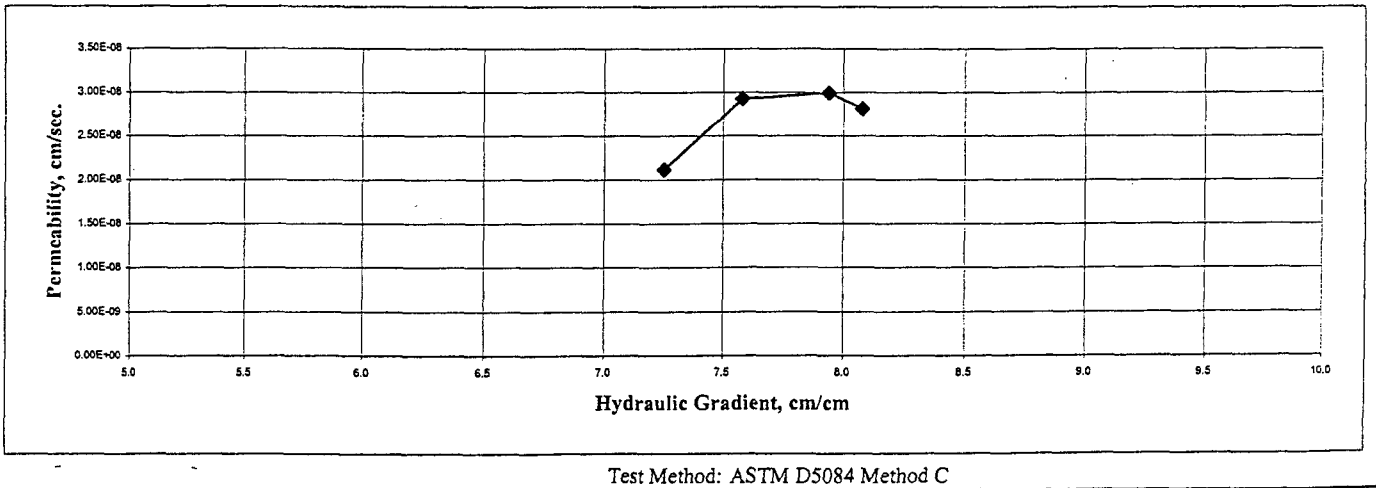
Average Hydraulic Gradient: 7.7

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5084 Method C

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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	8.8	55.0	36.2	

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

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.880 D_{60}= 0.214 D_{50}= 0.142
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

* (no specification provided)

Sample No.: STA 24+00 **Source of Sample:** STA 24+00 **Date:** 3/15/05
Location: **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

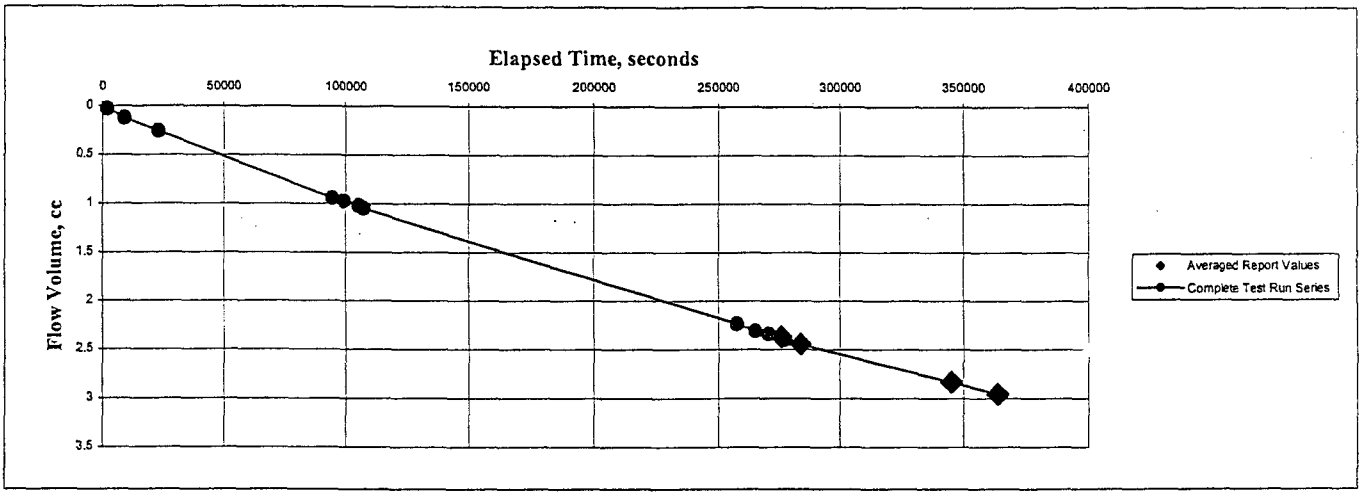
Permeability, cm/sec.: 2.72E-08

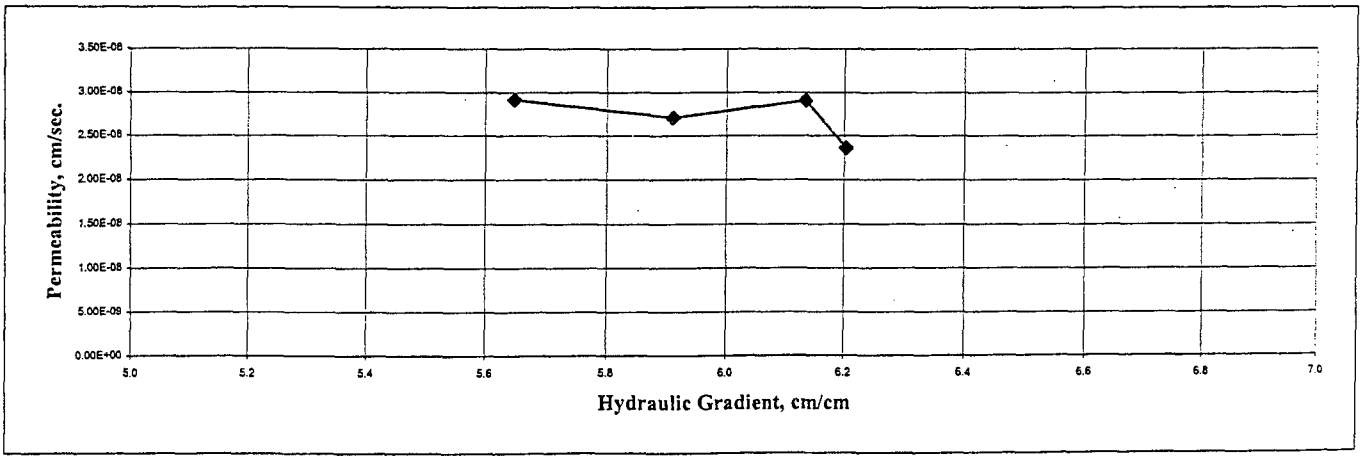
Average Hydraulic Gradient: 6.0

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5084 Method C

PROJECT NUMBER:	05-103	March 15, 2005

Giant Refining Company

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

Particle Size Distribution Report

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	8.6	56.1	35.3	

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

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.857 D_{60}= 0.218 D_{50}= 0.149
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

* (no specification provided)

Sample No.: STA 26+00 **Source of Sample:** STA 26+00 **Date:** 3/15/05
Location: **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
Remarks:

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

TEST RESULTS

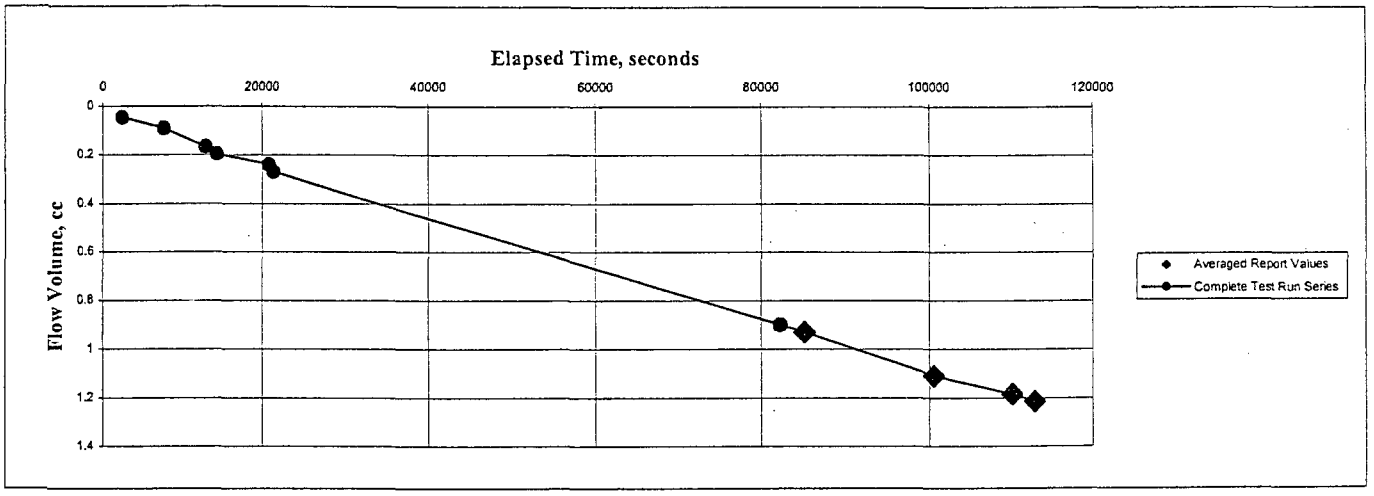
Permeability, cm/sec.: 2.81E-08

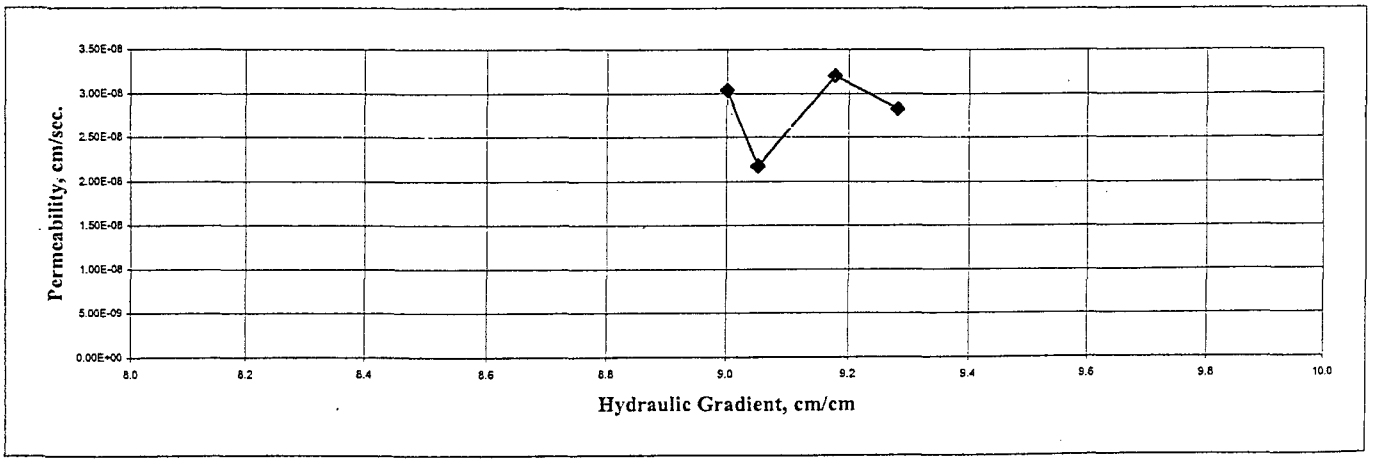
Average Hydraulic Gradient: 9.1

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5084 Method C

PROJECT NUMBER:	05-103	March 15, 2005

Giant Refining Company

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

GEOMAT INC

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

DAILY INSPECTION REPORT

DATE: 2/18/2005

PROJECT NAME: Giant Refinery Slurry Wall

JOB NO: 51-01 CLIENT: Pecon

WEATHER CONDITIONS: Overcast raining

WORK IN PROGRESS: Placing slurry & station @ 20.

EQUIPMENT ON SITE: backhoe

UNEXPECTED SITE CONDITIONS: Muddy mud

PERSON NOTIFIED: Mike & Joe (Pecon)

REMARKS: Onsite at 7:48 a.m. to test slurry - fresh/plant slurry, trench slurry & backfill material. The sample was at ~~sta~~ station ~20. Tech requested back in dr at 10AM, 2/23/05

Sand 7.5%

NO. OF DENSITY TESTS

SOILS	___ PASS	___ FAIL	___ RETEST	___ TOTAL
ASPHALT	___ PASS	___ FAIL	___ RETEST	___ TOTAL

CONCRETE 2 CYLINDER 2 SLUMP 2 AIR

TRAVEL TIME 0.75 ☐ STANDBY / ☐ RETEST TIME 2 TEST TIME 1.75

TOTAL 2.5

REASON FOR STANDBY: None

GEOMAT TECHNICIAN: James Simpson DATE: 2/18/05

CLIENT REPRESENTATIVE: _____ DATE: _____

CONTRACTOR SUPERINTENDENT: Michael Cordova DATE: 2/18/05

GEOMAT INC
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
CLIENT: Remedial Construction Services, Inc.
PROJECT NAME: Bloomfield Giant Refinery Slurry Wall

WEATHER CONDITIONS: Partly cloudy, dry, and calm.

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 instructed by Mike to perform slump, vicousity, filtrate, and weight of slurry placed into the trench north of the Giant Refinery. Technician requested again on 2/18/2005 at 10:00 a.m.

NUMBER OF DENSITY TESTS

SOILS	_____	PASS	_____	FAIL	_____	RETEST	_____ TOTAL
ASPHALT	_____	PASS	_____	FAIL	_____	RETEST	_____ TOTAL

CONCRETE

_____ CYLINDERS _____ SLUMP _____ AIR

TECHNICIAN TIME

TRAVEL TIME 0.75 ___ STANDBY/___ RETEST TIME _____ TEST TIME 1.75

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: A. A. Madrid

Distribution: Client (1)

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

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

GEOMAT Project No.: 51-0138

Attn: Bob Carlson

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

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200	Comments:
4+00	10:15 AM	117 lb/cu.ft	6"		

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
4+40	10:15 AM	middle	82 lbs/cu.ft	56 sec.✓	63 lb/cu.ft	16 ml	54 sec.✓	8 ✓	10:20 AM

comments:

Reviewed By: A. a. Madrid

Distribution: Client (1)

GEOMAT INC

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

DAILY INSPECTION REPORT

DATE: 2/14/2005

PROJECT NAME: Giant Refinery

JOB NO: ______ CLIENT: ______

WEATHER CONDITIONS: Partly Cloudy, dry + calm

WORK IN PROGRESS: ______

EQUIPMENT ON SITE: trackhoe/excavators

UNEXPECTED SITE CONDITIONS: muddy

PERSON NOTIFIED: Mike C., Joe L.

REMARKS: Onsite at 9:52am to be instructed by Mike to perform slump ~~[illegible]~~ viscosity, filtrate and weight of slurry placed into the bench ~~[illegible]~~ of Giant Refinery. Tech requested again on Friday at 10 a.m.

NO. OF DENSITY TESTS

SOILS	/ PASS	/ FAIL	/ RETEST	/ TOTAL
ASPHALT	/ PASS	/ FAIL	/ RETEST	/ TOTAL

CONCRETE 0 CYLINDER 0 SLUMP 0 AIR

TRAVEL TIME 0.75 ☐ STANDBY / ☐ RETEST TIME 0 TEST TIME 1.75

TOTAL 2.5

REASON FOR STANDBY: None

GEOMAT TECHNICIAN: James Sampson DATE: 2/14/05

CLIENT REPRESENTATIVE: Michael Carothers DATE: ______

CONTRACTOR SUPERINTENDENT: ______ DATE: ______

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

DAILY INSPECTION REPORT

DATE: February 18, 2005

JOB NUMBER: 51-0138
CLIENT: 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 DENSITY TESTS

SOILS	____ PASS	____ FAIL	____ RETEST	____ TOTAL
ASPHALT	____ PASS	____ FAIL	____ RETEST	____ TOTAL

CONCRETE

____ CYLINDERS ____ SLUMP ____ AIR

TECHNICIAN TIME

TRAVEL TIME 0.75 ___ STANDBY/___ RETEST TIME ____ TEST TIME 1.75

TOTAL 2.5

REASON FOR STANDBY:

GEOMAT TECHNICIAN James Simpson DATE February 18, 2005
CLIENT REPRESENTATIVE _____ DATE _____
CONTRACTOR SUPERINTENDENT Michael Curuthers DATE February 18, 2005

Reviewed by: A. a. Madrid

Distribution: Client (1)

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

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

GEOMAT Project No.: 51-0138

Attn: Bob Carlson

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

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200	Comments:
7+90	9:55 AM	112 lb/cu.ft	5.5"		

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time
8+20	9:55 AM	middle	66 lbs/cu.ft	40 sec.	64.5 lb/cu.ft	18 ml	41 sec.	8	9:55 AM
8+20	9:55 AM	bottom	70 lbs/cu.ft	38 sec.					

Comments:

Reviewed By: D. A. Madrid

Distribution: Client (1)

GEOMAT INC

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

51-0 CLIENT: Recon

R CONDITIONS: Overcast & wet

PROGRESS: Placing slurry at station 11+30.

NT ON SITE: Trackhoe

TED SITE CONDITIONS: Muddy

NOTIFIED: Joe & Mike

S: Onsite at 10:02 am. to test plant & trench slurry & ~~backfill~~
1. The sample was taken at station 11+30. Tech requested
3/3/05 at 10 am. No backfill material was tested because
the had mechanical difficulty.

ENSITY TESTS

4/4 PASS	0/4 FAIL	0/4 RETEST	4/4 TOTAL
4/4 PASS	0/4 FAIL	0/4 RETEST	4/4 TOTAL

E 4 CYLINDER 4 SLUMP 4 AIR

ME 0.75 ☐ STANDBY / ☐ RETEST TIME 0 TEST TIME 1.5

TOTAL 2.25

OR STANDBY: None

ECHNICIAN: James Simpson DATE: 2/23/05

PRESENTATIVE: Michael Carruthers DATE: 2/23/05

TOR SUPERINTENDENT: DATE:

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

DAILY INSPECTION REPORT

DATE: February 23, 2005

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

WEATHER CONDITIONS: Overcast and wet.

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

EQUIPMENT ON SITE: Trackhoe

UNEXPECTED SITE CONDITIONS: Muddy.

PERSON NOTIFIED: Mike and Joe (Recon)

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

NUMBER OF DENSITY TESTS

SOILS	_____	PASS	_____	FAIL	_____	RETEST	_____ TOTAL
ASPHALT	_____	PASS	_____	FAIL	_____	RETEST	_____ TOTAL

CONCRETE

_____ CYLINDERS _____ SLUMP _____ AIR

TECHNICIAN TIME

TRAVEL TIME 0.75 ___ STANDBY/___ RETEST TIME _____ TEST TIME 1.5

TOTAL 2.25

REASON FOR STANDBY:

GEOMAT TECHNICIAN James Simpson DATE February 23, 2005
CLIENT REPRESENTATIVE Michael Curuthers DATE February 23, 2005
CONTRACTOR SUPERINTENDENT _____ DATE _____

Reviewed by: A. A. Madrid

Distribution: Client (1)

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

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

GEOMAT Project No.: 51-0138

Attn: Bob Carlson

Project: Bloomfield Giant Refinery Slurry Wall
Location: Bloomfield, New Mexico
Date: 2/23/05

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200	Comments:
					No backfill due to equipment difficulties.

Slurry Data Center

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

Comments

Reviewed By: L.A. Machuca

Distribution: Client (1)

GEOMAT INC

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

DAILY INSPECTION REPORT

DATE: 3/03/2005

PROJECT NAME: Giant Refinery Slurry Wall

JOB NO: _____ CLIENT: Recon

WEATHER CONDITIONS: Overcast/cloudy dry & calm

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

EQUIPMENT ON SITE: trackhoe,

UNEXPECTED SITE CONDITIONS: None

PERSON NOTIFIED: Mike & Joe (Recon)

REMARKS: On-site at 9:52 am to test slurry in middle bottom of trench and Mud mix. We have also test backfill at station 14+60. The tests collect from the bottom and middle of the trench was at station 14+40. Tech requested back onsite on 3/9/05 @ 10am.

NO. OF DENSITY TESTS

SOILS	/ PASS	/ FAIL	/ RETEST	/ TOTAL
ASPHALT	/ PASS	/ FAIL	/ RETEST	/ TOTAL

CONCRETE	2 CYLINDER	2 SLUMP	2 AIR	
TRAVEL TIME	2.75 ☐ STANDBY / ☐	RETEST TIME 0	TEST TIME 1.75	
		TOTAL 2.5		

REASON FOR STANDBY: None

GEOMAT TECHNICIAN: James Simpson DATE: _____

CLIENT REPRESENTATIVE: _____ DATE: _____

CONTRACTOR SUPERINTENDENT: Michael Carruthers DATE: 3-3-05

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

DAILY INSPECTION REPORT

DATE: March 3, 2005

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

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

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

EQUIPMENT ON SITE: Trackhoe

UNEXPECTED SITE CONDITIONS: None.

PERSON NOTIFIED: Mike and Joe (Recon)

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

NUMBER OF DENSITY TESTS

SOILS	____ PASS	____ FAIL	____ RETEST	____ TOTAL
ASPHALT	____ PASS	____ FAIL	____ RETEST	____ TOTAL

CONCRETE

____ CYLINDERS ____ SLUMP ____ AIR

TECHNICIAN TIME

TRAVEL TIME 0.75 ___ STANDBY/___ RETEST TIME ____ TEST TIME 1.75

TOTAL 2.5

REASON FOR STANDBY:

GEOMAT TECHNICIAN James Simpson DATE March 3, 2005
CLIENT REPRESENTATIVE ____ DATE ____
CONTRACTOR SUPERINTENDENT Michael Curuthers DATE March 3, 2005

Reviewed by: D.A. Mackie

Distribution: Client (1)

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

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

GEOMAT Project No.: 51-0138

Attn: Bob Carlson

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

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

Backfill Data Center

Station	Time	Unit Wt.	Slump	%>#200	Comments:
					No backfill due to equipment difficulties.

Slurry Data Center

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	10:00 AM
15+40	10:00 AM	Bottom	70 lb/cu.ft.	54 sec					

Comments

Reviewed By: D. A. Mashil

Distribution: Client (1)

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

DAILY INSPECTION REPORT

DATE: March 9, 2005

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

WEATHER CONDITIONS: Clear, dry, and calm.

WORK IN PROGRESS: Backfilling at station 23+40.

EQUIPMENT ON SITE: 3 Trackhoes

UNEXPECTED SITE CONDITIONS: None.

PERSON NOTIFIED: Mike and Joe (Recon)

REMARKS: On site at 10:00 a.m. to test slurry, but not slurry was placed in the trench. Only the backfill material sampled and tested at station 23+40.

NUMBER OF DENSITY TESTS

SOILS	____	PASS	____	FAIL	____	RETEST	____ TOTAL
ASPHALT	____	PASS	____	FAIL	____	RETEST	____ TOTAL

CONCRETE

____ CYLINDERS ____ SLUMP ____ AIR

TECHNICIAN TIME

TRAVEL TIME 0.75 X STANDBY/ RETEST TIME 0.75 TEST TIME 0.5

TOTAL 2.0

REASON FOR STANDBY:

GEOMAT TECHNICIAN James Simpson DATE March 9, 2005
CLIENT REPRESENTATIVE Michael Curuthers DATE March 9, 2005
CONTRACTOR SUPERINTENDENT _____ DATE _____

Reviewed by: S.A. Madrid

Distribution: Client (1)

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

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

GEOMAT Project No.: 51-0138

Attn: Bob Carlson

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

Soil Bentonite Slurry Trench Cut Off Wall Quality Control Sheet

Backfill Data Center

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

Slurry Data Center

Trench					Plant				
Station	Time	Depth	Unit Wt.	Visc.	Unit Wt.	Filtrate	Visc.	pH	Time

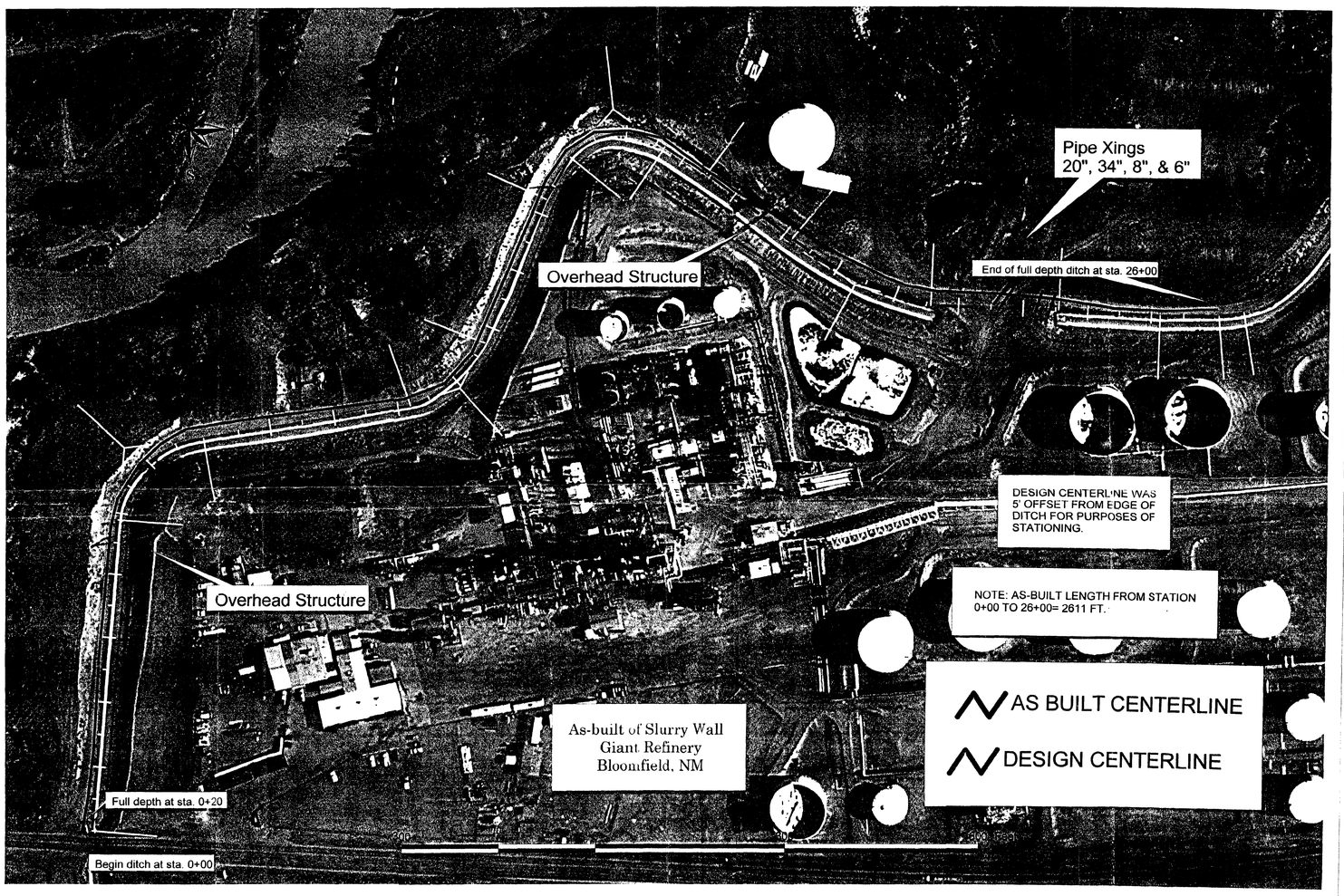
Comments: No slurry was sampled today.

Reviewed By: D.A. Machuca

Distribution: Client (1)

APPENDIX D

As-Built Slurry Wall Drawing



INTERMOUNTAIN MAPPING SERVICES, LLC

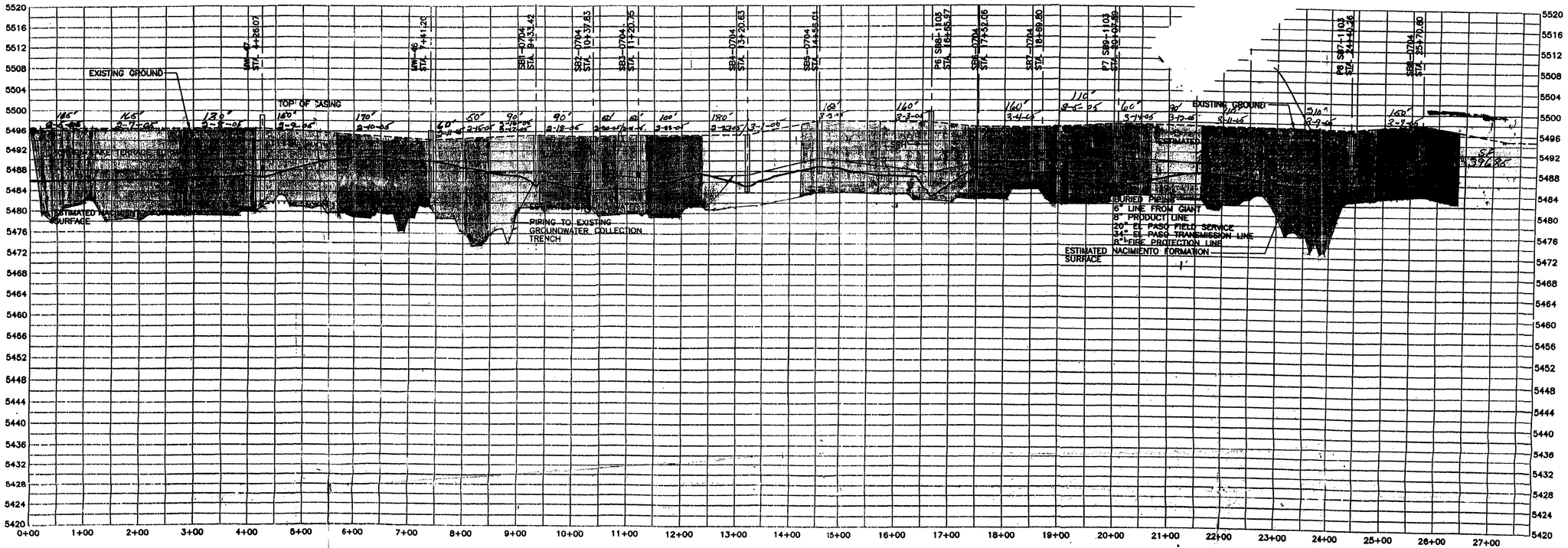
1875 Highway 170, La Plata, NM 87418 (505) 325-5244

SCOTT ANDREW NEW MEXICO 9625 REGISTERED PROFESSIONAL LAND SURVEYOR

4/7/05

APPENDIX E

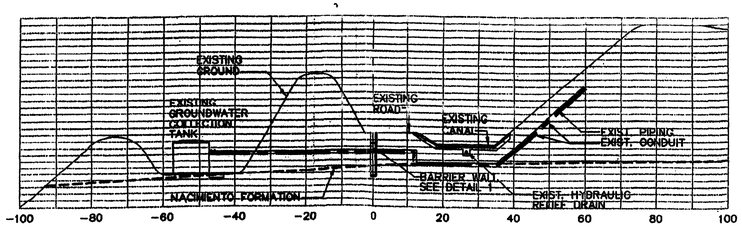
Barrier Profile - Actual



SECTION A–A'

SCALE: 1"=100' HORIZONTAL
1"=10' VERTICAL

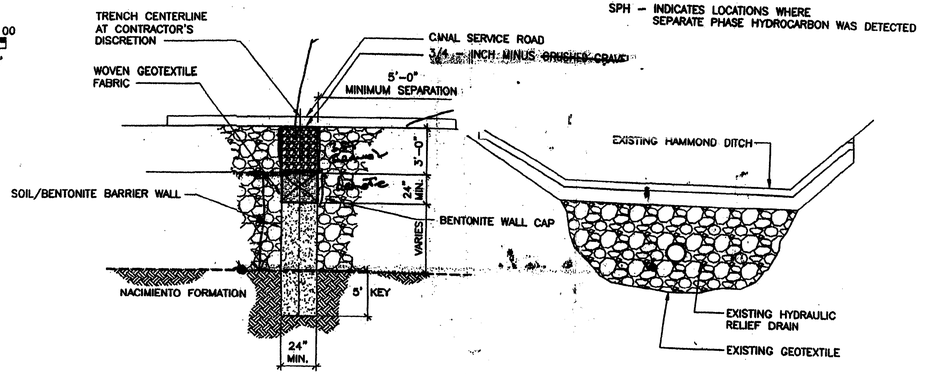
SCALE: 1" = 10' SCALE: 1" = 100'



SECTION (1 / C2 | C3)

SCALE: 1"=20'

As-Built Drawing by RECON, Inc.



SOIL–BENTONITE BARRIER WALL DETAIL (1 / C3 | C3)

MALCOLM PIRNIE

REVISIONS				
NO.	BY	DATE	REMARKS	

DES KR
DWN HMF
CKD KR

GIANT REFINERY
BLOOMFIELD, NEW MEXICO

NORTH BOUNDARY BARRIER

CIVIL

BARRIER PROFILE

DATE 11/04

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. ACTIVITIES

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

- 1/19 – 1/21/05: RECON mobilized a construction crew and equipment to the site.
- 1/19 – 1/22/05: Slurry trench alignment.
- 1/19 – 1/22/05: Layed out the staging area arrangement.
- 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

- □ 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 in-service.
  - ✓ 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 hot-tar patch on the 20-inch Enterprise pipeline.
- □ 2/01: Encased 16-inch Giant fire-water pipeline in concrete for protection during barrier construction activities.
- □ 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.

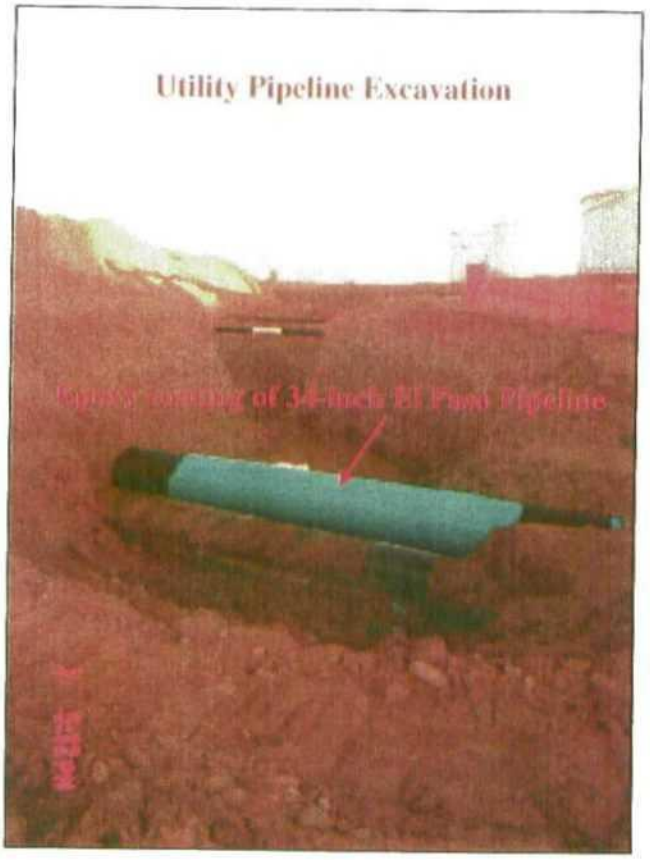
2. PLANNED ACTIVITIES

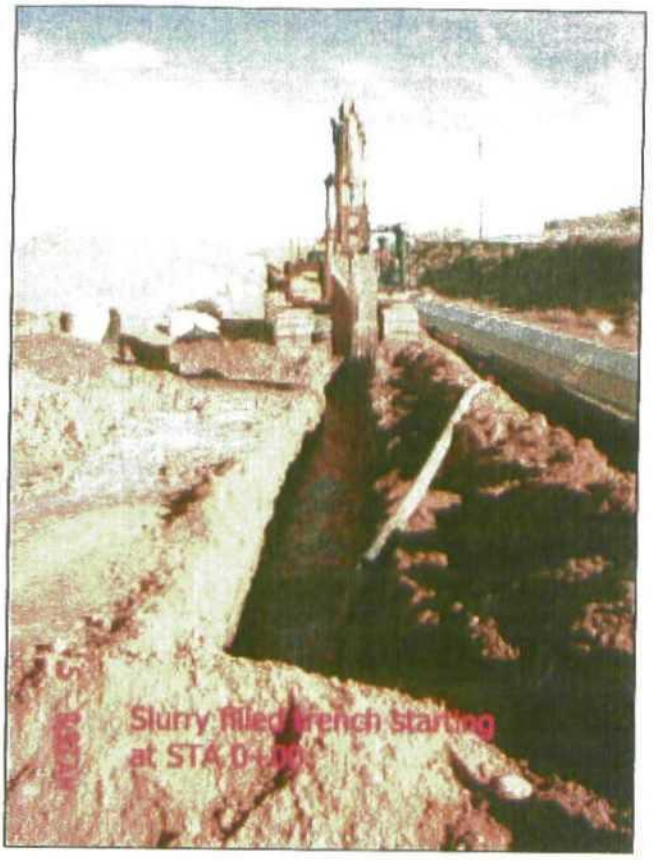
- □ Continue construction of North Boundary Barrier at STA 1+15.

