

GW – 001

**PERMITS,
RENEWALS,
& MODS
Application**

**OCD Discharge Plan
Application for Modification**

July 2007

**OCD DISCHARGE PLAN
APPLICATION FOR MODIFICATION
JULY 2007**

Permit No. GW-01



**San Juan Refining Company
Giant – Bloomfield Refinery
#50 Road 4990
Bloomfield, New Mexico 87413**

Chavez, Carl J, EMNRD

From: Chavez, Carl J, EMNRD
Sent: Friday, February 22, 2008 3:47 PM
To: 'Randy Schmaltz'
Cc: Price, Wayne, EMNRD; Monzeglio, Hope, NMENV; Cobrain, Dave, NMENV; Frischkorn, Cheryl, NMENV
Subject: OCD Discharge Plan Application for Modification (July 2007) (GW-1)

Mr. Schmaltz:

Good afternoon. The New Mexico Oil Conservation Division (OCD) has reviewed Western Refining Southwest, Inc.'s (WRSW) letter (letter) dated January 29, 2008 regarding the above subject associated with EPA ID# NMD089416416 (HWB-GRCB-07-003). WRSW's letter indicates that it is their intent for the Facility-Wide Groundwater Monitoring Plan (FWGWMP) to be accepted by both the New Mexico Environment Department (NMED) and OCD as the prevailing document for comprehensive groundwater monitoring at the Bloomfield Refinery. The OCD regards WRSW's letter with attachments dated January 29, 2008 to the NMED as the updated version of Appendix D from the report in the paragraph below.

Previously, WRSW submitted a letter dated July 30, 2007 with a report (Report) entitled, "OCD Discharge Plan Application For Modification" (July 2007) to the OCD. The report was developed to address OCD Administrative Compliance Order (ACO) and Stipulated Final Order (SFO) No. NM-OCD 2006-100, and an EPA Administrative Order on Consent (Docket No. VI-303-H). Section 9 of the report contained proposed modifications to resolve contamination issues associated with the refinery. A FWGWMP was developed in Appendix D of the report along with Section 10 (Inspection, Maintenance & Reporting) to address state and federal requirements.

OCD comments and/or recommendations on the report and letter aforementioned are as follows:

- 1) The OCD will continue to work with the NMED and WRSW to complete a FWGWMP before the discharge permit renewal date in order to include it as part of the discharge permit renewal with the understanding that the OCD may modify the monitoring requirements as specified under its WQCC discharge plan or permit at any time based on inspections or additional inspection requirements. A finalized version of the FWGWMP in the form of a table (electronic file requested) will assist the OCD with the incorporation of the FWGWMP into the OCD discharge permit. According to OCD records, the existing discharge permit is set to expire on June 7, 2009.
- 2) The OCD notices the on-site landfill disposal provisions for Fluid Catalytic Cracking Unit (FCCU) Catalyst and Sulfur Byproducts. The OCD is aware of Discharge Permit Items #21 (Active Landfill) and 22 (In-Active Landfill), and the closure plans requested under the permit by December 1, 2005. The OCD is concerned about the proximity of the landfills to the San Juan River; the RCRA ramifications (SWMU vs. AOC) of the landfills; and will likely seek to phase out the existing active landfill at the facility during the discharge permit renewal application process. The permit is set to expire on June 7, 2009. Please prepare to discuss and plan accordingly for above.
- 3) The Report references "GW-130" for the facility Underground Injection Control (UIC) Class I Non-Hazardous Injection Well; however, the well is now permitted under OCD records as "UICL-9." Please refer to the UIC Class I Well permit as "UICL-9" from now on.
- 4) Section 10 requirements are to be completed one time within the next 5 years (OCD extended to 3/1/2013) and are as follows:
 - a) An electronic version of the spreadsheet is requested to assist OCD with tracking the inspections, maintenance and reporting (IMR).
 - b) Columns for "Inspection, Maintenance, and Repair" shall be added to the spreadsheet to track one and/or multiple items performed at the same unit at the same time. A field with "date", "ok" or "problem" (also denoted w/ an asterisk to explain at the bottom of the spreadsheet what action was conducted to correct the problem) shall be added to the spreadsheet to report the results of the IMR to the OCD. The OCD recommends that WRSW provides separate spreadsheets for different locations or units (i.e., sumps, tanks, API, etc.) for

2/22/2008

simplified review of compliance with dates, etc. of the SFO. The operator shall provide an annual report in a format that satisfies the above with the Annual Ground Water Monitoring Report.

c) A storage tank numbering system shall be implemented at the facility with tank number references in the spreadsheet to show the exact tank of concern. A numbering system for other units is recommended.

d) Pits/Ponds shall be added to the spreadsheet.

e) The dates need to be revised up through March 1, 2013 for all locations or units to undergo testing.

Only large tanks are exempted (see paragraph below) and WRSW needs to denote tanks that are exempted in the spreadsheet with the new date for the inspection.

The "OCD Tank Inspection" spreadsheet indicates a 10 year inspection frequency; however, the SFO indicates that all locations or units are required on a one time basis to be tested within 5 years of the SFO date (3/1/2006) or by March 1, 2011. Exempted from this one time testing requirement are large tanks that have been tested within the past five years or are due to be tested within the next five years under other regulatory agency rules, regulations or guidelines, or under any other standards accepted by regulatory agencies, such as API Code 653, provided that the tanks shall be identified in the spreadsheet and test dates and results provided to the OCD. WRSW may request a time extension for accomplishing requirement or recommendations, which the OCD, in its sole discretion, may grant for good cause shown by WRSW. The OCD extends the end of the one time five year date to March 1, 2013 for good cause.

In conclusion, the OCD concludes that WRSW has complied with SFO Section I.V. Compromise and Settlement (Section 18(a)(c)). WRSW shall address Item #4 above satisfy Section 18(b) of the SFO. Regarding Section 18 (c), the OCD has opted to address the modification in the discharge permit renewal process for good cause as stated in Item #1 above.

Please contact me if you have questions. Thank you.

Note: Please be advised that NMOCD approval of this plan does not relieve Western Refining Southwest, Inc., Bloomfield Refinery of responsibility should their operations pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve Western Refining Southwest, Inc., Bloomfield Refinery of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Carl J. Chavez, CHMM
New Mexico Energy, Minerals & Natural Resources Dept.
Oil Conservation Division, Environmental Bureau
1220 South St. Francis Dr., Santa Fe, New Mexico 87505
Office: (505) 476-3491
Fax: (505) 476-3462
E-mail: CarlJ.Chavez@state.nm.us
Website: <http://www.emnrd.state.nm.us/ocd/index.htm>
(Pollution Prevention Guidance is under "Publications")

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Disclaimer

This application has been prepared using the requirements, format, and guidance that is contained in the document titled "Guidance For The Preparation Of Discharge Plans At Natural Gas Plants, Refineries, Compressor and Crude Oil Pump Stations" (Revised 12-95), as issued by the Oil Conservation Division. Further, this application was prepared for the sole and expressed purpose of renewing the existing discharge plan permit, of which renewal is required every five years. The information contained in this application is proprietary and may not be used for any purpose other than the processing of this application without the expressed written consent of the Giant Refining Company.

Discharge Plan Renewal Application

Section 1.0

July 2007

Section 1.0 Type of Operation

The Bloomfield Refinery is a crude oil refining facility.

The Standard Industrial Classification (SIC) code is 2911 and the NAIC is 32411.

The refinery has a nominal crude capacity of 18,000 barrels per day and produces various finished products; including propane, butane, naphtha, unleaded gasoline, diesel, kerosene, and residual fuel.

Discharge Plan Renewal Application

Section 2.0

July 2007

Section 2.0 Name of Operator or Legally Responsible Party or Local Representative

Owner: San Juan Refining Company
23733 North Scottsdale Road
Scottsdale, Arizona 85255

Operator: Giant Industries Arizona, Inc. (postal address)
23733 North Scottsdale Road
Scottsdale, Arizona 85255

Bloomfield Refinery (physical address)
#50 Rd 4990
Bloomfield, New Mexico 87413

Facility Name: Bloomfield Refinery (physical address)
#50 Rd 4990
Bloomfield, New Mexico 87413

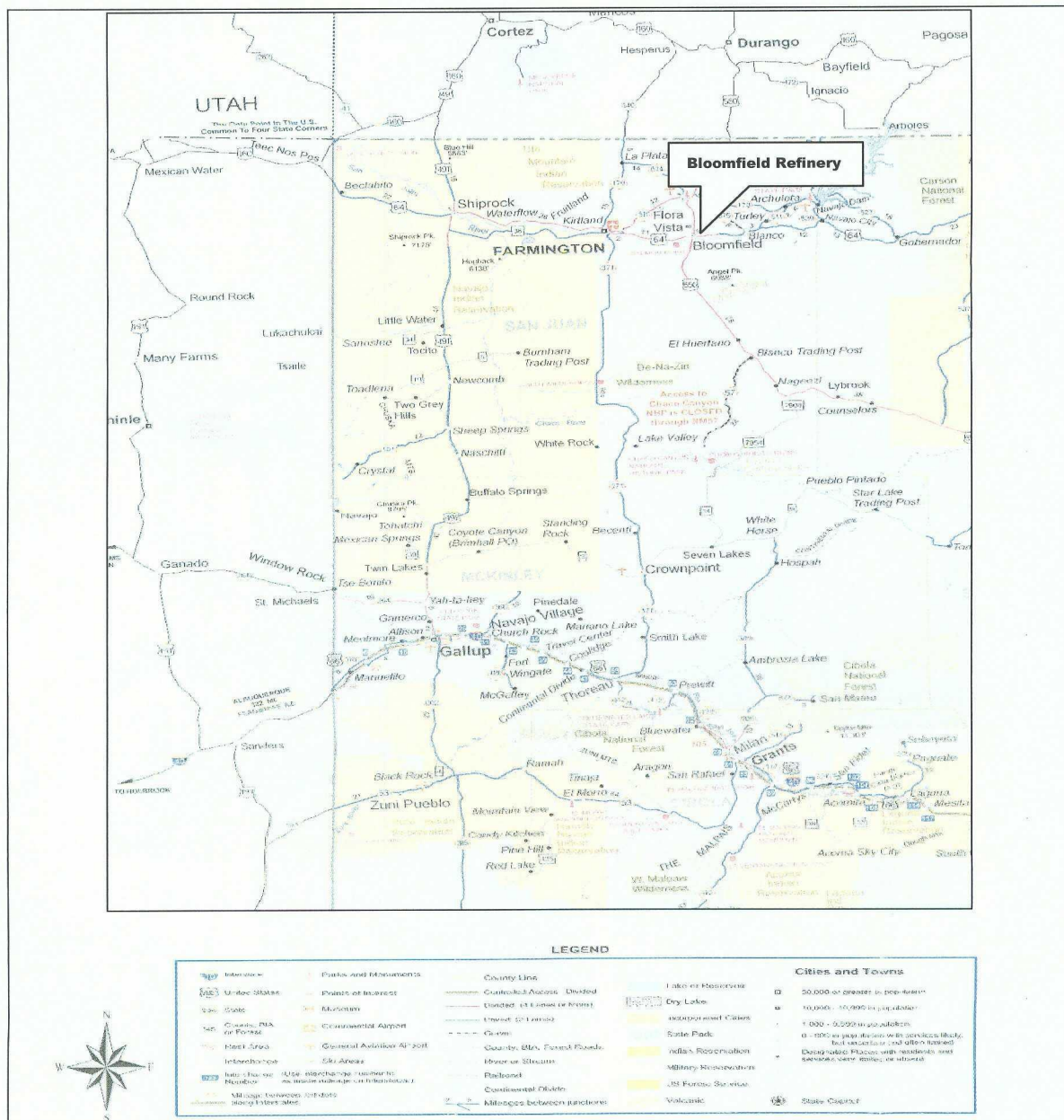
Key Contact: Todd Doyle, General Manager

Telephone: (505) 632-4104

Section 3.0 Location of the Discharge Plan Facility

The Bloomfield Refinery is generally located in the Four Corners Region of northern New Mexico. It is more specifically located approximately one mile south of the City of Bloomfield, New Mexico at 50 County Road 4990.

Regional Map



The plant site is nominally located at latitude 36° 41' 30" and longitude 107° 58' 20".

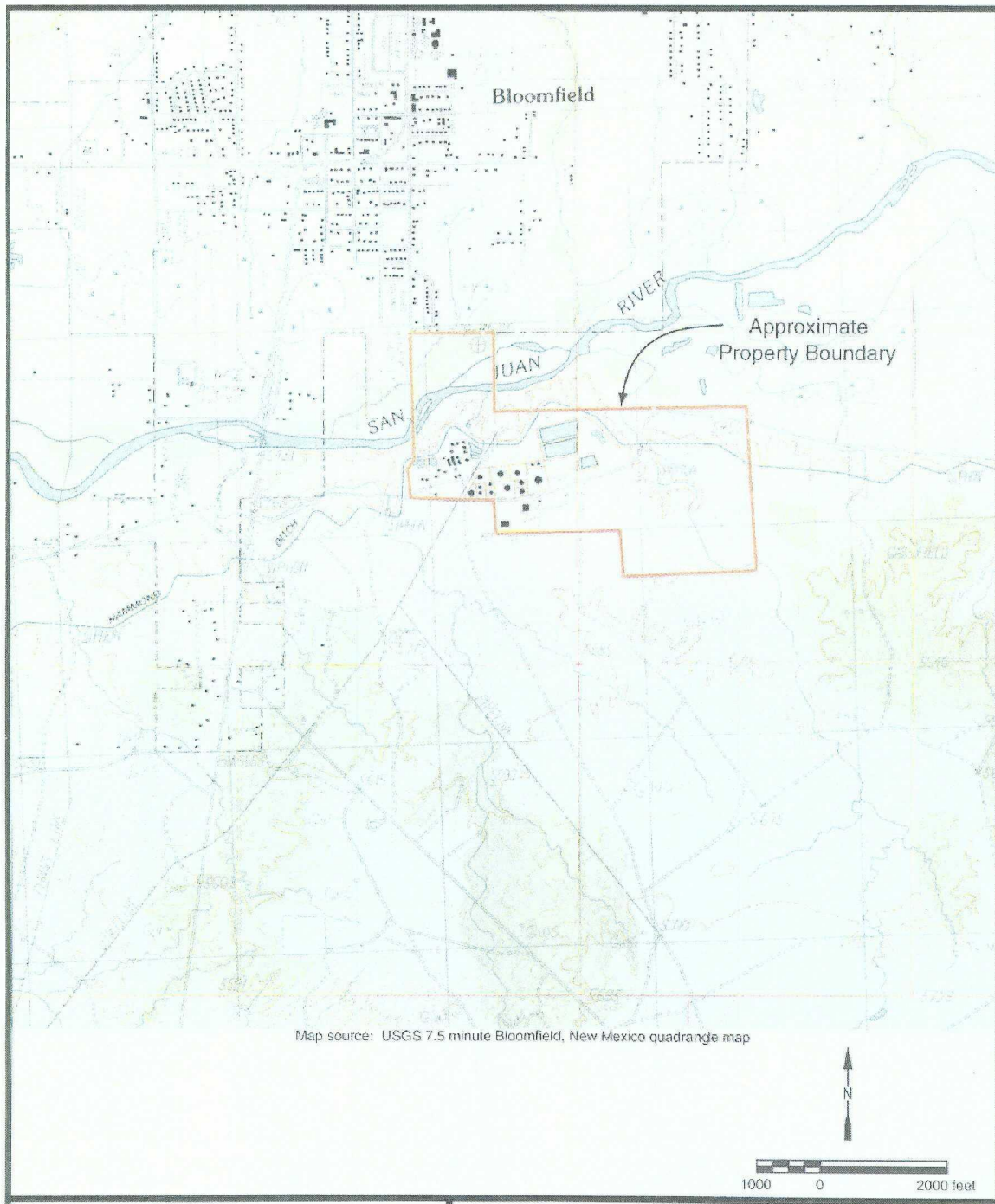
Discharge Plan Renewal Application

Section 3.0

July 2007

The legal description of the site is 286.93 acres, more or less, being that portion of the NW ¼ NE ¼ and the S ½ NE ¼ and the N ½ NW ¼ SW ¼ and the SE ¼ NW ¼ SW ¼ of Section 26, Township 29 North, Range 11 West, San Juan County, New Mexico.

Locality Map



A detailed map of the plant is also included with this application as Appendix A.

Discharge Plan Renewal Application

Section 4.0

July 2007

Section 4.0 Landowners

The facility was originally constructed as a crude topping unit in the late 1950's by Kimball Campbell.

Plateau, Inc purchased the facility in the early 1960's and sold it in 1964 to Suburban Propane of New Jersey.

Bloomfield Refining Company acquired the facility in 1984.

San Juan Refining Company obtained ownership in 1995 and is the current landowner of record.

Address: San Juan Refining Company
23733 North Scottsdale Road
Scottsdale, AZ 85255

Telephone: (480) 585-8888

Western Refining acquired Giant Industries, Inc in May of 2007. Following the merger, the Giant entity that owns/operates the refinery continues in existence and continues to hold their current permits.

Discharge Plan Renewal Application

Section 5.0

July 2007

Section 5.0 Facility Description

The Bloomfield Refinery receives and processes up to 18,000 barrels per day of crude oil and produces propane, butane, gasoline, kerosene, fuel oil, and residual fuel.

The refinery is located in northwestern New Mexico, approximately 1 mile south of the City of Bloomfield in San Juan County. It is further located approximately 1/2 mile east of State Route 44 on County Road 4990 (a.k.a. Sullivan Road).

The refinery is situated on an elevated terrace south of the San Juan River and the Hammond Irrigation Ditch. This terrace is approximately 100 feet above the river level and 20 feet above the irrigation ditch. The northern refinery fence line adjoins the irrigation ditch and the distance from the refinery to the river's edge varies from approximately 300 to 1,000 feet.

The main part of the refinery is located on a 45 acre site north of County Road 4990 and includes the following general areas:

- Office Area (buildings, warehouse, storage yard)
- Parking Lots & Heavy Oil Loading Station
- Process Area (refinery operations equipment)
- Wastewater Treatment Unit (WWTU)
- Tank Farm Area
- Used Equipment Laydown Area
- Firefighting Training Area
- Solid Waste Disposal Area

A refinery terminal facility, regional business office, transportation maintenance facility, and the refinery evaporation ponds are located on a 25 acre site south of County Road 4990 and includes the following general areas:

- Terminal Office & parking areas
- Crude Oil Unloading Station & Storage Tank Area
- Product Loading Station & Storage Tank Area
- High Pressure Storage Bullets Area
- Regional Office & parking area
- Transportation Maintenance Facility and truck parking areas
- Refinery Wastewater Evaporation Ponds
- Class I Injection Well (GW 130)

Crude supplies arrive by pipeline or tank trucks. The refinery incorporates various processing units that convert crude into finished products. These units are briefly described as follows:

- The crude unit separates crude oil into various fractions; including gas, naphtha, diesel, kerosene, and reduced crude.
- The reforming unit combines low octane naphtha molecules to form high octane naphtha.

Discharge Plan Renewal Application

Section 5.0

July 2007

- The fluidized catalytic cracking unit breaks up long-chain hydrocarbon molecules into smaller molecules, and essentially converts heavier oils into naphtha and lighter oils.
- The Ammonia Absorption Refrigeration Unit chills down hydrogen in order to recover LPG.
- The sulfur recovery unit cleans up fuel gas by converting hydrogen sulfide gas into elemental sulfur and produces a solid elemental sulfur byproduct.
- The poly unit polymerizes olefinic LPG and produces gasoline blendstock.
- The treater unit removes sulfur from LPG.
- The DHT (diesel hydrotreating) unit removes sulfur from diesel and light oils.
- The tank farm is a system of storage tanks used throughout the refinery to hold and store crude oil, intermediate feedstocks, finished products, chemicals, and water. These tanks are located above ground and range in size from 110,000 barrels to less than 1,000 barrels.

In addition to the above-mentioned processing units, various other equipment and systems support the operation of the refinery and are briefly described as follows.

Pumps, valves, and piping systems are used throughout the refinery to transfer various liquids among tankage and processing units.

Several tank truck loading racks are used at the terminals to load out finished products and receive crude oil, other feedstocks, additives, and chemicals.

A firefighting training facility is used to conduct employee firefighting training.

Process Wastewater Treatment System

The process wastewater system is a network of curbing, paving, catch basins, and underground piping that collects rainwater and other effluent from various processing areas within the refinery and then conveys this wastewater to the API separator. In general, process wastewater is effluent that may reasonably be expected to come in contact with hydrocarbons.

The API separator is a large concrete containment structure that uses gravity and residence time to separate wastewater into three components; a sludge layer that sinks to the bottom, a scum layer that floats to the top, and a clarified effluent in the middle. The clarified effluent then flows on through a series of three lined aeration lagoons.

Each lagoon is equipped with two aerators which effectively strip dissolved gasses and light hydrocarbons from the wastewater. Effluent from the aeration lagoons flows to the evaporation ponds.

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The evaporation pond acts as a holding basin for excess wastewater and allows for solar and wind-effect evaporation to take place. Water that is not evaporated is pumped to the Class I injection well.

The Class I well injects a nonhazardous wastewater stream into portions of the Cliff House and Upper Menefee Formations (3600 feet deep). It operates under Discharge Permit Number GW-130.

As part of an EPA Order, two benzene stripper columns will be installed in 2007 to treat the clarified effluent discharged from the API Separator. At the stripper columns, ambient air will be blown upwards through a falling cascade of clarified wastewater and, as a result, dissolved gases and light hydrocarbons including benzene will be disengaged and vented. Effluent from the stripper columns will flow onward to the aeration lagoons.

Storm Water Handling Management System

The storm water system is a network of berms, embankments, culverts, trenches, ditches, and retention ponds that collect, convey, control, treat, and release storm water that falls within or passes through refinery property.

The Bloomfield Refinery currently operates under the Multi-Sector General Permit – 2000 permit number NMR05B159. A Storm Water Pollution Prevention Plan (SWPPP) has been implemented and is maintained at the refinery

Items Specifically Requested in the OCD Guidance Document

1. Location of fences

The refinery incorporates an outer perimeter fence that substantially consists of chainlink, barbed wire and posts, and roughly corresponds to the property boundaries. In addition, interior zones of 8 foot high chain link fencing are installed around the warehouse yards, storage pads, loading racks, and other sensitive areas. The locations of these fence lines are shown on the plant site drawing in Appendix A.

2. Location of pits

The refinery does not use earthen pits for waste accumulation.

3. Location of berms

The refinery uses earthen berms to form secondary containment basins for tankage. The locations of these berms are shown on the plant site drawing in Appendix A.

4. Location of tanks

The refinery uses aboveground tanks for storage at various locations within the refinery. The locations of these tanks are shown on the plant site drawing in Appendix A.

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July 2007

5. Location of discharges

Treated process and non-process wastewater is evaporated at the evaporation ponds or injected underground at the Class I injection well.

Storm water that is not contained on-site is released off-site at two outfall locations on the boundary of refinery property. Location of the outfalls and retention areas are shown on the plant site drawing in Appendix A. Storm water analysis is kept on site in the Storm Water Pollution Prevention Plan.

Sanitary sewage is treated and released at four septic fields located within the Giant property line.

The locations of the evaporation ponds, storm water outfalls, and septic fields are shown on the plant site drawing in Appendix A.

6. Location of storage facilities

The refinery uses warehouses, outdoor yards, and curbed pads for storage of various materials and equipment within the refinery. The locations of these storage facilities are shown on the plant site drawing in Appendix A.

7. Location of disposal facilities

The refinery uses an onsite landfill to dispose of sulfur, FCC fines, and FCC spent catalyst. The Sulfur Recovery Unit (SRU) generates approximately 300 tons of solid sulfur per year. The Fluidized Catalytic Cracking (FCC) unit produces 200 tons of spent catalyst per year. These materials are deposited in the landfill and covered with soil. The location of the solid waste disposal area is shown on the plant site drawing in Appendix A.

8. Location of processing facilities

The refinery uses various processing units and support systems as described above. The locations of these facilities are shown on the plant site drawing in Appendix A.

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Section 6.0

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Section 6.0 Materials Stored or Used at the Facility

The refinery receives, stores, and processes crude oil and other petroleum-based feedstocks, and then produces various intermediate feedstocks and finished products, including propane, butane, unleaded gasoline, diesel, kerosene, and residual oil. These materials are stored in aboveground atmospheric and pressurized tanks. In 2005, B-1, B-2, and Tank #25 were dismantled and removed. By March 2006, Tanks #24 and #25 were rebuilt as 10,000 barrel tanks to hold Ultra Low Sulfur Diesel. In 2007, Tanks #20 and #22 were removed and Tank #20 is scheduled to be rebuilt as a 20,000 barrel tank to hold Naphtha. At Terminals, Tank #43 is scheduled to be removed in 2007 and be replaced with two 400 barrel tanks. These tanks are tentatively labeled as Tank #40 and #42 and will hold water with some crude oil. Tank updates are listed on Table 6.1 and Table 6.2 in Appendix B, respectively. These tables include the following information.

- tank name
- contents
- material of construction
- year tank was built or most recently modified
- volume
- location

The refinery also receives, stores, and uses a variety of additives, chemicals, and other sensitive materials in order to support the operation of the refinery. These materials are listed on Table 6.3 in Appendix B. This table includes the following information.

- product name
- product form (gas, liquid, or solid)
- general composition
- nominal quantity stored on-site at any given time
- location

Items Specifically Requested in the OCD Guidance Document

The OCD guidance document specifically requires that the following categories be included in the material list.

- process specific chemicals
- acids/caustics
- detergents/soaps
- solvents/inhibitors/degreasers
- paraffin treatment/emulsion breakers
- biocides
- other

The tables in Appendix B include the materials that correspond to the above categories.

Discharge Plan Renewal Application

Section 7.0

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Section 7.0 Sources and Quantities of Effluent & Waste Solids Generated at the Facility

The following processing units, systems, equipment, or categories are potential sources of effluent or waste solids generated at the refinery.

Sources of wastewater effluent include the following. These discharges are collected in the refinery process sewer system and flow to the API Separator. Appendix C illustrates the current process water and wastewater flow. Appendix C also contains design drawings for the new benzene stripper system to be installed in 2007.

Boiler Feedwater Treatment System

Raw water is treated in this system in order to remove impurities before being supplied as feedwater to the refinery boilers. Wastewater from water softening units and boiler blowdown containing dissolved solids is routinely discharged to the refinery process sewer system.

This discharge typically ranges from 4,000 to 6,000 gallons per day.

Boilers

Four boilers are in service at the refinery: two fired boilers, one waste heat boiler, and one steam generator. Wastewater containing dissolved solids is routinely discharged to the process sewer from these boilers.

This discharge typically ranges from 8,000 to 10,000 gallons per day.

Cooling Towers

Two cooling towers are in service at the refinery. Wastewater containing dissolved solids and biocide residue is routinely discharged to the process sewer from this equipment.

This discharge typically ranges from 30,000 to 40,000 gallons per day.

Crude Unit

Two desalters at the crude distillation unit are used to remove impurities and water from crude oil. Wastewater containing dissolved solids and trace hydrocarbons are routinely discharged to the process sewer from this equipment.

This discharge typically ranges from 30,000 to 40,000 gallons per day.

Ammonia Absorption Refrigeration Unit

The ARU recovers LPG from hydrogen. Wastewater from a cooling process is routinely discharged to the process sewer. The wastewater contains dissolved solids.

This discharge typically ranges from 6,500 to 7,500 gallons per day.

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Sulfur Recovery Unit

The SRU recovers solid elemental sulfur compounds from refinery fuel gas. Wastewater from a rinsing operation and filter press is routinely discharged to the process sewer. The wastewater contains dissolved solids and trace sulfur compounds.

This discharge typically ranges from 3,000 to 4,000 gallons per day.

Polymerization Unit

A water wash system is used to remove impurities from an intermediate gasoline feedstock. Wastewater containing trace hydrocarbons are intermittently discharged to the process sewer.

This discharge typically ranges from 14,000 to 18,000 gallons per day.

Sour Water Treater

One accumulator drum at this unit collects water from overhead vessels throughout the process units. Wastewater containing trace hydrocarbons is routinely discharged to the process sewer from this accumulator drum.

This discharge typically ranges from 14,000 to 15,000 gallons per day.

Heater Treater at Terminals

"Wet" crude oil is unloaded into this system. Steam is used to treat the load and separate the water from the oil. Wastewater containing trace hydrocarbons and dissolved solids is routinely discharged to the process sewer.

This discharge typically ranges from 14,000 to 15,000 gallons per day.

Storage Tanks

Numerous aboveground storage tanks are used within the refinery to store various products and intermediate feedstocks. Wastewater containing dissolved solids and trace hydrocarbons are occasionally drained from these tanks as bottom water or decanted water and then discharged to the process sewer.

This discharge typically ranges from 1,800 to 2,500 gallons per day

Recovered Groundwater

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Giant Refining Company - Bloomfield utilizes 15 active recovery wells and the Hammond Ditch French Drain Recovery System to pump and treat hydrocarbon impacted groundwater. Giant also pumps out 14 collection wells located on the north side of Hammond Ditch. The groundwater recovered with these systems is transferred to the API Separator for treatment.

This discharge typically ranges from 9,000 to 11,000 gallons per day.

Diesel/Kerosene Salt Dryers

Three salt wash vessels are used to remove impurities from diesel and kerosene product streams. Occasionally, the salt must be replaced and, at that time, the vessels are drained. Wastewater containing dissolved solids and trace hydrocarbons are discharged to the process sewer.

This discharge typically ranges from 800 to 1,000 gallons per event when replacing salt. This event occurs 2 – 3 times per year.

Sources of solid waste include the following. Most of these waste are generated intermittently and then removed, collected, containerized, and stored until shipped off-site for recycling or disposal.

Fluid Catalytic Cracking Unit (FCCU) Catalyst

A metallic (alumina) catalyst is used within the FCCU to convert hydrocarbon molecules. The material is a dry, metallic solid and is non hazardous. This catalyst is periodically replaced and the spent catalyst and fines are deposited in the on-site landfill and covered with soil.

Approximately 200 to 300 tons of spent FCCU catalyst is generated every year.