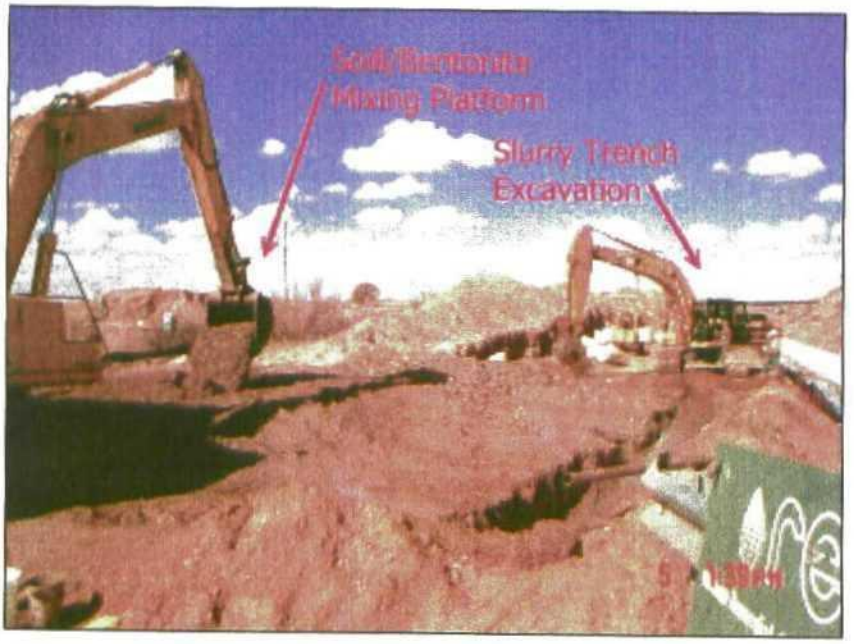
3. SCHEDULE

- □ Schedule has not been revised.

4. CONSTRUCTION PHOTOGRAPHS

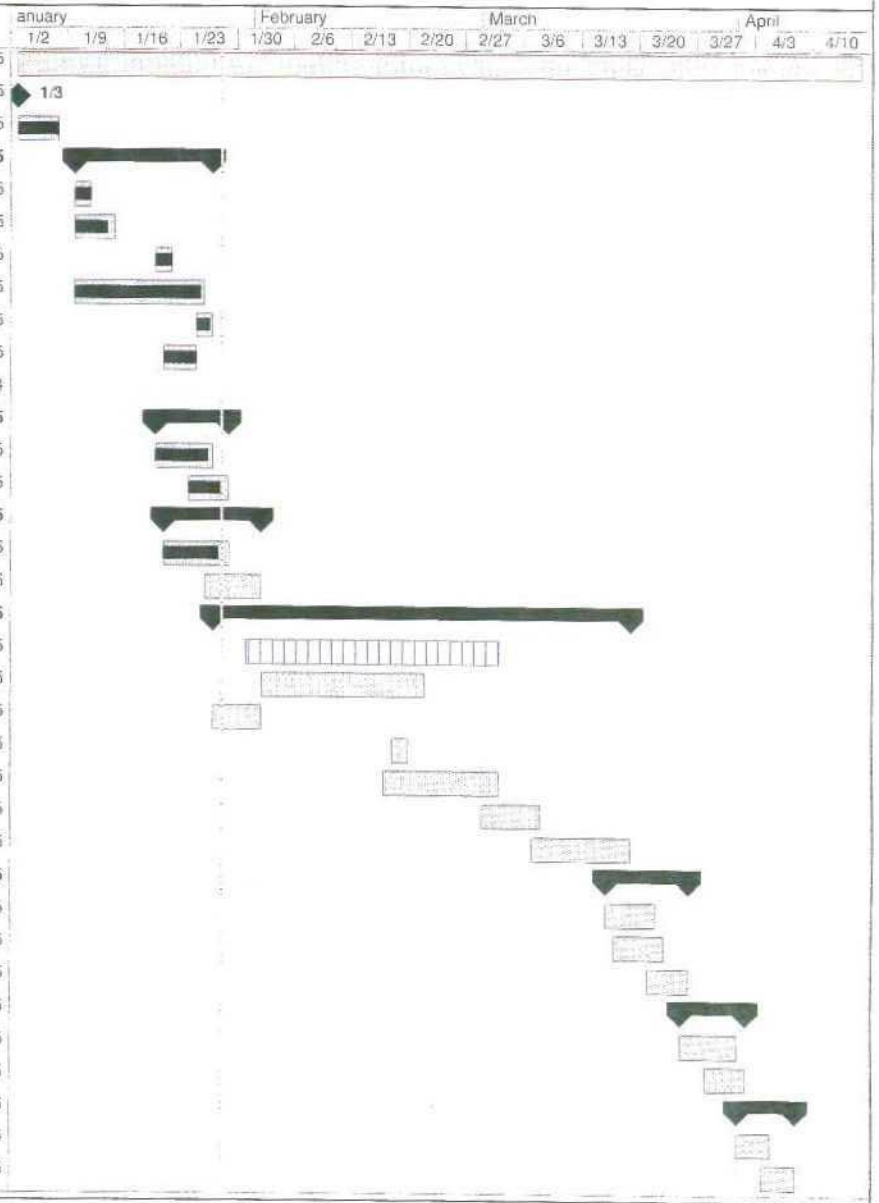

Utility Pipeline Excavation


Slurry filled trench starting


Soil/Bentonite
Mixing Platform
Slurry Trench
Excavation

GIANT [illegible]NG COMPANY
BLOOMFIELD REFINERYNORTH BOUNDARY BARRIER

ID	Task Name	Duration	Start	Finish
1	**Giant North Boundary Barrier Project Deadline**	76 days	Mon 1/3/05	Fri 4/15/05
2	**Contract Award**	60 days	Mon 1/3/05	Thu 3/24/05
3	**Review/Sign Contract**	5 days	Mon 1/3/05	Fri 1/7/05
4	**Pre-Construction Activities**	**13 days**	**Mon 1/10/05**	**Wed 1/26/05**
5	Award Recon S/C	2 days	Mon 1/10/05	Tue 1/11/05
6	Material/Equip Procurement	5 days	Mon 1/10/05	Fri 1/14/05
7	Meeting @ Giant	2 days	Thu 1/20/05	Fri 1/21/05
8	Mix Design/Permeability Testing	12 days	Mon 1/10/05	Tue 1/25/05
9	Slurry Wall Layout/Controls	2 days	Tue 1/25/05	Wed 1/26/05
10	Finalize Construction Schedule	2 days	Fri 1/21/05	Mon 1/24/05
11	**Mobilization**	5 days	Thu 12/9/04	Wed 12/15/04
12	**Giant Project Deadline**	**7 days**	**Thu 1/20/05**	**Fri 1/28/05**
13	Mobilize Crew and Equipment	5 days	Thu 1/20/05	Wed 1/26/05
14	Set up Office, Receiving & Mixing Areas	5 days	Mon 1/24/05	Fri 1/28/05
15	**Site Preparation**	**8 days**	**Fri 1/21/05**	**Tue 2/1/05**
16	Erosion & Sediment Control	6 days	Fri 1/21/05	Fri 1/28/05
17	Work Platform & Mixing Areas	5 days	Wed 1/26/05	Tue 2/1/05
18	**Slurry Wall Trench Construction**	**38 days**	**Thu 1/27/05**	**Fri 3/18/05**
19	Prepare/Batch Bentonite Slurry-Ongoing	24 days	Mon 1/31/05	Wed 3/2/05
20	Construct Trench From Sta 0+00 to 9+50	15 days	Wed 2/2/05	Mon 2/21/05
21	Dry Tie-In @ Sta 9+50	4 days	Thu 1/27/05	Tue 2/1/05
22	Construct Trench Around Dry Tie-In @Sta 9+50 to 9+75	2 days	Fri 2/18/05	Sat 2/19/05
23	Construction Trench From Sta 9+75 to Stat 21+50	11 days	Thu 2/17/05	Wed 3/2/05
24	Dry Tie-In @ Sta 21+50 to 24+00	5 days	Tue 3/1/05	Mon 3/7/05
25	Construct Trench From Sta 24+00 to Sta 26+00	10 days	Mon 3/7/05	Fri 3/18/05
26	**Final Protective Cover**	**8 days**	**Wed 3/16/05**	**Fri 3/25/05**
27	Adjust Top of Bentonite to Designated Elevation	4 days	Wed 3/16/05	Mon 3/21/05
28	Install Geotextile	4 days	Thu 3/17/05	Tue 3/22/05
29	Place Bank-Run Gravel to Grade	5 days	Mon 3/21/05	Fri 3/25/05
30	**Site Restoration**	**6 days**	**Fri 3/25/05**	**Fri 4/1/05**
31	Remove Access Bentonite-Soil Mix	5 days	Fri 3/25/05	Thu 3/31/05
32	Fill/Grade/Slope Service Road	5 days	Mon 3/28/05	Fri 4/1/05
33	**Demobilization**	**5 days**	**Fri 4/1/05**	**Thu 4/7/05**
34	Remove Office Complex & Equipment from site	2 days	Fri 4/1/05	Mon 4/4/05
35	Make Final Site Cleanup	4 days	Mon 4/4/05	Thu 4/7/05



Project: Giant Construction Schedule R
Date: Fri 1/28/05

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

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

- ☐ 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

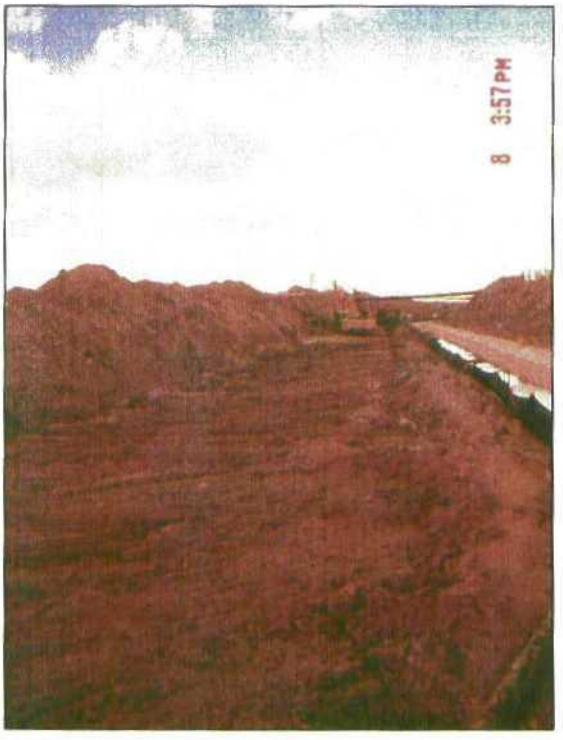
□ Resume construction of the North Boundary Barrier at STA 8+00.

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- ½ 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.

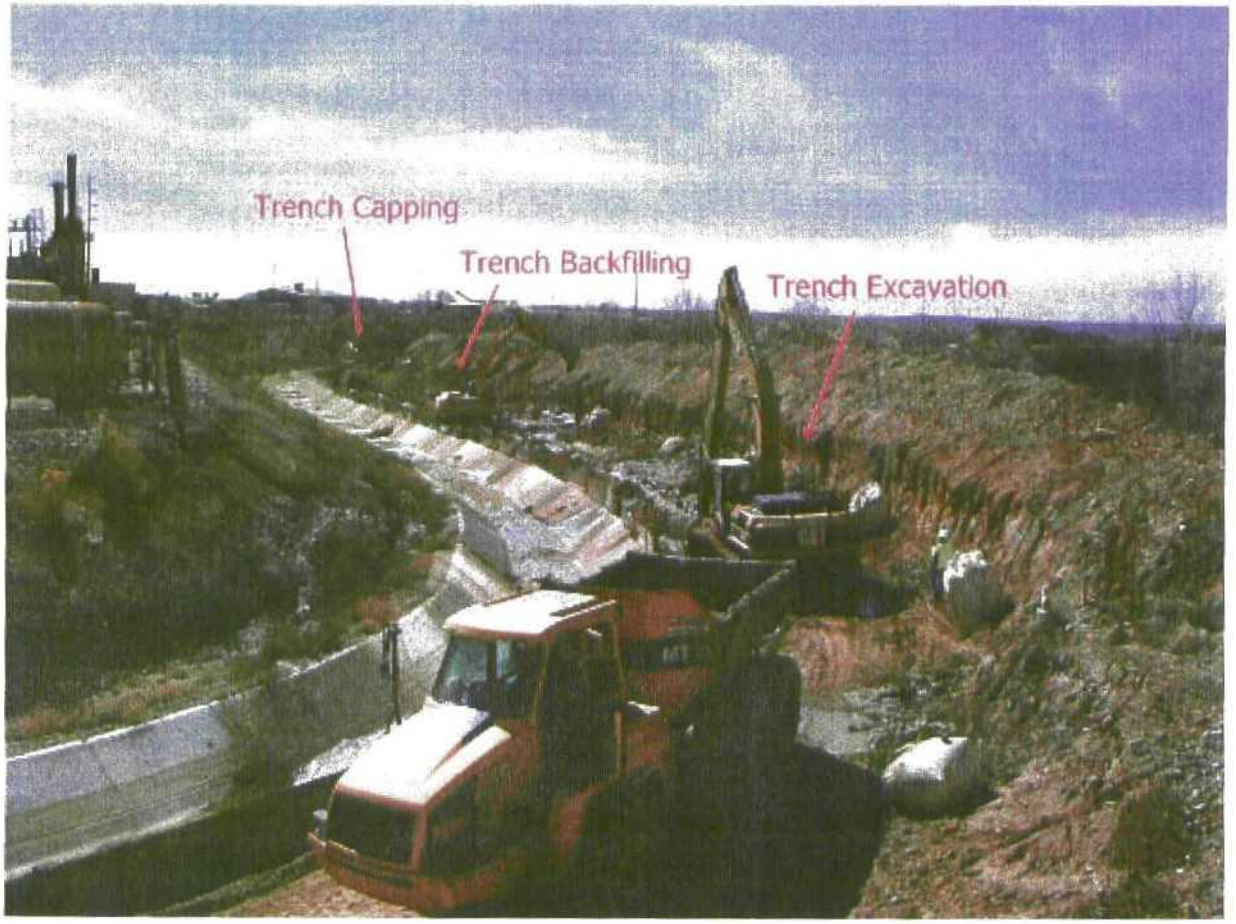
2. PLANNED ACTIVITIES

- 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 → Permeability = 2.12 x 10^{-8} cm/sec
  - ✓ STA 4+00 → Permeability = 6.93 x 10^{-8} cm/sec
  - ✓ STA 6+00 → Permeability = 2.08 x 10^{-8} cm/sec
  - ✓ STA 8+00 → Permeability = 2.01 x 10^{-8} cm/sec
  - ✓ STA 10+00→ Permeability = 2.71 x 10^{-8} cm/sec
  - ✓ STA 12+00→ Permeability = 4.06 x 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.

- 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.

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

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

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

TEST RESULTS

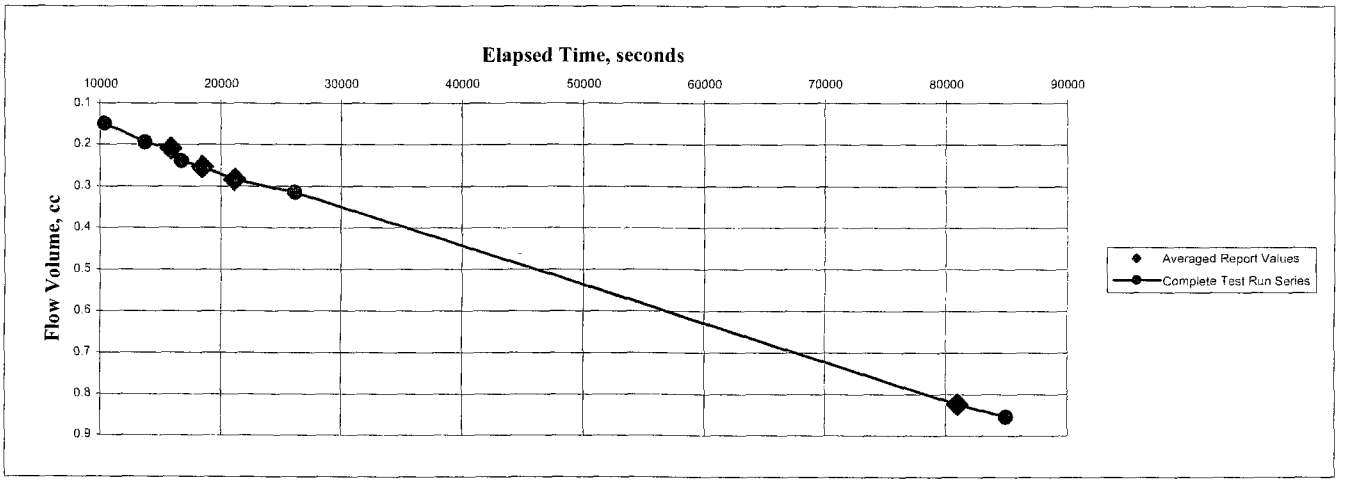
Permeability, cm/sec.: 2.12E-08

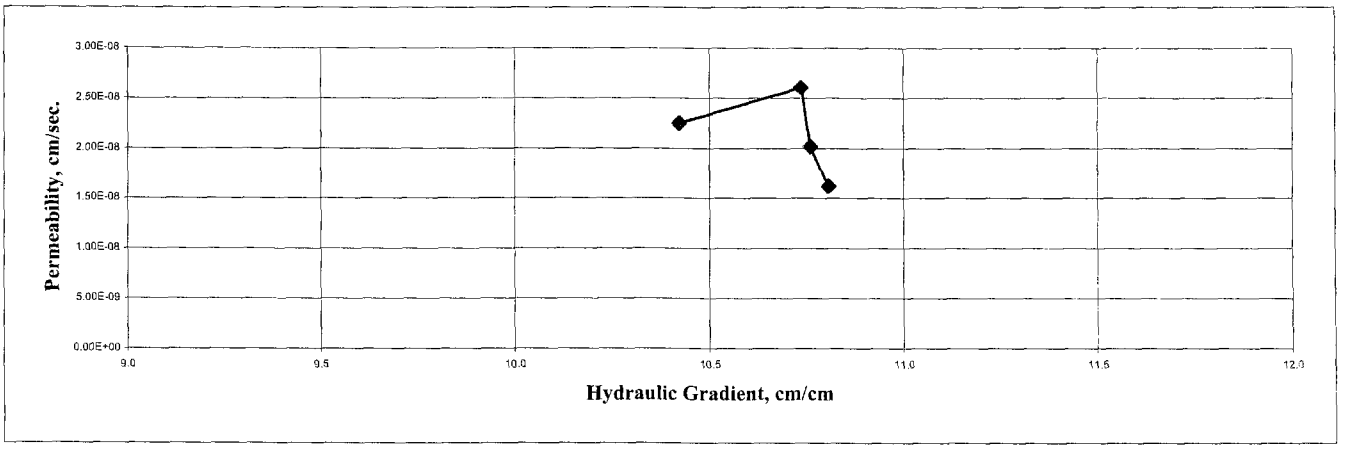
Average Hydraulic Gradient: 10.7

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.37	Specimen Height, cm:	6.38
Specimen Diameter, cm:	7.11	Specimen Diameter, cm:	7.11
Dry Unit Weight, pcf:	73.3	Dry Unit Weight, pcf:	84.7
Moisture Content, %	48.2	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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

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

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

TEST RESULTS

Permeability, cm/sec.: 6.93E-08

Average Hydraulic Gradient: 8.4

Effective Cell Pressure, psi: 5

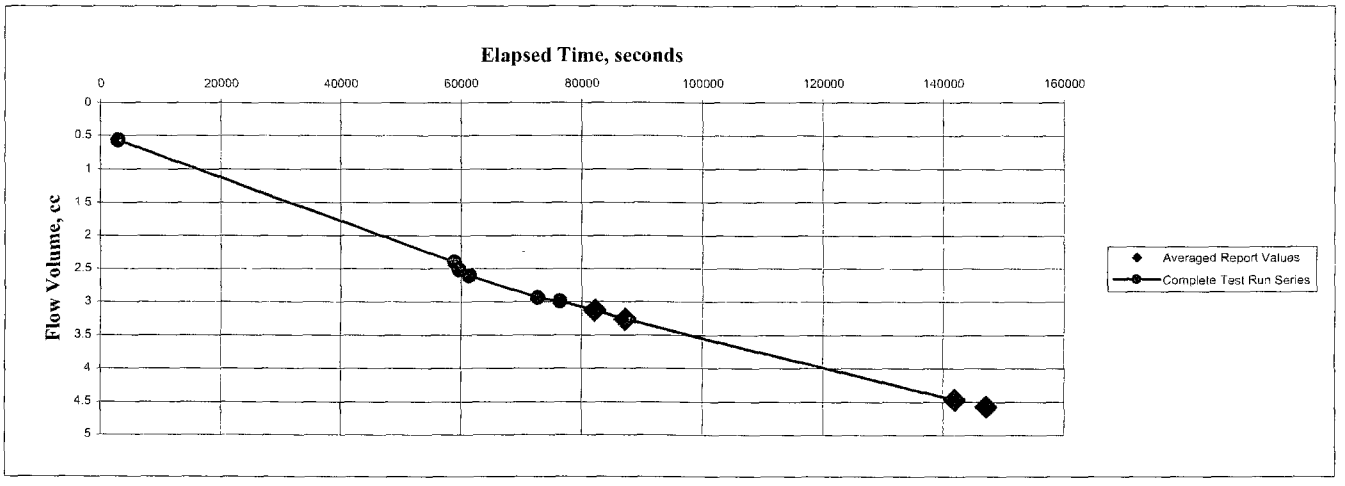
TEST SAMPLE DATA

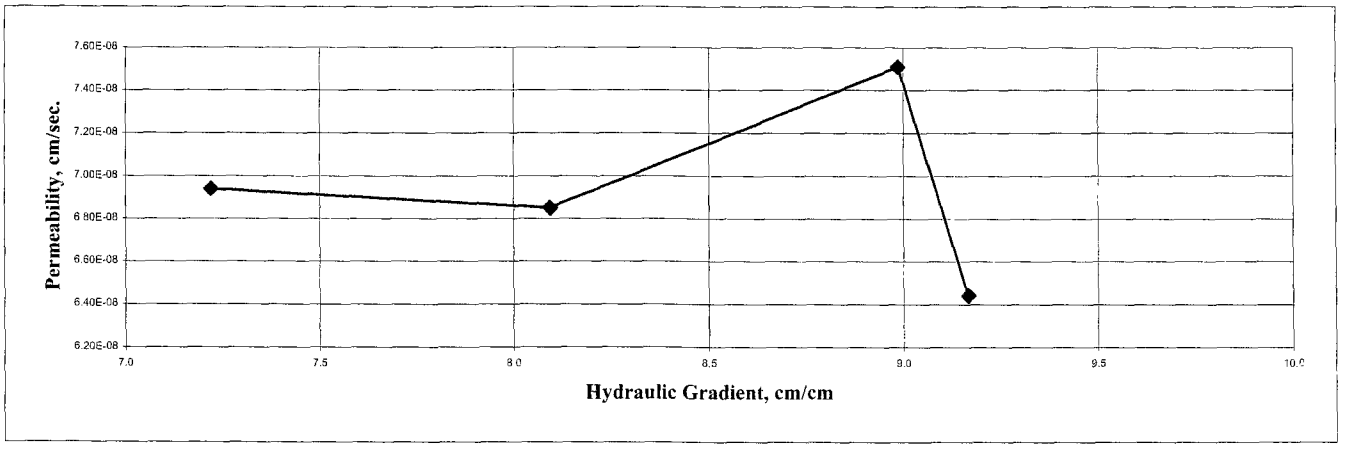
Before Test

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

After Test

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





Test Method: ASTM D5084 Method C

PROJECT NUMBER:	05-103	February 11, 2005

Giant Refinery, 2-1780

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: STA 6+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

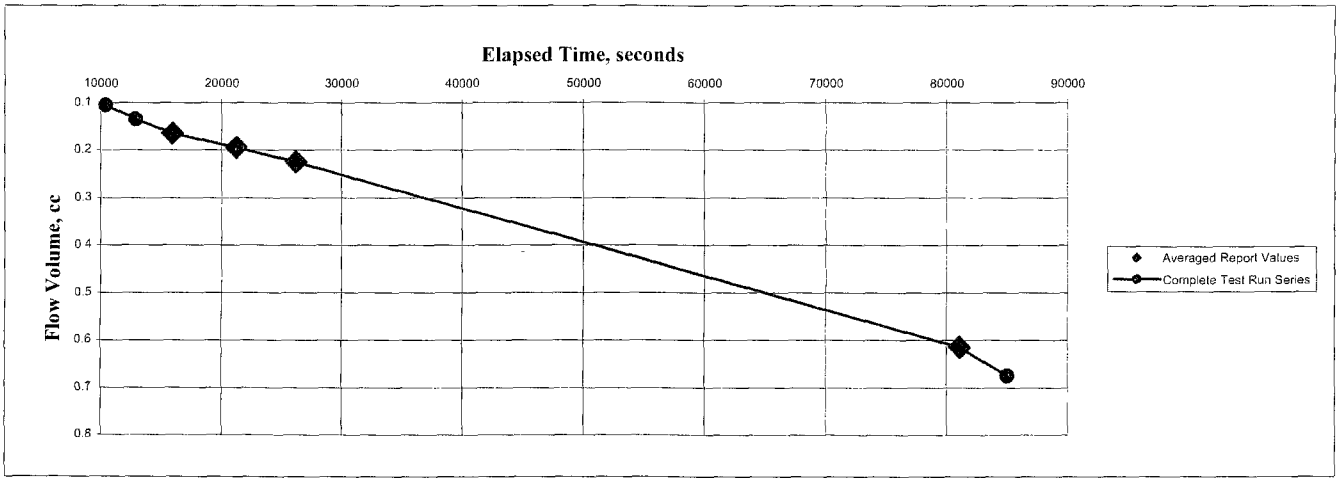
Permeability, cm/sec.: 2.08E-08

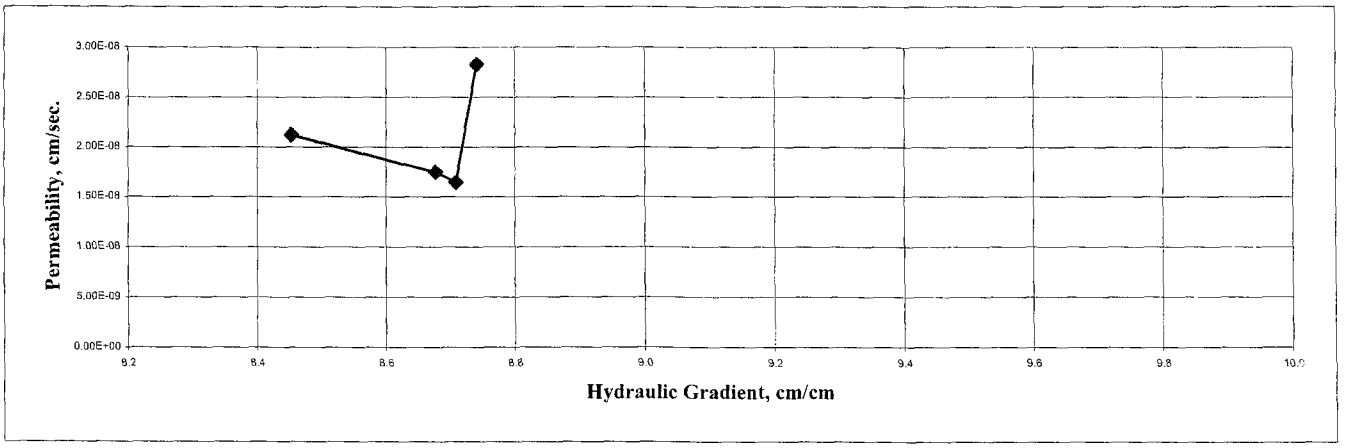
Average Hydraulic Gradient: 8.6

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.21	Specimen Height, cm:	6.27
Specimen Diameter, cm:	7.11	Specimen Diameter, cm:	7.11
Dry Unit Weight, pcf:	71.1	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

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING AND INSPECTION SERVICES

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

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: STA 8+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

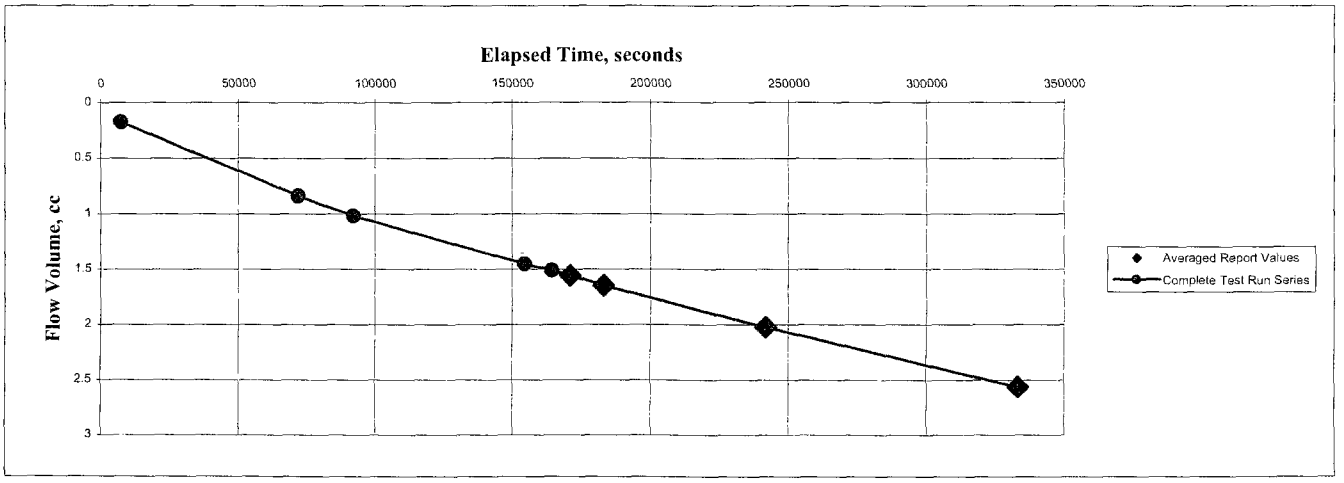
Permeability, cm/sec.: 2.01E-08

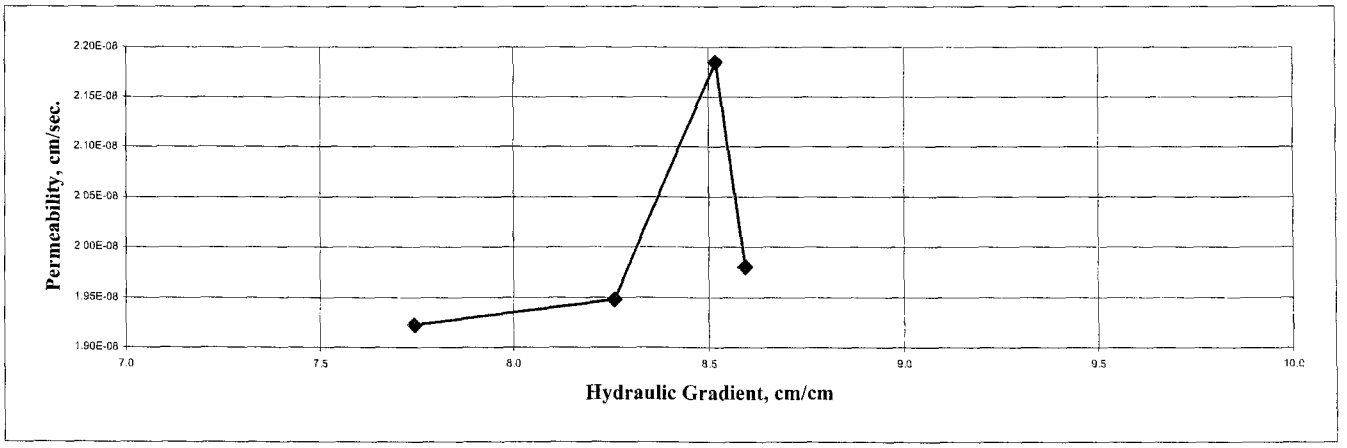
Average Hydraulic Gradient: 8.3

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5084 Method C

PROJECT NUMBER:	05-103	February 17, 2005	Giant Refinery Co

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: STA 10+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

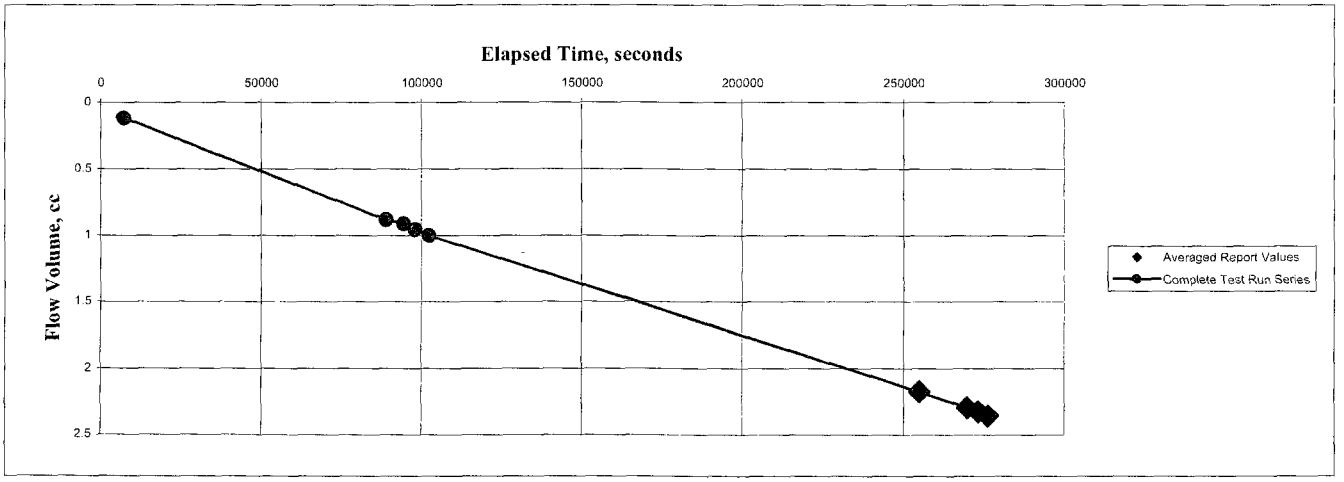
Permeability, cm/sec.: 2.71E-08

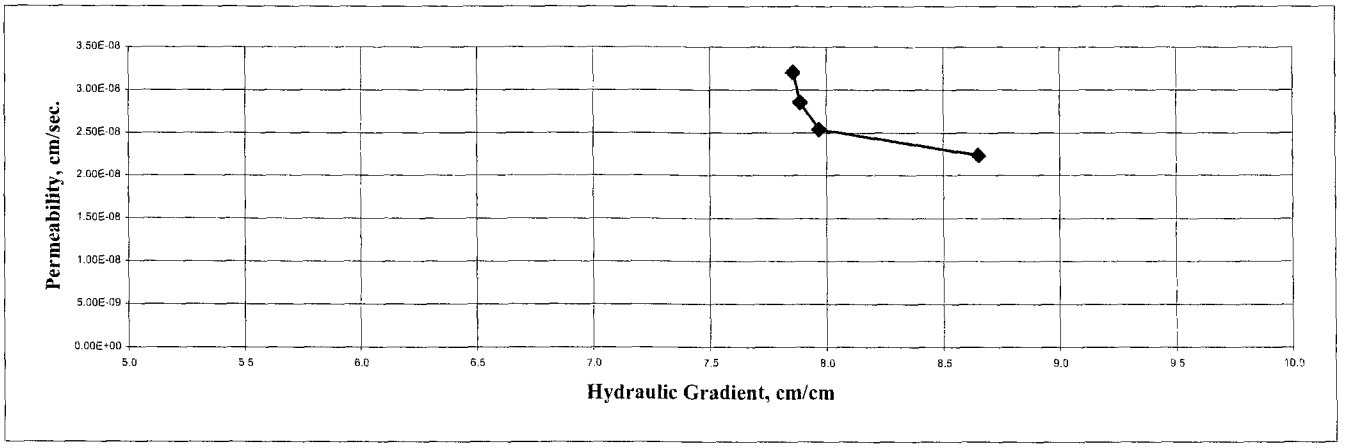
Average Hydraulic Gradient: 8.1

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

Before Test		After Test	
Specimen Height, cm:	7.49	Specimen Height, cm:	6.30
Specimen Diameter, cm:	7.11	Specimen Diameter, cm:	7.11
Dry Unit Weight, pcf:	70.2	Dry Unit Weight, pcf:	83.5
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.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

HYDRAULIC CONDUCTIVITY TEST REPORT

SAMPLE DATA

Sample Identification: STA 12+00
Visual Description: N/A
Remarks:

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

TEST RESULTS

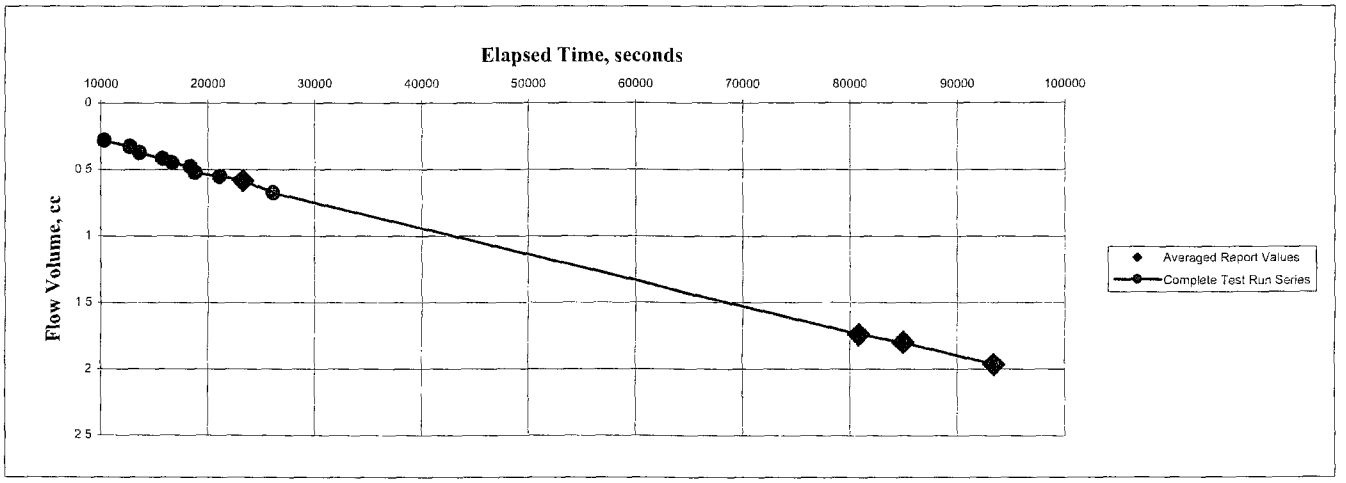
Permeability, cm/sec.: 4.06E-08

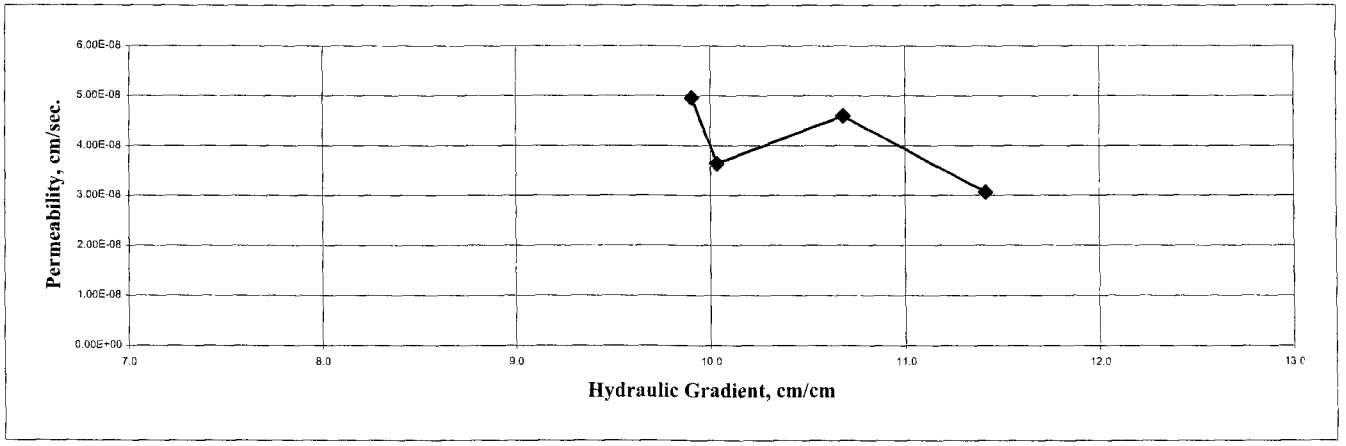
Average Hydraulic Gradient: 10.5

Effective Cell Pressure, psi: 5

TEST SAMPLE DATA

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





Test Method: ASTM D5084 Method C

PROJECT NUMBER:	05-103	March 2, 2005

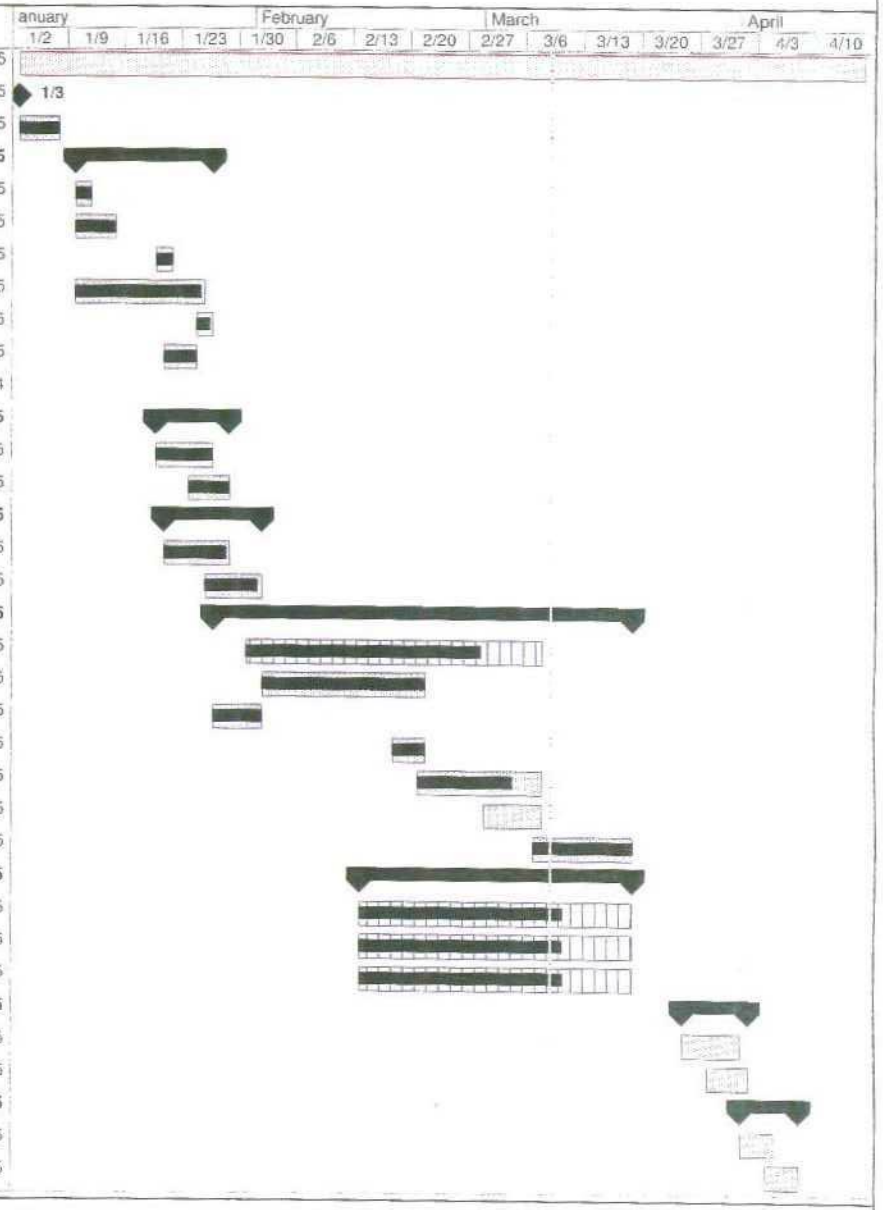
Giant Refinery Co

SIERRA TESTING LABORATORIES, INC.
GEOTECHNICAL AND MATERIALS TESTING SERVICES

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

GIANT REFINING COMPANY
BLOOMFIELD REFINERY NORTH BOUNDARY BARRIER

ID	Task Name	Duration	Start	Finish
1	**Giant North Boundary Barrier Project Deadline**	76 days	Mon 1/3/05	Fri 4/15/05
2	**Contract Award**	60 days	Mon 1/3/05	Thu 3/24/05
3	**Review/Sign Contract**	5 days	Mon 1/3/05	Fri 1/7/05
4	**Pre-Construction Activities**	**13 days**	**Mon 1/10/05**	**Wed 1/26/05**
5	Award Recon S/C	2 days	Mon 1/10/05	Tue 1/11/05
6	Material/Equip Procurement	5 days	Mon 1/10/05	Fri 1/14/05
7	Meeting @ Giant	2 days	Thu 1/20/05	Fri 1/21/05
8	Mix Design/Permeability Testing	12 days	Mon 1/10/05	Tue 1/25/05
9	Slurry Wall Layout/Controls	2 days	Tue 1/25/05	Wed 1/26/05
10	Finalize Construction Schedule	2 days	Fri 1/21/05	Mon 1/24/05
11	**Mobilization**	5 days	Thu 12/9/04	Wed 12/15/04
12	**Giant Project Deadline**	**7 days**	**Thu 1/20/05**	**Fri 1/28/05**
13	Mobilize Crew and Equipment	5 days	Thu 1/20/05	Wed 1/26/05
14	Set up Office, Receiving & Mixing Areas	5 days	Mon 1/24/05	Fri 1/28/05
15	**Site Preparation**	**8 days**	**Fri 1/21/05**	**Tue 2/1/05**
16	Erosion & Sediment Control	6 days	Fri 1/21/05	Fri 1/28/05
17	Work Platform & Mixing Areas	5 days	Wed 1/26/05	Tue 2/1/05
18	**Slurry Wall Trench Construction**	**38 days**	**Thu 1/27/05**	**Fri 3/18/05**
19	Prepare/Batch Bentonite Slurry-Ongoing	27 days	Mon 1/31/05	Mon 3/7/05
20	Construct Trench From Sta 0+00 to 9+50	15 days	Wed 2/2/05	Mon 2/21/05
21	Dry Tie-In @ Sta 9+50	4 days	Thu 1/27/05	Tue 2/1/05
22	Construct Trench Around Dry Tie-In @Sta 9+50 to 9+75	3 days	Fri 2/18/05	Mon 2/21/05
23	Construction Trench From Sta 9+75 to Stat 21+50	11 days	Mon 2/21/05	Mon 3/7/05
24	Dry Tie-In @ Sta 21+50 to 24+00	5 days	Tue 3/1/05	Mon 3/7/05
25	Construct Trench From Sta 24+00 to Sta 26+00	10 days	Mon 3/7/05	Fri 3/18/05
26	**Final Protective Cover**	**26 days**	**Mon 2/14/05**	**Fri 3/18/05**
27	Adjust Top of Bentonite to Designated Elevation	26 days	Mon 2/14/05	Fri 3/18/05
28	Install Geotextile	26 days	Mon 2/14/05	Fri 3/18/05
29	Place Bank-Run Gravel to Grade	26 days	Mon 2/14/05	Fri 3/18/05
30	**Site Restoration**	**6 days**	**Fri 3/25/05**	**Fri 4/1/05**
31	Remove Bentonite-Soil Mix	5 days	Fri 3/25/05	Thu 3/31/05
32	Fill/Grade/Slope Service Road	5 days	Mon 3/28/05	Fri 4/1/05
33	**Demobilization**	**5 days**	**Fri 4/1/05**	**Thu 4/7/05**
34	Remove Office Complex & Equipment from site	2 days	Fri 4/1/05	Mon 4/4/05
35	Make Final Site Cleanup	4 days	Mon 4/4/05	Thu 4/7/05



Project:Giant Construction Schedule

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Wed 3/9/05

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]
Sent: Friday, February 11, 2005 9:37 AM
To: '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:

1. 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.
2. How are the end points going to be handled. Will there be a hook shape of "L" at each end?
3. 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.

Randy Schmaltz

From: Randy Schmaltz
Sent: Monday, February 14, 2005 12:54 PM
To: 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:

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

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

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

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

-----Original Message-----
From: Price, Wayne [mailto:WPrice@state.nm.us]
Sent: Friday, February 11, 2005 9:37 AM
To: '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:

1. 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.
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3. Did you find any contamination under or around the pipelines?

-----Original Message-----
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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
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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.

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:

1. 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.
3. If the slurry trench specifications are showing that the sand build-up in the trench is not a problem, then the trench key shall go back to 5 feet.
4. 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

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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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

BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

DERRITH WATCHMAN-MOORE
DEPUTY SECRETARY

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

July 26, 2005

Mr. Randy Schmaltz
Environmental Supervisor
Giant Refining Company
P.O. Box 159
Bloomfield, New Mexico 87413

Mr. Ed Riege
Environmental Superintendent
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

SUBJECT: CORRECTIVE MEASURES IMPLEMENTATION REPORT FOR THE BARRIER WALL AND RECOVERY SYSTEM INSTALLATIONS GIANT REFINING COMPANY, BLOOMFIELD REFINERY RCRA PERMIT NO. NMD 089416416 HWB-GRCB-05-004

Dear Mr. Schmaltz and Mr. Riege:

The New Mexico Environment Department (NMED) is requiring Giant Refining Company, Bloomfield Refinery (GRCB) to submit a Corrective Measures Implementation Report (CMI Report). The CMI Report must summarize all activities that have occurred to date concerning the barrier wall installation, including information on the design and installation of the recovery and observation wells and provide as-built drawings of the barrier wall, associated wells and ancillary equipment. The CMI Report must incorporate all correspondence to date between NMED and GRCB starting with the Corrective Action Plan dated November 16, 2004 submitted by GRCB to NMED.

GRCB must submit a CMI Report outline to NMED for approval prior to the submittal of the CMI Report. NMED requires that CMI outline be submitted by November 1, 2005. The CMI Report will be due 120 days after receipt of NMED approval of the CMI Report outline. GRCB must also submit a final copy of the CMI Report to the New Mexico Energy, Minerals and

Natural Resource Department Oil Conservation Division (NMEMNRD OCD) Santa Fe and Aztec offices; attention Wayne Price and Denny Foust, respectively and the U.S. Environmental Protection Agency (EPA); attention Bob Wilkinson.

The CMI Report must contain the following but is not limited to:

1. A site plan of the refinery identifying the barrier wall and current locations and names of all observation and recovery wells installed at the refinery including those constructed along the barrier wall. The site plan must contain pertinent site features, symbols, and abbreviations,

2. All collection and observation well construction diagrams and boring logs,

3. All analytical laboratory and quality control (QC) data reports,

4. Summary tables of all field measurements, water table elevations and the analytical data collected during and after system installation,

s

5. Descriptions of the methods and instruments used to collect samples and measure field parameters.

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

Sincerely,

Hope Monzeglio

Hope Monzeglio
Project Leader
Hazardous Waste Bureau

HCM:hcm

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

Reading File and GRCB 2005 File

MALCOLM PIRNIE

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), Malcolm 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 L. Tucker

Dennis Tucker, P.E.
Senior Associate

Enclosure

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

4646 E. VAN BUREN STREET SUITE 400 PHOENIX, AZ 85008-6945 602-241-1770 fax 602-231-0131 http://www.pirnie.com

DRAFT CORRECTIVE MEASURES IMPLEMENTATION REPORT BLOOMFIELD REFINERY NORTH BOUNDARY BARRIER

GIANT REFINING COMPANY

October 2005

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

Prepared by
Malcolm Pirnie Inc.
4646 E. Van Buren Street, #400
Phoenix, AZ 85008

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D	Weekly Reports by Malcolm Pirnie, Inc., Slurry Wall Construction
E	Collection System Work Plan and Agency Comments
F	Observation and Collection Well Diagrams and Logs
G	Groundwater Analytical Laboratory Reports

State of New Mexico
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BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

DERRITH WATCHMAN-MOORE
DEPUTY SECRETARY

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

February 24, 2006

Mr. Randy Schmaltz
Environmental Supervisor
Giant Refining Company
P.O. Box 159
Bloomfield, New Mexico 87413

Mr. Ed Riege
Environmental Superintendent
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

SUBJECT: APPROVAL OF CORRECITVE MEASURES IMPLEMENTATION REPORT OUTLINE FOR THE BARRIER WALL AND RECOVERY SYSTEM INSTALLATIONS GIANT REFINING COMPANY, BLOOMFIELD REFINERY EPA NO. NMD 089416416 HWB-GRCB-05-004

Dear Mr. Schmaltz and Mr. Riege:

The New Mexico Environment Department (NMED) is in receipt of Giant Refining Company's, Bloomfield Refinery (GRCB) outline for the *North Boundary Corrective Measures Implementation Report* dated October 28, 2005. This report is considered an Interim Measures Implementation Report because the barrier wall may not be a final remedy at the site. NMED hereby approves the Interim Measures Implementation Report outline with the following conditions:

1. Appendix B must include as-built illustrations of the barrier wall, including cross-sections 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

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 Monzeglio
Project Leader
Hazardous Waste Bureau

HM

cc: J. Bearzi, NMED, HWB
*D. Cobrain, NMED HWB
W. Price, OCD Santa Fe Office
C. Chavez, OCD Santa Fe Office
D. Foust, OCD Aztec Office
B. Wilkinson, EPA

Reading File and GRCB 2006 File
*denotes electronic copy

APPENDIX F

Investigative Derived Waste Management and Analytical Results

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

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

February 16, 2005

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

RE: Stockpile Order No.: 0502121

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 3 samples on 2/11/2005 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

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

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

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

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	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE ORGANICS						Analyst: **SCC**
Diesel Range Organics (DRO)	17	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 RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	280	50		mg/Kg	10	2/14/2005 5:37:34 PM
Surr: BFB	118	78.3-120		%REC	10	2/14/2005 5:37:34 PM

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range

Hall Environmental Analysis Laboratory

Date: *16-Feb-05*

CLIENT:	San Juan Refining	**Client Sample ID:**	300'-600'
Lab Order:	0502121	**Collection Date:**	2/10/2005 2:00:00 PM
Project:	Stockpile		
Lab ID:	0502121-02	**Matrix:**	SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE ORGANICS						Analyst: SCC
Diesel Range Organics (DRO)	66	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 RANGE						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

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	

Hall Environmental Analysis Laboratory

Date: *16-Feb-05*

CLIENT:	San Juan Refining	Client Sample ID:	600'-900'
Lab Order:	0502121	Collection Date:	2/10/2005 2:15:00 PM
Project:	Stockpile		
Lab ID:	0502121-03	Matrix:	SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE ORGANICS						Analyst: SCC
Diesel Range Organics (DRO)	150	10		mg/Kg	1	2/14/2005 9:11:20 PM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	2/14/2005 9:11:20 PM
Surr: DNOP	104	60-124		%REC	1	2/14/2005 9:11:20 PM
EPA METHOD 8015B: GASOLINE RANGE						Analyst: NSB
Gasoline Range Organics (GRO)	76	25		mg/Kg	5	2/15/2005 9:58:39 AM
Surr: BFB	114	78.3-120		%REC	5	2/15/2005 9:58:39 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

Hall Environmental Analysis Laboratory

Date: *16-Feb-05*

CLIENT: San Juan Refining
Work Order: 0502121
Project: Stockpile

QC SUMMARY REPORT
Method Blank

Sample ID MB-7412	Batch ID: 7412	Test Code: SW8015	Units: mg/Kg	Analysis Date 2/14/2005 12:11:43 PM	Prep Date 2/14/2005
Client ID:		Run ID: FID(17A) 2_050214A		SeqNo: 339696	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10									
Motor Oil Range Organics (MRO)	ND	50									
Surr: DNOP	9.768	0	10	0	97.7	60	124	0			

Sample ID MB-7411	Batch ID: 7411	Test Code: SW8015	Units: mg/Kg	Analysis Date 2/14/2005 3:37:41 PM	Prep Date 2/11/2005
Client ID:		Run ID: PIDFID_050214A		SeqNo: 339601	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5									
Surr: BFB	1042	0	1000	0	104	78.3	120	0			

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

J

CLIENT: San Juan Refining
Work Order: 0502121
Project: Stockpile

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID LCS-7412	Batch ID: 7412	Test Code: SW8015	Units: mg/Kg	Analysis Date 2/14/2005 12:42:24 PM	Prep Date 2/14/2005
Client ID:		Run ID: FID(17A) 2_050214A		SeqNo: 339697	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	54.31	10	50	0	109	67.4	117	0			

Sample ID LCSD-7412	Batch ID: 7412	Test Code: SW8015	Units: mg/Kg	Analysis Date 2/14/2005 1:12:18 PM	Prep Date 2/14/2005
Client ID:		Run ID: FID(17A) 2_050214A		SeqNo: 339699	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	45.33	10	50	0	90.7	67.4	117	54.31	18.0	20	

Sample ID LCS-7411	Batch ID: 7411	Test Code: SW8015	Units: mg/Kg	Analysis Date 2/14/2005 4:07:36 PM	Prep Date 2/11/2005
Client ID:		Run ID: PIDFID_050214A		SeqNo: 339602	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28.01	5	25	0	112	84	120	0			

Sample ID GRO std 2.5ug	Batch ID: 7411	Test Code: SW8015	Units: mg/Kg	Analysis Date 2/15/2005 10:28:29 AM	Prep Date
Client ID:		Run ID: PIDFID_050215A		SeqNo: 340005	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	23.77	5	25	0	95.1	84	120	0			

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

1

Hall Environmental Analysis Laboratory

Sample Receipt Checklist

Client Name SJR | Date and Time Received: 2/11/2005

Work Order Number 0502121 | Received by AT

Checklist completed by _____ (Signature) | _____ (Date)

Matrix | Carrier name UPS

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐		
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☐	Not Shipped ☑	
Custody seals intact on sample bottles?	Yes ☑	No ☐	N/A ☐		
Chain of custody present?	Yes ☑	No ☐			
Chain of 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? *4° C ± 2 Acceptable* If given sufficient time to cool.

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

CHAIN-OF-CUSTODY RECORD

Accreditation Applied: NELAC ☐ USACE ☐ Other:

Client: SAN Juan Refining

Project Name: Stock Pile

Address: # 50 Rd 4990
Bloomfield, NM 87413

Project #:

Project Manager:

Phone #: 505-632-4161

Fax #: 505-632-3911

Sampler: Randy Schmaltz

Sample Temperature: Cindy Hurtado

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative HgCl2	Preservative HNO3	Preservative	HEAL No.
2/09/05	330p	Soil	0' to 300'	1-4 oz				0502121
2/10/05	200p	"	300' to 600'	"				-2
2/10/05	215p	"	600' to 900'	"				-3

Date	Time	Relinquished By: (Signature)	Received By: (Signature)
2/10/05	240pm	Cindy Hurtado	2/11/05 1573
Date:	Time:	Relinquished By: (Signature)	Received 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

ANALYSIS REQUEST

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)					Air Bubbles or Headspace (Y or N)
		X														
		X														
		X														

Remarks:

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

March 04, 2005

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

RE: Stockpile

Order No.: 0502235

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 1 sample on 2/24/2005 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

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

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

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Hall Environmental Analysis Laboratory

Date: *04-Mar-05*

CLIENT:	San Juan Refining	**Client Sample ID:**	900'-1200'
Lab Order:	0502235	**Collection Date:**	~~2/22/2005~~ 2:45:00 PM
Project:	Stockpile		
Lab ID:	0502235-01	**Matrix:**	SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE ORGANICS						Analyst: SCC
Diesel Range Organics (DRO)	11	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 RANGE						Analyst: NSB
Gasoline Range Organics (GRO)	40	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
Ethylbenzene	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

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Hall Environmental Analysis Laboratory

Date: *04-Mar-05*

CLIENT: San Juan Refining
Work Order: 0502235
Project: Stockpile

QC SUMMARY REPORT
Method Blank

Sample ID MB-7480	Batch ID: 7480	Test Code: SW8015	Units: mg/Kg	Analysis Date 2/25/2005 8:20:27 AM	Prep Date 2/24/2005
Client ID:		Run ID: FID(17A) 2_050225A		SeqNo: 341574	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10									
Motor Oil Range Organics (MRO)	ND	50									
Surr: DNOP	9.539	0	10	0	95.4	60	124	0			

Sample ID MB-7477	Batch ID: 7477	Test Code: SW8015	Units: mg/Kg	Analysis Date 2/28/2005 8:22:47 PM	Prep Date 2/24/2005
Client ID:		Run ID: PIDFID_050228A		SeqNo: 341948	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5									
Surr: BFB	977.6	0	1000	0	97.8	78.3	120	0			

Sample ID MB-7477	Batch ID: 7477	Test Code: SW8021	Units: mg/Kg	Analysis Date 2/28/2005 8:22:47 PM	Prep Date 2/24/2005
Client ID:		Run ID: PIDFID_050228A		SeqNo: 341961	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	0.1									
Benzene	ND	0.025									
Toluene	ND	0.025									
Ethylbenzene	ND	0.025									
Xylenes, Total	ND	0.025									
Surr: 4-Bromofluorobenzene	0.9725	0	1	0	97.2	87.4	116	0			

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

CLIENT: San Juan Refining
Work Order: 0502235
Project: Stockpile

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID LCS-7480	Batch ID: 7480	Test Code: SW8015	Units: mg/Kg	Analysis Date 2/25/2005 8:51:03 AM	Prep Date 2/24/2005
Client ID:		Run ID: FID(17A) 2_050225A		SeqNo: 341581	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	52.98	10	50	0	106	67.4	117	0			

Sample ID LCSD-7480	Batch ID: 7480	Test Code: SW8015	Units: mg/Kg	Analysis Date 2/25/2005 9:20:39 AM	Prep Date 2/24/2005
Client ID:		Run ID: FID(17A) 2_050225A		SeqNo: 341585	

Analyte	Result	PQL	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: SW8015	Units: mg/Kg	Analysis Date 2/28/2005 8:52:42 PM	Prep Date 2/24/2005
Client ID:		Run ID: PIDFID_050228A		SeqNo: 341949	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24.7	5	25	0	98.8	84	120	0			

Sample ID LCS-7477	Batch ID: 7477	Test Code: SW8021	Units: mg/Kg	Analysis Date 2/28/2005 8:52:42 PM	Prep Date 2/24/2005
Client ID:		Run ID: PIDFID_050228A		SeqNo: 341962	

Analyte	Result	PQL	SPK value	SPK Ref Val	%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			
Ethylbenzene	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	0			

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

1

Hall Environmental Analysis Laboratory

Sample Receipt Checklist

Client Name SJR | Date and Time Received: 2/24/2005

Work Order Number 0502235 | Received by AT

Checklist completed by _____ 2/24/05
Signature | Date

Matrix | Carrier name UPS

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑	Not Shipped ☐
Custody seals intact on sample bottles?	Yes ☑	No ☐	N/A ☐	
Chain of custody present?	Yes ☑	No ☐		
Chain of 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 Acceptable* If given sufficient time to cool.

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

CHAIN-OF-CUSTODY RECORD

QA / QC Package:
Std ☐ Level 4 ☐
Other:

Client: SAN Juan Refining

Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4161

Fax #: 505-632-3911

Project Name: Stock Pile

Project #:

Project Manager: Cinda Hurtado

Sampler: Randy Schmaltz

Sample Temperature: 2°

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

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)				Air Bubbles or Headspace (Y or N)
2/22/05	245pm	Soil	900'-1200'	1-4oz			0502351	X		X													

Remarks:

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
2/23/05	315pm	Cinda Hurtado	2/24/05 1308
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

March 17, 2005

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

RE: Stockpile

Order No.: 0503084

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 3 samples on 3/8/2005 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

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

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

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

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.

Hall Environmental Analysis Laboratory

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 RANGE 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 RANGE						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

Hall Environmental Analysis Laboratory

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	Qual	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 RANGE						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

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range

Hall Environmental Analysis Laboratory

Date: *17-Mar-05*

CLIENT:	San Juan Refining	Client Sample ID:	2300-2600
Lab Order:	0503084	Collection Date:	3/6/2005 2:00:00 PM
Project:	Stockpile		
Lab ID:	0503084-03	Matrix:	SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE ORGANICS						Analyst: SCC
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	3/15/2005 4:13:05 PM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	3/15/2005 4:13:05 PM
Surr: DNOP	110	60-124		%REC	1	3/15/2005 4:13:05 PM
EPA METHOD 8015B: GASOLINE RANGE						Analyst: NSB
Gasoline Range Organics (GRO)	7.4	5.0		mg/Kg	1	3/10/2005 6:02:12 PM
Surr: BFB	103	78.3-120		%REC	1	3/10/2005 6:02:12 PM
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	3/10/2005 6:02:12 PM
Toluene	ND	0.025		mg/Kg	1	3/10/2005 6:02:12 PM
Ethylbenzene	ND	0.025		mg/Kg	1	3/10/2005 6:02:12 PM
Xylenes, Total	0.079	0.025		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

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
Work Order: 0503084
Project: Stockpile

QC SUMMARY REPORT
Method Blank

Sample ID MB-7553	Batch ID: 7553	Test Code: SW8015	Units: mg/Kg	Analysis Date 3/11/2005 7:12:31 PM	Prep Date 3/10/2005
Client ID:		Run ID: FID(17A) 2_050310A		SeqNo: 344498	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10									
Motor Oil Range Organics (MRO)	ND	50									
Surr: DNOP	9.977	0	10	0	99.8	60	124	0			

Sample ID MB-7545	Batch ID: 7545	Test Code: SW8015	Units: mg/Kg	Analysis Date 3/10/2005 3:30:27 PM	Prep Date 3/9/2005
Client ID:		Run ID: PIDFID_050310A		SeqNo: 343992	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5									
Surr: BFB	946.3	0	1000	0	94.6	78.3	120	0			

Sample ID MB-7545	Batch ID: 7545	Test Code: SW8021	Units: mg/Kg	Analysis Date 3/10/2005 3:30:27 PM	Prep Date 3/9/2005
Client ID:		Run ID: PIDFID_050310A		SeqNo: 343960	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.025									
Toluene	ND	0.025									
Ethylbenzene	ND	0.025									
Xylenes, Total	ND	0.025									
Surr: 4-Bromofluorobenzene	0.9907	0	1	0	99.1	87.4	116	0			

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

Hall Environmental Analysis Laboratory

Date: *17-Mar-05*

CLIENT: San Juan Refining
Work Order: 0503084
Project: Stockpile

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID LCS-7553	Batch ID: 7553	Test Code: SW8015	Units: mg/Kg	Analysis Date 3/11/2005 7:42:07 PM	Prep Date 3/10/2005
Client ID:		Run ID: FID(17A) 2_050310A		SeqNo: 344499	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	51.43	10	50	0	103	67.4	117	0			

Sample ID LCSD-7553	Batch ID: 7553	Test Code: SW8015	Units: mg/Kg	Analysis Date 3/15/2005 1:05:20 PM	Prep Date 3/10/2005
Client ID:		Run ID: FID(17A) 2_050315A		SeqNo: 344580	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	57.01	10	50	0	114	67.4	117	51.43	10.3	17.4	

Sample ID LCS-7545	Batch ID: 7545	Test Code: SW8015	Units: mg/Kg	Analysis Date 3/10/2005 4:00:50 PM	Prep Date 3/9/2005
Client ID:		Run ID: PIDFID_050310A		SeqNo: 343993	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24.13	5	25	0	96.5	84	120	0			

Sample ID LCSD-7545	Batch ID: 7545	Test Code: SW8015	Units: mg/Kg	Analysis Date 3/10/2005 4:31:17 PM	Prep Date 3/9/2005
Client ID:		Run ID: PIDFID_050310A		SeqNo: 343994	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24.97	5	25	0	99.9	84	120	24.13	3.42	11.6	

Sample ID GRO lcs 2.5ug	Batch ID: 7545	Test Code: SW8015	Units: mg/Kg	Analysis Date 3/11/2005 3:53:36 PM	Prep Date
Client ID:		Run ID: PIDFID_050311A		SeqNo: 344199	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	22.54	5	25	0	90.2	84	120	0			

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

CLIENT: San Juan Refining
Work Order: 0503084
Project: Stockpile

QC SUMMARY REPORT
Laboratory Control Spike - generic

Sample ID LCS-7545 | Batch ID: 7545 | Test Code: SW8021 | Units: mg/Kg | Analysis Date 3/10/2005 4:00:50 PM | Prep Date 3/9/2005
Client ID: | Run ID: PIDFID_050310A | SeqNo: 343962

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	0.4062	0.025	0.42	0	96.7	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	106	86.9	112	0			

Sample ID LCSD-7545 | Batch ID: 7545 | Test Code: SW8021 | Units: mg/Kg | Analysis Date 3/10/2005 4:31:17 PM | Prep Date 3/9/2005
Client ID: | Run ID: PIDFID_050310A | SeqNo: 343969

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	0.3958	0.025	0.42	0	94.2	83.4	113	0.4062	2.59	27	
Toluene	2.015	0.025	1.9	0	106	86.3	118	2.083	3.35	19	
Ethylbenzene	0.384	0.025	0.41	0	93.7	81.7	113	0.3847	0.167	10	
Xylenes, Total	1.967	0.025	1.9	0	104	86.9	112	2.005	1.89	13	

Sample ID BTEX lcs 100ng | Batch ID: 7545 | Test Code: SW8021 | Units: mg/Kg | Analysis Date 3/11/2005 4:23:49 PM | Prep Date
Client ID: | Run ID: PIDFID_050311A | SeqNo: 344196

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	1.013	0.025	1	0	101	83.4	113	0			
Toluene	1.023	0.025	1	0	102	86.3	118	0			
Ethylbenzene	1.011	0.025	1	0	101	81.7	113	0			
Xylenes, Total	3.033	0.025	3	0	101	86.9	112	0			

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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 Blank
J - Analyte detected below quantitation limits | R - RPD outside accepted recovery limits

Hall Environmental Analysis Laboratory

Sample Receipt Checklist

Client Name SJR | Date and Time Received: 3/8/2005

Work Order Number 0503084 | Received by AT

Checklist completed by _____ 3/8/05
Signature | Date

Matrix | Carrier name | Client drop-off

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? 3° *4° C ± 2 Acceptable* If given sufficient time to cool.

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

_____

_____

_____

_____

Corrective Action _____

_____

_____

CHAIN-OF-CUSTODY RECORD

Accreditation Applied:
NELAC ☐ USACE ☐
Other:

Client: San Juan Refining

Address: 50 Road 4990
Bloomfield, NM
87413

Phone #: 505-632-4161
Fax #: 505-632-3911

Project Name: Stock Pile

Project #:

Project Manager:

Sampler: Randy Schmaltz

Sample Temperature: 3

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	HEAL No.
3/05/05	220pm	Soil	1500-1800	1-40m			0503084-1
3/06/05	230pm	"	1800-2100	"			-2
3/07/05	2pm	"	2300-2600	"			-3

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
3/21/05	3pm	Mary Hurtado	3/8/05 1437
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks:

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

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_2, NO_3, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)					Air Bubbles or Headspace (Y or N)
X		X														
X		X														
X		X														

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

March 24, 2005

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

RE: Stockpile

Order No.: 0503184

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 1 sample on 3/18/2005 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

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

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

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Hall Environmental Analysis Laboratory

Date: *24-Mar-05*

CLIENT:	San Juan Refining	**Client Sample ID:**	2100'-2300'
Lab Order:	0503184	**Collection Date:**	3/16/2005 9:00:00 AM
Project:	Stockpile		
Lab ID:	0503184-01	**Matrix:**	SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 418.1: TPH						Analyst: JT
Petroleum 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

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Hall Environmental Analysis Laboratory

Date: *24-Mar-05*

CLIENT: San Juan Refining
Work Order: 0503184
Project: Stockpile

QC SUMMARY REPORT
Method Blank

Sample ID MB-7613	Batch ID: 7613	Test Code: E418.1	Units: mg/Kg	Analysis Date 3/21/2005	Prep Date 3/21/2005
Client ID:		Run ID: BUCK IR_050321A		SeqNo: 346101	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Petroleum Hydrocarbons, TR	ND	20									

Sample ID MB-7609	Batch ID: 7609	Test Code: SW8021	Units: mg/Kg	Analysis Date 3/23/2005 10:42:54 AM	Prep Date 3/21/2005
Client ID:		Run ID: PIDFID_050323A		SeqNo: 346735	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	0.1									
Benzene	ND	0.025									
Toluene	ND	0.025									
Ethylbenzene	ND	0.025									
Xylenes, Total	ND	0.025									
Surr: 4-Bromofluorobenzene	1.03	0	1	0	103	87.4	116	0			

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

CLIENT: San Juan Refining
Work Order: 0503184
Project: Stockpile

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID LCS-7613	Batch ID: 7613	Test Code: E418.1	Units: mg/Kg	Analysis Date 3/21/2005	Prep Date 3/21/2005
Client ID:		Run ID: BUCK IR_050321A		SeqNo: 346102	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD 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	Units: mg/Kg	Analysis Date 3/21/2005	Prep Date 3/21/2005
Client ID:		Run ID: BUCK IR_050321A		SeqNo: 346105	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Petroleum Hydrocarbons, TR	99	20	100	0	99.0	82	114	92	7.33	20	

Sample ID LCS-7609	Batch ID: 7609	Test Code: SW8021	Units: mg/Kg	Analysis Date 3/23/2005 11:12:58 AM	Prep Date 3/21/2005
Client ID:		Run ID: PIDFID_050323A		SeqNo: 346736	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	0.4093	0.025	0.42	0	97.5	83.4	113	0			
Toluene	2.071	0.025	1.9	0	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			

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

I

Hall Environmental Analysis Laboratory

Sample Receipt Checklist

Client Name SJR | Date and Time Received: 3/18/2005

Work Order Number 0503184 | Received by AT

Checklist completed by _____ 3/18/05
Signature | Date

Matrix | Carrier name UPS

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	
Custody seals intact on shipping container/cooler?	Yes ☐	No ☑	Not Present ☐	Not Shipped ☐
Custody seals intact on sample bottles?	Yes ☑	No ☐	N/A ☐	
Chain of custody present?	Yes ☑	No ☐		
Chain of 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* If given sufficient time to cool.

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

CHAIN-OF-CUSTODY RECORD

QA / QC Package:
Std ☐ Level 4 ☐
Other:

Client: San Juan Refining
Address: #50 Rd 4990
Bloomfield, NM
87413
Phone #: 505-632-4161
Fax #: 505-632-3911

Project Name: Stock Pile
Project #:
Project Manager:
Sampler: Cindy Hurtado
Sample Temperature: 1°

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	HEAL No.
3/16/05	9AM	Soil	2100-2300'	1-4oz			0503184-1

Date	Time	Relinquished By: (Signature)	Received By: (Signature)
3/17/05	9AM	Cindy Hurtado	3/17/05 1600
Date:	Time:	Relinquished By: (Signature)	Received 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

ANALYSIS REQUEST

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)					Air Bubbles or Headspace (Y or N)
X			X													

Remarks:

APPENDIX G

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

GIANT
REFINING COMPANY

March 7, 2005

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

Re: Giant Bloomfield Refinery
North Boundary Barrier Collection System Design and Monitoring Plan

Dear Mr. Price:

Giant Refining Company Bloomfield (GRCB) is submitting for your review and approval the design of a collection and monitoring system to be installed along the north boundary barrier at the Giant Refinery in Bloomfield, New Mexico. GRCB received OCD's conditional approval (dated December 17, 2004) of the November 17, 2004 *Corrective Action Plan* (CAP) submitted by GRCB. The CAP describes the voluntary corrective measures to be implemented by GRCB at the Bloomfield refinery. Included in the CAP are a layout of the barrier wall and a conceptual description of a fluid collection system. The purpose of this letter is to submit the design of a collection and monitoring system and an estimated schedule for installation of the selected system.

Giant entered into a contract with Remedial Construction Services, L.P. (RECON) to construct the north boundary barrier. RECON mobilized to the Bloomfield refinery the week of January 17, 2005. The barrier construction began January 31, 2005 at the west end of the alignment and is proceeding easterly. As of February 25. 2005. approximately 1,100 feet of the barrier had been constructed. Construction is anticipated to be completed in early April 2005.

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

PHONE
505-632-8013
FAX
505-632-3911

50 ROAD 4990
P.O. BOX 159
BLOOMFIELD
NEW MEXICO
87413

Formation, the fluids will tend to accumulate in the depressions or troughs of the Nacimiento Formation, resulting in groundwater movement from the higher elevations of the formation to the lower depressions. As such, fluids collection points will be located in the significant formation depressions (as logged in the field during barrier construction). Fluids accumulation along portions of the barrier between those depressions is expected to be limited. However, observation wells will be installed at appropriate intervals between collection points to assess fluids behavior along the barrier.

Two types of systems were considered to collect and remove fluids that accumulate behind the barrier: 1) collection trenches, and 2) conventional vertical wells.

Collection trenches are typically used in soil conditions where an area of increased permeability is required to allow fluids to accumulate for subsequent removal. Since the JLT deposit (which overlies the Nacimiento Formation) has a high permeability, an engineered collection trench would not offer a benefit over the natural granular soil adjacent to the barrier. Further, there is limited construction space available between the barrier wall and the Hammond Ditch concrete liner (i.e., only 5 to 6 feet). Therefore, GRBC proposes to install vertical collection wells to collect and remove fluids. Initially, wells will be located at significant troughs (as identified in the field during barrier construction) in the Nacimiento Formation. Additional collection wells may be added along the barrier (if necessary) as operational experience is gained.

Each collection well will have a corresponding observation well located on the river side of the barrier. The observation wells will be monitored periodically to assess that the barrier is preventing fluids from migrating toward the river bluff. Additional pairs of observation wells will be installed along the barrier (i.e., between collection points) as necessary to limit the maximum spacing of observation locations to approximately 300 feet.

The installation of the collection and observation wells will be completed in two phases:

- Phase I will involve the installation of collection wells along the western half of the barrier (i.e., the portion constructed to date) and at the pipeline ROW crossing. A total of 11 collection wells will be installed during Phase I. GRBC plans to initiate Phase I during the week of March 28, 2005.
- Phase II will be implemented within 30 days after the barrier wall construction is completed. This will include installing collection wells along the remainder of the barrier wall alignment. The location of these collection wells will be determined based on logging of the top of the Nacimiento Formation during the remainder of the barrier construction. Phase II will also include the installation of the observation wells on the river side of the barrier and any additional observation well pairs in between collection points.

Collection System Design

1. Collection Well Design

The collection wells will be installed using the hollow stem auger drilling method. The wells will consist of a six-inch diameter PVC well casing and machine-slotted screen. The diameter of the borehole will be approximately 13-inches. Based on review of sieve analyses performed on the JLT deposits, the well screen slot size will be 0.040 inch. The depth of each well will be dependent on the depth to the top of the Nacimiento Formation at each location. The bottom of each well will extend approximately one to two-feet into the Nacimiento Formation. The screened interval will extend from the Nacimiento Formation at the bottom, up to the top of the barrier wall, or to a maximum 10-foot screen length, which ever is less.

A permeable filter pack will be placed around the well screen. Based on sieve analyses as described above, the filter pack material will consist of Colorado # 10 X 20 silica sand. The filter pack size was selected to minimize the movement of formational fine-grained soils through the screen openings, but to also provide a moderate permeability for fluid movement into the well.

The well surface completion will include a flush-mounted, traffic-rated box. A generalized well construction diagram is shown on Figure 1.

2. Collection Well Spacing

Based on the hydraulic properties of the JLT deposits, which includes an estimated hydraulic conductivity of 100 to150 ft/day, it is estimated that a maximum effective well spacing is approximately 300 feet. Each six-inch well could potentially produce 20 to 50 gallons per minute, if required, although the JLT will likely produce less. The actual spacing of the wells will be governed by the locations of the troughs in the Nacimiento Formation.

3. Collection Well Locations

The proposed locations of the Phase I wells are shown on Figure 2. The locations correspond to the troughs in the Nacimiento Formation as shown on the barrier profile (Figure 3). The profile shows the elevation of the top of the Nacimiento Formation (in the western portion of the alignment), as determined during construction of the barrier wall. As shown on Figure 2, the proposed collection well locations for Phase I are located only along the western portion of the barrier alignment and at the pipeline ROW crossing. The proposed locations for Phase II collection wells will be submitted to NMED and OCD for approval at the end of barrier construction.

4. Fluid Removal Methods

Fluids will be removed from the collection wells using a vacuum truck when necessary based on fluid level monitoring results. Collected fluids will be delivered to the existing French Drain collection tank. If required based on operational experience, permanent collection pumps may be installed in certain collection wells at a later date.

Monitoring Plan

A monitoring plan will be implemented to monitor fluid levels on both sides of the barrier. The plan includes the installation of observation wells on the river side of the barrier, and monitoring of fluid levels in the collection and observation wells.

1. Observation Well Design:

All observation wells will be installed during Phase II. The observation wells will consist of 2-inch diameter PVC well casing and machine-slotted screen. The wells depths and screened intervals will be similar to the collection wells described above. The wells will extend slightly into the Nacimiento Formation. The screened interval will extend from the Nacimiento Formation at the bottom, up to the top of the barrier wall, or to a maximum 10-foot screen length, which ever is less. A typical observation well construction diagram is shown on Figure 4.

2. Observation Well Locations:

Observation wells will be installed on the opposite side of the barrier from each collection well. The observation wells will be located approximately 10 feet away from the barrier wall so as not to encroach on the Hammond Ditch service road. Additional pairs of observation wells will be installed along the barrier (i.e., between collection points) as necessary to limit the maximum spacing of observation locations to approximately 300 feet. A pair of observation wells will also be installed at each end of the barrier.

3. Proposed Monitoring Schedule:

Fluid levels in the Phase I collection wells will be monitored twice weekly for the first 30 days following their installation. The Phase II collection and observation wells will also be monitored twice weekly for the first 30 days following their installation. In each case, if field observations indicate conditions are stabilizing during the initial 30-day period, GRBC proposes to change to a weekly monitoring interval thereafter. GRBC will propose a long-term monitoring schedule to NMED and OCD 60 days after installation of the Phase II wells.

4. Reporting

Initially, a summary of the fluid level monitoring activities described in Item 3 will be submitted to NMED and OCD on a monthly basis. Any modifications to the reporting schedule will be proposed the agencies as part of the long-term monitoring plan.

We are looking forward to receiving your approval of this collection system design and monitoring plan. If you have any questions in this matter, please contact me at 505-632-4171.

Sincerely,

GIANT REFINING COMPANY

James R. Schmaltz
Environmental Manager

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

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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.

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

GIANT
REFINING COMPANY

CERTIFIED MAIL # 7099 3220 0010 2242 4757

April 7, 2005

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

Re: Giant Bloomfield Refinery
North Boundary Barrier Collection System Design and Monitoring Plan

Dear Mr. Price:

Giant Refining Company Bloomfield (GRCB) is submitting for your review and approval the attached two exhibits (Figures 2 and 3) depicting the locations of the collection and observation wells to be installed along the north boundary barrier at the Giant Refinery in Bloomfield, New Mexico. These exhibits include the Phase II wells described in the March 7, 2004 North Boundary Collection System Design and Monitoring Plan submitted to OCD.

All wells will be installed as described in the March 7, 2005 plan, with the exception that the collection well filter pack has changed to a 8 X 12 Colorado silica sand from the 10 X 40 Colorado silica sand stated in the March 7, 2005 plan. All other aspects of the plan remain the same.

We are looking forward to receiving your approval of the Phase II collection system design. If you have any questions in this matter, please contact me at 505-632-4171.

Sincerely,

GIANT REFINING 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

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GIANT
REFINING COMPANY

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

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the Corrective Action Plan (CAP, page 11). Please refer to this report for technical details.

As described in the March 7, 2005 plan, the well screen and spacing design for the collection wells include the design of a filter pack and the screen open area to accommodate dewatering of the subsurface. The collection well filter pack material has been revised to a "8 X 12" Colorado Silica filter pack. This has changed from the March 7, 2005 plan because the larger filter pack will provide a higher hydraulic conductivity than that originally specified. To maximize the amount of groundwater extraction from the Jackson Lake Terrace Deposits, a screen slot size of 0.040-inches was selected in order to provide approximately 10 gallons per minute (gpm) flow *per foot of screen.*

The spacing of the collection wells was selected to adequately intercept and dewater the shallow perched water. Note that the estimated quantity of groundwater flow beneath the facility to the barrier (total flow across the entire length) has been estimated to be on the order of 10 gpm (see CAP), which is minor compared to the extraction design capacity of each well. Although each well has more than adequate capacity, the barrier wall is approximately 2,600 feet in length and therefore a number of collection wells will be required and must be spaced accordingly to intercept and extract the groundwater moving to and accumulating against the barrier.

An analytical model was used to evaluate dewatering rates and assess adequate spacing between wells. The Theis Well equation was used to solve for drawdown in the extraction well and to estimate drawdown in adjacent extraction wells with one well pumping. The Theis equation is as follows:

$$s = \frac{Q}{4\pi T} W(u)$$

s = drawdown, in feet
Q = gpm
T = transmissivity (k x b), ft/day
W(u) = well function

The following parameters were used as inputs for the model:

Hydraulic Conductivity (k) 100- 150 feet per day (ft/d)
Specific yield 0.16
Aquifer Saturated Thickness (b) = 7 to 10 feet (ft)
Pumping Rate 10 to 50 gallons per minute (gpm)
Duration of pumping 1 to14 days

The model output provided groundwater elevation drawdown for multiple distances from the pumping well. As the distance from the pumping well increases, the relative percent drawdown away from the pumping decreases. A minimum 10% relative drawdown was targeted for the maximum distance between pumping wells. The results of the model

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 COMPANY

James R. Schmaltz
Environmental Manager

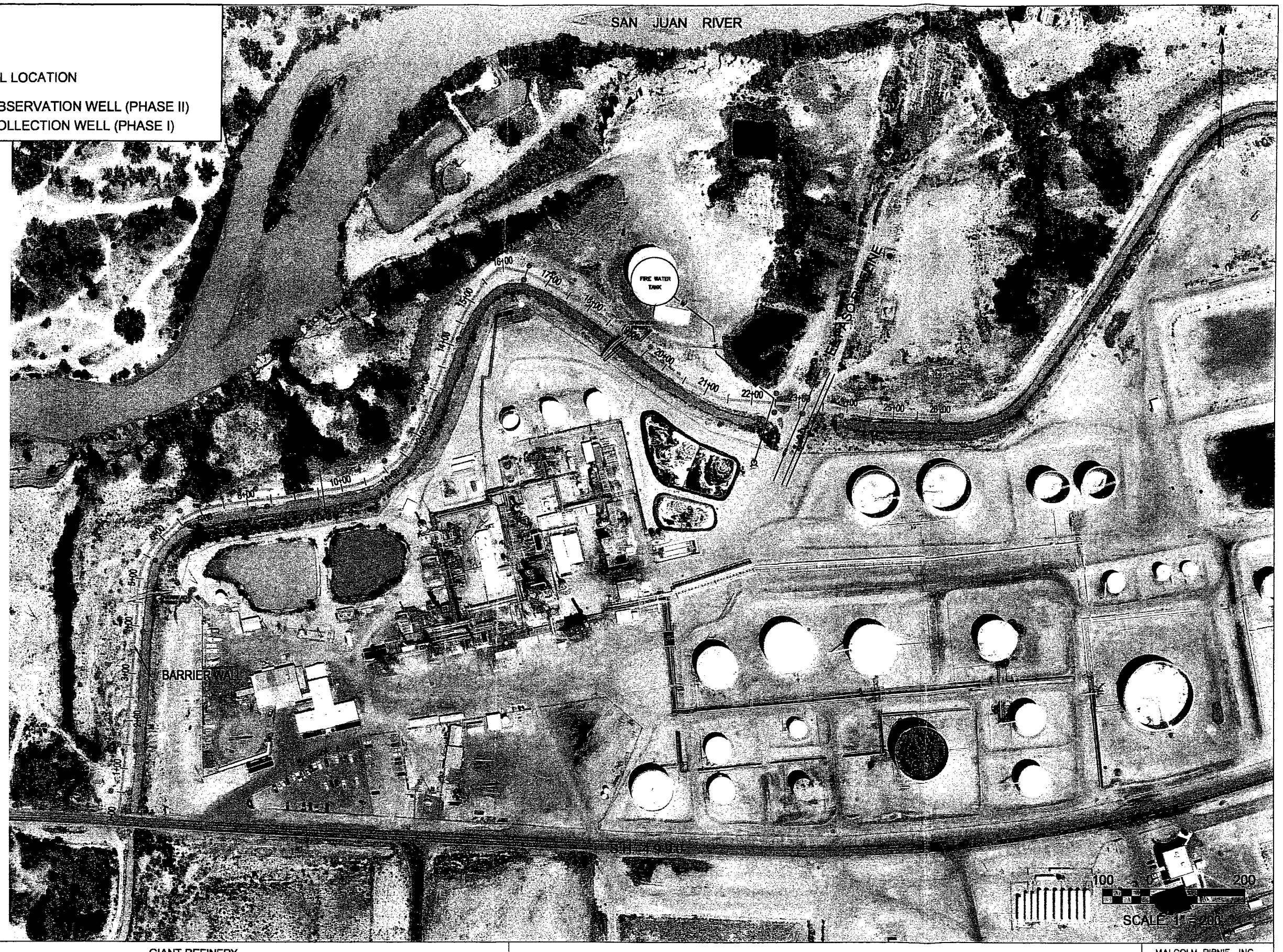
Cc: Denny Foust - OCD Aztec Office
Wayne Price - OCD
Bob Wilkinson – EPA
Ed Riege
Chad King

LEGEND:

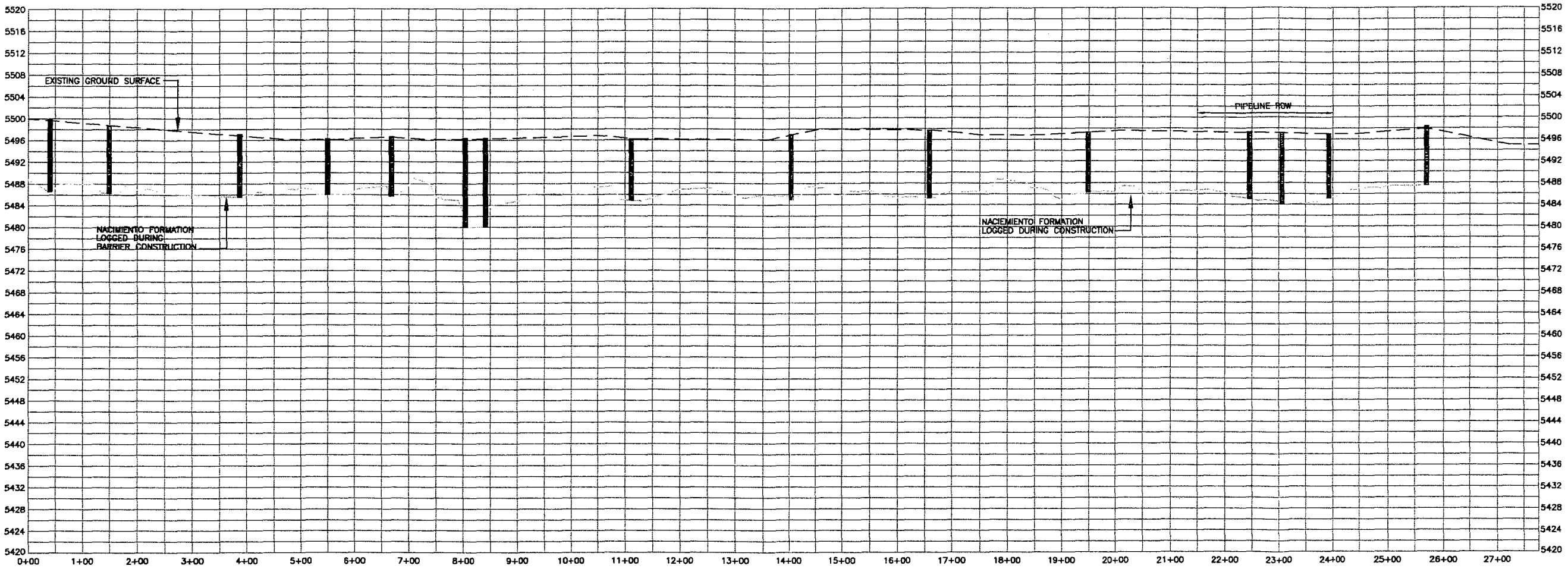
BARRIER WALL LOCATION

PROPOSED OBSERVATION WELL (PHASE II)

PROPOSED COLLECTION WELL (PHASE I)



MALCOLM PIRNIE	GIANT REFINERY BLOOMFIELD, NEW MEXICO CORRECTIVE ACTION PLAN	PHASE I AND II COLLECTION WELL LOCATIONS SCALE:1"=200'	MALCOLM PIRNIE, INC. MARCH 2005 FIGURE 2



NACIMIENTO SURFACE PROFILE

100 0 200

SCALE: 1" = 200'

MALCOLM PIRNIE	GIANT REFINERY BLOOMFIELD, NEW MEXICO COLLECTION SYSTEM PLAN	NORTH BOUNDARY BARRIER CROSS SECTION PHASE I AND II COLLECTION WELLS SCALE:1"=200'	MALCOLM PIRNIE, INC. MARCH 2005 FIGURE 3

State of New Mexico
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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.

- 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.

Should you have any questions regarding this letter, please call me at 505-428-2545.

Sincerely,

Hope Monzeglio

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

GIANT
REFINING COMPANY

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

Cindy Hurtado
Environmental Coordinator
Giant Refining – Bloomfield

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

ORIGINAL DOCUMENT LOCATED IN BARRIER WALL COLLECTION SYSTEM FILE

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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

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Giant
w/ Respond

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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.

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

Hope Monzeglio
Project Leader
Hazardous Waste Bureau

HM:hcm

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

Reading File and GRCB 2005 File

GIANT
REFINING COMPANY

Hope Monzeglio
New Mexico Environmental Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East
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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

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proportional to the concentration of dissolved oxygen. The Hach Spectrophotometer DR/2010 has been factory calibrated. This is a colormetric method therefore the sample is filtered and used to zero the instrument before adding the reagent.
Sample collection takes place after the well is sufficiently purged. Organic compounds or salts present in our groundwater possibly cause enough interference to skew the results. Groundwater color may also affect the results. The wells were remeasured during the Annual Sampling event with similar results as the last sampling event. These results will be included in the Annual Report.

4. The discrepancy occurred due to a typographical error. The Ultrameter 6P reads electrical conductance in micromhos per centimeter. The tables have been revised to include the correct units.

5. **Collection Methods**

At least three well volumes are purged from the well. Purge volumes are determined using the following equation:
Well Depth – Casing Height – Depth to Liquid X Conversion Factor X Three.
The conversion factor is determined by the diameter of the well casing.

Casing	Conversion Factor
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

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

BILL RICHARDSON
GOVERNOR

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.

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.

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
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

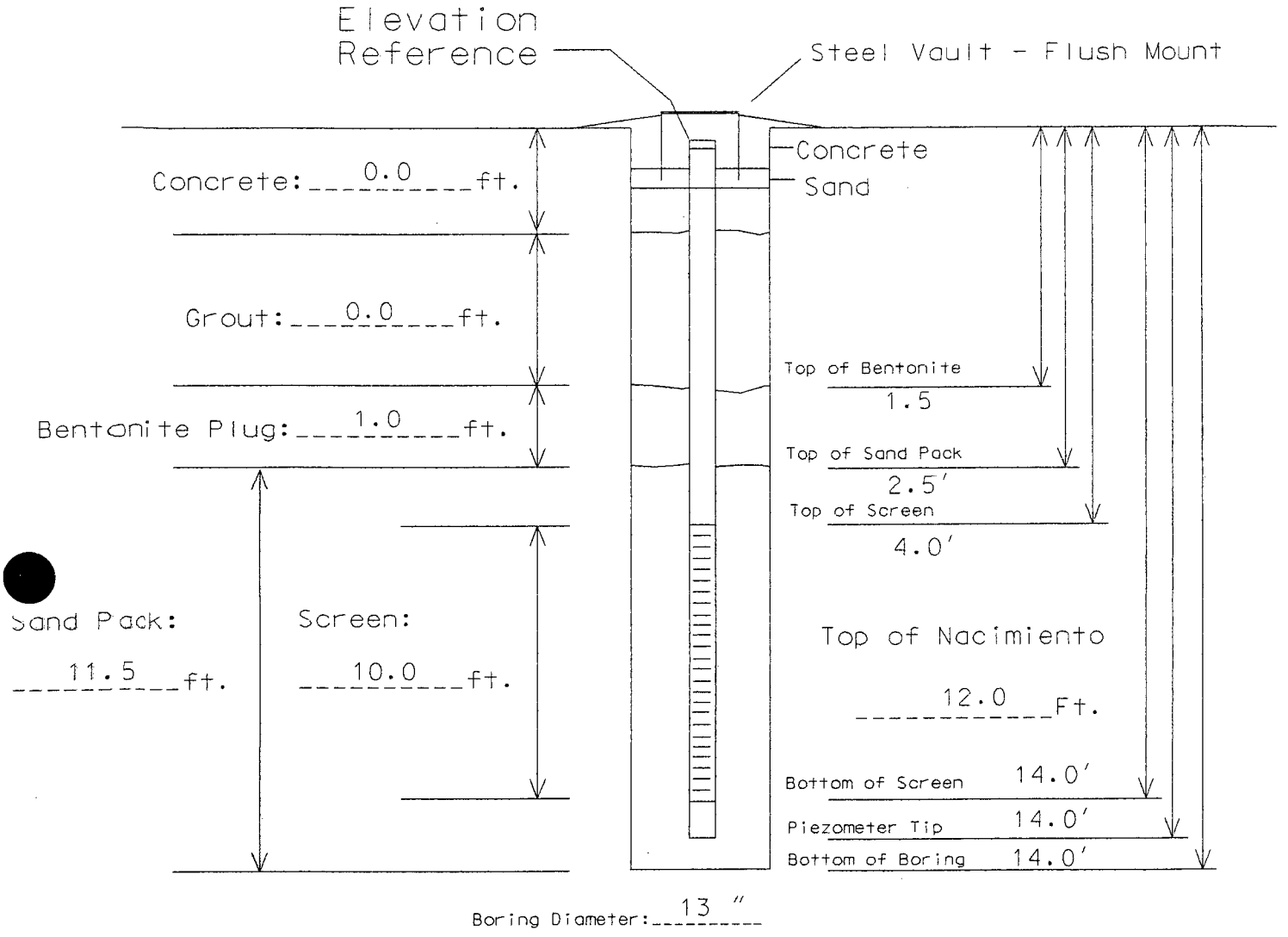
Observation and Collection Well Diagrams and Observation Well Logs

PRECISION ENGINEERING, INC.

505523-7674

Installation Diagram

Monitoring Well No. CW 0+60



Boring Diameter: 13 "

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

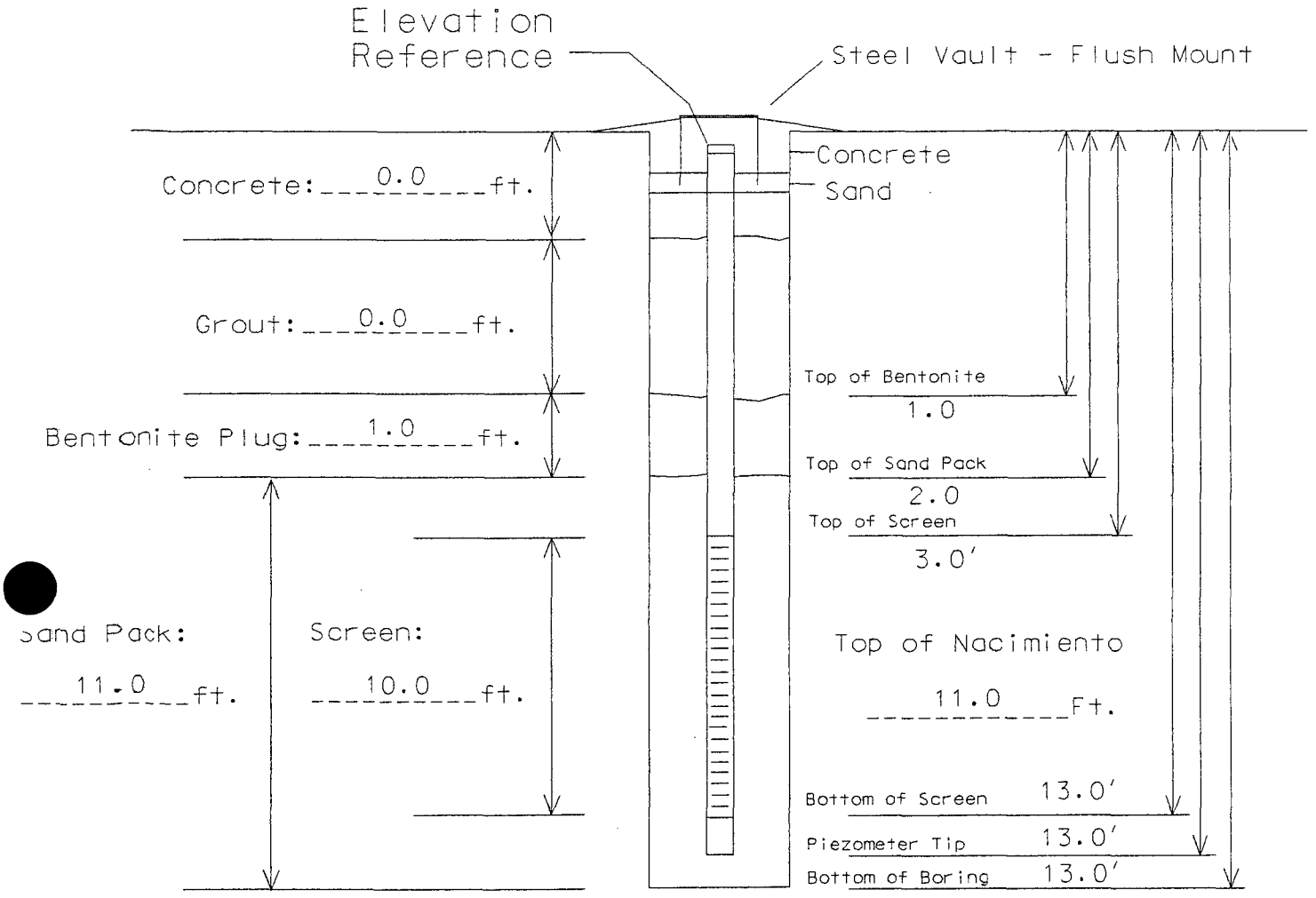
Project Name: Bloomfield Refinery

Elevation: TBS

PRECISION ENGINEERING, INC.
505-523-7674

Installation Diagram

Monitoring Well No. CW 1+50



Boring Diameter: 13 "

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

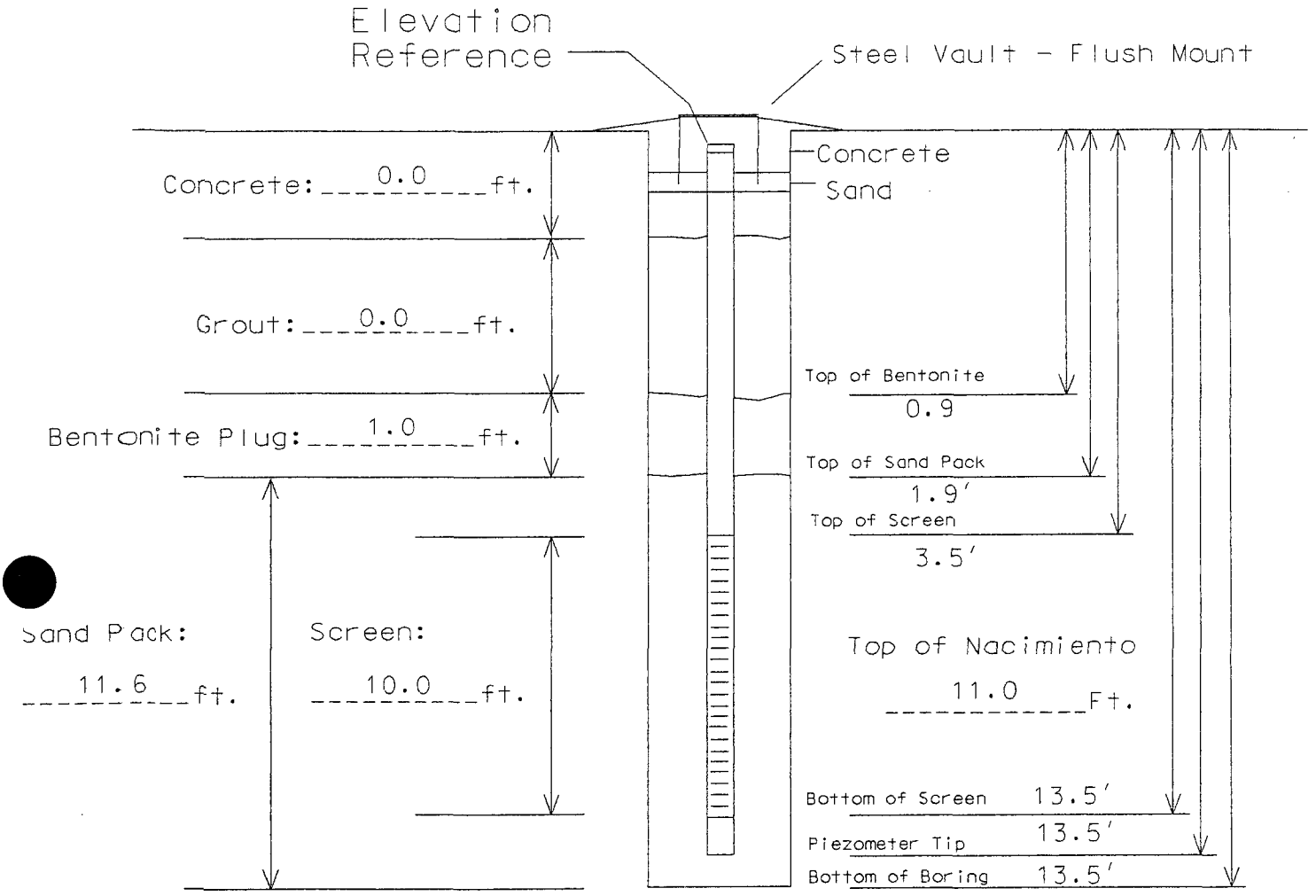
Project Name: Bloomfield Refinery

Elevation: TBS

PRECISION ENGINEERING, INC.
505-523-7674

Installation Diagram

Monitoring Well No. CW 3+85



Boring Diameter: 13 "

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

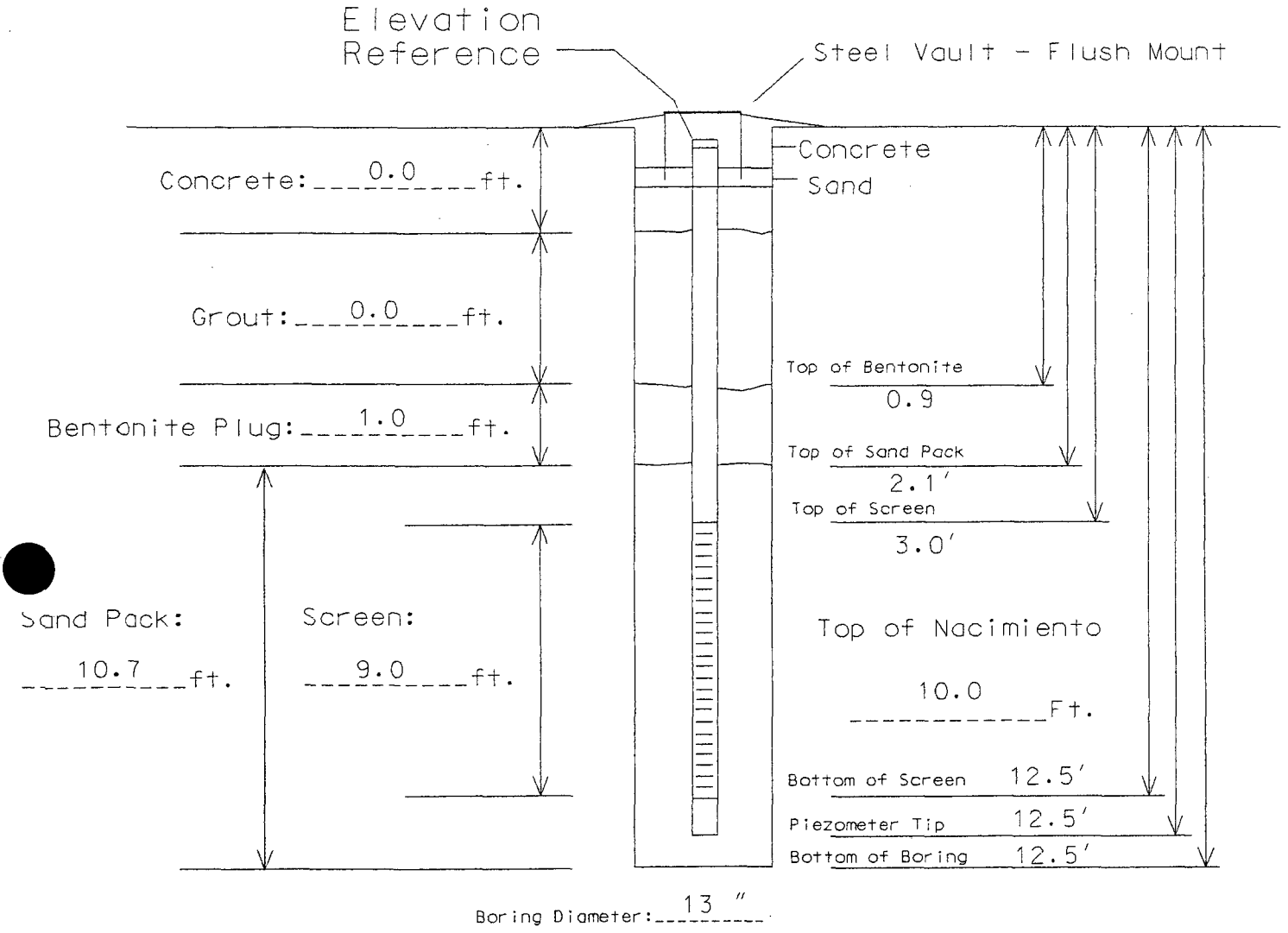
Project Name: Bloomfield Refinery

Elevation: TBS

PRECISION ENGINEERING, INC.
505-523-7674

Installation Diagram

Monitoring Well No. CW 5+50



Boring Diameter: 13 "

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

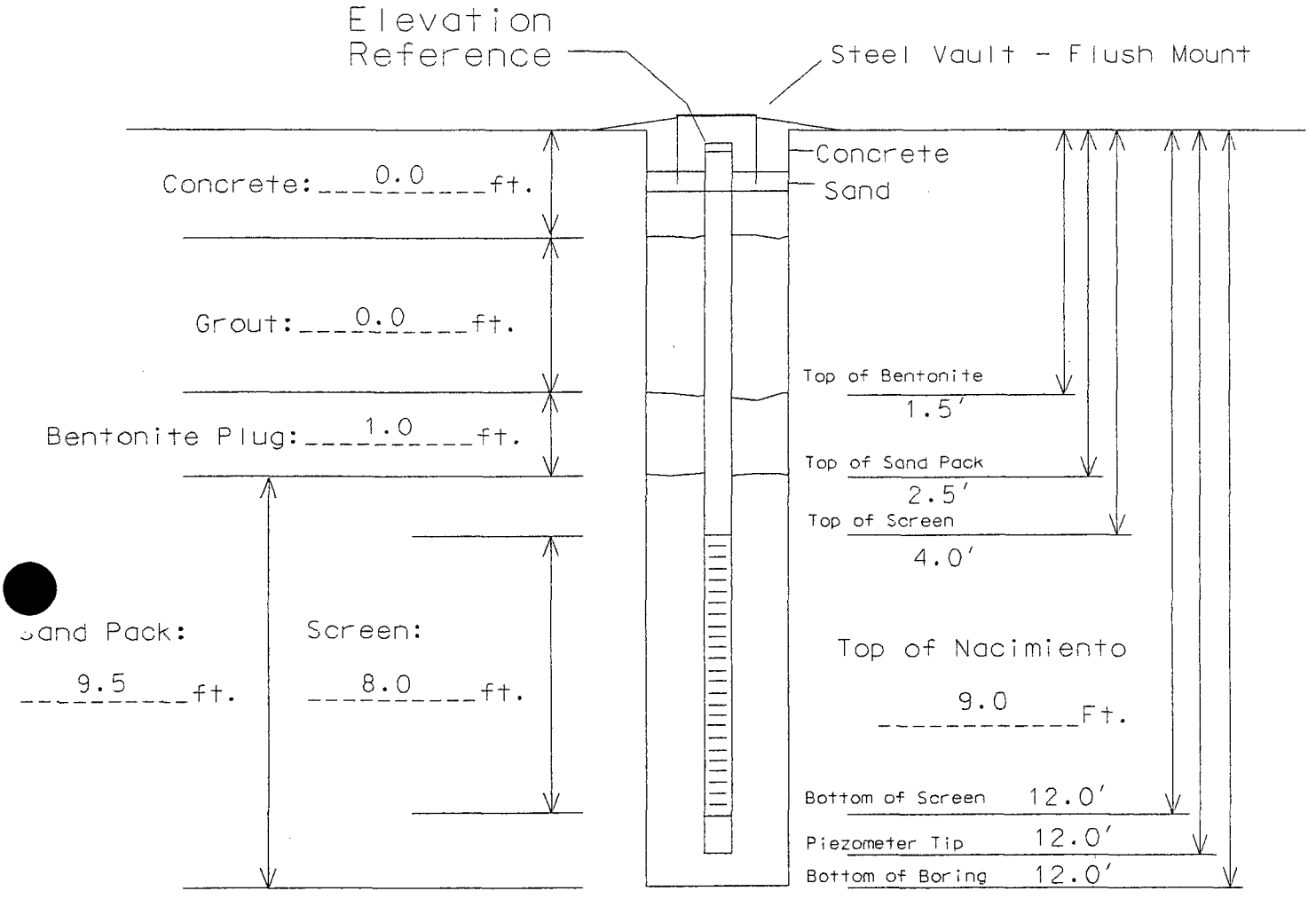
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. CW 6+70



Boring Diameter: 13 "

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

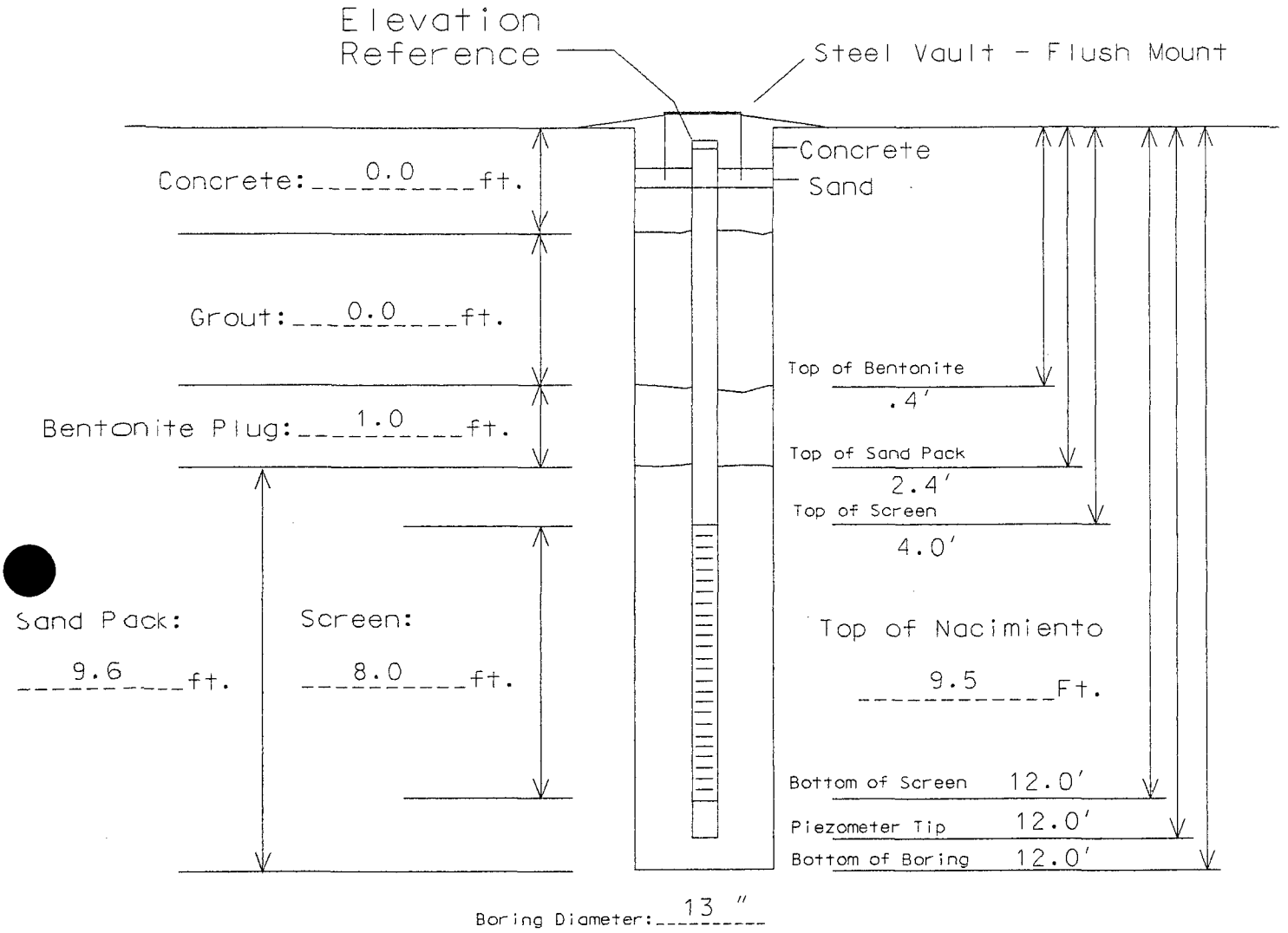
Elevation: TBS

PRECISION ENGINEERING, INC.