Naphtha Hydrotreating Unit (NHT) and Sulfur Guard Catalyst

There are two reactors that contain metallic catalyst in this unit. One reactor is used to convert hydrocarbon molecules and the other is used to adsorb sulfur molecules. The catalysts are periodically replaced and the spent catalyst is recycled by an off-site metal recovery service. This material is a dry, metallic solid and is shipped as a K-171 hazardous waste and as a self-heating solid.

Dump and screen procedures occur about every two years. Approximately 2 – 3 tons of spent catalyst is generated every two years.

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Reforming Unit Catalyst

A metallic (platinum) catalyst is used in the reforming unit to convert hydrocarbon molecules. This catalyst is periodically replaced and the spent catalyst is recycled by an off-site metal recovery service. This material is a dry, metallic solid and is shipped with a hazardous waste code of K-171 and as a self-heating solid.

Catalyst is changed out every ten years. However, some dump and screen procedures occur periodically. Reformer catalyst is generated on an average of 0.3 tons per year.

Polymerization Unit

A phosphoric acid catalyst is used to convert LPG olefins into an intermediate gasoline feedstock. This catalyst is periodically replaced and disposed of at an off-site landfill. The spent catalyst is a dry solid and is non hazardous.

Approximately 40 to 60 tons of polymerization catalyst is generated every year.

Diesel Hydrotreating Unit (DHT) Catalyst

Metallic catalyst is used in this unit to convert hydrocarbon molecules. This catalyst is a dry, metallic solid and will be shipped off as a K-171 hazardous waste. It will either be regenerated or recycled for metals.

Approximately 16 tons of DHT spent catalyst will be generated every year.

Sulfur Byproduct

26 An elemental sulfur byproduct is regularly generated at the SRU. This solid non hazardous residue is disposed of in the on-site landfill and covered with soil.

Approximately 300 to 400 tons of sulfur byproduct is generated each year.

Heat Exchanger Bundle Cleaning Sludge

Heat exchanger bundles are occasionally cleaned in order to restore heat transfer performance. This cleaning is conducted on a concrete curbed pad that incorporates a wastewater accumulation sump. Sediment and sludge collects in the bottom of the sump and the wastewater is removed and discharged into the process sewer.

The sludge (K-051) is removed from the sump, contained in 55 gallon drums, and disposed of at an off-site hazardous waste disposal facility. The quantity of this waste ranges from 0 to 3 tons per year

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Storage Tank Bottom Sludge

Oily sludge accumulates at the bottom of storage tanks (e.g. crude oil, FCC feed tanks). These tanks are periodically taken out of service and the sludge is removed, containerized, and shipped off-site for oil recovery, treatment, and disposal.

The quantity of this waste varies from 0 to 20 tons per year.

Main Column Bottoms Sludge

Periodic cleanout of pump screens and piping in the FCCU generates main column bottom sludge. It is classified as K-170 hazardous waste and is shipped to an off-site hazardous waste disposal facility.

The quantity of this waste ranges from 1 to 12 tons per year.

API Separator Sludge

Oily sediment and sludge accumulates at the bottom of the API Separator. The Separator is taken out of service annually and the bottom sludge removed via vacuum truck. This sludge remains in the truck and is shipped off-site for recycling.

Approximately 300,000 to 500,000 pounds of API Separator sludge is recycled as a feedstock to a petroleum coker at the Norco Refinery annually. This refinery is located in Louisiana.

Maintenance Shop

Most process equipment and mobile equipment is repaired and maintained at the refinery maintenance shop. Waste oils are collected and stored in a 250 gallon tote and recycled periodically.

The quantity of this waste ranges from 600 to 800 gallons per year.

Process Filters

Process filters throughout the refinery are periodically replaced and are disposed of as special waste at the San Juan County Landfill. TCLP analysis on the filters indicates that the waste is non hazardous.

Approximately 16 yards of material is generated every year.

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Section 8.0

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Section 8.0 Description of Current Liquid and Solid Waste Collection / Storage / Disposal Procedures

The following procedures are used to manage the wastewater effluents and solid waste that are generated within the refinery as described in Section 7.0.

Process Wastewater

Process wastewater is generated at various refinery processing units, storage tanks, utility systems, and maintenance activities. This water is collected in a segregated sewer system located throughout the refinery processing and tankage areas. This collection system is substantially composed of concrete paving and curbing, concrete catch basins and trenches, and buried concrete and carbon steel pipe. Process wastewater flows by gravity to the API Separator where solids, sludge, and floating scum are removed. Currently, the effluent from the API Separator flows into a series of three aeration lagoons that act as benzene strippers. Wastewater is then either evaporated at the evaporation ponds or injected underground at the Class I injection well. This well injects into portions of the Cliff House and Upper Menefee formations (3,600 feet deep). It operates under Discharge Permit Number GW – 130. - VICK-9

As part of an EPA Order, two benzene stripper columns will be installed in 2007 to treat the clarified effluent discharged from the API Separator. At the stripper columns, ambient air will be blown upwards through a falling cascade of clarified wastewater and, as a result, dissolved gases and light hydrocarbons including benzene will be disengaged and vented. Effluent from the stripper columns will flow onward to the aeration lagoons and .

API Separator Sludge

Oily sediment and sludge accumulates at the bottom of the API Separator. The separator is taken out of service annually and the bottom sludge is removed via vacuum trucks. This sludge is shipped off-site for recycling.

API separator sludge is recycled as a feedstock to a petroleum coker at the Norco Refinery:

Motiva Enterprises, LLC – Norco Refinery
15536 River Road
Norco, LA. 70079
EPA ID: LAD008186579

Storage Tank Bottom Sludge

Oily sludge accumulates at the bottom of storage tanks (e.g. crude oil, FCC feed tanks). These tanks are periodically taken out of service and the sludge is removed, containerized, and shipped off-site for oil recovery, treatment, and disposal.

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Crude oil tank bottoms can be recycled as a feedstock to a petroleum coker at the Norco Refinery:

Motiva Enterprises, LLC – Norco Refinery
15536 River Road
Norco, LA. 70079
EPA ID: LAD008186579

FCC feed tank bottoms can be treated and recycled at:

Green America Recycling L.L.C.
10107 Hwy 79
Hannibal, MO.
63401
EPA ID: MODO54018288

Heat Exchanger Bundle Cleaning Sludge

Oily sludge accumulates at the bottom of the cleaning pad sump. At the conclusion of the exchanger cleaning operation, the sludge is removed, placed in 55 gallon drums, then shipped off-site as a K050 hazardous waste for treatment and disposal.

Philip Reclamation Services
4050 Homestead Rd.
Houston, Texas
77028
EPA ID: TXDO74196338

Main Column Bottoms Sludge

This sludge is stored in 55 gallon drums after removal from the FCCU. It is classified as K-170 hazardous waste and is shipped to an off-site hazardous waste disposal facility.

Philip Reclamation Services
4050 Homestead Rd.
Houston, Texas
77028
EPA ID: TXDO74196338

PSC/21st Century EMI
2095 Newlands Drive East
Fernley, Nevada 89408
EPA ID: NVD980895338

Spent Reformer Catalyst

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This material is a dry solid that is stored in drums or flowbins after removal from the Reformer. Occasionally it is reprocessed on-site and then placed back into the Reformer. On other occasions, it is shipped out via truck as a K-171 and self-heating solid hazardous waste and then reprocessed at an off-site facility.

Gulf Chemical
302 Midway Road
Freeport, Texas 77542
EPA ID: TXD074195678

Eurecat US, Inc.
13100 Bay Park Road
Pasadena, Texas 77507
EPA ID: TXD106829963

Spent NHT Catalyst

This material is a dry solid that is stored in drums or flowbins after removal from the unit. It is then shipped out via truck as a K171 and self-heating hazardous waste and recycled at an off-site facility.

Gulf Chemical
302 Midway Road
Freeport, Texas 77542
EPA ID: TXD074195678

Eurecat US, Inc.
13100 Bay Park Road
Pasadena, Texas 77507
EPA ID: TXD106829963

Diesel Hydrotreating Unit (DHT) Catalyst

This material is periodically replaced. This catalyst is a dry, metallic solid and will be shipped off as a K-171 hazardous waste. It will either be regenerated or recycled for metals.

Regeneration: Eurecat US, Inc.
13100 Bay Park Road
Pasadena, Texas 77507
EPA ID: TXD106829963

Recycling Recupere Sol, Inc.
80 Rue Des Melezes
St. Ambroise, Quebec
G7P2N4
ID #:1141254640

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Polymerization Unit

This catalyst is periodically replaced. It is a dry solid and stored on concrete containment and covered with a tarp until removal to an off-site landfill via truck.

Clean Harbors Grassy Mountain
3 Miles East, 7 Miles North of Knolls
Clive, Utah 84029
EPA ID: UTD991301748

Spent FCCU Catalyst

This material is a non hazardous dry solid that is disposed of in the on-site landfill and covered with soil.

Sulfur Byproduct

An elemental sulfur byproduct is regularly generated at the SRU. This solid non hazardous residue is disposed of in the on-site landfill and covered with soil.

Maintenance Shop

During equipment maintenance, waste oils are collected and stored in a 250 gallon tote located on a concrete pad. Periodically, this material is shipped off-site via vacuum truck for recycling.

Mesa Oil, Inc
7239 Bradburn Blvd.
Denver, Colorado 80030
EPA ID: COD982581993

Process Filters

Process filters are a solid non hazardous waste. When replaced, the used filters are stored on a concrete pad until dry and then are disposed of as special waste at the San Juan County Landfill. The material is transported by dump truck.

San Juan County Regional Landfill
#78 CR 3140
Aztec, New Mexico 87410
NMED Registration #: 241102

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Section 9.0 Proposed Modifications

Bloomfield Refinery has been working closely with OCD and NMED to resolve contamination issues associated with the refinery. A proposed Long-term Groundwater Monitoring Plan designed to satisfy OCD and NMED directives is located in Appendix D.

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Section 10.0 Inspection, Maintenance, & Reporting

Refinery personnel and contractors routinely conduct inspection, maintenance, and repair of all processing units, systems, tanks, equipment, instrumentation, valves, piping, and other items necessary for the continued operation of the refinery. Some of these activities are conducted under the auspices of applicable regulations (e.g. 29 CFR 1910.119 – OSHA Process Safety Management Standard) and involve detailed recordkeeping and reporting. Specific procedures that relate to sources of liquid effluent and solid waste are described as follows.

Process Wastewater Collection System

Paving, curbing, catch basins, and trenches are routinely inspected for integrity. As required by OCD, Giant utilizes the pressure test technique to verify the integrity of sewer system components. Giant has developed a maintenance schedule spreadsheet (listed in Section 10.0) for testing tanks, process lines, and sumps. This test program will use the OCD methodology and criteria.

The API Separator is emptied and inspected annually. If a problem is found, it is repaired before placing the API Separator back in service.

Refinery operations personnel routinely conduct visual surveillance of process areas and monitor the integrity of concrete paving, curbing, catch basins, and trenches. Problems with containment systems are reported to the appropriate department for repair.

Storm Water Collection System

Storm water system “Best Management Practices” from the refinery’s Storm Water Pollution Prevention Plan (SWPPP) are followed. The SWPPP has been included as a separate document with the submittal of the Application for Modification of the OCD Discharge Plan.

Storage Tanks, Petroleum and Chemical Storage Areas

Refinery Operations, Warehouse, Safety, Environmental, Technical Services, and Laboratory personnel routinely conduct visual surveillance of storage areas and monitor the integrity of containment and check for leakage or other problems. All incidents and near misses are reported to refinery management and appropriate actions are taken. Additional information can be found in the refinery’s ICP and SPCC.