505-123-7674

Installation Diagram

Monitoring Well No. CW 8+10



Boring Diameter: 13 "

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

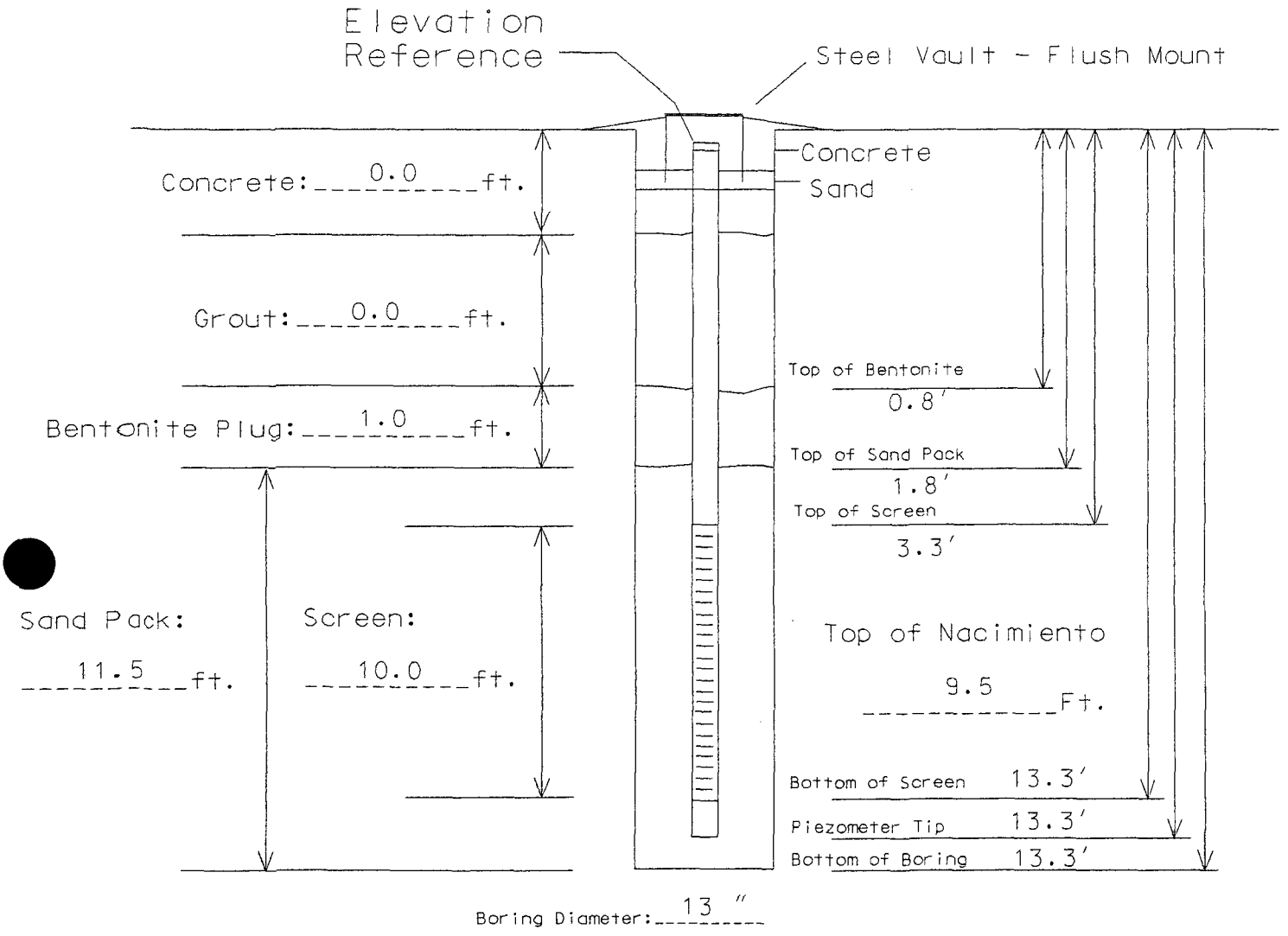
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. CW 8+45



Boring Diameter: 13 "

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

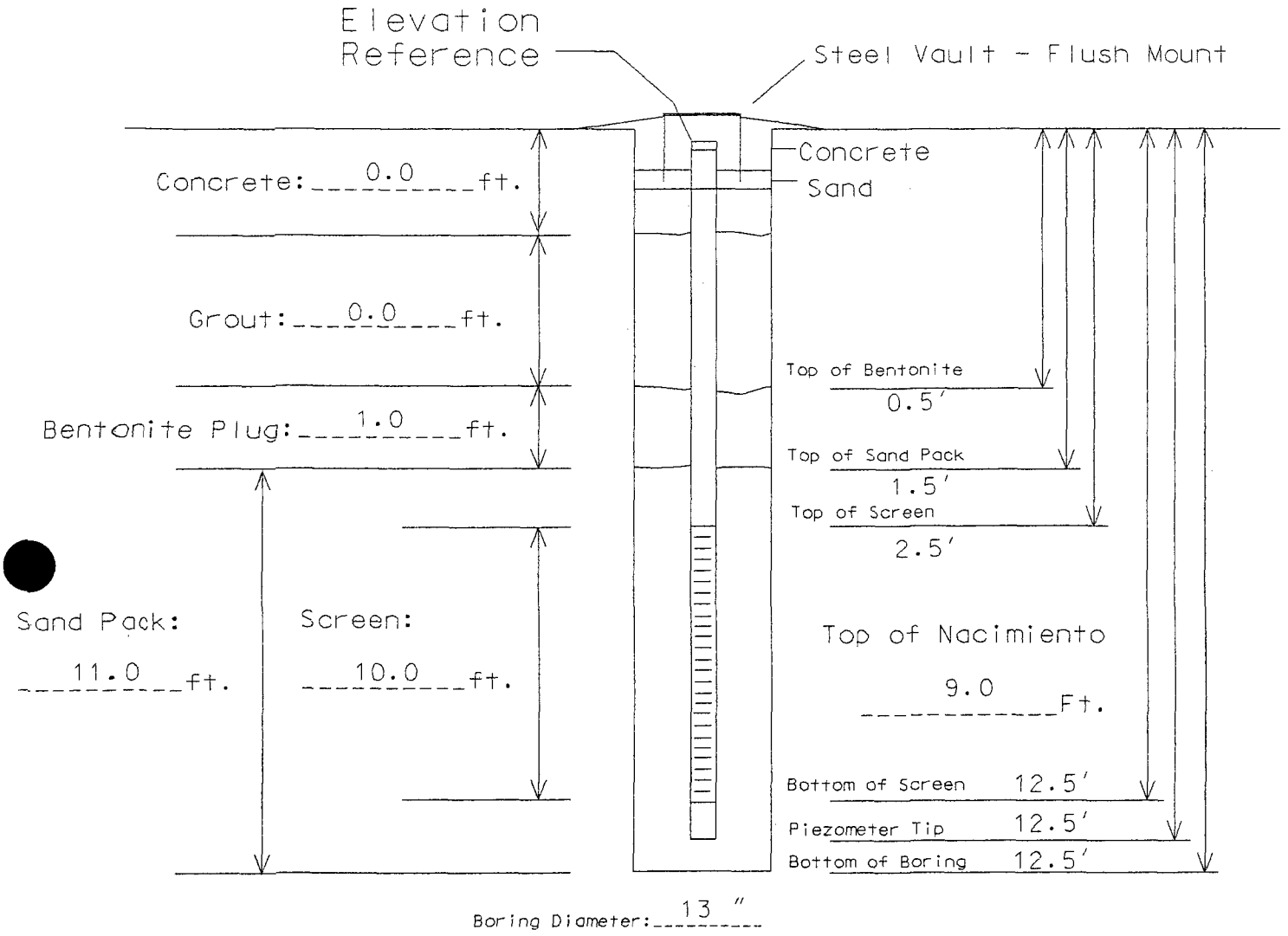
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. CW 11+15



Boring Diameter: 13 "

Sand Type: 10-20 Silica

Ballards, 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

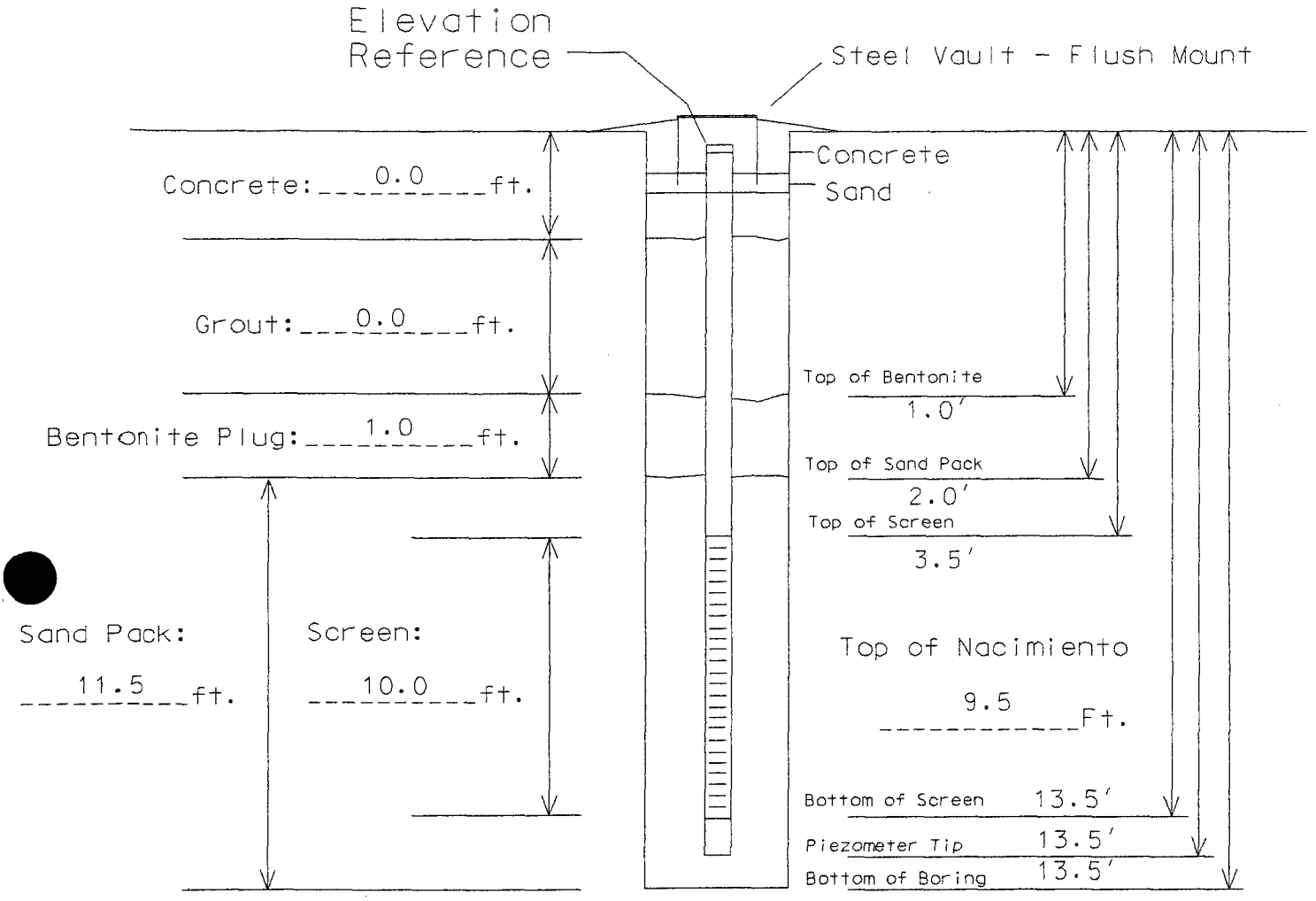
Project Name: Bloomfield Refinery

Elevation: TBS

PRECISION ENGINEERING, INC.
505-523-7674

Installation Diagram

Monitoring Well No. CW 14+10



Boring Diameter: 13 "

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

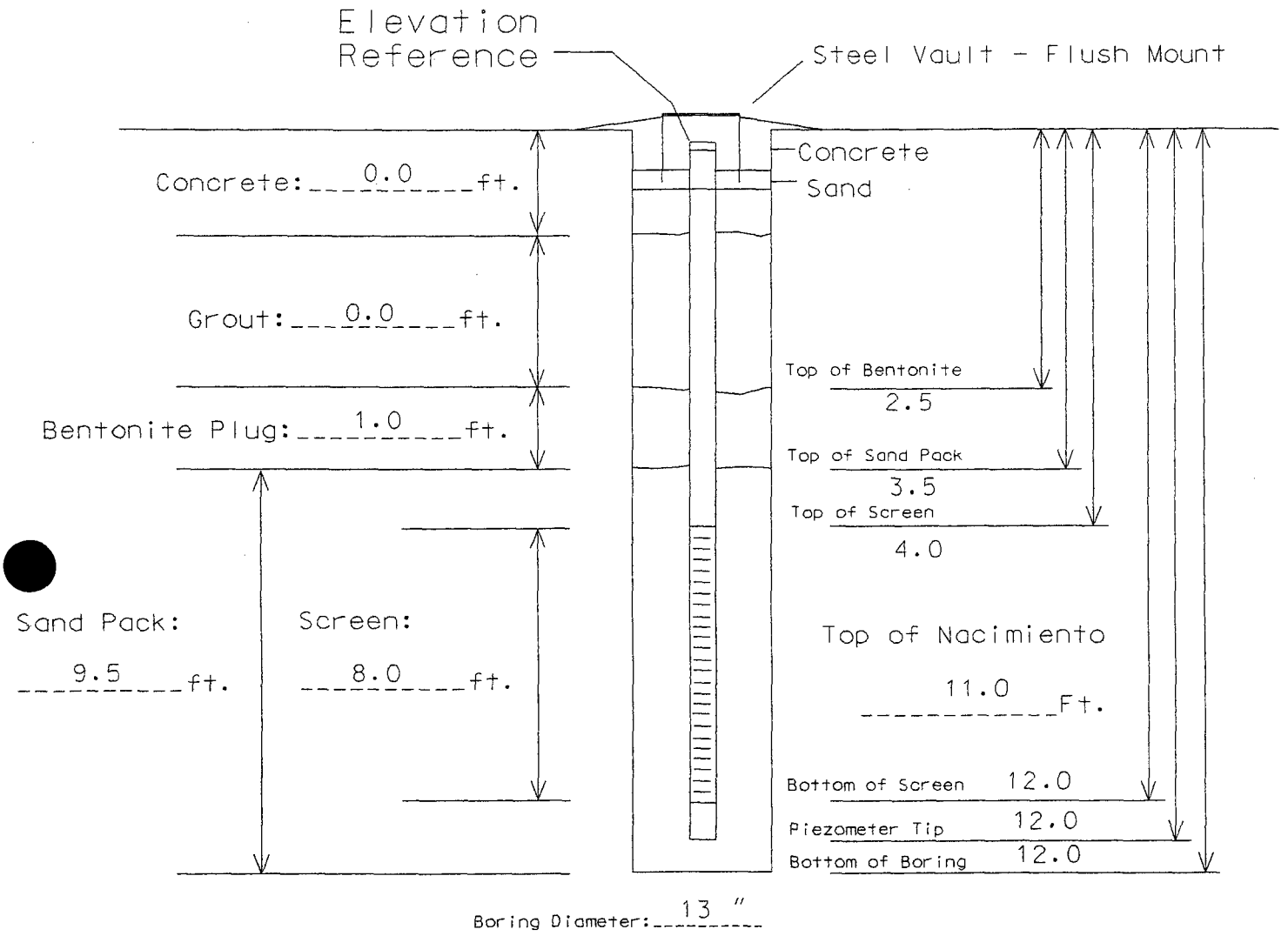
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. CW 23+90



Boring Diameter: 13 "

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

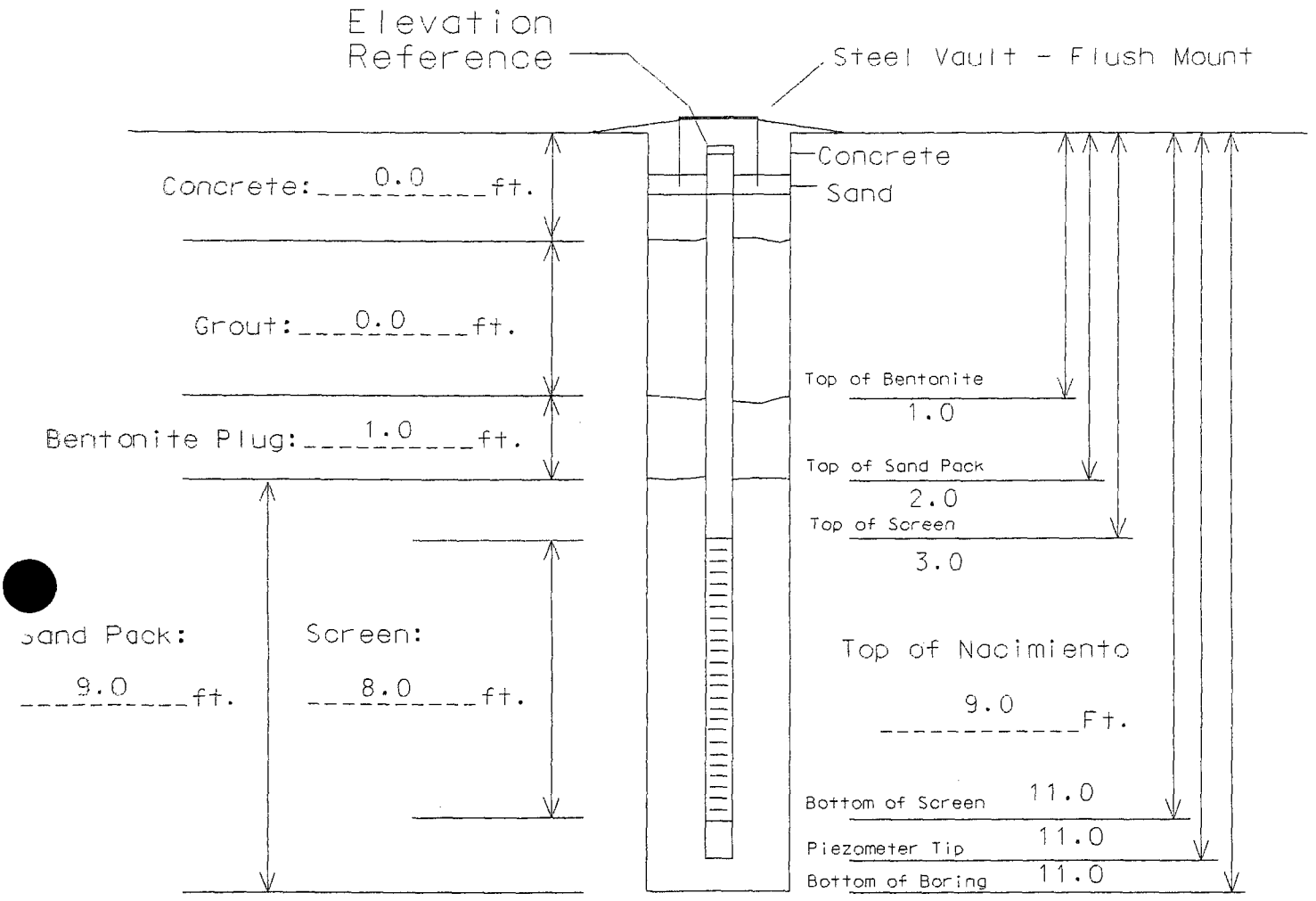
Project Name: Bloomfield Refinery

Elevation: TBS

PRECISION ENGINEERING, INC.
505-523-1674

Installation Diagram

Monitoring Well No. CW 25+95



Boring Diameter: 13 "

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

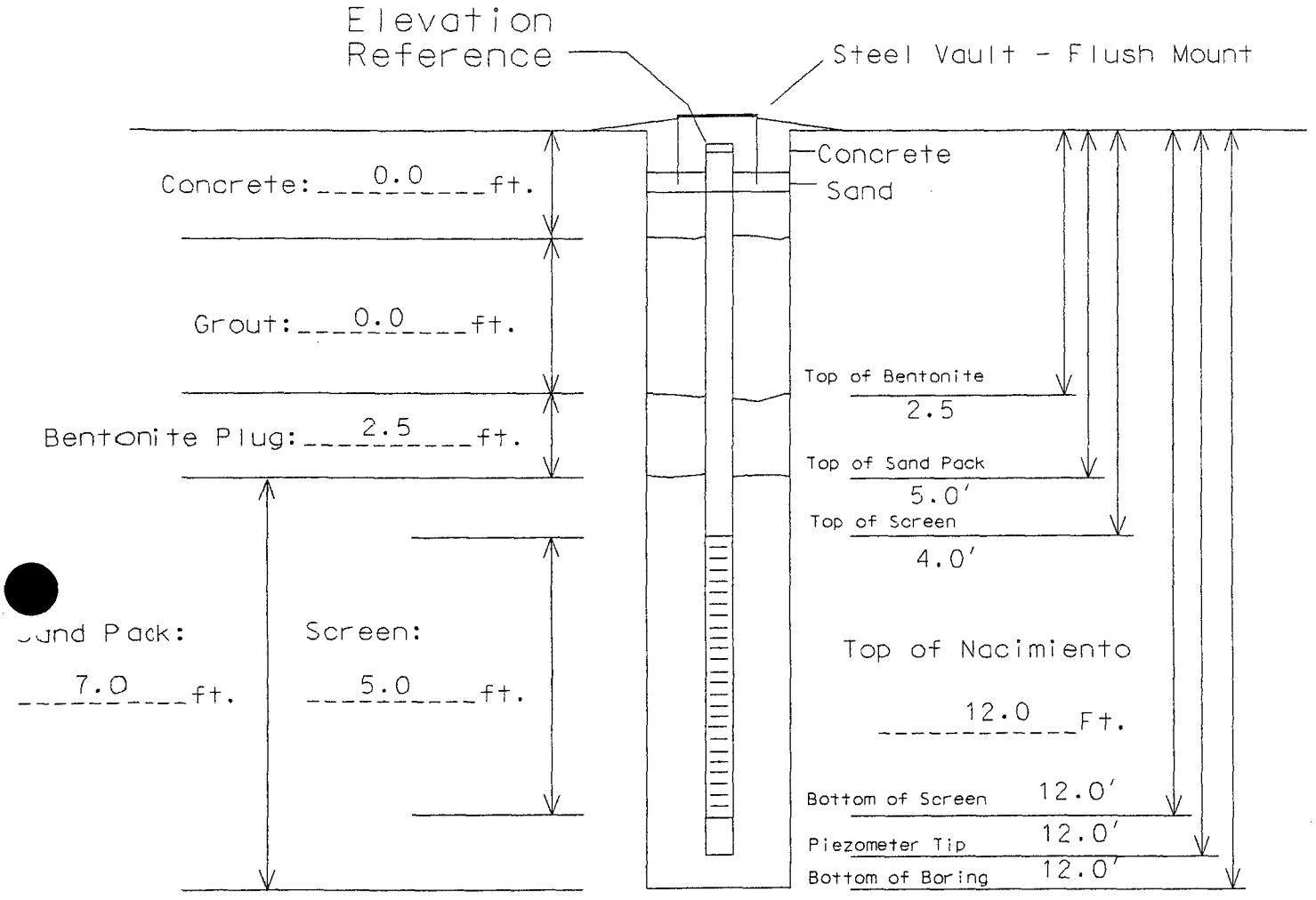
Project Name: Bloomfield Refinery

Elevation: TBS

PRECISION ENGINEERING, INC.
505-523-7674

Installation Diagram

Monitoring Well No. OW 0+60



Boring Diameter: 8 5/8"

Sand Type: 10-20 Silica

Bollards. Type/Size: NA

Bentonite: 3/8" Chips

Screen Type/Size: 2" PVC Sch. 40. 0.40" 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

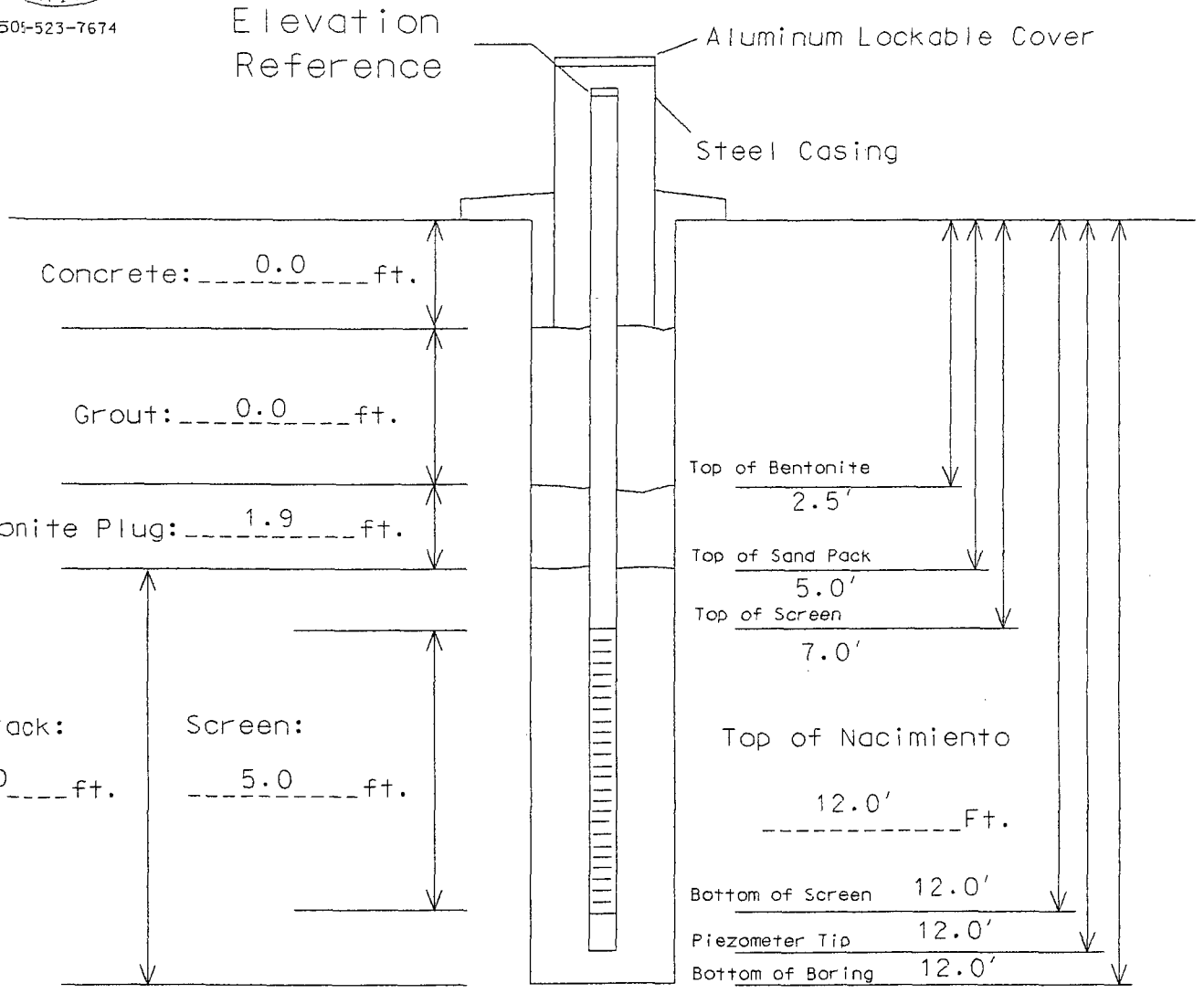
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. OW 1+50



Boring 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

Other:

Project #: 05-038

Project Name: Bloomfield Refinery

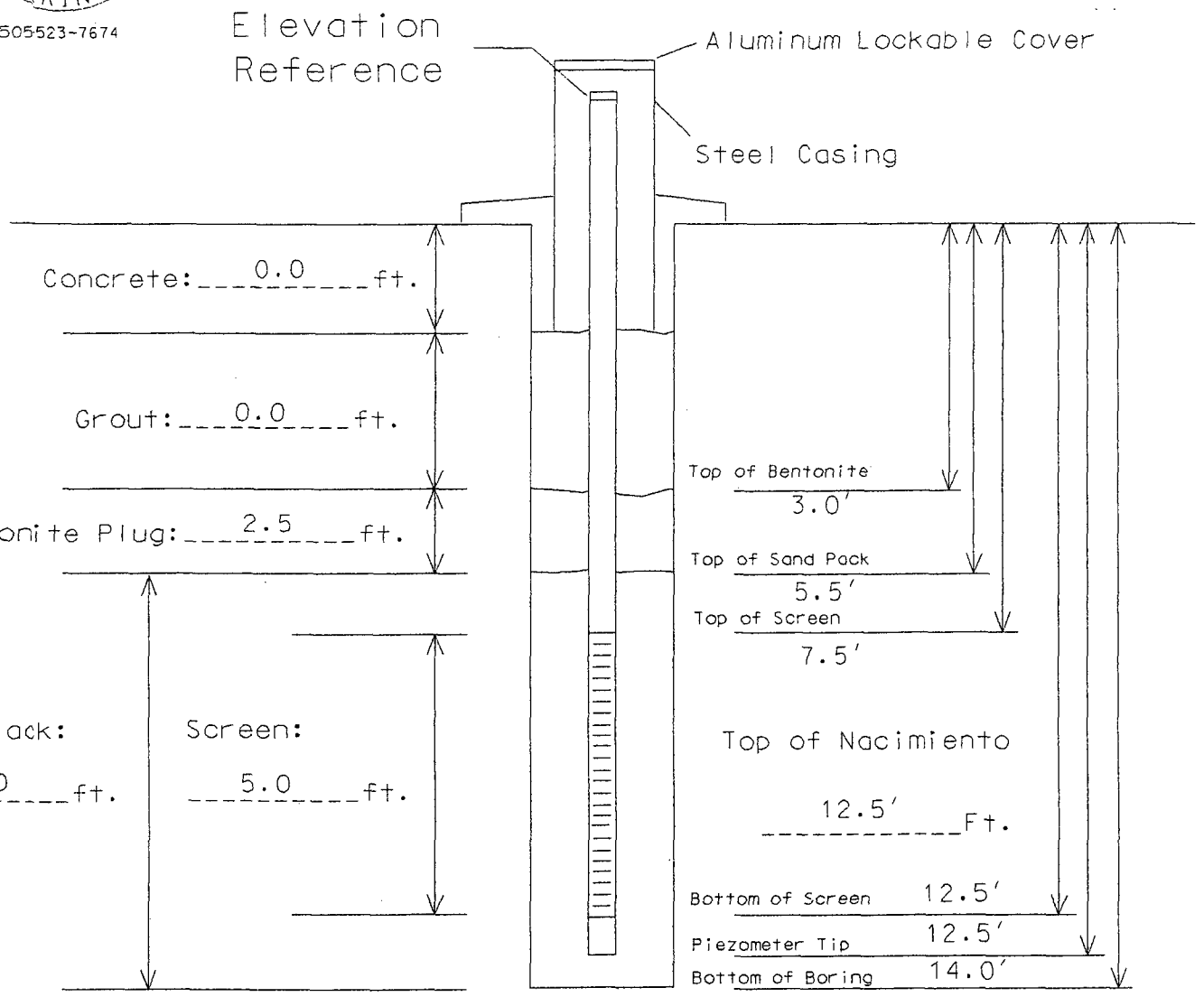
Elevation: TBS

PRECISION ENGINEERING, INC.