OCD UNDERGROUND LINE TESTING

Process Stream Line Number	Description (Service)	Location (Unit) and test group	Line Size	Line Length	Starting Location	End Location	DRAWING REFERENCE	Test Method	Test Date
1 6-CS-150-0001	Plant Raw Water Supply	Utility	6	900 L/F	River Pump Station	North of Tk. #2 @ Bridge	D-500-800-027	Hydro/Tracer	2008
2 6-PVC-150-0002	Plant Raw Water Supply	Utility	6	901 L/F	South of Bridge @ Tk. #2	East end of East Fresh Wtr. Pd.	D-500-800-027	Hydro/Tracer	2008
3 6-PVC-150-0003	Water Filter Back Flush	Utility	6	902 L/F	Filter House @ South Side	East end of East Fresh Wtr. Pd.	D-500-800-027	Hydro/Tracer	2008
4 8-PVC-150-0004	Plant Process Wtr./Fire Wtr.	Utility	8	903 L/F	Filter House @ South Side	South of Bridge @ Tk. #2	D-500-800-027	Hydro/Tracer	2008
5 8-CS-150-0005	Plant Process Wtr./Fire Wtr.	Utility	8	904 L/F	South of Bridge @ Tk. #2	Tk. #2 / Fire Pump House	D-500-800-027	Hydro/Tracer	2008
6 6-CS-150-0006	Plant Process Wtr. Feed	Utility	6	905 L/F	Tk. #2 Pump House/Filter House	Valve Box @ West of #1 Cooling Twr.	D-500-800-027	Hydro/Tracer	2008
7 16-CS-150-0007	Plant Raw Wtr. Pump Suct.	Utility	16	906 L/F	Isolation Valve Box Filter House	Pump Suction in Filter House	D-500-800-031	Hydro/Tracer	2008
8 6-PVC-150-0008	Effluent Wtr. Transfer Line	Utility	6	907 L/F	Effluent Pond Outlet Pump P-616	North Evaporation Pond	D-500-800-031	Hydro/Tracer	2008
9 6-PVC-150-0009	Effluent Wtr. Trans. Pump	Utility	6	908 L/F	North Evaporation Pond Outlet	Effluent Transfer Pump P-671	D-500-800-031	Hydro/Tracer	2008
10 6-PVC-150-0010	Effluent Wtr. Pump Disch.	Utility	6	909 L/F	Effluent Trans. Pump Disch.	Enjection Well Building	D-500-800-031	Hydro/Tracer	2008
11 6-PVC-150-0011	Injection Well Recir. Line	Utility	6	910 L/F	Enjection Well Building	North Evaporation Pond	D-500-800-031	Hydro/Tracer	2009
12 2-PVC-075-0012	River Terrace Transfer Line	Utility	2	911 L/F	River Terrace Processing Skid	River Pump Building Water Basin	D-500-800-043	Hydro/Tracer	2010
13 12-CS-150-0013	Crude Transfer Line	Terminals	12	912 L/F	Pipe Rack East Of LPG Stg Tks.	Pipe Rack Southwest of Tk. # 31	N/A	Hydro/Tracer	2010
14 6-CS-150-0014	Steam Header at Terminals	Utility	6	913 L/F	Pipe Rack Southeast of Tk. # 31	Pipe Rack East Of LPG Stg. Tks.	N/A	Hydro/Tracer	2010
15 4-CS-150-0015	Condensate Return Header	Utility	4	914 L/F	Pipe Rack East Of LPG Stg Tks.	Pipe Rack Southwest of Tk. # 31	N/A	Hydro/Tracer	2010
16 4-CS-150-0016	C-4 To Blend	Terminals	4	915 L/F	Pipe Rack East Of LPG Stg Tks.	Pipe Rack Southwest of Tk. # 31	N/A	Hydro/Tracer	2008
17 12-CS-150-0017	Desel Sales Line	Terminals	12	916 L/F	Pipe Rack Southeast of Tk. # 31	Filter Pad Area North Of Loading Pad	N/A	Hydro/Tracer	2008
18 12-CS-150-0018	Lite Natural Line	Terminals	12	917 L/F	Pipe Rack Southeast of Tk. # 31	Filter Pad Area North Of Loading Pad	N/A	Hydro/Tracer	2008
19 12-CS-150-0019	(DEAD) Out Of Service	Terminals	12	918 L/F	Pipe Rack Southeast of Tk. # 31	Filter Pad Area North Of Loading Pad	N/A	Hydro/Tracer	O/S
20 4-CS-150-0020	Lite Straight Run Product	Terminals	4	TBD	Pipe Rack Southeast of Tk. # 31	Rack Area North Of Tk. # 23	N/A	Hydro/Tracer	2008
21 3-CS-150-0021	Poly Material To Storage	Terminals	3	382 L/F	Pipe Rack Southeast of Tk. # 31	Area Northeast Of Tk. # 21	N/A	Hydro/Tracer	2009
22 3-CS-150-0022	Poly Unit Feed Line	Terminals	3	383 L/F	Area Northeast Of Tk. # 21	Pipe Rack Southwest of Tk. # 31	N/A	Hydro/Tracer	2009
23 2-CS-150-0023	LPG Rerun Line	Terminals	2	384 L/F	Area Northeast Of Tk. # 21	Pipe Rack Southwest of Tk. # 31	N/A	Hydro/Tracer	2010
24 2-CS-150-0024	Saturate To Storage	Terminals	2	385 L/F	Pipe Rack Southeast of Tk. # 31	Area Northeast Of Tk. # 21	N/A	Hydro/Tracer	2010
25 2-CS-300-0025	C-4 To Storage	Terminals	2	386 L/F	Pipe Rack Southeast of Tk. # 31	Area Northeast Of Tk. # 21	N/A	Hydro/Tracer	2010
26 2-CS-300-0026	C-3 To Storage	Terminals	2	387 L/F	Pipe Rack Southeast of Tk. # 31	Area Northeast Of Tk. # 21	N/A	Hydro/Tracer	2010
27 8-CS-150-0027	JP-8 Sales Line	Terminals	8	388 L/F	Pipe Rack Southeast of Tk. # 31	Out Of Service	N/A	Hydro/Tracer	2008
28 6-CS-150-0028	#1 Diesel Sales From Tk. 18	Terminals	6	389 L/F	Pipe Rack Southeast of Tk. # 31	Filter Pad Area North Of Loading Pad	N/A	Hydro/Tracer	2008
29 4-CS-150-0029	Slop Line To Tk. # 221	Terminals	4	390 L/F	Area Northeast Of Tk. # 21	Out of Service	N/A	Hydro/Tracer	O/S
30 6-CS-150-0030	Isomater/Naphtha Line	Tank Farm	6	391 L/F	Low Rack West Of Tk. # 25	Area West Of Buliet Tk. # 12	N/A	Hydro/Tracer	2009
31 8-CS-150-0031	Premium Sales	Tank Farm	8	392 L/F	Pipe Rack West Of Tk. # 36	Filter Pad Area North Of Loading Pad	N/A	Hydro/Tracer	2007
32 6-CS-150-0032	Reformate from Tk.s # 3 & 4	Tank Farm	6	393 L/F	Pipe Rack West Of Tk. # 36	Filter Pad Area North Of Loading Pad	N/A	Hydro/Tracer	2007
33 4-CS-150-0033	Naphtha to VRU	Terminals	4	394 L/F	Crude Line East Of Tk. # 21	Manifold @ VRU Unit	N/A	Hydro/Tracer	2007
34 4-CS-150-0034	Naphtha Feed To VRU Unit	Terminals	4	395 L/F	Transfer Pump @ Tk. # 44	Manifold @ VRU Unit	N/A	Hydro/Tracer	2007
35 4-CS-150-0035	Naphtha Fill/Rerun To Tk. #44	Terminals	4	396 L/F	Manifold @ VRU Unit	Naphtha Fill Line To Tk. # 44	N/A	Hydro/Tracer	2007
36 8-CS-150-0036	#1 Diesel To Bays #1 & 2	Terminals	8	397 L/F	From F-706 Filter Piping	To Meter Spools @ Bays # 1&2	D-700-500-118	Hydro/Tracer	2007
37 6-CS-150-0037	(Old Kerosene) To Bay # 3	Terminals	6	398 L/F	From F-706 Filter Piping	To Meter Spools @ Bays # 3	D-700-500-118	Hydro/Tracer	2007
38 10-CS-150-0038	Premium Sales Line	Terminals	10	399 L/F	From F-705 Filter Piping	To Meter Spools @ Bays # 1,2 & 3	D-700-500-118	Hydro/Tracer	2007
39 10-CS-150-0039	(Old Unleaded Sales Line	Terminals	10	400 L/F	From F-704 Filter Piping	To Meter Spools @ Bays # 1,2 & 3	D-700-500-118	Hydro/Tracer	2007
40 8-CS-150-0040	Diesel To Bay # 4	Terminals	8	401 L/F	From F-703 Filter Piping	To Meter Spool @ Bay # 4	D-700-500-123	Hydro/Tracer	2007
41 8-CS-150-0041	Ethanol Pump Suction Line	Terminals	8	402 L/F	From Tk. # 45 Outlet Nozzel	To P-707 & P-707A Pump Suction	D-700-500-140	Hydro/Tracer	2007
42 4-CS-150-0042	Ethanol Unloading Line	Terminals	4	403 L/F	From P-706 Pump Discharge	To Tk. # 45 Inlet Nozzel	D-700-500-140	Hydro/Tracer	2010
43 6-CS-150-0044	Materials Transfer Line	Tank Farm	6	404 L/F	Suction Manifold @ P-607A	Unloading line @ Tk. #18 and 19	B-600-500-296	Hydro/Tracer	2010
44 3-CS-150-0045	Naphtha Rerun To Tk. # 35	Tank Farm	3	405 L/F	Line From North Pipe Rack Area	To Tk. # 35 Fill Nozzel	B-600-500-232	Hydro/Tracer	2010
45 4-CS-150-0046	Naphtha Feed Line to Unit	Tank Farm	4	406 L/F	From P-607A Pump Discharge	To Rack Area @ Reformer Unit	B-600-500-236	Hydro/Tracer	2010
46 12-CS-150-0047	Cooling Water Return Line	Utility	12	165 L/F	From # 1 Cooling Tower Pumps	To #1 Cooling Tower Water Inlet	D-500-500-011	Hydro/Tracer	2007
47 12-CS-150-0048	Cooling Water Supply Line	Utility	12	165 L/F	From Rack Area @ Reformer	To #1 Cooling Tower Water Inlet	D-500-500-011	Hydro/Tracer	2007
48 20-CS-150-0049	Cooling Water Supply Line	Utility	20	145 L/F	From # 2 Cooling Tower Pumps	To S. End of FCC Unit @ Twr. 207 Area	D-201-500-123	Hydro/Tracer	2007
49 20-CS-150-0050	Cooling Water Return Line	Utility	20	145 L/F	From South End of FCC Unit	To # 2 Cooling Tower Water Inlet	D-201-500-123	Hydro/Tracer	2007
50 16-CS-150-0051	Fire Water Supply Main	Utility	16	Varies	From Fire Pump House @ Tk. #2	To Fire Main Block Vales # 1,2 & 3	D-500-500-096	Hydro/Tracer	2007
51 16-CS-150-0052	Fire Water Distribution Line	Utility	16/12	Varies	Fire Line Block Val. # 3	To Fire Line Block Vals. # 7 and 10	D-500-500-096	Hydro/Tracer	2007
52 12-CS-150-0053	Fire Water Distribution Line	Utility	12	Varies	Fire Line Block Val. # 2	To Fire Line Block Vals. # 5 and 6	D-500-500-096	Hydro/Tracer	2007
53 12-CS-150-0054	Fire Water Distribution Line	Utility	12	Varies	Fire Line Block Val. # 6	To Fire Line Block Vals. # 7 and 8	D-500-500-096	Hydro/Tracer	2007



BLOOMFIELD REFINERY

OCD TANK INSPECTIONS

TANK #	Service	Normal Capacity Bbls	Capacity Gallons	Last Inspection	Next Inspection
2	FILTERED WATER	64,347	2702574	2000	2010
3	MID-GRADE	9,365	393330	2003	2013
4	MID-GRADE	9,365	393330	2003	2013
5	ISOMERATE	9096	382032	2005	2015
8	CRUDE SLOP	460	19320	1999	2009
9	CRUDE SLOP	460	19320	2007	2017
10	SPENT CAUSTIC	360	15120	2007	2017
11	LOW REFORMATE	50,358	2115036	2002	2012
12	CAT / POLY GAS	50,358	2115036	1999	2009
13	UNLEAD SALES	27,646	1161132	2003	2013
14	UNLEAD SALES	27,615	1159830	2005	2015
17	CAT FEED	38403	1612926	2006	2016
18	#1 DIESEL SALES	50358	2115036	1999	2009
19	#2 DIESEL SALES	34991	1469622	2000	2010
20	NAPHTHA	10000	420000	2007	2017
23	BASE GASOLINE	38,402	1612884	2002	2012
24	ULS DIESEL	10107	424494	2006	2016
25	ULS DIESEL	10107	424494	2006	2016
26	SWEET NAPHTHA	3,264	137088	1998	2008
27	HEAVY BURNER FUEL	9,854	413868	2006	2016
28	CRUDE	77,854	3269868	1999	2009
29	#2 DIESEL SLOP	16,676	700392	2005	2015
30	PREMIUM UNLEAD BLEND	16,676	700392	2004	2014
31	CRUDE	98,676	4144392	2001	2011
32	PREMIUM UNLEAD SALES	17,913	752346	1999	2009
33	RECOVERY WELL WATER	360	15120	2003	2013
35	REFORMER FEED	43904	1843968	2005	2013
36	CAT / POLY GAS	43904	1843968	2005	2015
37	FRENCH DRAIN	121	5082	2001	2011
38	EAST OUTFALL	302	12684	2003	2013
40	TERMINALS SLOP	400	16800	2007	2017
41	TERMINALS SLOP	2798	117516	2002	2012
42	TERMINALS SLOP	400	16800	2007	2017
44	VRU NAPHTHA	1,751	73542	1998	2008
45	ETHANOL	4821	202482	1998	2008

BLOOMFIELD REFINERY

SUMPS & SEWER BOXES

	Identity	Description (Service)	Type Material	Length Size	Width Size	Depth/ft	Location	Capacity Gal.	DRAWING REFERENCE	Test Method	Test Date
1	Fire Pump House	Blow Down Sump	Concrete	4	4	8	Tank # 2	957.4	N/A	Hydro/Tracer	2008
2	(Crude) Sewer Box # 12	Sewer Collection Box	Concrete	4	4	4.7	Crude Unit	562.5	D-500-100-032	Hydro/Tracer	2008
3	(Crude) Sewer Box # 11	Sewer Collection Box	Concrete	4	4	4.9	Crude Unit	586.4	D-500-100-032	Hydro/Tracer	2008
4	(Crude) Sewer Box # 9	Sewer Collection Box	Concrete	4	4	6.01	Crude Unit	719.3	D-500-100-032	Hydro/Tracer	2008
5	(Crude) Sewer Box # 8	Sewer Collection Box	Concrete	4	4	6.26	Crude Unit	749.2	D-500-100-032	Hydro/Tracer	2008
6	(Crude) Sewer Box # 7	Sewer Collection Box	Concrete	4	4	6.53	Crude Unit	781.5	D-500-100-032	Hydro/Tracer	2008
7	(Crude) Sewer Box # 5	Sewer Collection Box	Concrete	4	4	6.25	Crude Unit	748.0	D-500-100-032	Hydro/Tracer	2008
8	(Crude) Sewer Box # 1	Sewer Collection Box	Concrete	4	4	7.87	Crude Unit	941.9	D-500-100-032	Hydro/Tracer	2008
9	(Gas Con) Sewer Box	Sewer Collection Box	Concrete	3	3	3	Gas Con Unit	202.0	N/A	Hydro/Tracer	2008
10	(FCC) Sewer Box # 1	Sewer Collection Box	Concrete	3.5	3.5	4	FCC Unit	366.5	N/A	Hydro/Tracer	2008
11	(FCC) Sewer Box # 2	Sewer Transfer Box	Concrete	3.5	3.5	4	FCC Unit	366.5	N/A	Hydro/Tracer	2008
12	(Treater) Sewer Box	Sewer Collection Box	Concrete	4	4	4	Treater Unit	478.7	N/A	Hydro/Tracer	2008
13	(Treater) Sewer Box	Sewer Collection Box	Concrete	4	4	6	Wet Gas Comp	718.1	N/A	Hydro/Tracer	2008
14	(DHT) Sewer Box # 18	Sewer Collection Box	Concrete	4	4	5	DHT Unit	598.4	N/A	Hydro/Tracer	2008
15	(DHT) Sewer Box # 17	Sewer Transfer Box	Concrete	4	4	4.62	Poly Unit	552.9	N/A	Hydro/Tracer	2008
16	Sump @ S.W. Side Of Tk. 3	Tank Drain Sump	Concrete	4	4	4	Tank Farm	478.7	N/A	Hydro/Tracer	2007
17	Sump Between Tk. 3 & 4	Tank Drain Sump	Concrete	4	4	4	Tank Farm	478.7	N/A	Hydro/Tracer	2007
18	Sump Between Tk. 4 & 5	Tank Drain Sump	Concrete	6	10	4	Tank Farm	1795.2	N/A	Hydro/Tracer	2007
19	Sump @ N. Side Of Tk. 5	Tank Drain Sump	Concrete	4	4	4	Tank Farm	478.7	N/A	Hydro/Tracer	2007
20	Sump Between Tk. 11 & 12	Tank Drain Sump	Concrete	6	10	4	Tank Farm	1795.2	N/A	Hydro/Tracer	2007
21	Sump Between Tk. 13 & 14	Tank Drain Sump	Concrete	6	10	4	Tank Farm	1795.2	N/A	Hydro/Tracer	2007
22	Sump @ N. Side Of Tk. 17	Tank Drain Sump	Concrete	4	4	4	Tank Farm	478.7	N/A	Hydro/Tracer	2007
23	Sump @ N.E. Side Of Tk. 18	Tank Drain Sump	Concrete	6	10	4	Tank Farm	1795.2	N/A	Hydro/Tracer	2007
24	Sump @ N.E. Side Of Tk. 19	Tank Drain Sump	Concrete	6	10	4	Tank Farm	1795.2	N/A	Hydro/Tracer	2007
25	Sump @ S.W. Side Of Tk. 20	Tank Drain Sump	Concrete	4	4	4	Tank Farm	478.7	N/A	Hydro/Tracer	2007
26	Sump @ S.E. Side Of Tk. 22	Tank Drain Sump	Steel	4	8	4	Tank Farm	957.4	N/A	Hydro/Tracer	2007
27	Sump @ S. Side Of Tk. 23	Tank Drain Sump	Concrete	4	4	4	Tank Farm	478.7	N/A	Hydro/Tracer	2007
28	Sump @ N.W. Side Of Tk. 26	Tank Drain Sump	Concrete	4	4	4	Tank Farm	478.7	N/A	Hydro/Tracer	2007
29	Sump @ S.E. Side Of Tk. 27	Tank Drain Sump	Concrete	6	10	4	Tank Farm	1795.2	N/A	Hydro/Tracer	2007
30	Sump @ West Side Of Tk. 28	Tank Drain Sump	Concrete	6	10	4	Tank Farm	1795.2	N/A	Hydro/Tracer	2007
31	Sump @ N.E. Side Of Tk. 29	Tank Drain Sump	Concrete	6	10	4	Tank Farm	1795.2	N/A	Hydro/Tracer	2007
32	Sump @ S.W. Side Of Tk. 30	Tank Drain Sump	Concrete	6	10	4	Tank Farm	1795.2	N/A	Hydro/Tracer	2007
33	Sump @ N.W. Side Of Tk. 31	Tank Drain Sump	Concrete	6	10	4	Tank Farm	1795.2	N/A	Hydro/Tracer	2007
34	Sump @ S.E. Side Of Tk. 31	Tank Drain Sump	Concrete	6	10	4	Tank Farm	1795.2	N/A	Hydro/Tracer	2007
35	Sump @ East Side Of Tk. 32	Tank Drain Sump	Concrete	4	4	4	Tank Farm	478.7	N/A	Hydro/Tracer	2007
36	Sump @ N.E. Side Of Tk. 35	Tank Drain Sump	Concrete	7.8' Dia	N/A	5.5	Tank Farm	1680.0	N/A	Hydro/Tracer	2007
37	Sump @ N.E. Side Of Tk. 36	Tank Drain Sump	Concrete	7.8' Dia	N/A	5.5	Tank Farm	1680.0	N/A	Hydro/Tracer	2007