505523-7674

Installation Diagram

Monitoring Well No. OW 3+85



Boring 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

Other:

Project #: 05-038

Project Name: Bloomfield Refinery

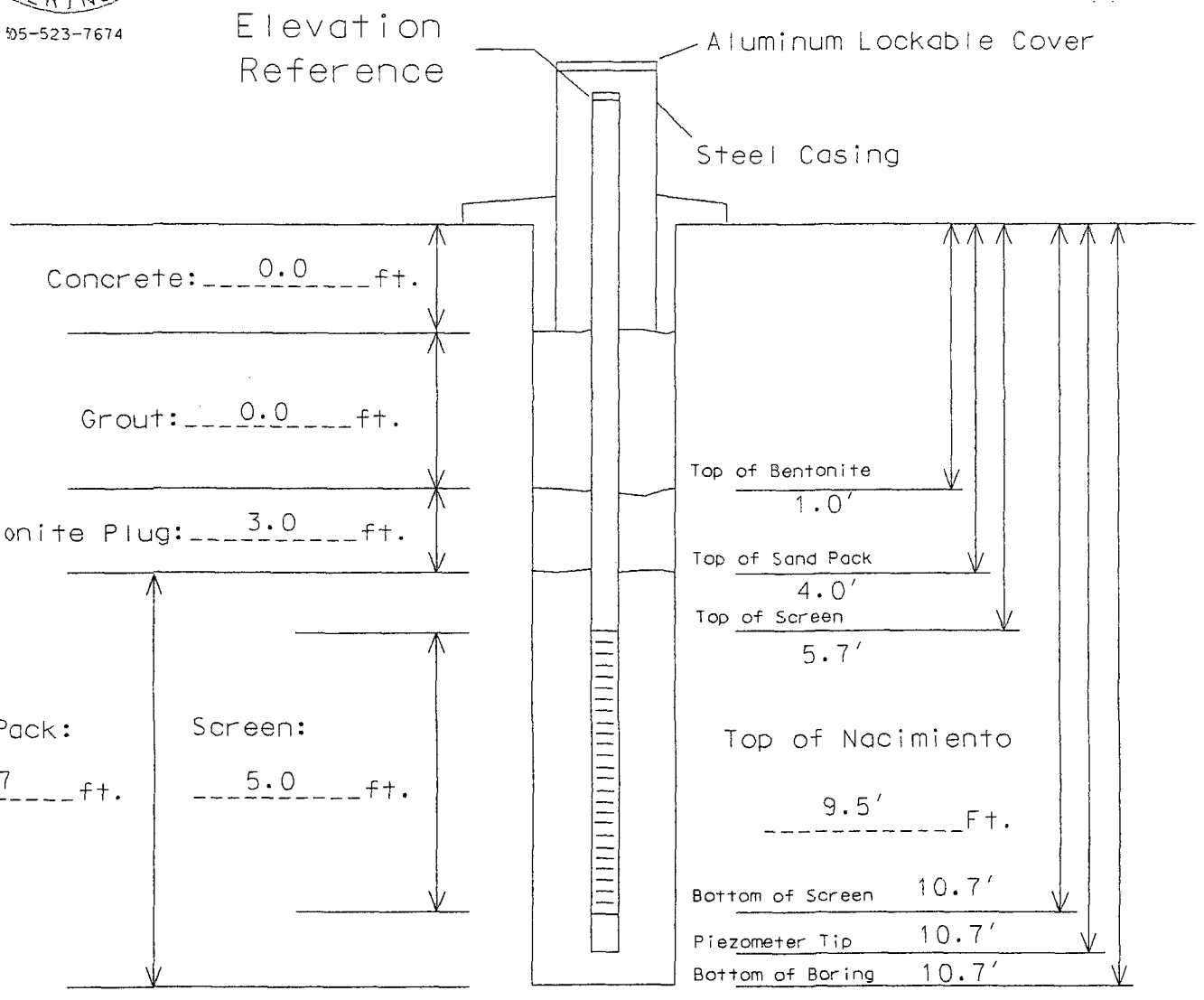
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. OW 5+50



Boring 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

Other:

Project #: 05-038

Project Name: Bloomfield Refinery

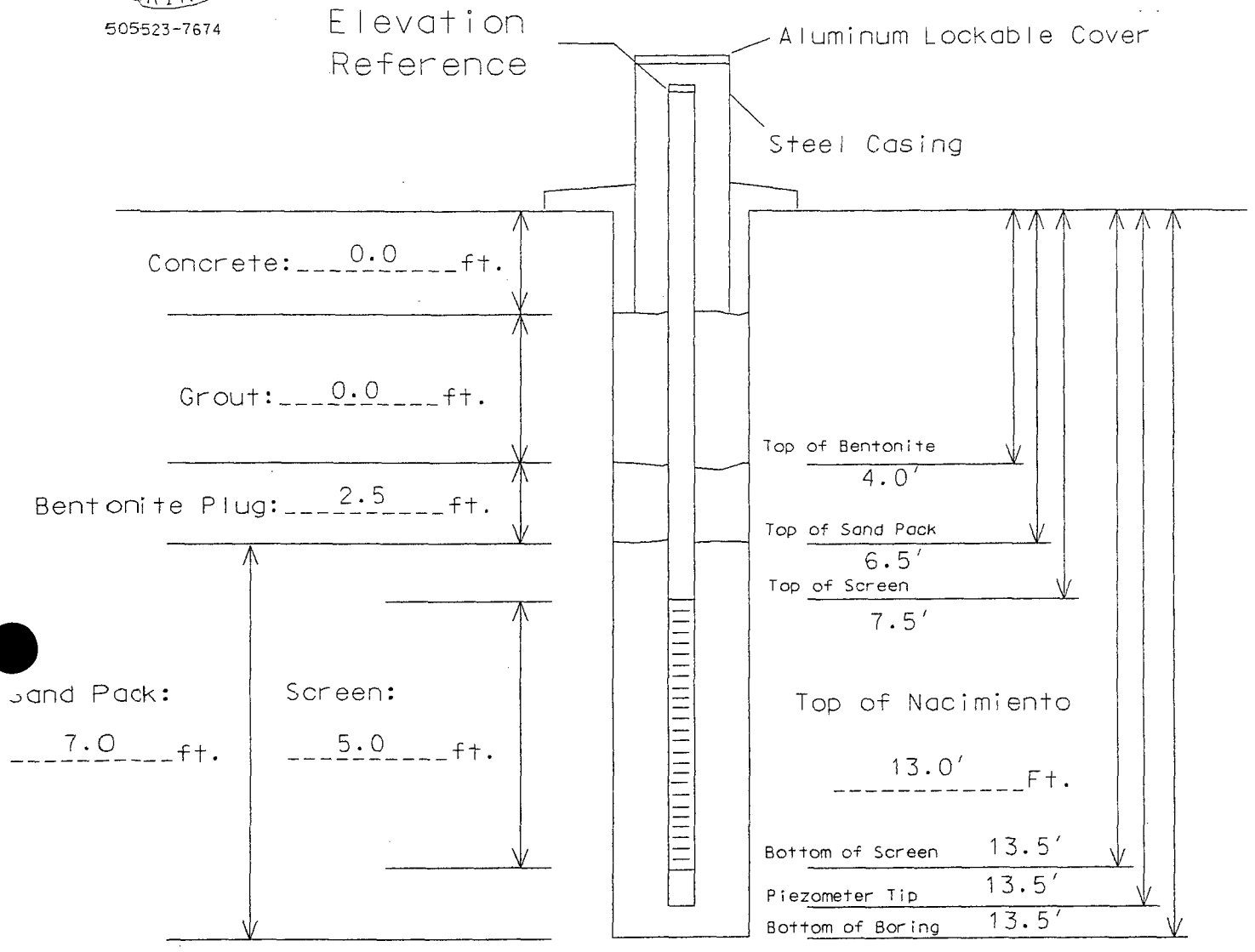
Elevation: TBS

PRECISION ENGINEERING, INC.

505523-7674

Installation Diagram

Monitoring Well No. OW 6+70



Boring 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

Other:

Project #: 05-038

Project Name: Bloomfield Refinery

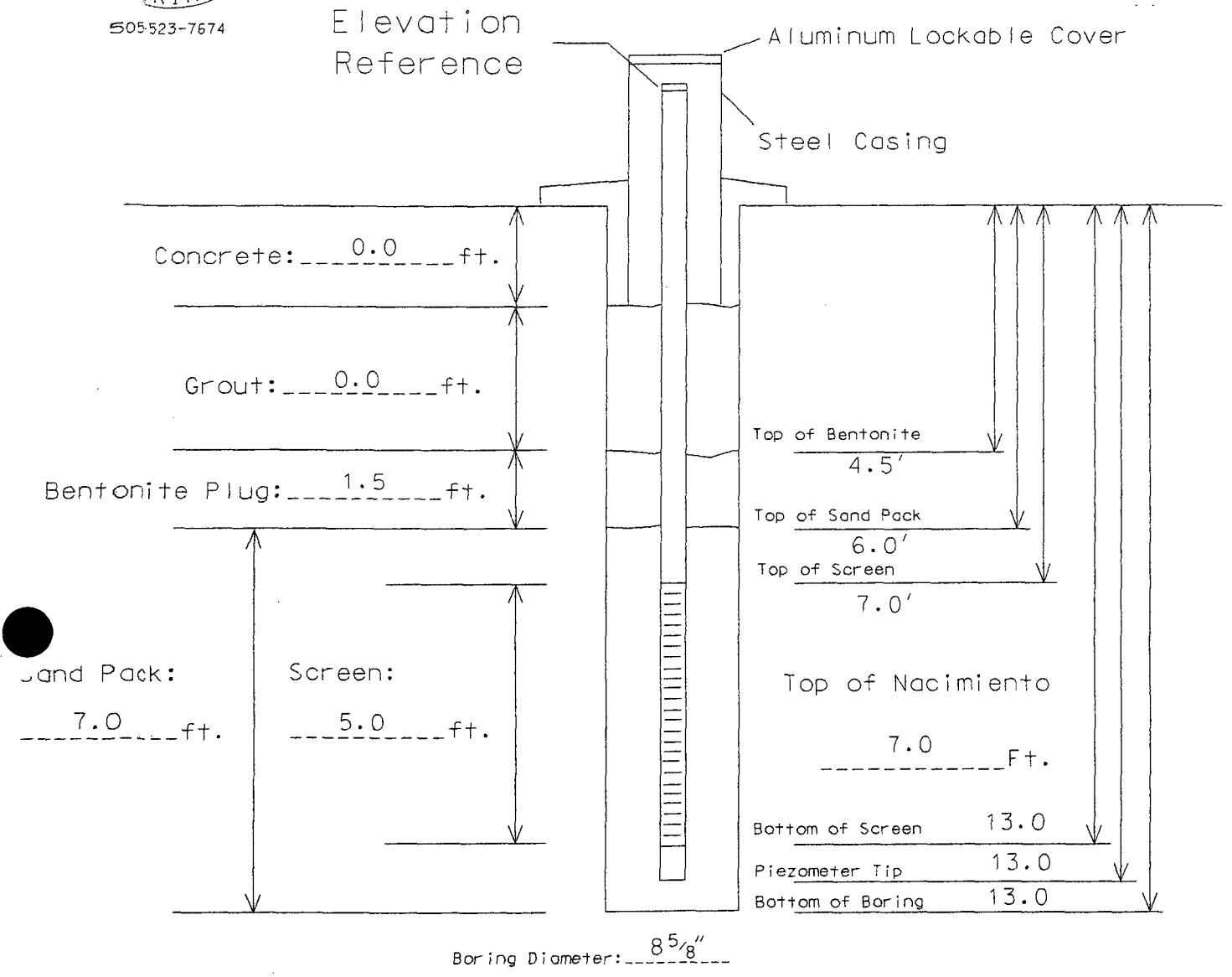
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. OW 8+10



Boring 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

Other:

Project #: 05-038

Project Name: Bloomfield Refinery

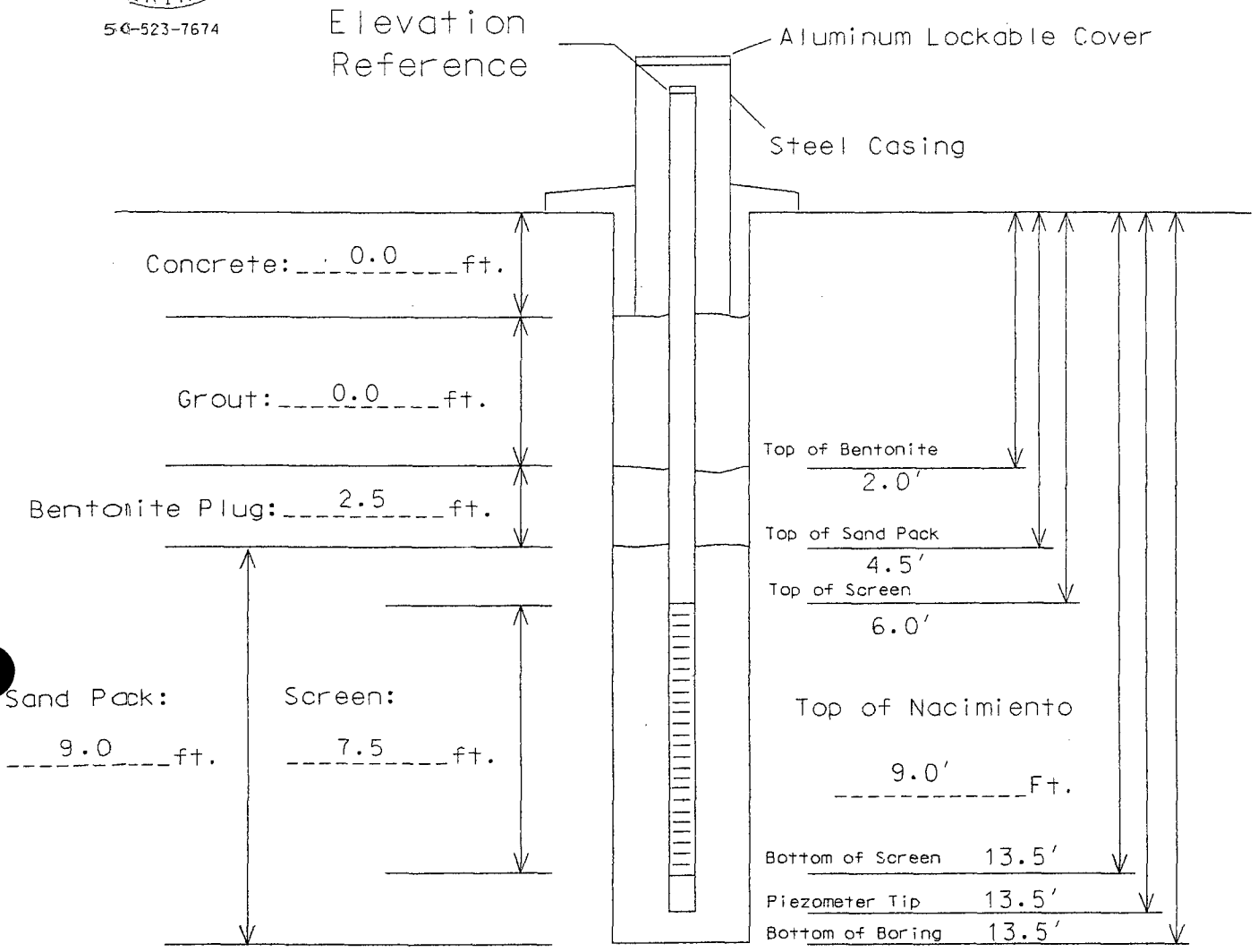
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. OW 11+15



Boring 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

Other:

Project #: 05-038

Project Name: Bloomfield Refinery

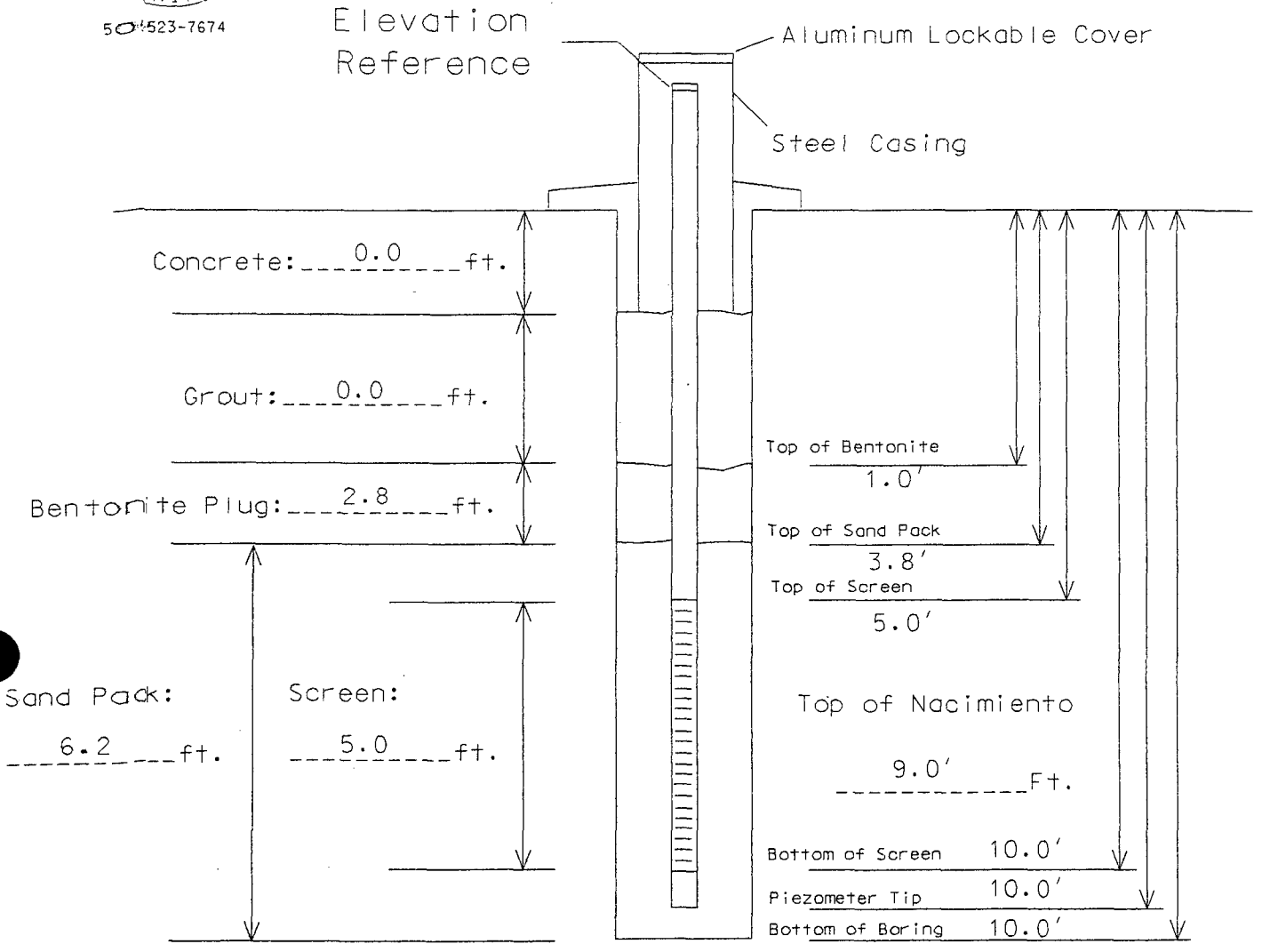
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. OW 14+10



Boring 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

Other:

Project #: 05-038

Project Name: Bloomfield Refinery

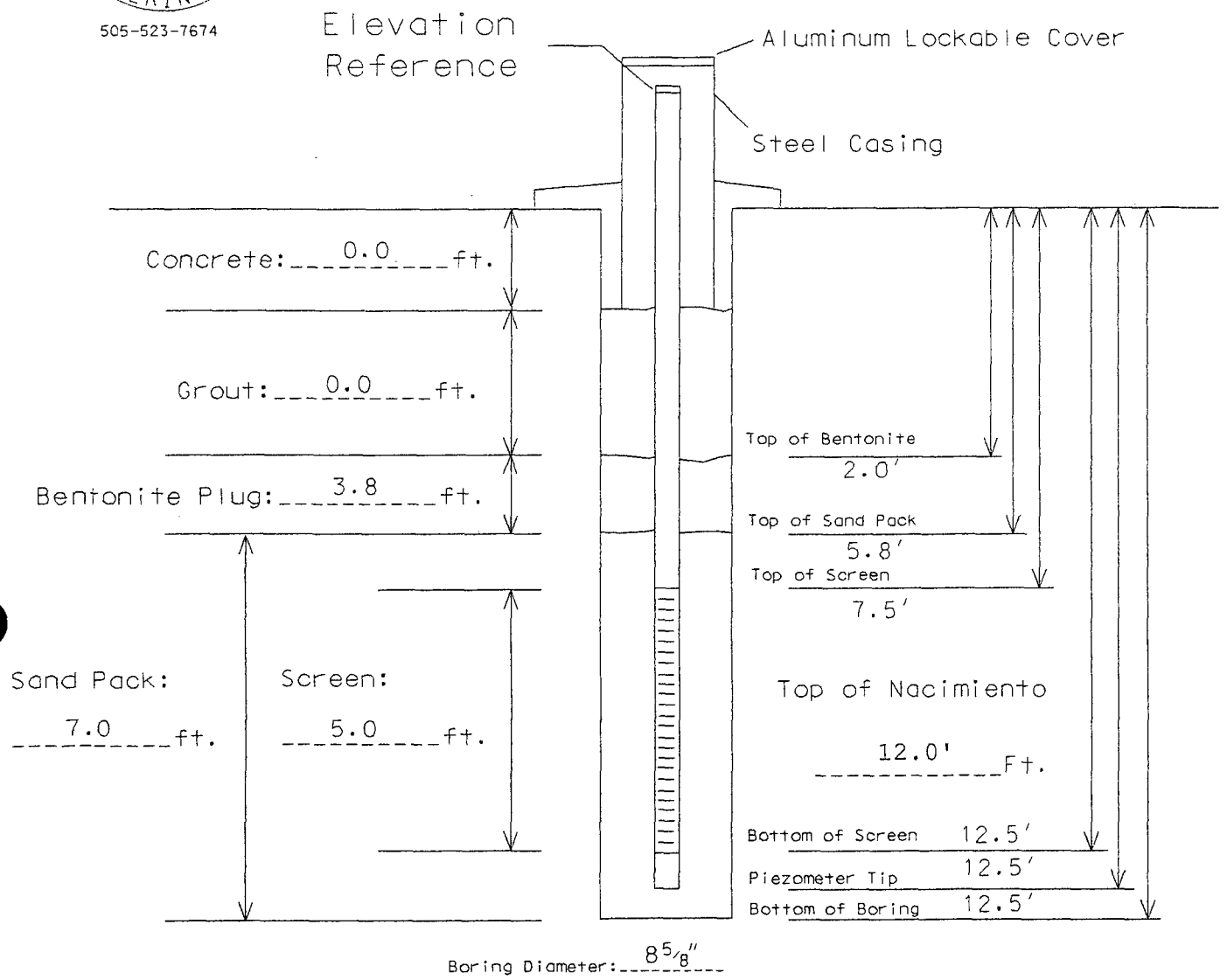
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. OW 16+60



Boring 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

Other:

Project #: 05-038

Project Name: Bloomfield Refinery

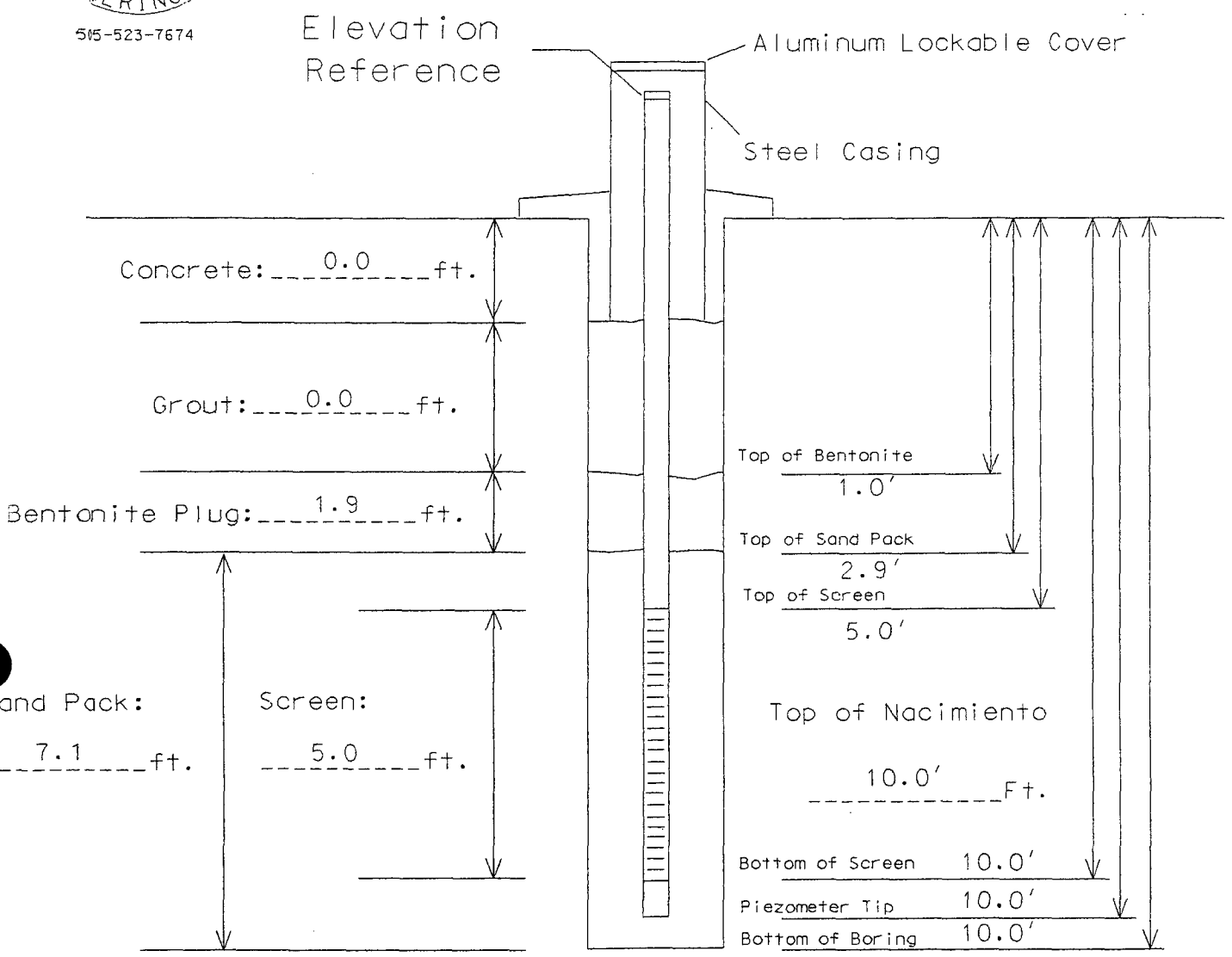
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. OW 19+50



Boring 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

Other:

Project #: 05-038

Project Name: Bloomfield Refinery

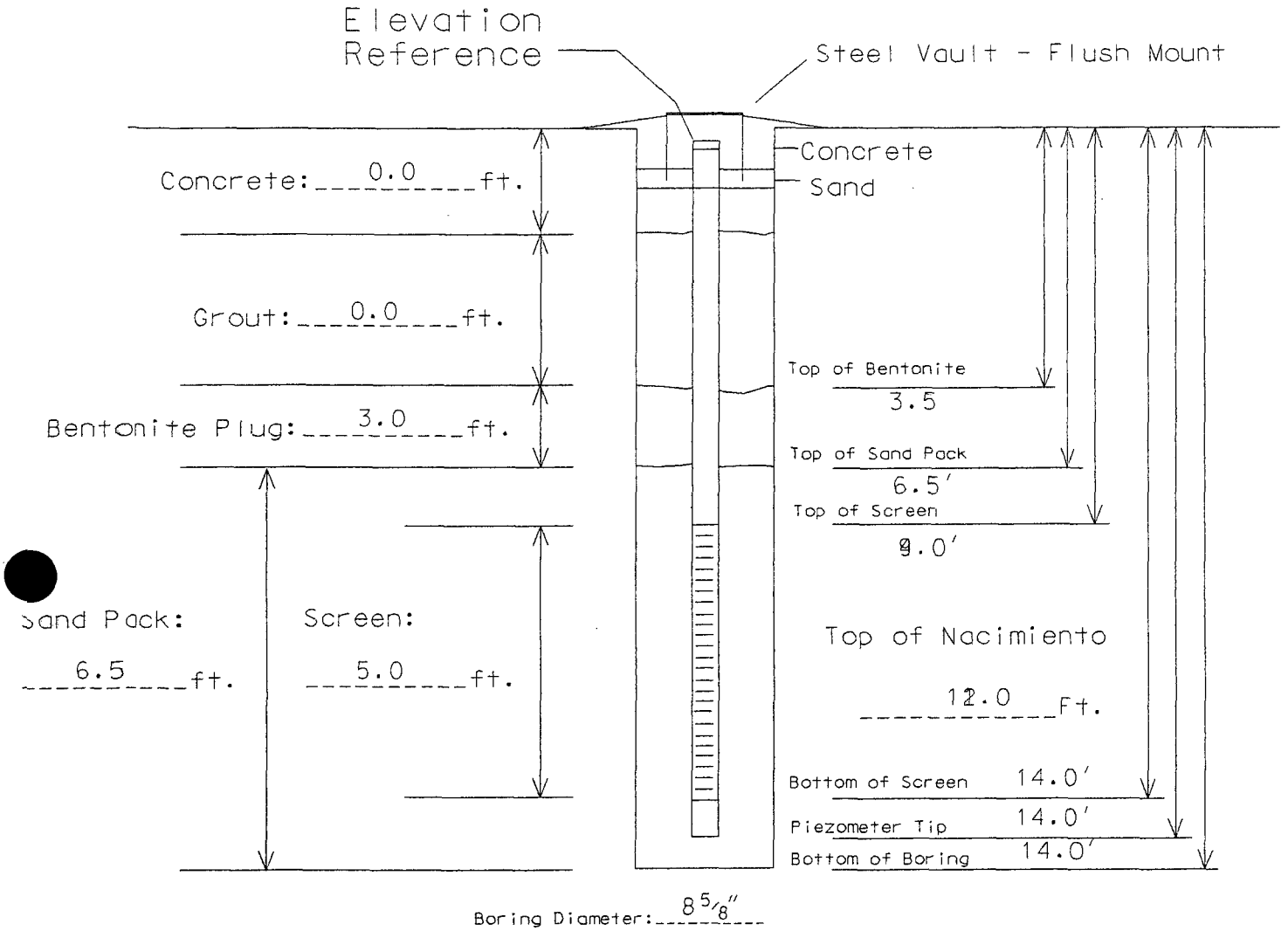
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. OW 22+00



Boring Diameter: 8 5/8"

Sand Type: 10-20 Silica

Bollards. Type/Size: NA

Bentonite: 3/8" Chips

Screen Type/Size: 2" PVC Sch. 40. 0.40" 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

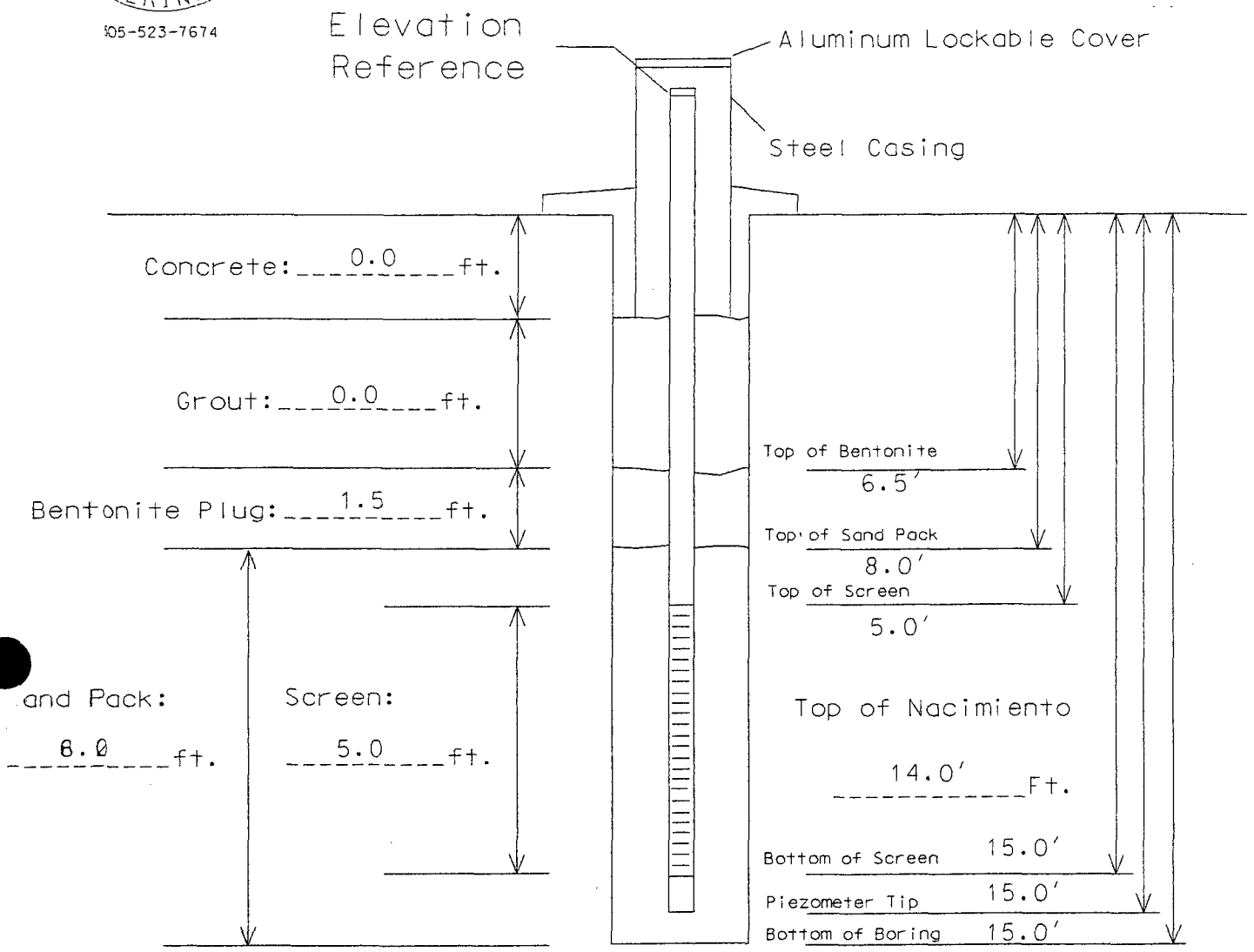
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. OW 23+10



Boring 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

Other:

Project #: 05-038

Project Name: Bloomfield Refinery

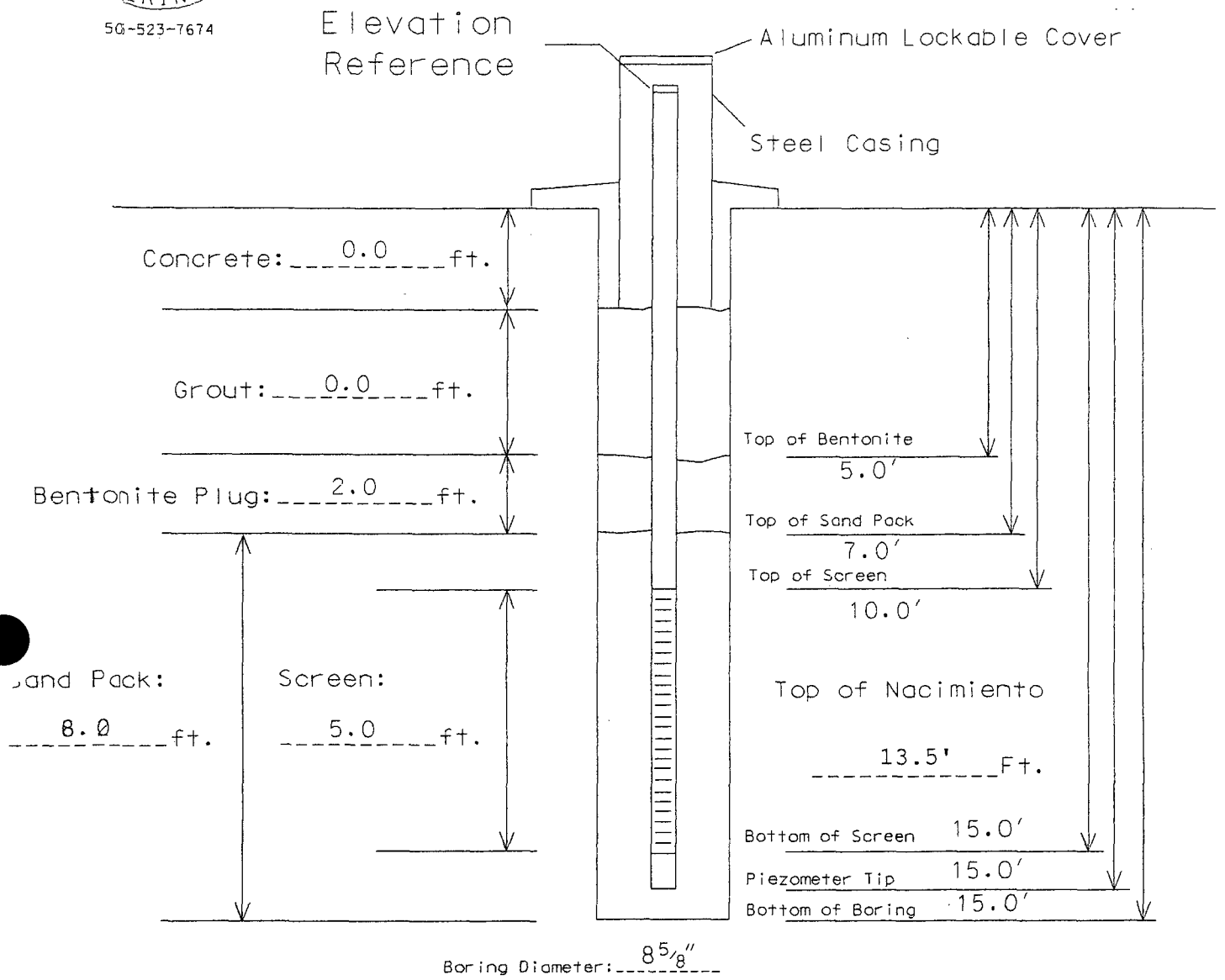
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. OW 23+90



Boring 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

Other:

Project #: 05-038

Project Name: Bloomfield Refinery

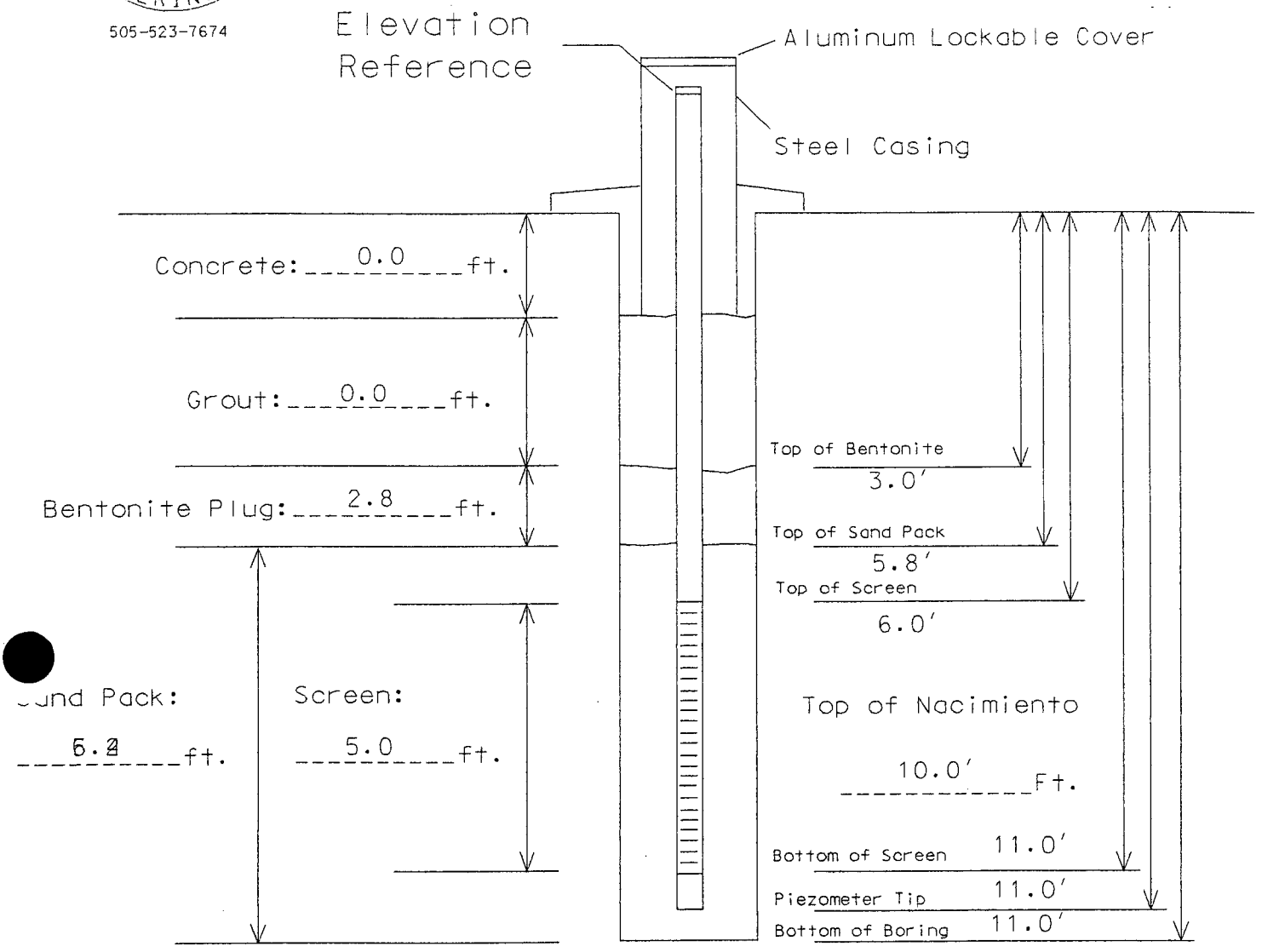
Elevation: TBS

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. OW 25+70



Boring 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

Other:

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS

Sheet: 1 OF 15
Bor Point: See Plan
Water Elevation: 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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-2.0		***//*** ***//*** ***//***		**Sand**, very fine to fine, brown, moist				
	2.0-3.5		***oo*** ***oo*** ***oo*** ***oo***	2.5	**Gravel**, cobbles, to boulder size, grey, moist very dense,				
	3.5-8.0		******** ******** ******** ******** ******** ******** ******** ******** ********	5.0 7.5	**Sand**, silty, clayey, yellow-brown, damp, moderately dense				
	8.0-11.5 12.0		******** ******** ******** ******** ******** ******** ******** ******** ********	10.0	**Sand**, silty, grey-black, hydrocarbon odor, dense, moist, Water Level 10.7'				
	12.5		= = = = = = = = = = = =		**Nacimiento Formation** Friable Sandstone, silty, yellow-brown, dense, damp, no odor				
	14.0			15.0 20.0	TD Set 2" Well @ 12.0' 5' of Screen, 7' of Riser Top of Sand 5.0' Top of Bentonite 2.5'				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KMM

C:\unzipped\Observation Well Logs\[OW0+60.xls]Sheet1

Sheet: 2 OF 15
Bore Point: See Plan
Water Elevation:
Boring No.: OW 1+50

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

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 4/20/2005

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-8.0		OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo	2.5 5.0 7.5	**Gravel**, cobbles, to boulder size, brown to grey rock, slightly sandy, very dense				
	8.0-11.5		******** ******** ******** ******** ******** ******** ********	10.0	**Sand**, medium, silty, grey/black, wet dense, moist, moderately dense Slighty water bearing				
	12.0		******** = = = = = = = =		**Nacimiento Formation** Sandstone, degraded, weathered, very dense yellow-brown to light brown, damp				
	13.5			15.0 20.0	TD Set 2" Well @ 12.0' 5' of Screen, 7' of Riser Top of Sand 5.0' Top of Bentonite 2.5'				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: WHK

C:\unzipped\Observation Well Logs\[OW1+50.xls]Sheet1

Sheet: 3 OF 15
Bore Point: See Plan
Water Elevation: 10.7'
Boring No.: OW 3+85

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

File #: 05-038
Site: Bloomfield Giant Refining
Elevation: EXISTING
Date: 4/20/2005

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-10.5		OoO*Oo		**Gravel**, cobbles, to boulder size, brown to grey rock, slightly sandy, very dense				
			OoO*Oo						
			OoO*Oo						
			OoO*Oo						
			OoO*Oo	2.5					
			OoO*Oo						
			OoO*Oo						
			OoO*Oo						
			OoO*Oo						
			OoO*Oo	5.0					
			OoO*Oo						
			OoO*Oo						
			OoO*Oo						
			OoO*Oo						
			OoO*Oo	7.5					
			OoO*Oo						
			OoO*Oo						
			OoO*Oo						
			OoO*Oo						
			OoO*Oo	10.0					
	10.5		OoO*Oo		Water Level 10.7'				
			********		**Sand**, medium, silty, grey/black, water bearing				
			********		dense, moist, moderately dense				
	12.5		********		**Nacimiento Formation**				
			= = = =		Sandstone, degraded, weathered, fissile,				
			= = = =		very, dense, yellow-brown to light brown, damp				
			= = = =						
	14.0		= = = =						
					TD				
				15.0					
					Set 2" Well @ 12.5'				
					5' of Screen, 7' of Riser				
					Top of Sand 7.0'				
					Top of Bentonite 5.5'				
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: WHK

C:\unzipped\Observation Well Logs\[OW3+85_rev.xls]Sheet1

Sheet: 4 OF 15
Bore Point: See Plan
Water Elevation: 10.7'
Boring No.: OW 5+50

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

File #: 05-038
Site: Bloomfield Giant Refining
Elevation: EXISTING
Date: 5/1/2005

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-9.0		OoO*Oo		**Gravel**, cobbles, to boulder size, sandy, silty, brown, very dense				
			OoO*Oo						
			OoO*Oo						
			OoO*Oo						
			OoO*Oo	2.5					
			OoO*Oo						
			OoO*Oo						
			OoO*Oo						
			OoO*Oo						
			OoO*Oo	5.0					
			OoO*Oo						
			OoO*Oo						
			OoO*Oo						
			OoO*Oo						
			OoO*Oo	7.5					
			OoO*Oo						
			OoO*Oo						
			OoO*Oo						
	9.0		********		**Sand**, fine to medium, greeniish brown,				
			********	10.0	damp, dense				
	9.5		====		**Nacimiento Formation**				
	10.7				TD				
				15.0					
					Set 2" Well @ 10.7				
					5' of Screen, 9' of Riser				
					Top of Sand 4.0'				
					Top of Bentonite 1.0'				
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: WHK

C:\unzipped\Observation Well Logs\[OW5+50_rev.xls]Sheet1

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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-5.5		***--***		**Sand**, Very Fine to Fine, Silty, Brown, Moist, Gravel, Cobbles				
			--						
			--						
			--						
			--	2.5					
			--						
			--						
			--						
			--						
			--	5.0					
	5.5-13.0		*o*--*o*		**Sand**, Fine, Silty, Light Brown, Damp, Some Small Gravel, (Cobbles @ 12.0')				
			o--*o*						
			o--*o*						
			o--*o*						
			o--*o*	7.5					
			o--*o*						
			o--*o*						
			o--*o*						
			o--*o*						
			o--*o*	10.0					
			o--*o*						
			o--*o*						
			o--*o*						
			o--*o*						
			o--*o*						
			o--*o*						
	13.0'		= = = =		**Nacimiento Formation**				
			= = = =						
			= = = =						
			= = = =	15.0					
	15.0				TD				
					1.5' of Bentonite (Bottom of Hole)				
					Set 2" Well @ 13.5'				
					5' of Screen				
					12.5' of Riser				
					Top of Sand 6.5'				
					Top of Bentonite 4.0'				
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KMM

C:\unzipped\Observation Well Logs\[OW6+70.xls]Sheet1

Sheet: 6 OF 15
Bore Point: See Plan
Water Elevation: Not Encountered
Boring No.: OW8+10

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

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 4/6/2005

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-7.0		***_***		**Sand**, Fine to Coarse, Slightly Silty, Brown, Damp, Gravel, Cobbles				
			_						
			_						
			_						
			_	2.5					
			_						
			_						
			_						
			_						
			_	5.0					
			_						
			_						
			_						
	7.0-13.0		= = = =		**Nacimiento**, Sand, Fine, Green/Brown, Damp				
			= = = =	7.5	Hydrocarbon Odor				
			= = = =						
			= = = =						
			= = = =						
			= = = =						
			= = = =	10.0					
			= = = =						
			= = = =						
			= = = =						
			= = = =						
			= = = =						
			= = = =						
	13.0'				TD				
					Set 2" Well @ 13.0'				
				15.0	5' of Screen				
					11.0' of Riser				
					Top of Sand 6.0'				
					Top of Bentonite 4.5'				
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KMM

C:\unzipped\Observation Well Logs\[OW8+10.xls]Sheet1

Sheet: 7 OF 15
Bore Point: See Plan
Water Elevation: 9.4'
Boring No.: OW11+15

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

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 4/7/2005

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-9.0		**o**O**		**Sand**, Very Fine to Medium, Brown, Damp,				
			oO**		Gravel, Cobbles, Hydrocarbon Odor @ 5.0'				
			oO**						
			oO**						
			oO**	2.5					
			oO**						
			oO**						
			oO**						
			oO**						
			oO**	5.0					
			oO**						
			oO**						
			oO**						
			oO**						
			oO**	7.5					
			oO**						
			oO**						
	9.0-13.5		********		**Sand**, Very Fine to Medium, Black/Grey,				
	9.4		********		Damp, Strong Hydrocarbon Odor, **Water 9.4'**				
			********	10.0					
			********						
			********						
			********						
			********						
			********						
			********						
			********						
			= = = =		**Nacimiento**				
	13.5				TD				
				15.0	Set 2" Well @ 13.5'				
					7.5' of Screen, 9' of Riser				
					Top of Sand 4.5'				
					Top of Bentonite 2.0'				
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KMM

C:\unzipped\Observation Well Logs\[OW11+15.xls]Sheet1

Sheet: 8 OF 15
Bore Point: See Plan
Water Elevation:
Boring No.: OW 14+10

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

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 5/6/2005

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-8.5		OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo OoO*Oo	2.5 5.0 7.5	Gravel, cobbles, to boulder size, sand fine to coarse, damp dense				
	8.5		******** ********		Sand, fine to coarse, some gravel, grey, moist				
	9.0		=====		Nacimiento Formation				
	10.0				TD				
				15.0 20.0	Set 2" Well @ 10.0 5' of Screen, 8' of Riser Top of Sand 3.8' Top of Bentonite 1.5'				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED 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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-5.0		***//***		**Sand**, Very Fine to Fine, Clayey, Brown, Moist, Gravel, Cobbles				
			//						
			//						
			//						
			//	2.5					
			//						
			//						
			//						
			//						
			//	5.0					
	5.0-10.0		********		**Sand**, Fine to Coarse, Black, Moist, Gravel, Some Cobbles, Hydrocarbon Odor @ 5.0'				
			********						
			********						
			********						
			********	7.5					
			********						
			********						
			********						
			********						
	9.5		********	10.0	Water Level 9.5'				
	10.0-12.0		********		**Same as Above**, No Gravel or Cobbles, Black Strong Hydrocarbon Odor				
			********						
			********						
	12.0		= = = =		Nacimiento				
	12.5				TD				
					Set 2"' Well @ 12.5'				
					5' of Screen, 10' of Riser				
					Top of Sand 5.8'				
				15.0	Top of Bentonite 3.5'				
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED 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

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-8.0		***o***O*		**Sand**, Fine to Medium, Tan, Damp, Gravel, Cobbles				
			oO*						
			oO*						
			oO*						
			oO*	2.5					
			oO*						
			oO*						
			oO*						
			oO*						
			oO*	5.0					
			oO*						
			oO*						
			oO*						
			oO*						
			oO*	7.5					
	8.0-10.0		***o***o*		**Sand**, Fine to Medium, Grey/Black, Moist, Hydrocarbon Odor, Small Gravel				
			oo*						
			oo*						
			oo*						
			oo*	10.0					
	10.0		= = = =		**Nacimiento**				
					Set 2" Well @ 10.0'				
					5' of Screen				
					8.0' of Riser				
					Top of Sand 2.9'				
					Top of Bentonite 1.0'				
				15.0					
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KMM

Sheet: 11 OF 15
Bore Point: See Plan
Water Elevation: Not Encountered
Boring No.: OW22+00

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

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 5/6/2005

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-11.0		***o***O*		**Gravel**, cobbles, to boulder size, brown to grey rock, slightly sandy, very dense				
			oO*						
			oO*						
			oO*						
			oO*	2.5					
			oO*						
			oO*						
			oO*						
			oO*						
			oO*	5.0					
			oO*						
			oO*						
			oO*						
			oO*						
			oO*	7.5					
			oo*						
			oo*						
			oo*						
			oo*						
			oo*	10.0					
			oo*						
			oo*						
	11.0-14.0		**-**o**		**Sand**, Fine to Medium, some clay, some gravel, damp dense				
			-o**						
			-o**						
			-o**						
			-o**						
			-o**						
	14.0				TD				
				15.0					
					Set 2" Well @ 14.0'				
					5' of Screen				
					9.5' of Riser				
					Top of Sand 6.5'				
					Top of Bentonite 3.5'				
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KMM

C:\unzipped\Observation Well Logs\[OW22+00.xls]Sheet1

Sheet: 12 OF 15
Bore Point: See Plan
Water Elevation: Not Encountered
Boring No.: OW23+10

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

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 5/6/2005

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-13.5		***o***O*		**Gravel**, cobbles, to boulder size, brown to grey rock, slightly sandy, very dense				
			oO*						
			oO*						
			oO*						
			oO*	2.5					
			oO*						
			oO*						
			oO*						
			oO*						
			oO*	5.0					
			oO*						
			oO*						
			oO*						
			oO*						
			oO*	7.5					
			oO*						
			oO*						
			oO*						
			oO*						
			oO*	10.0					
			oO*						
			oO*						
			oO*						
			oO*						
			oO*						
	13.5		***o***O*						
			********		**Sand**, Fine to coarse, dark brown, moist, dense				
			********						
			********						
	14.0		====		**Nacimiento Formation**				
	15.0			15.0	TD				
					Set 2" Well @ 15.0'				
					5' of Screen				
					10.5' of Riser				
					Top of Sand 8.0'				
					Top of Bentonite 1.0'				
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KMM

C:\unzipped\Observation Well Logs\[OW23+10_rev.xls]Sheet1

Sheet: 13 OF 15
Bore Point: See Plan
Water Elevation: Not Encountered
Boring No.: OW23+90

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

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 5/6/2005

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-12.0		***o***O*		**Gravel**, cobbles, to boulder size, brown to grey rock, slightly sandy, very dense				
			oO*						
			oO*						
			oO*						
			oO*	2.5					
			oO*						
			oO*						
			oO*						
			oO*						
			oO*	5.0					
			oO*						
			oO*						
			oO*						
			oO*						
			oO*	7.5					
			oO*						
			oO*						
			oO*						
			oO*						
			oO*	10.0					
			oO*						
			oO*						
			oO*						
	12.0		***o***O*						
			********		**Sand**, Fine to coarse, dark brown, moist, dense				
			********						
	13.5		====		**Nacimiento Formation**				
					TD				
				15.0					
					Set 2" Well @ 15.0'				
					5' of Screen				
					7.0' of Riser				
					Top of Sand 7.0'				
					Top of Bentonite 5.0'				
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KMM

C:\unzipped\Observation Well Logs\[OW23+90_rev.xls]Sheet1

Bore Point: See Plan
Water Elevation: 8.4'
Boring No.: OW25+70

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

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 4/6/2005

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0.0-10.5		******** ******** ******** ******** ******** ******** ******** ******** ******** ******** ******** ******** ******** ******** ******** ******** ********	2.5 5.0 7.5	**Sand**, Very Fine to Medium, Brown, Damp Gravel, Cobbles				
	8.4		******** ******** ******** ********	10.0	Water Level 8.4'				
	10.0		==== ====		**Nacimiento Formation**				
	11.0			15.0 20.0	TD Set 2" Well @ 11.0' 5' of Screen 9.0' of Riser Top of Sand 5.8' Top of Bentonite 3.0'				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: KMM

C:\unzipped\Observation Well Logs\[OW25+70_rev.xls]Sheet1

APPENDIX I

Baseline Groundwater Analytical Laboratory Reports

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

May 27, 2005

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

RE: Phase II Monitoring

Order No.: 0505104

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 7 samples on 5/12/2005 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

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

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

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	CW 6 + 70
Lab Order:	0505104	Collection Date:	5/11/2005 9:15:00 AM
Project:	Phase II Monitoring		
Lab ID:	0505104-01	Matrix:	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: MAP
Fluoride	ND	0.50		mg/L	5	5/24/2005
Chloride	2400	10		mg/L	100	5/24/2005
Phosphorus, 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 METALS						Analyst: CMC
Arsenic	ND	0.020		mg/L	1	5/16/2005 2:09:29 PM
Barium	0.34	0.020		mg/L	1	5/16/2005 2:09:29 PM
Cadmium	ND	0.0020		mg/L	1	5/16/2005 2:09:29 PM
Chromium	ND	0.0060		mg/L	1	5/16/2005 2:09:29 PM
Lead	ND	0.0050		mg/L	1	5/16/2005 2:09:29 PM
Selenium	ND	0.050		mg/L	1	5/16/2005 2:09:29 PM
Silver	ND	0.0050		mg/L	1	5/16/2005 2:09:29 PM

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT: San Juan Refining
Lab Order: 0505104
Project: Phase II Monitoring
Lab ID: 0505104-02

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 METALS						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	1	5/16/2005 2:13:35 PM
Chromium	ND	0.0060		mg/L	1	5/16/2005 2:13:35 PM
Lead	ND	0.0050		mg/L	1	5/16/2005 2:13:35 PM
Selenium	ND	0.050		mg/L	1	5/16/2005 2:13:35 PM
Silver	ND	0.0050		mg/L	1	5/16/2005 2:13:35 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	OW 11 + 15
Lab Order:	0505104	Collection Date:	5/11/2005 11:45:00 AM
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
Surr: 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 METALS						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

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	CW 14 + 10
Lab Order:	0505104	Collection Date:	5/11/2005 1:45:00 PM
Project:	Phase II Monitoring		
Lab ID:	0505104-04	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		µg/L	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 METALS						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

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	OW 14 + 10
Lab Order:	0505104	Collection Date:	5/11/2005 2:15:00 PM
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 METALS						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

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	CW 16 + 60
Lab Order:	0505104	Collection Date:	5/11/2005 3:00:00 PM
Project:	Phase II Monitoring		
Lab ID:	0505104-06	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 8:33:39 PM
Surr: 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 METALS						Analyst: CMC
Arsenic	ND	0.020		mg/L	1	5/16/2005 3:18:45 PM
Barium	0.60	0.020		mg/L	1	5/16/2005 3:18:45 PM
Cadmium	ND	0.0020		mg/L	1	5/16/2005 3:18:45 PM
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

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	Trip Blank
Lab Order:	0505104	Collection Date:	
Project:	Phase II Monitoring		
Lab ID:	0505104-07	Matrix:	TRIP BLANK

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Benzene	ND	0.50		µg/L	1	5/16/2005 9:04:43 PM
Toluene	ND	0.50		µg/L	1	5/16/2005 9:04:43 PM
Ethylbenzene	ND	0.50		µg/L	1	5/16/2005 9:04:43 PM
Xylenes, Total	ND	0.50		µg/L	1	5/16/2005 9:04:43 PM
Surr: 4-Bromofluorobenzene	98.2	83.3-121		%REC	1	5/16/2005 9:04:43 PM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

CLIENT: San Juan Refining
Work Order: 0505104
Project: Phase II Monitoring

QC SUMMARY REPORT

Method Blank

Sample ID MBLK | Batch ID: R15380 | Test Code: E300 | Units: mg/L | Analysis Date 5/12/2005 | Prep Date
Client ID: | Run ID: LC_050512A | SeqNo: 361746

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.1									
Chloride	ND	0.1									
Phosphorus, Orthophosphate (As P)	ND	0.5									
Sulfate	ND	0.5									
Nitrate (As N)+Nitrite (As N)	ND	0.1									

Sample ID MB | Batch ID: R15380 | Test Code: E300 | Units: mg/L | Analysis Date 5/12/2005 | Prep Date
Client ID: | Run ID: LC_050512A | SeqNo: 361769

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.1									
Chloride	ND	0.1									
Phosphorus, Orthophosphate (As P)	ND	0.5									
Sulfate	ND	0.5									
Nitrate (As N)+Nitrite (As N)	ND	0.1									

Sample ID MB | Batch ID: R15380 | Test Code: E300 | Units: mg/L | Analysis Date 5/14/2005 | Prep Date
Client ID: | Run ID: LC_050512A | SeqNo: 362063

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.1	0	0	0	0	0	0			
Chloride	ND	0.1	0	0	0	0	0	0			
Phosphorus, Orthophosphate (As P)	ND	0.5	0	0	0	0	0	0			
Sulfate	0.1124	0.5	0	0	0	0	0	0			J
Nitrate (As N)+Nitrite (As N)	ND	0.1	0	0	0	0	0	0			

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

CLIENT: San Juan Refining
Work Order: 0505104
Project: Phase II Monitoring

QC SUMMARY REPORT
Method Blank

Sample ID MBLK | Batch ID: R15492 | Test Code: E300 | Units: mg/L | Analysis Date 5/24/2005 | Prep Date
Client ID: | Run ID: LC_050524A | SeqNo: 365448

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.1									
Chloride	ND	0.1									
Phosphorus, Orthophosphate (As P)	ND	0.5									
Sulfate	ND	0.5									
Nitrate (As N)+Nitrite (As N)	ND	0.1									

Sample ID MBLK | Batch ID: R15502 | Test Code: E300 | Units: mg/L | Analysis Date 5/25/2005 | Prep Date
Client ID: | Run ID: LC_050525A | SeqNo: 365704

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.1									
Chloride	ND	0.1									
Phosphorus, Orthophosphate (As P)	ND	0.5									
Sulfate	ND	0.5									
Nitrate (As N)+Nitrite (As N)	ND	0.1									

Sample ID MBLK | Batch ID: R15517 | Test Code: E300 | Units: mg/L | Analysis Date 5/26/2005 | Prep Date
Client ID: | Run ID: LC_050526A | SeqNo: 366186

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.1									
Chloride	ND	0.1									
Phosphorus, Orthophosphate (As P)	ND	0.5									
Sulfate	ND	0.5									
Nitrate (As N)+Nitrite (As N)	ND	0.1									

9/18

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

CLIENT: San Juan Refining
Work Order: 0505104
Project: Phase II Monitoring

QC SUMMARY REPORT
Method Blank

Sample ID Reagent Blank 5m Batch ID: R15402 Test Code: SW8021 Units: µg/L Analysis Date 5/16/2005 7:08:29 AM Prep Date
Client ID: Run ID: PIDFID_050516A SeqNo: 362600

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.5									
Toluene	ND	0.5									
Ethylbenzene	ND	0.5									
Xylenes, Total	ND	0.5									
Surr: 4-Bromofluorobenzene	20.29	0	20	0	101	83.3	121	0			

Sample ID MB-7989 Batch ID: 7989 Test Code: SW7470 Units: mg/L Analysis Date 5/17/2005 Prep Date 5/17/2005
Client ID: Run ID: MI-LA254_050517A SeqNo: 362937

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.0002									

Sample ID MB-7969 Batch ID: 7969 Test Code: SW6010A Units: mg/L Analysis Date 5/16/2005 1:06:22 PM Prep Date 5/13/2005
Client ID: Run ID: ICP_050516B SeqNo: 362840

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.02									
Barium	ND	0.02									
Cadmium	ND	0.002									
Chromium	ND	0.006									
Lead	ND	0.005									
Selenium	ND	0.05									
Silver	ND	0.005									

10/18

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

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT: San Juan Refining
Work Order: 0505104
Project: Phase II Monitoring

QC SUMMARY REPORT
Sample Duplicate

Sample ID 0505104-01B DUP Batch ID: R15380 Test Code: E300 Units: mg/L Analysis Date 5/12/2005 Prep Date
Client ID: CW 6 + 70 Run ID: LC_050512A SeqNo: 361758

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Orthophosphate (As P)	ND	0.5	0	0	0	0	0	0	0	20	

Sample ID 0505104-06C DUP Batch ID: 7969 Test Code: SW6010A Units: mg/L Analysis Date 5/16/2005 3:22:52 PM Prep Date 5/13/2005
Client ID: CW 16 + 60 Run ID: ICP_050516B SeqNo: 362863

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.01937	0.02	0	0	0	0	0	0	0	30	J
Barium	0.6666	0.02	0	0	0	0	0	0.6004	10.4	30	
Cadmium	ND	0.002	0	0	0	0	0	0	0	30	
Chromium	ND	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	ND	0.05	0	0	0	0	0	0	0	30	
Silver	0.0007985	0.005	0	0	0	0	0	0	0	30	J

11 / 18

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

J

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT: San Juan Refining
Work Order: 0505104
Project: Phase II Monitoring

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID 0505104-01B MS	Batch ID: R15380	Test Code: E300	Units: mg/L	Analysis Date 5/12/2005	Prep Date
Client ID: CW 6 + 70		Run ID: LC_050512A		SeqNo: 361759	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Orthophosphate (As P)	5.075	0.5	5	0	102	80	120	0			

Sample ID 0505104-01B MSD	Batch ID: R15380	Test Code: E300	Units: mg/L	Analysis Date 5/12/2005	Prep Date
Client ID: CW 6 + 70		Run ID: LC_050512A		SeqNo: 361760	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Orthophosphate (As P)	4.964	0.5	5	0	99.3	80	120	5.075	2.22	20	

Sample ID 0505104-01a ms	Batch ID: R15402	Test Code: SW8021	Units: µg/L	Analysis Date 5/16/2005 9:35:32 PM	Prep Date
Client ID: CW 6 + 70		Run ID: PIDFID_050516A		SeqNo: 362634	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	22.01	0.5	20	2.675	96.7	88.7	114	0			
Toluene	19.67	0.5	20	0.297	96.9	89.3	112	0			
Ethylbenzene	20.06	0.5	20	0.4584	98.0	88.6	113	0			
Xylenes, Total	58.06	0.5	60	1.266	94.7	89.4	112	0			
Surr: 4-Bromofluorobenzene	23.36	0	24	0	97.3	83.3	121	0			

Sample ID 0505104-01a msd	Batch ID: R15402	Test Code: SW8021	Units: µg/L	Analysis Date 5/16/2005 10:06:25 PM	Prep Date
Client ID: CW 6 + 70		Run ID: PIDFID_050516A		SeqNo: 362635	

Analyte	Result	PQL	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	
Ethylbenzene	20.23	0.5	20	0.4584	98.8	88.6	113	20.06	0.802	10	
Xylenes, Total	57.92	0.5	60	1.266	94.4	89.4	112	58.06	0.242	13	
Surr: 4-Bromofluorobenzene	23.49	0	24	0	97.9	83.3	121	23.36	0.547	0	

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

12/18

CLIENT: San Juan Refining
Work Order: 0505104
Project: Phase II Monitoring

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID 0505104-06C MS Batch ID: 7969 Test Code: SW6010A Units: mg/L Analysis Date 5/16/2005 2:55:37 PM Prep Date 5/13/2005
Client ID: CW 16 + 60 Run ID: ICP_050516B SeqNo: 362856

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.5693	0.02	0.5	0.02032	110	75	125	0			
Cadmium	0.5242	0.002	0.5	0	105	75	125	0			
Chromium	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 ID 0505104-06C MSD Batch ID: 7969 Test Code: SW6010A Units: mg/L Analysis Date 5/16/2005 2:59:48 PM Prep Date 5/13/2005
Client ID: CW 16 + 60 Run ID: ICP_050516B SeqNo: 362857

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.567	0.02	0.5	0.02032	109	75	125	0.5693	0.415	20	
Cadmium	0.5172	0.002	0.5	0	103	75	125	0.5242	1.33	20	
Chromium	0.4934	0.006	0.5	0	98.7	75	125	0.5004	1.42	20	
Lead	0.4987	0.005	0.5	0.01022	97.7	75	125	0.5047	1.21	20	
Selenium	0.4678	0.05	0.5	0	93.6	75	125	0.4651	0.575	20	
Silver	0.528	0.005	0.5	0	106	75	125	0.5375	1.79	20	

13/18

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

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT: San Juan Refining
Work Order: 0505104
Project: Phase II Monitoring

QC SUMMARY REPORT
Laboratory Control Spike - generic

Sample ID LCS	Batch ID: R15380	Test Code: E300	Units: mg/L	Analysis Date 5/12/2005	Prep Date
Client ID:		Run ID: LC_050512A		SeqNo: 361747	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.5047	0.1	0.5	0	101	90	110	0			
Chloride	4.755	0.1	5	0	95.1	90	110	0			
Phosphorus, Orthophosphate (As P)	4.836	0.5	5	0	96.7	90	110	0			
Sulfate	9.669	0.5	10	0	96.7	90	110	0			
Nitrate (As N)+Nitrite (As N)	3.386	0.1	3.5	0	96.7	90	110	0			

Sample ID LCS	Batch ID: R15380	Test Code: E300	Units: mg/L	Analysis Date 5/12/2005	Prep Date
Client ID:		Run ID: LC_050512A		SeqNo: 361770	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.5233	0.1	0.5	0	105	90	110	0			
Chloride	4.89	0.1	5	0	97.8	90	110	0			
Phosphorus, Orthophosphate (As P)	5.19	0.5	5	0	104	90	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	99.6	90	110	0			

Sample ID LCS	Batch ID: R15380	Test Code: E300	Units: mg/L	Analysis Date 5/14/2005	Prep Date
Client ID:		Run ID: LC_050512A		SeqNo: 362064	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.516	0.1	0.5	0	103	90	110	0			
Chloride	4.744	0.1	5	0	94.9	90	110	0			
Phosphorus, Orthophosphate (As P)	4.845	0.5	5	0	96.9	90	110	0			
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	96.7	90	110	0			

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

CLIENT: San Juan Refining
Work Order: 0505104
Project: Phase II Monitoring

QC SUMMARY REPORT
Laboratory Control Spike - generic

Sample ID LCS	Batch ID: R15492	Test Code: E300	Units: mg/L	Analysis Date 5/24/2005	Prep Date
Client ID:		Run ID: LC_050524A		SeqNo: 365449	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.5042	0.1	0.5	0	101	90	110	0			
Chloride	4.586	0.1	5	0	91.7	90	110	0			
Phosphorus, Orthophosphate (As P)	4.653	0.5	5	0	93.1	90	110	0			
Sulfate	9.322	0.5	10	0	93.2	90	110	0			
Nitrate (As N)+Nitrite (As N)	3.255	0.1	3.5	0	93.0	90	110	0			

Sample ID LCS	Batch ID: R15502	Test Code: E300	Units: mg/L	Analysis Date 5/25/2005	Prep Date
Client ID:		Run ID: LC_050525A		SeqNo: 365705	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.5249	0.1	0.5	0	105	90	110	0			
Chloride	4.589	0.1	5	0	91.8	90	110	0			
Phosphorus, Orthophosphate (As P)	4.656	0.5	5	0	93.1	90	110	0			
Sulfate	9.366	0.5	10	0	93.7	90	110	0			
Nitrate (As N)+Nitrite (As N)	3.236	0.1	3.5	0	92.4	90	110	0			

Sample ID LCS	Batch ID: R15517	Test Code: E300	Units: mg/L	Analysis Date 5/26/2005	Prep Date
Client ID:		Run ID: LC_050526A		SeqNo: 366187	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.4586	0.1	0.5	0	91.7	90	110	0			
Chloride	4.665	0.1	5	0	93.3	90	110	0			
Phosphorus, Orthophosphate (As P)	4.688	0.5	5	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			

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

CLIENT: San Juan Refining
Work Order: 0505104
Project: Phase II Monitoring

QC SUMMARY REPORT
Laboratory Control Spike - generic

Sample ID BTEX lcs 100ng | Batch ID: R15402 | Test Code: SW8021 | Units: µg/L | Analysis Date 5/17/2005 2:41:13 AM | Prep Date
Client ID: | Run ID: PIDFID_050516A | SeqNo: 362606

Analyte	Result	PQL	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	19.56	0.5	20	0	97.8	88.6	113	0			
Xylenes, Total	58.39	0.5	60	0	97.3	89.4	112	0			

Sample ID LCS-7989 | Batch ID: 7989 | Test Code: SW7470 | Units: mg/L | Analysis Date 5/17/2005 | Prep Date 5/17/2005
Client ID: | Run ID: MI-LA254_050517A | SeqNo: 362938

Analyte	Result	PQL	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 | Units: mg/L | Analysis Date 5/17/2005 | Prep Date 5/17/2005
Client ID: | Run ID: MI-LA254_050517A | SeqNo: 362962

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	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 | Units: mg/L | Analysis Date 5/16/2005 1:09:21 PM | Prep Date 5/13/2005
Client ID: | Run ID: ICP_050516B | SeqNo: 362841

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.526	0.02	0.5	0	105	80	120	0			
Barium	0.5109	0.02	0.5	0	102	80	120	0			
Cadmium	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			
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 - 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

CLIENT:	San Juan Refining
Work Order:	0505104
Project:	Phase II Monitoring

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Sample ID LCSD-7969 Batch ID: 7969 Test Code: SW6010A Units: mg/L Analysis Date 5/16/2005 1:12:23 PM Prep Date 5/13/2005

Client ID: Run ID: ICP_050516B SeqNo: 362842

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.5106	0.02	0.5	0	102	80	120	0.526	2.97	20	
Barium	0.4946	0.02	0.5	0	98.9	80	120	0.5109	3.23	20	
Cadmium	0.5016	0.002	0.5	0	100	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	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	

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Qualifiers: ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

Hall Environmental Analysis Laboratory

Sample Receipt Checklist

Client Name SJR | Date and Time Received: 5/12/2005

Work Order Number 0505104 | Received by AT

Checklist completed by _____ 5/12/05
Signature | Date

Matrix | Carrier name UPS

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐	Not Shipped ☐
Custody seals intact on sample bottles?	Yes ☐	No ☑	N/A ☐	
Chain of custody present?	Yes ☑	No ☐		
Chain of 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?	21°	*4° C ± 2 Acceptable* If given sufficient time to cool.		