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Section 11.0 Spill/Leak Prevention & Reporting Procedures (Contingency Plans)

Giant Refining Company – Bloomfield has developed, implemented, and is currently utilizing an Integrated Contingency Plan (ICP) as described in the Federal Register Notice “The National Response Team’s Integrated Contingency Plan Guidance (One Plan) dated June 5, 1996 (Volume 61, Number 109, pages 28641 – 28664). This document describes the recommended method for developing and adopting a comprehensive and integrated contingency plan for complying with the numerous and overlapping safety and environmental requirements of OSHA, DOT, EPA, USCG, and other federal and state regulations. This includes the following regulations.

- EPA Spill Prevention, Control, & Countermeasures Plan (40 CFR Part 112.7)
- EPA Facility Response Plan (40 CFR Part 112.20 & 112.21)
- EPA Risk Management Program (40 CFR Part 68)
- EPA Contingency Planning Requirements (40 CFR Part 264, 265, 279.52)
- USCG Facility Response Plan (33 CFR Part 154, Subpart F)
- RSPA Pipeline Response Plan (49 CFR Part 194)
- DOT Emergency Response Plans (49 CFR Part 130 & 172)
- OSHA Process Safety Management Standard (29 CFR 1910.119)
- OSHA Emergency Action Plan (29 CFR 1910.38)
- OSHA Training & Response Requirements (29 CFR 1910.120)

Included within the ICP is a plan for addressing Spill Prevention, Control, and Countermeasures (SPCC) as required by the Oil Pollution Act (40CFR Part 112.7). The requirements of the ICP and SPCC encompass and comply with the requirements of NMOCD Rule 116 and WQCC Section 1203.

In addition, a Storm Water Pollution Prevention Plan (SWPPP), as required by Clean Water Act NPDES Multi-sector General Permit requirements, has been developed and implemented. A copy of the SWPPP has been included with the submittal of the Application for Modification of the OCD Discharge Plan.

A copy of the Giant Refinery – Bloomfield ICP and SWPPP are kept in the Environmental Managers office.

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Section 12.0 Site Characteristics

Bloomfield, New Mexico is a town of 5000 residents located in the Four Corners Region of northern New Mexico. San Juan Refining Company – Giant – Bloomfield is located one mile south of Bloomfield on a bluff overlooking the San Juan River. The facility is comprised of approximately 285 acres with surface vegetation consisting of native grasses, shrubs, cacti, and small trees. Bordering the facility is a combination of federal and private properties.

The topography of the site is generally flat with low-lying spots to the east of the process area. Unnamed arroyos frame the eastern and western borders of the facility. The majority of the processing facility resides on a bluff 100 feet above the San Juan River.

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 Navajo Dam (20 miles upstream) controls the flow of the San Juan River. The town of Bloomfield and the surrounding areas derive their potable water from the river.

Hammond Ditch is a concrete lined canal that is used for irrigation and watering livestock and not intended for human consumption. On the northern boundary of the refinery, Hammond Ditch has a French Drain system installed to prevent water build-up underneath the liner. As indicated on the plant site drawing in Appendix A, there are four outfalls associated with this drain system. The French Drain Recovery System and the #1 East Outfall flow into recovery tanks and are pumped back to the facility. The #2 and #3 East Outfalls flow freely to the San Juan River.

The refinery's man-made evaporation ponds, fresh water ponds, and aeration lagoons comprise the additional surface water in the area.

Giant – Bloomfield is located within the San Juan Basin, a sub-province of the Colorado Plateau physiographic province. There are three distinct stratigraphic units that underlay the 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 has been deposited as the result of eolian deposition.

The underlying Jackson Lake Terrace deposits consist of coarse-grained fluvio-glacial outwash. It is primarily composed of well-rounded gravels, cobbles, and sand sized rocks. Cobbles and boulders are commonly observed in the deposits.

The Nacimiento Formation consists of inter-bedded carbonaceous mudstone/siltstone. It has very low permeability and effectively serves as an aquitard below the Jackson Lake Terrace Formation.

In general, groundwater flows from east to west within the Jackson Lake Terrace. Groundwater elevation and flow direction maps are provided to the OCD in the annual groundwater reports indicate that troughs or depressions exist within the Nacimiento Formation surface underlying the facility. These contours likely influence the migration and accumulation of groundwater beneath the refinery.

Discharge Plan Renewal Application

Section 12.0

July 2007

Shallow groundwater located above the Nacimiento Formation aquitard is mostly man-made and also most likely to be affected by any discharge at the refinery. Groundwater at this site is irregular and intermittent.

Due to the irregular surface topography of the Nacimiento Formation, depth to groundwater is highly variable. It may be encountered in as little as 4 feet below ground surface (River Terrace) and as much as 45 feet in the southeast portion of the tank farm.

Sampling and analysis of the shallow groundwater has been ongoing at the refinery since the 1980's and this data has been supplied to the OCD in the annual groundwater report. The predominant type of contaminant at the refinery is petroleum hydrocarbons.

Soil types are a sand and sand/clay mix throughout the refinery. Information obtained from the New Mexico State Engineer's Office indicates that there is not a significant, useable aquifer in the vicinity of the refinery. Bedrock depth ranges from exposed on the northern portion of the site to 44 feet below ground surface at the southeast section of the tank farm.

Flooding potential is minimal as the refinery is perched on a bluff 100 feet above the San Juan River. Berms, dikes, and storm water retention ponds protect against flooding due to a precipitation and/or run-off event.

Discharge Plan Renewal Application

Section 13.0

July 2007

Section 13.0 Compliance Information

The Bloomfield Refinery was constructed in the mid-1950's and has been in near continuous operation since that time. Over the years, various releases of petroleum-based products and other materials have occurred, largely as a result of minor spills, equipment leaks and former impoundments and disposal sites. As a result, surface soil, subsurface soil, and groundwater have been impacted at various locations and over various time periods spanning the past 50 years.

Bloomfield Refinery has been working closely with OCD and NMED to resolve contamination issues associated with the refinery. The North Boundary Barrier Wall, the River Terrace Voluntary Corrective Measures Bioventing System, and the #1 East Outfall indicate the commitment that Giant has to protecting the environment. Giant will continue to follow directives from OCD through the stipulated Final Order and from NMED's Draft Order to implement a long-term groundwater monitoring plan and remediate and close Solid Waste Management Units (SWMUs) and Areas of Concern (AOC). A proposed long-term groundwater monitoring plan is in Appendix D and an Assessment, Remediation and Contingency Plan is in Appendix E.

Table 6.1 - Materials Stored in Atmospheric Storage Tanks

Tank No	Contents	Material	Construction Date	Volume BBLs	Location
2	Water	Carbon Steel	Jan-78	67,000	Tank Farm
3	Premium No Lead Sales	Carbon Steel	Sep-66	10,000	Tank Farm
4	Premium No Lead Sales	Carbon Steel	Sep-66	10,000	Tank Farm
5	Isomate	Carbon Steel	Sep-66	10,000	Tank Farm
8	Slop Oil	Carbon Steel	Dec-87	460	Tank Farm
9	Slop Oil	Carbon Steel	Dec-87	460	Tank Farm
10	Spent Caustic	Carbon Steel	Jan-86	400	Treater
11	Reformate	Carbon Steel	Dec-82	55,000	Tank Farm
12	Poly/Cat Gas	Carbon Steel	Dec-82	55,000	Tank Farm
13	No Lead Gas	Carbon Steel	Sep-87	30,000	Tank Farm
14	No Lead Gas	Carbon Steel	Sep-87	30,000	Tank Farm
17	Reduced Crude	Carbon Steel	Feb-61	40,000	Tank Farm
18	Off-Road Diesel Sales	Carbon Steel	Jan-74	55,000	Tank Farm
19	ULS Diesel Sales	Carbon Steel	Jan-75	36,000	Tank Farm
20	Sweet Naphtha	Carbon Steel	Sept-07*	20,000	Tank Farm
23	Base Gas	Carbon Steel	Jan-62	40,000	Tank Farm
24	Diesel Rundown	Carbon Steel	Mar-06	10,000	Tank Farm
25	Diesel Rundown	Carbon Steel	Mar-06	10,000	Tank Farm
26	Naphtha	Carbon Steel	Dec-67	4,000	Tank Farm
27	Heavy Burner Fuel	Carbon Steel	Jan-67	10,000	Tank Farm
28	Crude Oil	Carbon Steel	Apr-69	80,000	Tank Farm
29	LCO/FCC Slop	Carbon Steel	Jan-74	17,000	Tank Farm
30	LCO/FCC Slop	Carbon Steel	Jan-74	17,000	Tank Farm
31	Crude Oil	Carbon Steel	Aug-77	110,000	Tank Farm
32	Sub-Grade Sales	Carbon Steel	Apr-88	20,000	Tank Farm
33	Recovered Water	Carbon Steel		400	Tank Farm
34	Water	Carbon Steel		400	Inj. Well
35	Reformer Feed	Carbon Steel	Apr-88	55,000	Tank Farm
36	Sub Grade Blend	Carbon Steel	Apr-88	55,000	Tank Farm
37	Recovered Water	Carbon Steel	Jan-02	120	Hammond Ditch
38	Recovered Water	Carbon Steel	Oct-03	300	Hammond Ditch
41	Crude Oil	Carbon Steel	May-02	2,800	Terminals
42	Water/Crude Oil	Carbon Steel	Sept-07*	400	Terminals
43	Water/Crude Oil	Carbon Steel	Sept-07*	400	Terminals
44	Sweet Naphtha	Carbon Steel	Jan-88	2,000	Terminals
45	Ethanol	Carbon Steel	Jan-94	5,000	Terminals

* Projected Completion Date

Table 6.2 - Materials Stored in Pressurized Storage Tanks

Tank No.	Contents	Construction Date		Volume BBLs	Location
B-12	Out of Service	Carbon Steel	Jan-60	692	Terminals
B-13	LPG	Carbon Steel	Jan-60	500	Terminals
B-14	LPG	Carbon Steel	Jan-60	500	Terminals
B-15	LPG	Carbon Steel	Jan-60	714	Terminals
B-16	LPG	Carbon Steel	Jan-78	714	Terminals
B-17	LPG	Carbon Steel	Jan-78	714	Terminals
B-18	LPG	Carbon Steel	Jan-78	714	Terminals
B-19	LPG	Carbon Steel	Jan-78	714	Terminals
B-20	LPG	Carbon Steel	Jan-78	714	Terminals
B-21	LPG	Carbon Steel	Oct-83	714	Terminals
B-22	LPG	Carbon Steel	Apr-88	714	Terminals
B-23	LPG	Carbon Steel	Apr-88	714	Terminals

Table 6.3 - Significant Chemicals Chemical Inventory

Product	Max. Volume	Daily Usg.	Ingredients	Location	Phys. State
Acetone	4 - 5gal. Pails	20gal./yr	Acetone	Lab	Liquid
Acetylene (WTL)	3 - 207 lb cylinders	4cyl./yr	Acetylene	Whse. Yrd./ Weld Sh.	Gas
Acetylene (AC150)	1 - 150 lb cylinders	1cyl./yr	Acetylene	Whse. Yrd./ Weld Sh.	Gas
Ammonium Thiosulfate	2 - 250 gallon tote	0	Ammonium Thiosulfate	SRU Bldg./Whse. Yrd.	Liquid
Antifreeze/coolant	3 - 55 gallon drums	1gal./day	Ethylene Glycol. Water	Whse. Yrd.	Liquid
Antifreeze/coolant	10 - 1gallon jugs	2gal./mon	Ethylene Glycol. Water	Whse. Yrd.	Liquid
Argon (T size)	2 - 177 lb cylinders	2cyl./yr	Argon	Lab	Gas
Bio - Flora	250 gallon tote	3gal./day	Humega, Fulvic Acid, Bioscrubber II	API Separator	Liquid
Carbon Dioxide	4 - 20 lb cylinders	4cyl./yr	Carbon Dioxide	Lab	Gas
Caustic	4500 gallons	18.7gal./day	Sodium Hydroxide, Water	Treater/SRU	Liquid
Valero OGA76215	2000 gallon tank	1/2gal./day	Solvent Naphtha	Terminals	Liquid
Chevron OGA72015	2000 gallon tank	3.5gal./day	Solvent Naphtha	Terminals	Liquid
Chlorine	5 - 150# cylinder	10/yr	Chlorine	Cig. Twrs./Whse. Yrd.	Gas
Chlorine	1 - 2000# cylinder	1/yr	Chlorine	Cooling tower	Gas
Conoco 6576	2000 gallon tank	8.5gal./day	Solvent Naphtha	Terminals	Liquid
Conoco 68	1 - 5 gallon pails	35gal./yr	Superior Hydraulic Oil	Whse. Yrd.	Liquid
Conoco SAE 15W-40	quart jugs	24qrts./yr	Proprietary Blend	Whse. Yrd.	Liquid
Conoco SAE 15W-40	1 gallon jug	41gal./yr	Proprietary Blend	Whse. Yrd.	Liquid
Conoco SAE 15W-40	5 gallon pail	12-5gal./yr.	Proprietary Blend	Whse. Yrd.	Liquid
Conoco SAE 15W-40	1-55 gallon drum	2drum./yr	Proprietary Blend	Whse. Yrd.	Liquid
Dow CA-2102	4 - 550 gallon tote	1/2gal./day	Proprietary Blend	SRU Bldg.	Liquid
Zep	1 - 550 gallon tote	2gal./day	Ethanol, Surfactants	SRU Bldg.	Liquid
Dow IC-110	2,500 gallon tank	17.8gal./day	Aminocaboxylato Iron	SRU Bldg.	Liquid
Dow IC-210	2,500 gallon tank	95gal./day	Aminocarboxylate Sodium Salt I	SRU Bldg.	Liquid
Du Pont Antioxidant #22	3 - 55 gallon drums	3drum./yr	N,N-D-SecButyl-P-Phenylenediamine	Whse. Yrd./Proc. Area	Liquid
Du Pont Stadis 425	1 - 300 gallon tote	55gal./mon.	Toluene	Proc. Area	Liquid
Ethyl Hitec 3023	10,000 gallon tank	30gal./day	Petroleum Distillates	Terminals	Liquid
Nemo 1117	7000 gallon tank	27gal./day	Proprietary Blend	Terminals	Liquid
Fire Ext. Foam (ATC/AFFF)	6 - 250 gal. Totes	0	Diethylene Glycol Butyl Ether, Water	Filter Hs.	Liquid
Fire Ext. Foam (ATC/AFFF)	12 - 5 gal Buckets	0	Diethylene Glycol Butyl Ether, Water	FireHs.	Liquid
Fire Ext. Foam (ATC/AFFF)	55 - 5 gal Buckets	0	Diethylene Glycol Butyl Ether, Water	Tank #2	Liquid
Helium	2 - 145 lb cylinders	8/yr	Helium	Lab	Gas

Table 6.3 - Significant Materials Chemical Inventory

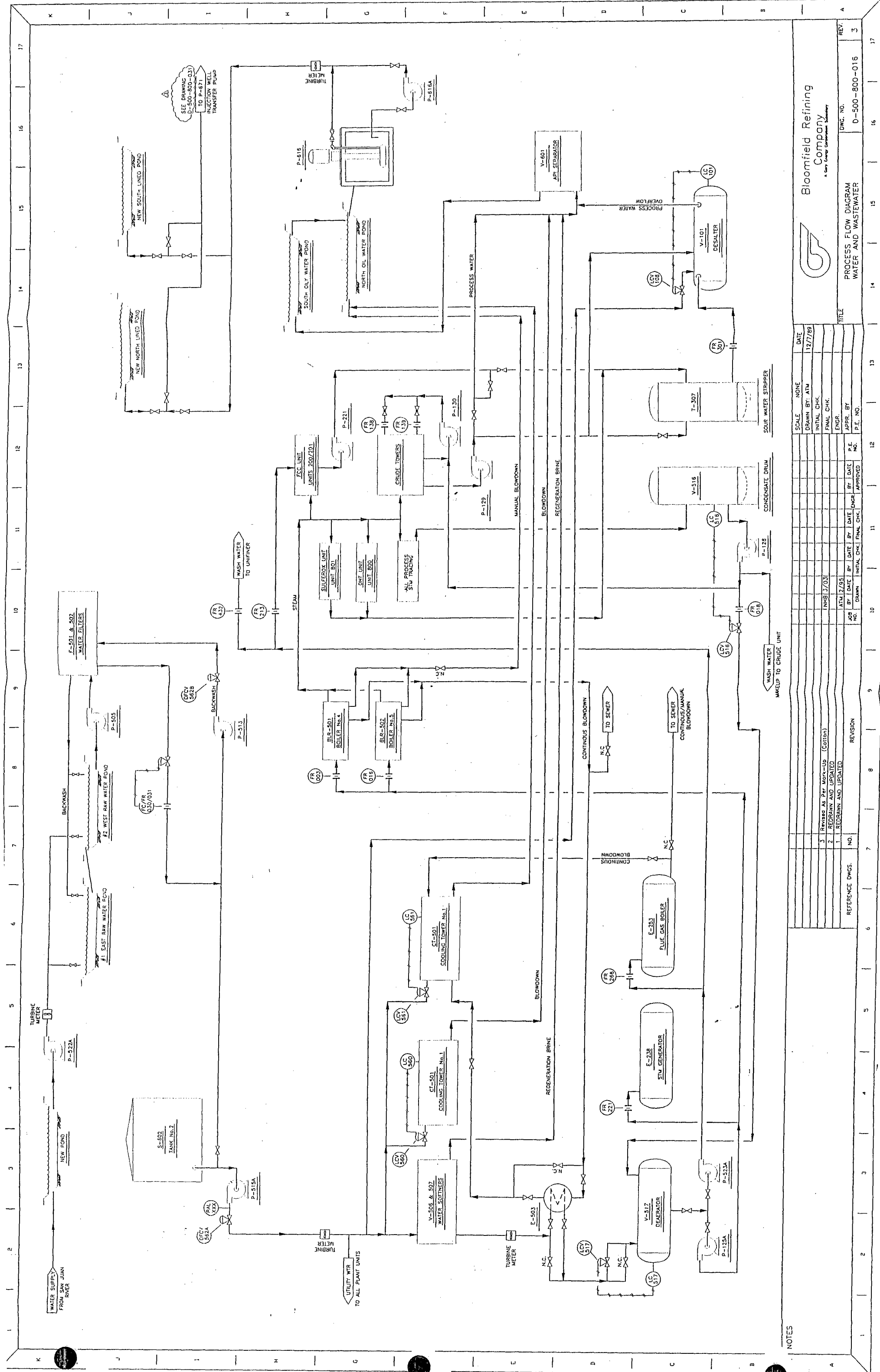
Product	Max. Volume	Daily Usg.	Ingredients	Location	Phys. State
Hydrogen	2 145 lb cylinders	4/yr	Hydrogen	Lab	Gas
Hydrogen Peroxide	2-500 lb drums	30drm./yr	Hydrogen peroxide, water	Whse. Yrd.	Gas
Ice Melt	10 - 20 lb bags	10bgs/yr	Potassium Chloride, Sodium Chloride	Whse. Yrd./Proc. Area	Solid
Infineum F7589	500 gallon tank	2gal./mon	Naphthalene	Terminals	Liquid
Isopropyl	4 - 5 gallon pail	15gal/yr	Isopropyl	Lab	Liquid
Ketjenfine	1 - 55 gallon drum	0	MO/NI/Alumina Silica Catalyst	Whse. Yrd.	Solid
Methanol	4 - 55 gallon drums	8qrts./day	Methanol	Whse. Yrd./Proc. Area	Liquid
Nalco 23268	2 - 400 gallon tote	4.5gal/day	Sodium Tolytriazole	Whse. Yrd./Clg. Twrs	Liquid
Nalco 71D5+	2 - 400 gallon tote	2gal./day	Kerosene	Whse. Yrd./Clg. Twrs	Liquid
Nalco 7308	1 - 55 gallon drum	Min. as needed	Polyglycol, Ethoxylated Nonyl-phenol	Lab.	Liquid
Nalco 7338	1 - 55 gallon drum	3drm./yr	Glutaraldehyde	Whse. Yrd./Lab.	Liquid
Nalco 7348	1 - 55 gallon drum	0.75gal./day	Ethoxylated Nonyl-phenol	Whse. Yrd./Lab.	Liquid
Nalco 7356	3 - 200 gallon tote	3.7gal./day	Phosphoric acid	Whse. Yrd./Clg. Twrs	Liquid
Nalco Eliminox 02	2 - 400 gallon tote	1.2gal./day	Carbohyrazide	Whse. Yrd./Boiler Hs.	Liquid
Nalco NexGuard 22310	2 - 400 gallon tote	2.9gal./day	Acrylate Polymer, NaOH, Water	Whse. Yrd./ Boiler Hs.	Liquid
Nalco Tri-act 1804	2 - 400 gallon tote	1.75gal./day	Cyclohexylamine, Water	Whse. Yrd./Boiler Hs.	Liquid
Nalcolyte 8157	2 - 250gallon tote	2.6gal./day	Aluminum Hydroxy Chloride	Whse. Yrd./Pump Hs.	Liquid
Nitrogen	18 - 165 lb cylinders	320cyl./yr	Nitrogen	Whse. Yrd./Proc. Area	Gas
Octane	2-55 gallon drums	1/2 gal./day	PRF Octane Blend	Whse. Yrd.	Liquid
Octel MO-1	2000 gallon tank	2gal./day	Propreitary Polymer, Xylene	Terminal	Liquid
Octel Oil Red B liquid dye	540g tank, 250g tote	2.9gal./day	Organic Die in Xylene	Whse. Yrd./Terminal	Liquid
Oxygen	4 - 150 lb cylinders	12cyl./yr	Oxygen	Whse. Yrd./ Weld Sh./Lab	Gas
Pennzoil motor oil	2 - 55 gallon drums	100gal./yr	Proprietary Blend	Whse. Yrd.	Liquid
Perchloroethylene	3 - 55 gallon drums	3drm./yr	Tetrachloroethylene	Whse. Yrd./Proc. Area	Liquid
Phillips Scentinel A	80 gallon tank	200gal./yr	Ethyl Mercaptan	Terminal	Liquid
Phillips 80 Octane	2 - 55 gallon drums	1drm./yr	Isooctane, N-Heptane	Whse. Yrd./Lab.	Liquid
Phillips Isooctane	2 - 55 gallon drums	1/4gal./day	2,2,4-Trimethylpentane	Whse. Yrd./Lab.	Liquid
Phillips Toluene	10 gallons	50gal./yr	Toluene, Benzene	Lab.	Liquid
Purple K Dry Chem Ext. Agent	5 - 50lb. Buckets	0	Proprietary Blend of Potassium Bicarbonate	Tank #2 & FireHs.	Solid
Safety Klean 105 Solvent	25 gallons	0	Parts Washer Solvent	Whse./Shop	Liquid
Stoddard solvent	3 - 55 gallon drums	9drms./yr	Stoddard solvent	Whse. Yrd.	Liquid
Sulfuric acid	2 - 500 gallon tanks	4.5	Sulfuric acid	Clg. Twrs	Liquid

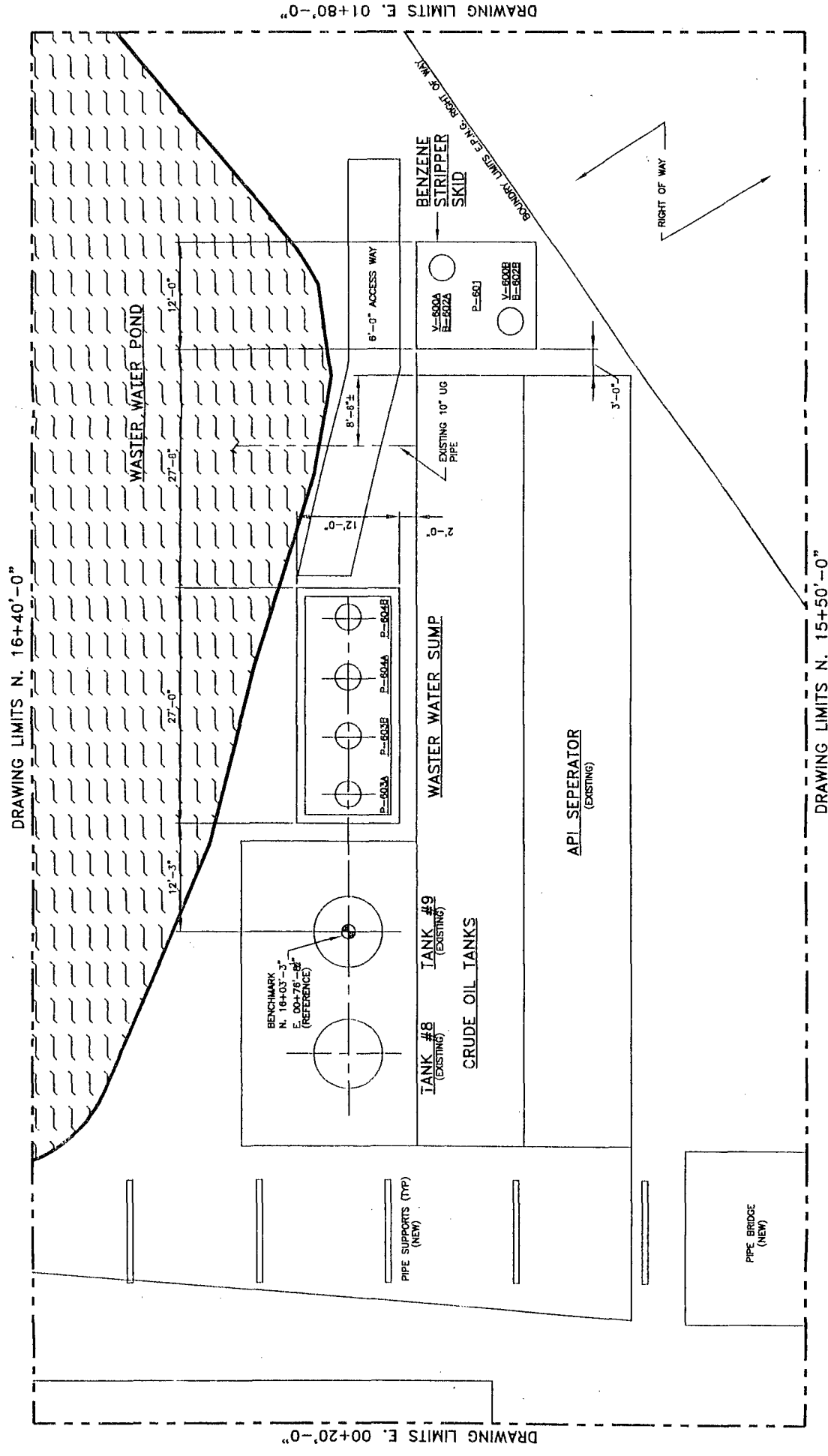
Table 6.3 - Significant Chemicals Chemical Inventory

Product	Max. Volume	Daily Usg.	Ingredients	Location	Phys. State
SynGear 7032 Oil	2 - 55 gallon drums	2drn./yr	Proprietary Blend	Whse. Yrd./Terminals	Liquid
SynGear Barrier Fluid 5	3 - 5 gallon tote	3pails/yr	Proprietary Blend	Proc. Area/ Whse. Yrd.	Liquid
Syngear SH 7032	1 - 55 gallon drum	1/2drn./yr	Proprietary Blend	Whse. Yrd.	Liquid
Ultimate Degreaser	3 - 55 gallon drums	2drn./yr	Trisodium Phosphate, Water	Whse. Yrd./Proc. Area	Liquid
Unichem 7055	521 gallon tote	2.5	Polyethylbenzene Residue	Boiler Hs.	Liquid
Unichem 7219	521 gallon tote	1.25	Aromatic Solvent	Boiler Hs.	Liquid
Unichem 7376	521 gallon tote	3.5	Alkylamines	Boiler Hs.	Liquid
Unichem 7533	3 - 55 gallon drums	8.7	Proprietary Blend, silver corrosion inhibitor	Whse. Yrd./Proc. Area	Liquid
Unichem 7543	800 gallons	9	Proprietary Blend	Whse. Yrd./Proc. Area	Liquid
Unichem 8091	3000 gallon tank	2	Aromatic Solvents	Proc. Area	Liquid
Unocal ATF Dexton R II	6 - 55 gallon drums	3drn./yr	Oil Mist	Whse. Yrd./Proc. Area	Liquid
X - Course Salt	16 - 2000 lb sacks	83sax/yr.	Sodium Chloride	Whse. Yrd./Proc. Area	Solid
Xylene	3 - 5 gallon pails	2pails/yr	Xylene	Lab	Liquid
Zep + E Chemical	3 - 5 gallon pails	2pails/yr	Potassium Dodecylbenzene Sulfonate	Whse. Yrd./Proc. Area	Liquid
Z-seal	4 - 55gallon drum	3drms./yr	Ethylene glycol	Whse. Yrd.	Liquid

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BENZENE STRIPPING SYSTEM
PLOT PLAN
WASTE WATER SUMP & BENZENE SKID
MERRICK PROJECT NUMBER: 32015121-02



MERRICK
BUILDING QUALITY SOLUTIONS

CLINT O'CONNOR

BLOOMFIELD REFINERY	BLOOMFIELD NEW MEXICO	REV.
METROCK DWG NO.	5121-C-1501	
DWG NO.		