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

CHAIN-OF-CUSTODY RECORD

QA/QC Package: Std ☐ Level 4 ☐
Other:

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: Giant Refinery Ciniza
Address: #50, CR 4990
Bloomfield, NM 87413
Phone #: 505-632-4161
Fax #: 505-632-3911

Project Name: Phase II Monitoring
Project #:
Project Manager:
Sampler: Cindy Hurtado / Angela FOLK
Sample Temperature: /

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative: $HgCl_2$	Preservative: HNO_3	Preservative:	HEAL No.
5-11-05	915	H_2O	CW Le + 70	2-VOA	X			0505104-1
				1-250mL			H_2SO_4	
				1-250ml				
				1-500ml		X		
5-11-05	1030	H_2O	CW 8 +10	2 VOA	X			-2
				1-250mL			H_2SO_4	
				1-250ml				
				1-500 ml		X		

ANALYSIS REQUEST

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	827O (Semi-VOA)					Air Bubbles or Headspace (Y or N)
X																
								X								
								X								
							X									
X																
								X								
								X								
							X									

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
5-11-05	340pm	Cindy Hurtado	5/12/05 1415
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks:

CHAIN-OF-CUSTODY RECORD

QA/QC Package: Std ☐ Level 4 ☐ Other:

Client: San Juan Refining

Project Name: Phase II Monitoring

Address: #50 CR 4990 Bloomfield, NM 87413

Project #:

Project Manager:

Phone #: 505-632-4161

Sampler: Cindy Hurtado/Angela Folk

Fax #: 505-632-3911

Sample Temperature: 10

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

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	Preservative	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)					Air Bubbles or Headspace (Y or N)
5-11-05	1145AM	H_2O	CW11+15	2-VOA	X			0505104-3	X																
				1-250ml			H_2SO_4										X								
				1-250ml													X								
				1-500ml		X										X									
5-11-05	145pm	H_2O	CW14+10	2-VOA	X			-4																	
				1-250ml			H_2SO_4		X																
				1-250ml													X								
				1-500ml		X											X								
																X									

Date	Time	Relinquished By: (Signature)	Received By: (Signature)	
5-11-05	340pm	Cindy Hurtado		
				5/12/05 1415
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)	

Remarks:

CHAIN-OF-CUSTODY RECORD

QA/QC Package:
Std ☐ Level 4 ☐
Other: _____

HALL ENVIRONMENTAL ANALYSIS LABORATORY
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Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
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Client: SAN Juan Refining
Address: #50 Rd 4990
Bloomfield, NM 87413
Phone #: 505-632-4161
Fax #: 505-632-3911

Project Name: PHASE II Monitoring
Project #:
Project Manager:
Sampler: Cindy Hurtado/Angela Folk
Sample Temperature: /

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	Preservative	HEAL No.	BTEX + ~~MTBE~~ + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)				Air Bubbles or Headspace (Y or N)
5-11-05	2:15pm	H_2O	OW14+10	2-VOA	X			0505104-5	X															
				1-250ml			H_2SO_4										X							
				1-250ml													X							
				1-500ml		X										X								
5-11-05	3pm	H_2O	CW16+60	2-VOA	X			-6	X															
				1-250ml			H_2SO_4										X							
				1-250ml													X							
				1-500ml		X										X								
			Trip Blank					-7																

Date: 5-11-05 Time: 3:40pm Relinquished By: (Signature) Cindy Hurtado
Received By: (Signature)
Date: 5/12/05 Time: 1415

Date: Time: Relinquished By: (Signature)
Received By: (Signature)

Remarks:

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

May 27, 2005

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

RE: Phase II Monitoring

Order No.: 0505088

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 9 samples on 5/11/2005 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

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

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

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT: San Juan Refining
Lab Order: 0505088
Project: Phase II Monitoring
Lab ID: 0505088-01

Client Sample ID: CW 0+60
Collection Date: 5/10/2005 8:30:00 AM
Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						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		µg/L	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-Bromofluorobenzene	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 METALS						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	ND	0.0050		mg/L	1	5/16/2005 1:24:22 PM

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	CW 1+50
Lab Order:	0505088	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 METALS						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

Hall Environmental Analysis Laboratory

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:	0505088-03	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/L	20	5/13/2005 8:03:34 PM
Ethylbenzene	860	10		µg/L	20	5/13/2005 8:03:34 PM
Xylenes, Total	3200	10		µg/L	20	5/13/2005 8:03:34 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 METALS						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
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT: San Juan Refining
Lab Order: 0505088
Project: Phase II Monitoring
Lab ID: 0505088-04

Client Sample ID: CW 19+50
Collection Date: 5/10/2005 10:45:00 AM
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 METALS						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:
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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: *27-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	CW 3+85
Lab Order:	0505088	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/L	20	5/13/2005 9:04:37 PM
Ethylbenzene	20	10		µg/L	20	5/13/2005 9:04:37 PM
Xylenes, Total	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 METALS						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

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	CW 5+50
Lab Order:	0505088	Collection Date:	5/10/2005 2:15:00 PM
Project:	Phase II Monitoring		
Lab ID:	0505088-06	Matrix:	AQUEOUS

Analyses	Result	PQL	Qual	Units	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		%REC	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 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

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	Trip Blank
Lab Order:	0505088	Collection Date:	
Project:	Phase II Monitoring		
Lab ID:	0505088-07	Matrix:	TRIP BLANK

Analyses	Result	PQL	Qual	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

Qualifiers:

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J - Analyte detected below quantitation limits.
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Hall Environmental Analysis Laboratory

Date: *27-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	CW 22+00
Lab Order:	0505088	Collection Date:	5/10/2005 2:45:00 PM
Project:	Phase II Monitoring		
Lab ID:	0505088-08	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	ND	0.00020		mg/L	1	5/17/2005
EPA 6010: TOTAL RECOVERABLE METALS						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:

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- 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: *27-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	OW 22+00
Lab Order:	0505088	Collection Date:	5/10/2005 3:10:00 PM
Project:	Phase II Monitoring		
Lab ID:	0505088-09	Matrix:	AQUEOUS

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
Surr: 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 METALS						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:

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- * - 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: *27-May-05*

CLIENT: San Juan Refining
Work Order: 0505088
Project: Phase II Monitoring

QC SUMMARY REPORT
Method Blank

Sample ID MBLK	Batch ID: R15366	Test Code: E300	Units: mg/L	Analysis Date 5/11/2005	Prep Date
Client ID:		Run ID: LC_050511A		SeqNo: 361369	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.1									
Chloride	ND	0.1									
Phosphorus, Orthophosphate (As P)	ND	0.5									
Sulfate	ND	0.5									
Nitrate (As N)+Nitrite (As N)	ND	0.1									

Sample ID MBLK	Batch ID: R15404	Test Code: E300	Units: mg/L	Analysis Date 5/16/2005	Prep Date
Client ID:		Run ID: LC_050516A		SeqNo: 362672	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.1									
Chloride	0.05255	0.1									J
Phosphorus, Orthophosphate (As P)	ND	0.5									
Sulfate	ND	0.5									
Nitrate (As N)+Nitrite (As N)	ND	0.1									

Sample ID MBLK	Batch ID: R15517	Test Code: E300	Units: mg/L	Analysis Date 5/26/2005	Prep Date
Client ID:		Run ID: LC_050526A		SeqNo: 366186	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.1									
Chloride	ND	0.1									
Phosphorus, Orthophosphate (As P)	ND	0.5									
Sulfate	ND	0.5									
Nitrate (As N)+Nitrite (As N)	ND	0.1									

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

J

10 / 16

CLIENT: San Juan Refining
Work Order: 0505088
Project: Phase II Monitoring

QC SUMMARY REPORT
Method Blank

Sample ID Reagent Blank 5m Batch ID: R15378 Test Code: SW8021 Units: µg/L Analysis Date 5/13/2005 8:43:30 AM Prep Date
Client ID: Run ID: PIDFID_050513A SeqNo: 361595

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.5									
Toluene	ND	0.5									
Ethylbenzene	ND	0.5									
Xylenes, Total	ND	0.5									
Surr: 4-Bromofluorobenzene	19.54	0	20	0	97.7	83.3	121	0			

Sample ID Reagent Blank 5m Batch ID: R15402 Test Code: SW8021 Units: µg/L Analysis Date 5/16/2005 7:08:29 AM Prep Date
Client ID: Run ID: PIDFID_050516A SeqNo: 362600

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.5									
Toluene	ND	0.5									
Ethylbenzene	ND	0.5									
Xylenes, Total	ND	0.5									
Surr: 4-Bromofluorobenzene	20.29	0	20	0	101	83.3	121	0			

Sample ID MB-7989 Batch ID: 7989 Test Code: SW7470 Units: mg/L Analysis Date 5/17/2005 Prep Date 5/17/2005
Client ID: Run ID: MI-LA254_050517A SeqNo: 362937

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.0002									

11/16

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

CLIENT:	San Juan Refining
Work Order:	0505088
Project:	Phase II Monitoring

QC SUMMARY REPORT
Method Blank

Sample ID MB-7969 Batch ID: 7969 Test Code: SW6010A Units: mg/L Analysis Date 5/16/2005 1:06:22 PM Prep Date 5/13/2005

Client ID: Run ID: ICP_050516B SeqNo: 362840

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.02									
Barium	ND	0.02									
Cadmium	ND	0.002									
Chromium	ND	0.006									
Lead	ND	0.005									
Selenium	ND	0.05									
Silver	ND	0.005									

12/16

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

CLIENT: San Juan Refining
Work Order: 0505088
Project: Phase II Monitoring

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID LCS | Batch ID: R15366 | Test Code: E300 | Units: mg/L | Analysis Date 5/11/2005 | Prep Date
Client ID: | Run ID: LC_050511A | SeqNo: 361370

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.5049	0.1	0.5	0	101	90	110	0			
Chloride	4.695	0.1	5	0	93.9	90	110	0			
Phosphorus, Orthophosphate (As P)	4.781	0.5	5	0	95.6	90	110	0			
Sulfate	9.703	0.5	10	0	97.0	90	110	0			
Nitrate (As N)+Nitrite (As N)	3.329	0.1	3.5	0	95.1	90	110	0			

Sample ID LCS | Batch ID: R15404 | Test Code: E300 | Units: mg/L | Analysis Date 5/16/2005 | Prep Date
Client ID: | Run ID: LC_050516A | SeqNo: 362675

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.5306	0.1	0.5	0	106	90	110	0			
Chloride	4.664	0.1	5	0.05255	92.2	90	110	0			
Phosphorus, Orthophosphate (As P)	4.747	0.5	5	0	94.9	90	110	0			
Sulfate	9.524	0.5	10	0	95.2	90	110	0			
Nitrate (As N)+Nitrite (As N)	3.281	0.1	3.5	0	93.7	90	110	0			

Sample ID LCS | Batch ID: R15517 | Test Code: E300 | Units: mg/L | Analysis Date 5/26/2005 | Prep Date
Client ID: | Run ID: LC_050526A | SeqNo: 366187

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.4586	0.1	0.5	0	91.7	90	110	0			
Chloride	4.665	0.1	5	0	93.3	90	110	0			
Phosphorus, Orthophosphate (As P)	4.688	0.5	5	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			

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

CLIENT: San Juan Refining
Work Order: 0505088
Project: Phase II Monitoring

QC SUMMARY REPORT
Laboratory Control Spike - generic

Sample ID BTEX lcs 100ng	Batch ID: R15378	Test Code: SW8021	Units: µg/L	Analysis Date 5/14/2005 2:37:48 AM	Prep Date
Client ID:		Run ID: PIDFID_050513A		SeqNo: 362246	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	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	60	0	103	89.4	112	0			

Sample ID BTEX lcs 100ng	Batch ID: R15402	Test Code: SW8021	Units: µg/L	Analysis Date 5/17/2005 2:41:13 AM	Prep Date
Client ID:		Run ID: PIDFID_050516A		SeqNo: 362606	

Analyte	Result	PQL	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	19.56	0.5	20	0	97.8	88.6	113	0			
Xylenes, Total	58.39	0.5	60	0	97.3	89.4	112	0			

Sample ID LCS-7989	Batch ID: 7989	Test Code: SW7470	Units: mg/L	Analysis Date 5/17/2005	Prep Date 5/17/2005
Client ID:		Run ID: MI-LA254_050517A		SeqNo: 362938	

Analyte	Result	PQL	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	Units: mg/L	Analysis Date 5/17/2005	Prep Date 5/17/2005
Client ID:		Run ID: MI-LA254_050517A		SeqNo: 362962	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.004773	0.0002	0.005	0	95.5	75.2	134	0.004839	1.35	0	

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

CLIENT: San Juan Refining
Work Order: 0505088
Project: Phase II Monitoring

QC SUMMARY REPORT
Laboratory Control Spike - generic

Sample ID LCS-7969 Batch ID: 7969 Test Code: SW6010A Units: mg/L Analysis Date 5/16/2005 1:09:21 PM Prep Date 5/13/2005
Client ID: Run ID: ICP_050516B SeqNo: 362841

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.526	0.02	0.5	0	105	80	120	0			
Barium	0.5109	0.02	0.5	0	102	80	120	0			
Cadmium	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			
Selenium	0.5057	0.05	0.5	0	101	80	120	0			
Silver	0.5122	0.005	0.5	0	102	80	120	0			

Sample ID LCSD-7969 Batch ID: 7969 Test Code: SW6010A Units: mg/L Analysis Date 5/16/2005 1:12:23 PM Prep Date 5/13/2005
Client ID: Run ID: ICP_050516B SeqNo: 362842

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.5106	0.02	0.5	0	102	80	120	0.526	2.97	20	
Barium	0.4946	0.02	0.5	0	98.9	80	120	0.5109	3.23	20	
Cadmium	0.5016	0.002	0.5	0	100	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	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	

15/16

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

Hall Environmental Analysis Laboratory

Sample Receipt Checklist

Client Name SJR | Date and Time Received: 5/11/2005

Work Order Number 0505088 | Received by GLS

Checklist completed by _____ 5-11-05
Signature | Date

Matrix | Carrier name UPS

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑	Not Shipped ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	N/A ☑	
Chain of custody present?	Yes ☑	No ☐		
Chain of 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* If given sufficient time to cool.		

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

CHAIN-OF-CUSTODY RECORD

QA / QC Package:
Std ☐ Level 4 ☐
Other:

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: San Juan Refinery
Address: #50 Rd 4990
Bloomfield, NM 87413
Phone #: 505-632-4161
Fax #: 505-632-3911

Project Name: Phase II Monitoring
Project #:
Project Manager:
Sampler: Cindy Hurtado / Angela Folk
Sample Temperature: n/a

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	Preservative	HEAL No.	BTEX + ~~MTBE~~ + ~~TMB's~~ (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)					Air Bubbles or Headspace (Y or N)
5-10-05	830A	H_2O	CW0+60	2-VOA	X			0505058-1	X																
				1-250mL			H_2SO_4	-1									X								
				1-250mL				-1									X								
				1-500mL		X		-1								X									
5-10-05	915A	H_2O	CW1+50	2-VOA	X			-2	X																
				1-250mL			H_2SO_4	-2									X								
				1-250mL				-2									X								
				1-500mL		X		-2								X									

Date	Time	Relinquished By: (Signature)	Received By: (Signature)
5-10-05	330pm	Cindy Hurtado	5-11-05 @ 14:00
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks:

CHAIN-OF-CUSTODY RECORD

QA/QC Package: Std ☐ Level 4 ☐
Other:

Client: San Juan Refining
Address: 50 Rd 4990 Bloomfield, NM 87413
Phone #: 505-632-4161
Fax #: 505-632-3911

Project Name: Phase II Monitoring
Project #:
Project Manager:
Sampler: Cindy Hurtado / Angela Folk
Sample Temperature:

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

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	Preservative	HEAL No. 0505088	BTEX + ~~MTBE~~ + ~~TMB's~~ (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_2, NO_3, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)					Air Bubbles or Headspace (Y or N)
5-10-05	1015A	H_2O	OW19+50	2-VOA	X			-3	X																
				1-250mL			H_2SO_4	-3									X								
				1-250mL				-3									X								
				1-500mL		X		-3								X									
5-10-05	1045A	H_2O	CW19+50	2-VOA	X			-4	X																
				1-250mL			H_2SO_4	-4									X								
				1-250mL				-4									X								
				1-500mL	X			-4								X									

Date: 5-10-05 Time: 330pm Relinquished By: (Signature) Cindy Hurtado
Received By: (Signature) [signature] 5-11-05 @ 14:00
Date: Time: Relinquished By: (Signature)
Received By: (Signature)

Remarks:

CHAIN-OF-CUSTODY RECORD

QA / QC Package:
Std ☐ Level 4 ☐
Other:

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: San Juan Refining
Address: #50 Rd 4990
Bloomfield, NM
87413
Phone #: 505-632-4161
Fax #: 505-632-3911

Project Name: Phase II Monitoring
Project #:
Project Manager:
Sampler: Cindy Hurtado/Angela Folk
Sample Temperature:

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	Preservative	HEAL No.	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)	Air Bubbles or Headspace (Y or N)
	1330							0505088												
5-10-05	1345	H2O	CW3+85	2-VOA	X			-5	X											
				1-250mL			H_2SO_4	-5								X				
				1-250mL				-5								X				
				1-500mL		X		-5							X					
5-10-05	2:15pm	H2O	CW5+50	2-VOA	X			-6	X											
				1-250mL			H_2SO_4	-6								X				
				1-250mL				-6								X				
				1-500mL		X		-6							X					
			Trip Blank					-7												

Date	Time	Relinquished By: (Signature)	Received By: (Signature)	Remarks:
5-10-05	330pm	Cindy Hurtado		
			5-11-05 @ 1400	
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)	

CHAIN-OF-CUSTODY RECORD

QA / QC Package:
Std ☐ Level 4 ☐
Other: _____

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: San Juan Refining
Address: #50 Rd 4990 Bloomfield, NM 87413
Phone #: 505-632-4161
Fax #: 505-632-3911

Project Name: PHASE II Monitoring
Project #:
Project Manager:
Sampler: Cindy Hurtado/Angela Folk
Sample Temperature: 6°

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	Preservative	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)					Air Bubbles or Headspace (Y or N)
								0505088																	
5-10-05	245pm	H_2O	CW22+00	2-VOA	X			-8	X																
				1-250mL		#	H_2SO_4	-8									X								
				1-250mL				-8									X								
				1-500mL		X		-8								X									
5-10-05	310pm	H_2O	OW22+00	2-VOA	X			-9	X																
				1-250mL			H_2SO_4	-9									X								
				1-250mL				-9									X								
				1-500mL		X		-9								X									

Date	Time	Relinquished By: (Signature)	Received By: (Signature)	Remarks:
5-10-05	330pm	Cindy Hurtado	5-11-05 @1400	
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)	

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

May 31, 2005

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

RE: Phase II Monitoring

Order No.: 0505119

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 7 samples on 5/13/2005 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

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

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

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

Hall Environmental Analysis Laboratory

Date: *31-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	CW 23÷10
Lab Order:	0505119	Collection Date:	5/12/2005 8:30:00 AM
Project:	Phase II Monitoring		
Lab ID:	0505119-01	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	5/14/2005
Chloride	450	2.0		mg/L	20	5/25/2005
Phosphorus, Orthophosphate (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		mg/L	5	5/25/2005
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Benzene	6300	50		µg/L	100	5/17/2005 10:12:56 AM
Toluene	76	10		µg/L	20	5/16/2005 10:37:05 PM
Ethylbenzene	190	10		µg/L	20	5/16/2005 10:37:05 PM
Xylenes, Total	350	10		µg/L	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 METALS						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

Hall Environmental Analysis Laboratory

Date: *31-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	CW 23+90
Lab Order:	0505119	Collection Date:	5/12/2005 9:20:00 AM
Project:	Phase II Monitoring		
Lab ID:	0505119-02	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)	ND	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		µg/L	20	5/16/2005 11:07:51 PM
Ethylbenzene	170	10		µg/L	20	5/16/2005 11:07:51 PM
Xylenes, Total	400	10		µg/L	20	5/16/2005 11:07:51 PM
Surr: 4-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 METALS						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

Hall Environmental Analysis Laboratory

Date: *31-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	CW 25+95
Lab Order:	0505119	Collection Date:	5/12/2005 10:10:00 AM
Project:	Phase II Monitoring		
Lab ID:	0505119-03	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	ND	0.50		µg/L	1	5/16/2005 11:38:28 PM
Xylenes, Total	ND	0.50		µg/L	1	5/16/2005 11:38:28 PM
Surr: 4-Bromofluorobenzene	100	83.3-121		%REC	1	5/16/2005 11:38:28 PM
EPA METHOD 7470: MERCURY						Analyst: CMC
Mercury	ND	0.00020		mg/L	1	5/26/2005
EPA 6010: TOTAL RECOVERABLE METALS						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

Hall Environmental Analysis Laboratory

Date: *31-May-05*

CLIENT: San Juan Refining
Lab Order: 0505119
Project: Phase II Monitoring
Lab ID: 0505119-04

Client Sample ID: OW 25+70
Collection Date: 5/12/2005 10:20:00 AM
Matrix: AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: IC
Fluoride	0.53	0.10		mg/L	1	5/14/2005
Chloride	50	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	350	5.0		mg/L	10	5/25/2005
EPA METHOD 8021B: VOLATILES						Analyst: NSB
Benzene	0.79	0.50		µg/L	1	5/17/2005 12:09:01 AM
Toluene	ND	0.50		µg/L	1	5/17/2005 12:09:01 AM
Ethylbenzene	ND	0.50		µg/L	1	5/17/2005 12:09:01 AM
Xylenes, Total	ND	0.50		µg/L	1	5/17/2005 12:09:01 AM
Surr: 4-Bromofluorobenzene	101	83.3-121		%REC	1	5/17/2005 12:09:01 AM
EPA METHOD 7470: MERCURY						Analyst: CMC
Mercury	ND	0.00020		mg/L	1	5/26/2005
EPA 6010: TOTAL RECOVERABLE METALS						Analyst: CMC
Arsenic	0.14	0.10		mg/L	5	5/18/2005 2:48:09 PM
Barium	25	2.0		mg/L	100	5/18/2005 3:22:11 PM
Cadmium	ND	0.010		mg/L	5	5/18/2005 2:48:09 PM
Chromium	0.44	0.030		mg/L	5	5/18/2005 2:48:09 PM
Lead	0.13	0.025		mg/L	5	5/18/2005 2:48:09 PM
Selenium	ND	0.25		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

Hall Environmental Analysis Laboratory

Date: *31-May-05*

CLIENT:	San Juan Refining	**Client Sample ID:**	OW 23+90
Lab Order:	0505119	**Collection Date:**	5/12/2005 12:30:00 PM
Project:	Phase II Monitoring		
Lab ID:	0505119-05	**Matrix:**	AQUEOUS

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 300.0: ANIONS						Analyst: IC
Fluoride	0.72	0.10		mg/L	1	5/14/2005
Chloride	320	2.0		mg/L	20	5/25/2005
Nitrogen, Nitrite (As N)	ND	0.10		mg/L	1	5/14/2005
Nitrogen, Nitrate (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		µg/L	20	5/17/2005 12:39:31 AM
Xylenes, Total	130	10		µg/L	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

Hall Environmental Analysis Laboratory

Date: *31-May-05*

CLIENT:	San Juan Refining	Client Sample ID:	OW 23+10
Lab Order:	0505119	Collection Date:	5/12/2005 1:00:00 PM
Project:	Phase II Monitoring		
Lab ID:	0505119-06	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 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

Hall Environmental Analysis Laboratory

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	Qual	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
Ethylbenzene	ND	0.50		µg/L	1	5/17/2005 2:10:51 AM
Xylenes, Total	ND	0.50		µg/L	1	5/17/2005 2:10:51 AM
Surr: 4-Bromofluorobenzene	97.4	83.3-121		%REC	1	5/17/2005 2:10:51 AM

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Hall Environmental Analysis Laboratory

Date: 31-May-05

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

QC SUMMARY REPORT

Method Blank

Sample ID MBLK | Batch ID: R15380 | Test Code: E300 | Units: mg/L | Analysis Date 5/12/2005 | Prep Date
Client ID: | Run ID: LC_050512A | SeqNo: 361746

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.1									
Chloride	ND	0.1									
Nitrogen, Nitrite (As N)	ND	0.1									
Nitrogen, Nitrate (As N)	ND	0.1									
Phosphorus, Orthophosphate (As P)	ND	0.5									
Sulfate	ND	0.5									
Nitrate (As N)+Nitrite (As N)	ND	0.1									

Sample ID MB | Batch ID: R15380 | Test Code: E300 | Units: mg/L | Analysis Date 5/12/2005 | Prep Date
Client ID: | Run ID: LC_050512A | SeqNo: 361769

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.1									
Chloride	ND	0.1									
Nitrogen, Nitrite (As N)	ND	0.1									
Nitrogen, Nitrate (As N)	ND	0.1									
Phosphorus, Orthophosphate (As P)	ND	0.5									
Sulfate	ND	0.5									
Nitrate (As N)+Nitrite (As N)	ND	0.1									

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

J

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

QC SUMMARY REPORT
Method Blank

Sample ID MB	Batch ID: R15380	Test Code: E300	Units: mg/L	Analysis Date 5/14/2005	Prep Date
Client ID:		Run ID: LC_050512A		SeqNo: 362063	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.1	0	0	0	0	0	0			
Chloride	ND	0.1	0	0	0	0	0	0			
Nitrogen, Nitrite (As N)	ND	0.1	0	0	0	0	0	0			
Nitrogen, Nitrate (As N)	ND	0.1	0	0	0	0	0	0			
Phosphorus, Orthophosphate (As P)	ND	0.5	0	0	0	0	0	0			
Sulfate	0.1124	0.5	0	0	0	0	0	0			J
Nitrate (As N)+Nitrite (As N)	ND	0.1	0	0	0	0	0	0			

Sample ID MBLK	Batch ID: R15502	Test Code: E300	Units: mg/L	Analysis Date 5/25/2005	Prep Date
Client ID:		Run ID: LC_050525A		SeqNo: 365704	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.1									
Chloride	ND	0.1									
Nitrogen, Nitrite (As N)	ND	0.1									
Nitrogen, Nitrate (As N)	ND	0.1									
Phosphorus, Orthophosphate (As P)	ND	0.5									
Sulfate	ND	0.5									
Nitrate (As N)+Nitrite (As N)	ND	0.1									

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

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

QC SUMMARY REPORT
Method Blank

Sample ID Reagent Blank 5m Batch ID: R15402 Test Code: SW8021 Units: µg/L Analysis Date 5/16/2005 7:08:29 AM Prep Date
Client ID: Run ID: PIDFID_050516A SeqNo: 362600

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.5									
Toluene	ND	0.5									
Ethylbenzene	ND	0.5									
Xylenes, Total	ND	0.5									
Surr: 4-Bromofluorobenzene	20.29	0	20	0	101	83.3	121	0			

Sample ID Reagent Blank 5m Batch ID: R15413 Test Code: SW8021 Units: µg/L Analysis Date 5/17/2005 8:39:57 AM Prep Date
Client ID: Run ID: PIDFID_050517A SeqNo: 362968

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.5									
Toluene	ND	0.5									
Ethylbenzene	ND	0.5									
Xylenes, Total	ND	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 Units: mg/L Analysis Date 5/26/2005 Prep Date 5/26/2005
Client ID: Run ID: MI-LA254_050526A SeqNo: 366067

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.0002									

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

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

QC SUMMARY REPORT
Method Blank

Sample ID MB-7986 Batch ID: 7986 Test Code: SW6010A Units: mg/L Analysis Date 5/18/2005 1:00:33 PM Prep Date 5/17/2005
Client ID: Run ID: ICP_050518A SeqNo: 363313

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.02									
Barium	ND	0.02									
Cadmium	ND	0.002									
Chromium	ND	0.006									
Lead	ND	0.005									
Selenium	ND	0.05									
Silver	ND	0.005									

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

Hall Environmental Analysis Laboratory

Date: *31-May-05*

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

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID LCS | Batch ID: R15380 | Test Code: E300 | Units: mg/L | Analysis Date 5/12/2005 | Prep Date
Client ID: | Run ID: LC_050512A | SeqNo: 361747

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.5047	0.1	0.5	0	101	90	110	0			
Chloride	4.755	0.1	5	0	95.1	90	110	0			
Nitrogen, Nitrite (As N)	0.9372	0.1	1	0	93.7	90	110	0			
Nitrogen, Nitrate (As N)	2.449	0.1	2.5	0	98.0	90	110	0			
Phosphorus, Orthophosphate (As P)	4.836	0.5	5	0	96.7	90	110	0			
Sulfate	9.669	0.5	10	0	96.7	90	110	0			
Nitrate (As N)+Nitrite (As N)	3.386	0.1	3.5	0	96.7	90	110	0			

Sample ID LCS | Batch ID: R15380 | Test Code: E300 | Units: mg/L | Analysis Date 5/12/2005 | Prep Date
Client ID: | Run ID: LC_050512A | SeqNo: 361770

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.5233	0.1	0.5	0	105	90	110	0			
Chloride	4.89	0.1	5	0	97.8	90	110	0			
Nitrogen, Nitrite (As N)	0.978	0.1	1	0	97.8	90	110	0			
Nitrogen, Nitrate (As N)	2.507	0.1	2.5	0	100	90	110	0			
Phosphorus, Orthophosphate (As P)	5.19	0.5	5	0	104	90	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	99.6	90	110	0			

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

I

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

QC SUMMARY REPORT
Laboratory Control Spike - generic

Sample ID LCS | Batch ID: R15380 | Test Code: E300 | Units: mg/L | Analysis Date 5/14/2005 | Prep Date
Client ID: | Run ID: LC_050512A | SeqNo: 362064

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.516	0.1	0.5	0	103	90	110	0			
Chloride	4.744	0.1	5	0	94.9	90	110	0			
Nitrogen, Nitrite (As N)	0.9562	0.1	1	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	0			
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	96.7	90	110	0			

Sample ID LCS | Batch ID: R15502 | Test Code: E300 | Units: mg/L | Analysis Date 5/25/2005 | Prep Date
Client ID: | Run ID: LC_050525A | SeqNo: 365705

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.5249	0.1	0.5	0	105	90	110	0			
Chloride	4.589	0.1	5	0	91.8	90	110	0			
Nitrogen, Nitrite (As N)	0.9075	0.1	1	0	90.8	90	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	9.366	0.5	10	0	93.7	90	110	0			
Nitrate (As N)+Nitrite (As N)	3.236	0.1	3.5	0	92.4	90	110	0			

Sample ID BTEX lcs 100ng | Batch ID: R15402 | Test Code: SW8021 | Units: µg/L | Analysis Date 5/17/2005 2:41:13 AM | Prep Date
Client ID: | Run ID: PIDFID_050516A | SeqNo: 362606

Analyte	Result	PQL	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	19.56	0.5	20	0	97.8	88.6	113	0			
Xylenes, Total	58.39	0.5	60	0	97.3	89.4	112	0			

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

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

QC SUMMARY REPORT
Laboratory Control Spike - generic

Sample ID BTEX lcs 100ng Batch ID: R15413 Test Code: SW8021 Units: µg/L Analysis Date 5/17/2005 10:39:14 PM Prep Date
Client ID: Run ID: PIDFID_050517A SeqNo: 363019

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	19.19	0.5	20	0	95.9	88.7	114	0			
Toluene	19.54	0.5	20	0	97.7	89.3	112	0			
Ethylbenzene	19.59	0.5	20	0	97.9	88.6	113	0			
Xylenes, Total	59.19	0.5	60	0	98.7	89.4	112	0			

Sample ID LCS-8047 Batch ID: 8047 Test Code: SW7470 Units: mg/L Analysis Date 5/26/2005 Prep Date 5/26/2005
Client ID: Run ID: MI-LA254_050526A SeqNo: 366068

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.004958	0.0002	0.005	0	99.2	75.2	134	0			

Sample ID LCSD-8047 Batch ID: 8047 Test Code: SW7470 Units: mg/L Analysis Date 5/26/2005 Prep Date 5/26/2005
Client ID: Run ID: MI-LA254_050526A SeqNo: 366084

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	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 LCS-7986 Batch ID: 7986 Test Code: SW6010A Units: mg/L Analysis Date 5/18/2005 1:03:29 PM Prep Date 5/17/2005
Client ID: Run ID: ICP_050518A SeqNo: 363314

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.528	0.02	0.5	0	106	80	120	0			
Barium	0.5084	0.02	0.5	0	102	80	120	0			
Cadmium	0.5097	0.002	0.5	0	102	80	120	0			
Chromium	0.5011	0.006	0.5	0	100	80	120	0			
Lead	0.4976	0.005	0.5	0	99.5	80	120	0			
Selenium	0.4864	0.05	0.5	0	97.3	80	120	0			
Silver	0.5102	0.005	0.5	0	102	80	120	0			

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

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

QC SUMMARY REPORT
Laboratory Control Spike Duplicate

Sample ID LCSD-7986 Batch ID: 7986 Test Code: SW6010A Units: mg/L Analysis Date 5/18/2005 1:06:28 PM Prep Date 5/17/2005
Client ID: Run ID: ICP_050518A SeqNo: 363315

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.5204	0.02	0.5	0	104	80	120	0.528	1.44	20	
Barium	0.5108	0.02	0.5	0	102	80	120	0.5084	0.483	20	
Cadmium	0.5099	0.002	0.5	0	102	80	120	0.5097	0.0392	20	
Chromium	0.5056	0.006	0.5	0	101	80	120	0.5011	0.894	20	
Lead	0.4979	0.005	0.5	0	99.6	80	120	0.4976	0.0656	20	
Selenium	0.4785	0.05	0.5	0	95.7	80	120	0.4864	1.65	20	
Silver	0.5105	0.005	0.5	0	102	80	120	0.5102	0.0645	20	

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

Hall Environmental Analysis Laboratory

Sample Receipt Checklist

Client Name SJR | Date and Time Received: 5/13/2005

Work Order Number 0505119 | Received by GLS

Checklist completed by [signature] Signature | 5-13-05 Date

Matrix | Carrier name UPS

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑	Not Shipped ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	N/A ☑	
Chain of custody present?	Yes ☑	No ☐		
Chain of 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* If given sufficient time to cool.		

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

_____

_____

_____

_____

Corrective Action _____

_____

_____

CHAIN-OF-CUSTODY RECORD

QA / QC Package:
Std ☐ Level 4 ☐
Other:

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: San Juan Refining
Address: #50 CR4990 Bloomfield, NM 87413
Phone #: 505-632-4161
Fax #: 505-632-3911

Project Name: Phase II Monitoring
Project #:
Project Manager:
Sampler: Cindy Hurtado / Angela Folk
Sample Temperature: 1°

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative: $HgCl_2$	Preservative: HNO_3	Preservative:	HEAL No. 0505119
5-12-05	830AM	H_2O	CW23+10	2-VOA	X			-1
"	"	"	"	1-250ml			H_2SO_4	-1
"	"	"	"	1-250ml				-1
"	"	"	"	1-500ml		X		-1
5-12-05	920AM	H_2O	CW23+90	2-VOA	X			-2
"	"	"	"	1-250ml			H_2SO_4	-2
"	"	"	"	1-250ml				-2
"	"	"	"	1-500ml		X		-2

ANALYSIS REQUEST

BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	831D (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)					Air Bubbles or Headspace (Y or N)
X	X															
								X								
								X								
							X									
X																
								X								
								X								
							X									

Date: 5-12-05 Time: 330pm Relinquished By: (Signature) Cindy Hurtado
Received By: (Signature) 5-13-05 12:40
Date: Time: Relinquished By: (Signature)
Received By: (Signature)

Remarks:

CHAIN-OF-CUSTODY RECORD

QA/QC Package: Std ☐ Level 4 ☐
Other:

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: San Juan Refining
Address: #50 Rd 4990 Bloomfield, NM 87413
Phone #: 505-632-4161
Fax #: 505-632-3911

Project Name: Phase II Monitoring
Project #:
Project Manager:
Sampler: Cindy Hurtado / Angela Folk
Sample Temperature:

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HNO_3	Preservative	HEAL No. 0505119
5-12-05	1010 Hr	H_2O	CW25+95	2-VOA	X			-3
"	"	"	"	1-250ml			H_2SO_4	-3
"	"	"	"	1-250ml				-3
"	"	"	"	1-500ml		X		-3
5-12-05	1020 Hr	H_2O	OW25+70	2-VOA	X			-4
"	"	"	"	1-250ml			H_2SO_4	-4
"	"	"	"	1-250ml				-4
"	"	"	"	1-500ml		X		-4

ANALYSIS REQUEST

BTEX + MTBE + TMB (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)					Air Bubbles or Headspace (Y or N)
X								X								
								X								
							X									
X								X								
							X									

Date	Time	Relinquished By: (Signature)	Received By: (Signature)
5-12-05	330pm	Cindy Hurtado	[signature] 5-13-05 @ 7:40
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks:

CHAIN-OF-CUSTODY RECORD

Accreditation Applies: NELAC ☐ USACE ☐ Other: _____

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

Client: San Juan Refining
Address: #50 Rd 4990, Bloomfield, NM 87413
Phone #: 505-632-4161
Fax #: 505-632-3911

Project Name: PHASE II Monitoring
Project #:
Project Manager:
Sampler: Cindy Hurtado / Angela Folk
Sample Temperature:

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative: $HgCl_2$	Preservative: HNO_3	Preservative:	HEAL No.
5-12-05	1230pm	H_2O	OW23+90	2-VOA	Y			0505119 -5
"	"	"	"	1-250mL			H_2SO_4	-5
"	"	"	"	1-250mL				-5
5-12-05	1pm	H_2O	OW23+10	2-VOA	X			-6
"	"	"	"	1-250mL			H_2SO_4	-6
"	"	"	"	1-250mL				-6
"	"	"	"	1-500mL		X		-6
"	"	"	trip blank	1-40mL	X			-7

Date	Time	Relinquished By: (Signature)	Received By: (Signature)
5-12-05	330pm	Cindy Hurtado	5-13-05 @ 1240
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks: Limited Amount of sAmple - Wells kept drying up - Do what you Can

ANALYSIS REQUEST

BTEX + ~~MTBE~~ + ~~TMB's (8021)~~	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260B (VOA)	8270 (Semi-VOA)					Air Bubbles or Headspace (Y or N)
X																
								X								
								X								
							X									
X																
								X								
								X								
							X									
X																

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)] x (Conversion Factor) x 3

The conversion factor is determined by the diameter of the well casing.

Casing Diameter	Conversion Factor
6-inches	1.50 gallons/ft of water column
5-inches	1.02 gallons/ft of water column
4-inches	0.74 gallons/ft of water column
3-inches	0.367 gallons/ft of water column
2-inches	0.163 gallons/ft of water column

Typically disposable bailers are used for purging and sampling. Each bailer holds one liter of liquid. Three well volumes can be calculated by counting the number of times a well is bailed.

After sufficient purging, samples are collected with the bailer and poured into the appropriate sample containers provided by the laboratory. Two people are usually utilized for sampling activities. Sampling takes place over a bucket to insure that spills are contained.

All purged water is poured into a 55-gallon drum designated for sampling events.

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 Quality Control Samples

Trip blanks are used to evaluate if fuel hydrocarbons may have been introduced to the environmental samples during shipment, handling, or storage. Trip blanks are prepared in the laboratory by pouring deionized, distilled water into 40 millimeter vials. The trip blanks are shipped from the laboratory to the project site and then remain with the field samples back to the laboratory with each cooler containing VOA samples.

DECONTAMINATION AND WASTE HANDLING PROCEDURES

Equipment Decontamination

Equipment that may directly or indirectly contact samples will be decontaminated. In addition, care will be taken to prevent the samples from coming into contact with potentially contamination substances, such as tape, engine exhaust, corroded surfaces, and dirt.

To decontaminate sampling devices (such as level probes), surfaces will be scrubbed with a solution of potable water rand Alconox or equivalent laboratory-grade detergent. The equipment will then be rinsed with distilled, potable water. The equipment will air-dry on a clean surface or rack. If the sampling device will not be used immediately after being decontaminated, it will be wrapped in a clean plastic bag. Where possible, disposable sampling equipment will be used in order to minimize decontamination procedures and avoid cross-contamination.

Purge and Decontamination Water Disposal

The Ultrameter 6P and the interface probe are rinsed with distilled water after every well. The rinse procedure takes place over a bucket to insure that spills are contained. All rinse and purge water is contained and then disposed of through the refinery wastewater system.

Any glassware used is taken to the refinery laboratory and washed with Alconox and water and rinsed with reverse osmosis water. Laboratory wastewater runs through the refinery system.

Waste Handling

Investigation-derived waste (IDW) that is generated during field activities will consist of general trash, disposable sampling equipment, and used personal protective equipment (PPE). These waste streams will be managed onsite.

Decontamination water, if generated, will be collected and placed into the onsite treatment system. Any purge water generated will be handled in the same manner.

APPENDIX K

Barrier Construction Quality Control Measures

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
pH	API RP 13B-1
Soil-Bentonite Backfill	
Slump Cone	ASTM C143 / C143M

The bentonite slurry consists of a stable colloidal suspension comprised of bentonite in water. The resulting bentonite slurry had the following minimum characteristics:

1. Viscosity: 35 seconds minimum (V > 35 sec-Marsh @ 68 degrees Fahrenheit) using Marsh Funnel Viscometer prior to placement of the backfill.
2. Filtrate loss: 25 cubic centimeters maximum in 30 minutes @ 100 psi using standard filter press.
3. Density: greater than 64 lbs/ft^3
4. Sand Content: 10 percent measured five feet above the trench bottom.
5. pH: controlled between 7 and 12

Soils excavated from the slurry trench were mixed with bentonite slurry prior to placement in the trench. Additional dry bentonite was added to ensure a permeability of less than or equal to 1 x 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 1×10^{-7} cm/sec. Results reported by Sierra Testing Laboratories are included in Appendix C of this IM Implementation Report.