BENZENE STRIPPER SKID & WASTE WATER SUMP PLAN

007 ZINGER



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**MALCOLM
PIRNIÉ**

Prepared by
Malcolm Pirnie, Inc.

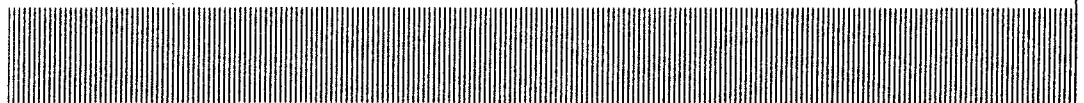


Western Refining

Bloomfield Refinery • #50 Road 4990 • Bloomfield, NM 87413

Facility-Wide Groundwater Monitoring Plan

July 2007



Report Prepared By:

Malcolm Pirnie, Inc.

4646 E Van Buren
Suite 400
Phoenix, AZ 85008
602.241.1770

5127-004



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- D. Analytical Summary (2004-2007) – River Terrace and San Juan River
- E. Groundwater Elevation and Separate Phase Hydrocarbon (SPH) Thickness Summary
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Executive Summary

This Site-Wide Groundwater Monitoring Plan (Plan) has been prepared in response to requirements stated in the Draft July 2007 Bloomfield Refinery Order issued to Giant Refining Company by the State of New Mexico Environment Department (NMED), and to satisfy the requirement to be included in the modified Discharge Plan required by New Mexico Energy, Minerals, and Natural Resources Department Oil Conservation Division (OCD).

This Plan has been prepared to collect data that will be used to characterize the nature and extent of potential impacts to groundwater at and migrating from the Bloomfield Refinery owned by San Juan Refining Company and operated by Giant Industries Arizona, Inc. ("Bloomfield Refinery" or "Facility"). This Plan also includes monitoring the effectiveness of interim containment and remediation systems implemented at the Facility, specifically the North Boundary Barrier Wall and the River Terrace Bioventing System. Also included is sampling of San Juan River, and several existing outfall locations in the east portion of the Facility.

This Plan divides the Facility into four areas for periodic monitoring: the Refinery Complex, the North Boundary Barrier, the Bluff Outfalls and Seeps, and the River Terrace. The number of sampling locations, the target analytes, and monitoring frequencies vary by area. With exception of the River Terrace area and Tank #33, designated monitoring wells and sample points in these areas will be monitored on a semi-annual frequency, with a more-comprehensive monitoring well network sampled on an annual frequency. Monitoring events following the procedures presented in this Plan will begin with the initial annual event in the third quarter of 2007. Monitoring wells in the River Terrace area will be sampled on a quarterly basis. Tank #33, which receives water from East Outfall #1 via Tank #38, will also be sampled on a quarterly basis.

Groundwater monitoring activities have been conducted at the Facility since the early 1990's in response to various directives issued by NMED and the OCD. It is our intent that this Plan be accepted by both agencies as the prevailing document for comprehensive groundwater monitoring at the Bloomfield Refinery.

Effectiveness of the North Boundary Barrier Wall, active pumping systems, and remedial actions at the River Terrace continue to be evaluated. Giant will review the last five years of facility-wide monitoring data, and assess the monitoring program presented in this Plan. Revisions to the Plan, as necessary, will then be presented for agency review and approval. These revisions may include, but not be limited to, a reduction or change in monitoring locations, monitoring frequency, and/or target analytes.



1. Introduction

This Site-Wide Groundwater Monitoring Plan (Plan) has been prepared for the implementation of a groundwater monitoring program at the Bloomfield Refinery to assess the nature and extent of potential impacts to groundwater from historic refinery operations. The monitoring program will also assess the effectiveness of interim containment and remediation systems implemented at the Refinery.

The Plan follows the requirements of the Draft July 2007 Order issued by the New Mexico Environment Department (NMED) and includes the following information:

- Site description
- Description of facility operations
- Summary of historic monitoring data
- Description of subsurface conditions
- Monitoring and sampling methods
- Monitoring and sampling locations and frequency
- Monitoring and sampling schedule

1.1. Facility Ownership and Operation

Owner: San Juan Refining Company
23733 North Scottsdale Road
Scottsdale, Arizona 85255-3465

Operator: Giant Industries Arizona, Inc. (postal address)
23733 North Scottsdale Road
Scottsdale, Arizona 85255-3465

Bloomfield Refinery (physical address)
#50 Rd 4990
Bloomfield, New Mexico 87413

Facility Name: Bloomfield Refinery (physical address)
#50 Rd 4990
Bloomfield, New Mexico 87413
Facility Status: Corrective Action/Compliance

US EPA ID: NMD089416416
SIC Code: 2911



2. Background

2.1. SITE LOCATION AND DESCRIPTION

The Bloomfield Refinery is a crude oil refining facility with a process capacity of 18,000 barrels per day. It is located approximately 1 mile south of Bloomfield, New Mexico, in San Juan County, latitude N36 41' 87", longitude W107 58' 70". It is further located approximately ½ mile east of State Route 550 on County Road 4990 (a.k.a. Sullivan Road). See Figure 1 for a site location map.

The Facility is located on the south side of the San Juan River and the Hammond Irrigation Ditch (Hammond Ditch) and situated on a bluff approximately 120 feet above the river. The top of the bluff is relatively flat and is at an elevation of 5,540 feet above sea level. Property managed by the Bureau of Land Management (BLM) borders the Facility to the south. Undeveloped company property and the San Juan River border the Facility to the north. Undeveloped private and public lands border the property to the east and several gravel pits border the property to the west. A large portion of the undeveloped land in the vicinity of the refinery is used for oil and gas production and as range for grazing. An unnamed arroyo flows toward the San Juan River on the southern and western edges of the site. East of the site, a well-defined arroyo cuts a small canyon from the bluff to the San Juan River. The Hammond Ditch lies on the bluff between the San Juan River and the Facility.

The portion of the Facility located north of County Road 4990 includes an office area that consists of buildings, warehouse space and a storage yard, parking lots, a heavy oil loading station, the petroleum process area, API separator and wastewater treatment surface impoundments, the raw water ponds, the tank farm, a fenced-in equipment lay-down area utilized to store refinery equipment prior to use, the fire training area, and the solid waste disposal area. The Facility south of County Road 4990 includes the terminal office and parking areas, terminals for loading product and off-loading crude oil and gas, a hazardous waste storage area (less than 90-day), a high-pressure bullet storage tank area, the regional office and parking area, the transportation maintenance facility and truck parking areas, the refinery evaporation ponds, and a Class I injection well. See Figure 2 for a Site Plan of the Facility.

Running southwest through the center of the Facility are four utility pipelines operated by El Paso Natural Gas, Enterprise, Conoco-Phillips, and Giant Industries Arizona, Inc. ("Giant"). The Enterprise and Giant pipelines are currently not in service.

Surface waters in the vicinity of the Facility include the San Juan River and the Hammond Irrigation Ditch. The San Juan River originates in the San Juan Mountains of

Colorado approximately 100 miles northeast of Bloomfield and is located north of the Facility flowing west/southwest. The San Juan River is controlled upstream by the Navajo Dam and is used for potable drinking water for the city of Bloomfield and surrounding areas. Hammond Ditch is located on the bluff between the river and the process area of the Facility, flowing east to west across the site. Hammond Ditch is a man-made canal, lined with concrete in 2002, which transports water used for irrigation and watering livestock only. In addition, manmade surface water features at the Facility includes the refinery evaporation ponds, raw water ponds, and the wastewater treatment surface impoundments.

2.2. FACILITY OPERATIONS

Kimball Campbell Corporation constructed the Facility as a crude topping unit in the late 1950's. Ownership of the refinery has changed hands over the years. The current Facility owner is San Juan Refining Company and the facility is operated by Giant Industries Arizona, Inc..

The Facility has a capacity to receive and process over 18,000 barrels of crude oil per day (bcpd). The main source of crude oil supply comes from the Four Corners area, and is transported by pipeline or tanker truck. The Facility operates the following process units: crude distillation, reforming, fluidized catalytic cracking, sulfur recovery, merox treater, catalytic polymerization, and diesel hydrotreating. Current and past operations produce leaded and unleaded gasoline, diesel fuels, Jet-A fuel, JP-4 jet fuel, kerosene, propane, butane, naphtha, residual fuel, heavy fuel oils, and liquefied petroleum gas. Other operations at the Facility include crude and product storage, crude unloading and product loading, waste management (closed and existing facilities), and non-petroleum material storage.

2.3. Corporate Structure

On May 31, 2007, Giant Industries, Inc. became a wholly-owned subsidiary of Western Refining, Inc. of El Paso, Texas. Giant Industries, Inc. is the parent company of Giant Industries Arizona, Inc., which operates the Bloomfield Refinery. San Juan Refining Company is a subsidiary of Giant Industries Arizona, Inc.

2.4. Historic Site-Wide Monitoring

2.4.1. Refinery Complex Groundwater Monitoring

Groundwater monitoring has occurred at the Facility since the early 1990s in support of various investigations to monitor potential impacts to groundwater quality associated with historic refinery operations. Figure 3 shows the locations of monitoring wells at the Facility within and near the Refinery Complex. Most of the Facility monitoring wells extend down to the top of the Nacimient Formation surface. Table 1 provides a

summary of the groundwater monitoring network installed at the Facility including well construction information. A copy of the wells logs is provided in Appendix F.

During the last five years, groundwater samples collected at monitor wells within the Refinery complex have been collected on a semi-annual basis. Samples have been analyzed for volatile organic compounds (VOCs), dissolved and total metals, and general chemistry parameters. Sample analysis has been performed in compliance with the Corrective Measures Study and Corrective Measures Implementation letter dated January 6, 2003. Concurrently, OCD guidance has been followed per the Site Investigation and Abatement Plan letter dated December 30, 2002. Figure 4 provides a summary of target VOCs detected in the Refinery Complex during the Spring 2007 semi-annual sampling event. A summary of the analytical results for samples collected between 2003 and 2007 are included in Appendix A.

2.4.2. North Boundary Barrier Monitoring

Following the installation of the North Boundary Barrier and Collection System in April 2005, groundwater samples have been collected from the collection and observation wells and analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tert butyl ether (MTBE), total petroleum hydrocarbons-diesel range organics (TPH-DRO), total metals, and general chemistry parameters. Results of groundwater monitoring along the North Boundary Barrier were included in the System Start-Up Six Month Report of the North Boundary Barrier Collection System Phase II (submitted January 5, 2006), and the Annual Report of the North Boundary Barrier Collection System Phase II May 2005 to May 2006 Report (submitted June 28, 2006). Figure 3 shows the locations of monitoring wells along the North Boundary Barrier. A summary of the analytical results for samples collected between 2005 and 2007 are included in Appendix B.

2.4.3. Outfall Monitoring

Near the San Juan River bluff area, groundwater samples have been collected from East Outfall #2, and East Outfall #3 on a semi-annual basis since 2003. Samples have been analyzed for VOCs, total metals, dissolved metals, and general chemistry parameters. Tank #33 (which receives water from East Outfall #1 via Tank #38) was sampled monthly in 2005, and quarterly thereafter. Samples were analyzed for BTEX. A summary of the analytical results for samples collected between 2003 and 2007 are included in Appendix C.

2.4.4. River Terrace Area Monitoring

Groundwater samples have been collected from two monitoring wells (MW-48 and MW-49), two dewatering wells (DW-1 and DW-2), and thirteen temporary piezometers (TP-1 thru TP-13) to monitor the River Terrace Sheet Pile Area groundwater quality on both sides of the sheet pile barrier. Figure 5 shows the locations of the wells at the River Terrace. Prior to the start of the Bioventing System (January 2006), groundwater data

revealed that the highest impacts were observed in groundwater collected from piezometers installed in the western half of the River Terrace area. After the installation of the Bioventing System, on-going sampling at the River Terrace is conducted in accordance with the approved Bioventing System Monitoring Plan, dated October 28, 2006, and in accordance with an NMED comment letter dated June 13, 2007. Figure 6 provides a summary of target VOCs detected at the River Terrace during the Spring 2007 semi-annual sampling event. A summary of the analytical results for samples collected between 2005 and 2007 are included in Appendix D.

In addition, San Juan River samples were collected monthly in 2004, and have been collected quarterly thereafter. The river samples were analyzed for BTEX, MTBE, TPH, metals, SVOCs, and general chemistry. Samples are collected from four locations: one upstream of the Facility, two immediately downstream of the River Terrace, and one downstream of the Facility. Analytical results from historic river sampling events have been reported in the annual groundwater reports submitted to NMED and OCD in April of each year. A summary of the analytical results for samples collected between 2004 and 2007 are included in Appendix D.

3. Subsurface Conditions

3.1. Refinery Site

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

Groundwater at the Facility is present at depths ranging from approximately 6 to 40 feet below ground surface (bgs), increasing in depth from west to east across the site. Groundwater flow direction is generally from the southeast to the northwest toward Hammond Ditch and the San Juan River. Figure 7 provides groundwater elevation contours recorded during the April 2007 monitoring event. The thickness of SPH detected in 2007 is summarized in Figure 8. The shallow groundwater consists of an aquifer where groundwater migrates through the permeable glacial outwash deposits designated as the Jackson Lake Terrace overlying the less permeable Nacimiento Formation. A permanent shallow aquifer formed above the Nacimiento Formation likely as a result of site development, refinery operations, and leakage from the Hammond Ditch. This shallow aquifer is not currently used for drinking water. Below the Nacimiento Formation is the Ojo Alamo sandstone formation, a water-bearing unit used as a potable water source.

The geologic units that underlie the Facility are as follows: the uppermost unit consists of unconsolidated surface soils, silts, and fine windblown sands forming loess deposits. The silty fine sand is underlain by the Jackson Lake Terrace deposit, approximately 10 to 15 feet thick. The Jackson Lake Terrace consists of well-rounded boulders, cobbles, gravels and sands exhibiting moderate to high permeability. Below the Jackson Lake Terrace is the Nacimiento Formation. The Nacimiento Formation is composed of interbedded, black carbonaceous mudstone, siltstone, and argillaceous sandstones. The Nacimiento Formation has been investigated at the Facility to a depth of approximately 100 feet; however, literature suggests the formation ranges up to 900 feet in total thickness. The Nacimiento Formation demonstrates low permeability and acts as a confining unit for the Jackson Lake Terrace. Below the Nacimiento Formation is the Ojo Alamo Sandstone, a water-bearing unit consisting of tertiary sandstones. Directly below the Ojo Alamo are the Cretaceous Kirtland Shale and the Fruitland Formation.

The Nacimiento Formation acts as a confining layer to vertical migration of groundwater beneath the refinery, which does not infiltrate to the underlying Ojo Alamo Sandstone. The morphology of the contact between the Jackson Lake Terrace and the underlying Nacimiento Formation in the vicinity of the facility is important in that it influences the direction of the perched groundwater flow. Approximately 100 feet of the Nacimiento

Formation is exposed in the precipice (bluff) face north of the Facility adjacent to the San Juan River.

3.2. River Terrace Site

The River Terrace area is located adjacent to the San Juan River approximately 500 feet north of the refinery Facility, and is the location of the pumping station used to deliver river water to the refinery raw water ponds. Surface water in the vicinity of the River Terrace includes the San Juan River to the north and west. The San Juan River level is approximately 120 feet lower than the grade level of the refinery complex.

Recharge of the River Terrace groundwater is predominantly influenced by the flow of the San Juan River, which is typically higher in the summer months due to high irrigation water demands. Groundwater elevations at the River Terrace are typically approximately five to seven feet below ground surface (bgs).

The near surface soils in the River Terrace consist of one to two feet of silt underlain by one to two feet of fine grained sand. In some areas a six-inch clay lens exists beneath the silt layer. Beneath the fine grained sediments are medium to coarse grained sands that extend from approximately three or four feet bgs to approximately ten feet bgs. At ten feet bgs the sand transitions to coarser grained material with some gravel. Boring logs indicate that the Nacimiento Formation is present beneath the River Terrace at approximately 15 to 17 feet bgs.

4. Investigation Methods

4.1. Monitoring and Sampling Methods

4.1.1. Groundwater Levels

Groundwater levels and SPH thickness measurements will be obtained prior to well purging in preparation for a sampling event. Measurement data and the date and time of each measurement will be recorded on a site monitoring data sheet. The depth to groundwater and SPH thickness levels will be measured to the nearest 0.01 ft. The depth to groundwater and SPH thickness will be recorded relative to the surveyed well casing rim or other surveyed datum. A corrected water table elevation will be provided in wells containing SPH by adding 0.8 times the measured SPH thickness to the calculated water table elevation. Water level and SPH thickness measurements will be made using an oil/water interface probe. Groundwater and SPH levels will be measured in all wells within 48 hours of the start of obtaining water level measurements. All automated and manual extraction of SPH and water from recovery wells, observation wells, and collection wells will be discontinued for 48 hours prior to the measurement of water and SPH levels.

4.1.2. Groundwater Sampling

All monitoring wells scheduled for sampling during a groundwater sampling event will be sampled within 15 working days of the start of the monitoring and sampling event.

4.1.3. Well Purging

Each monitoring well will be purged by removing groundwater prior to sampling in order to ensure that formation water is being sampled. Total purge volume will be determined by monitoring groundwater pH, specific conductance, and temperature after every two gallons or each well volume, whichever is less, has been purged from the well. Purging will continue, as needed, until the specific conductance, pH, and temperature readings are within ten percent between readings for three consecutive measurements. Once the readings are within 10%, purging will stop and the well is ready for sample collection. Dissolved oxygen and oxidation-reduction potential (ORP) will be recorded at this time. The volume of groundwater purged, the instruments used, and the readings obtained at each interval will be recorded on the field-monitoring log. Well purging and sampling will be performed using disposable bailers and/or appropriate sampling pumps.

4.1.4. Groundwater Sample Collection

Groundwater samples will be obtained from each well within 24 hours of the completion of well purging. Sample collection methods will be documented in the field monitoring reports. The samples will be transferred to the appropriate, clean, laboratory-prepared

containers provided by the analytical laboratory. Sample handling and chain-of-custody procedures are described in Section 4.3. Decontamination procedures for reusable water sampling equipment are described in Section 4.1.6.

All purged groundwater and decontamination water will be disposed in the refinery wastewater treatment system upstream of the API Separator. The procedures for disposable materials are described in Section 4.1.8.

Groundwater samples intended for metals analysis will be submitted to the laboratory as total metals samples. Groundwater samples obtained for dissolved metals analysis will be filtered using disposable filters with a 0.45 micrometers mesh size.

4.1.5. Sample Handling

At a minimum, the following procedures will be used when collecting samples:

1. Neoprene, nitrile, or other protective gloves will be worn when collecting samples. New disposable gloves will be used to collect each sample,
2. All samples collected for chemical analysis will be transferred into clean sample containers supplied by the analytical laboratory. The sample container will be clearly marked. Sample container volumes and preservation methods will be in accordance with the most recent standard EPA and industry accepted practices for use by accredited analytical laboratories. Sufficient sample volume will be obtained for the laboratory to complete the method-specific QC analyses on a laboratory-batch basis.
3. Sample labels and documentation will be completed for each sample. Immediately after the samples are collected, they will be stored in a cooler with ice or other appropriate storage method until they are delivered to the analytical laboratory. Standard chain-of-custody procedures, as described in Section 4.3 of this Plan, will be followed for all samples collected. All samples will be submitted to the laboratory to allow the laboratory to conduct the analyses within the method holding times. At a minimum, all samples will be submitted to the laboratory within 48 hours after their collection.

Shipment procedures will include the following:

1. Individual sample containers will be packed to prevent breakage and transported in a sealed cooler with ice or other suitable coolant or other EPA or industry-wide accepted method. The drainage hole at the bottom of the cooler will be sealed and secured in case of sample container leakage. Temperature blanks will be included with each shipping container,
2. Each cooler or other container will be delivered directly to the analytical laboratory,
3. Glass bottles will be separated in the shipping container by cushioning material to prevent breakage,

4. Plastic containers will be protected from possible puncture during shipping using cushioning material,
5. The chain-of-custody form and sample request form will be shipped inside the sealed storage container to be delivered to the laboratory,
6. Chain-of-custody seals will be used to seal the sample-shipping container in conformance with EPA protocol, and
7. Signed and dated chain-of-custody seals will be applied to each cooler prior to transport of samples from the site.

4.1.6. Decontamination Procedures

The objective of the decontamination procedures is to minimize the potential for cross-contamination. The majority of field equipment used for groundwater sampling will be disposable and, therefore, not require decontamination. In order to prevent cross-contamination, field equipment that comes into contact with water or soil will be decontaminated between each sampling location. The decontamination procedure will consist of washing the equipment with a non-phosphate detergent solution (examples include Fantastik™, Liqui-Nox®), followed by two rinses of distilled water and air dried. Decontamination water and rinsate will be contained and disposed of the same way as purge water, as described in Section 4.1.8. Decontamination procedures and the cleaning agents used will be documented in the daily field log.

4.1.7. Field Equipment Calibration Procedures

Field equipment requiring calibration will be calibrated to known standards, in accordance with the manufacturers' recommended schedules and procedures. Calibration checks will be conducted daily and the instruments will be recalibrated if necessary. Calibration measurements will be recorded in the daily field logs.

4.1.8. Collection and Management of Well Purge Water

All water generated during sampling and decontamination activities will be temporarily stored in labeled 55-gallon drums until disposed in the refinery wastewater treatment system upstream of the API separator.

4.2. Analytical Methods

Groundwater and surface water samples collected during the monitoring events will be analyzed for one or more of the following constituents:

- volatile organic compounds (VOCs) by EPA Method 8260B;
- semi-volatile organic compounds (SVOCs) by EPA Method 8270C;

- metals analysis (total and dissolved) by EPA Method 6010, except mercury which will be analyzed by EPA Method 7470.
- total petroleum hydrocarbons (TPH) – gasoline range organics (GRO) by EPA Method 8015B;
- TPH – diesel range organics (DRO) by EPA Method 8015B;
- total dissolved solids (TDS) by EPA Method 160.1 or field measurement;
- specific conductance by EPA Method 120.1 or field measurement;
- carbon dioxide by EPA Method 310.1;
- alkalinity by EPA Method 310.1; and
- anions by EPA Method 300.0.

4.2.1. Target Analytes

Table 2 provides a summary of target analytes for each analytical method.

4.3. Documentation of Field Activities

4.3.1. General

Daily field activities, including observations and field procedures, will be recorded on appropriate forms. The original field forms will be maintained at the Facility. Per Order, completed forms will be maintained in a bound and sequentially numbered field file for reference during field activities.

4.3.2. Sample Custody

All samples collected for analysis will be recorded in the field report or data sheets. Chain-of-custody forms will be completed at the end of each sampling day, prior to the transfer of samples off site, and will accompany the samples during shipment to the laboratory. A signed and dated custody seal will be affixed to the lid of the shipping container. Upon receipt of the samples at the laboratory, the custody seals will be broken, the chain-of-custody form will be signed as received by the laboratory, and the conditions of the samples will be recorded on the form. The original chain-of-custody form will remain with the laboratory and copies will be returned to the relinquishing party. Bloomfield Refinery will maintain copies of all chain-of-custody forms generated as part of sampling activities. Copies of the chain-of-custody records will be included with all draft and final laboratory reports submitted to NMED and OCD.

4.4. Quality Assurance Procedures

Contract analytical laboratories will maintain internal quality assurance programs in accordance with EPA and industry accepted practices and procedures. At a minimum, the laboratories will use a combination of standards, blanks, surrogates, duplicates, matrix spike/matrix spike duplicates (MS/MSD), blank spike/blank spike duplicates (BS/BSD), and laboratory control samples to demonstrate analytical QA/QC. The laboratories will establish control limits for individual chemicals or groups of chemicals based on the long-term performance of the test methods. In addition, the laboratories will establish internal QA/QC that meets EPA's laboratory certification requirements. The specific procedures to be completed are identified in the following sections.

4.4.1. Equipment Calibration Procedures and Frequency

The laboratory's equipment calibration procedures, calibration frequency, and calibration standards will be in accordance with the EPA test methodology requirements and documented in the laboratory's quality assurance and SOP manuals. All instruments and equipment used by the laboratory will be operated, calibrated, and maintained according to manufacturers' guidelines and recommendations. Operation, calibration, and maintenance will be performed by personnel who have been properly trained in these procedures. A routine schedule and record of instrument calibration and maintenance will be kept on file at the laboratory.

4.4.2. Field QA/QC Samples

Field duplicates, field blanks, equipment rinsate blanks, and trip blanks will be obtained for quality assurance during sampling activities. The samples will be handled as described in Section 4.1.5.

Field duplicate water samples will be obtained at a frequency of ten percent. At a minimum, one duplicate sample per sampling event will be obtained.

Field blanks will be obtained at a minimum frequency of one per day. Field blanks will be generated by filling sample containers in the field with deionized water and submitting the samples, along with the groundwater samples, to the analytical laboratory for the appropriate analyses.

Equipment rinsate blanks will be obtained for chemical analysis at the rate of one rinsate blank per box of disposable bailers used per sampling event since disposable sampling equipment is used for groundwater purging and sampling activities. For sampling equipment that is used at more than one location (e.g., sampling pumps), an equipment rinsate blank will be collected at a frequency of one per sampling day. Rinsate samples will be generated by rinsing deionized water through unused or decontaminated sampling equipment. The rinsate sample then will be placed in the appropriate sample container

and submitted with the groundwater samples to the analytical laboratory for the appropriate analyses.

Trip blanks will accompany laboratory sample bottles and shipping and storage containers intended for VOC analyses. Trip blanks will consist of a sample of analyte-free deionized water prepared by the laboratory and placed in an appropriate sample container. The trip blank will be prepared by the analytical laboratory prior to the sampling event and will be kept with the shipping containers and placed with other water samples obtained from the site each day. Trip blanks will be analyzed at a frequency of one for each shipping container of samples.

4.4.3. Laboratory QA/QC Samples

Analytical procedures will be evaluated by analyzing reagent or method blanks, surrogates, matrix spike/matrix spike duplicates (MS/MSDs), blank spike/blank spike duplicates (BS/BSDs) and/or laboratory duplicates, as appropriate for each method. The laboratory QA/QC samples and frequency of analysis to be completed will be documented in the cited EPA or other test methodologies. At a minimum, the laboratory will analyze laboratory blanks, MS/MSDs, BS/BSDs and laboratory duplicates at a frequency of one in twenty for all batch runs requiring EPA test methods and a frequency of one in ten for non-EPA test methods. Laboratory batch QA/QC samples will be project specific.

4.4.4. Laboratory Deliverables

The analytical data package will be prepared in accordance with EPA-established Level II analytical support protocol. The following will be provided in the analytical laboratory reports submitted electronically and in hard (paper) copy:

1. Transmittal letter, including information about the receipt of samples, the testing methodology performed, any deviations from the required procedures, any problems encountered in the analysis of the samples, any data quality exceptions, and any corrective actions taken by the laboratory relative to the quality of the data contained in the report,
2. Sample analytical results, including sampling date; date of sample extraction or preparation; date of sample analysis; dilution factors and test method identification; soil, rock, or sediment sample results in consistent units (mg/kg) or micrograms per kilogram in dry-weight basis; water sample results in consistent units (milligrams per liter or micrograms per liter ($\mu\text{g/L}$)); vapor sample results in consistent units (ppm or ppmv); and detection limits for undetected analytes. Results will be reported for all field samples, including field duplicates and blanks, submitted for analysis,
3. Method blank results, including reporting limits for undetected analytes,

4. Surrogate recovery results and corresponding control limits for samples and method blanks (organic analyses only),
5. MS/MSD and/or BS/BSD spike concentrations, percent recoveries, relative percent differences (RPDs), and corresponding control limits,
6. Laboratory duplicate results for inorganic analyses, including relative percent differences and corresponding control limits,
7. Sample chain-of-custody documentation,
8. Holding times and conditions,
9. Conformance with required analytical protocol(s),
10. Instrument calibration,
11. Blanks,
12. Detection/quantitation limits,
13. Recoveries of surrogates and/or matrix spikes (MS/MSDs),
14. Variability for duplicate analyses,
15. Completeness,
16. Data report formats, and
17. The following data deliverables for organic compounds will be required from the laboratory:
 - a. A cover letter referencing the procedure used and discussing any analytical problems, deviations, and modifications, including signature from authority representative certifying to the quality and authenticity of data as reported,
 - b. Report of sample collection, extraction, and analysis dates, including sample holding conditions,
 - c. Tabulated results for samples in units as specified, including data qualification in conformance with EPA protocol, and definition of data descriptor codes,
 - d. Raw data quantification reports for each sample and calibrations, including areas and retention times for analytes, surrogates, and internal standards,
 - e. A calibration data summary reporting calibration range used and a measure of linearity [include decafluorotriphenylphosphine (DFTPP) and p-bromofluorobenzene (BFB) spectra and compliance with tuning criteria for GC/MS],
 - f. Final extract volumes (and dilutions required), sample size, wet-to-dry weight ratios, and instrument practical detection/quantitation limit for each analyte,
 - g. Analyte concentrations with reporting units identified, including data qualification in conformance with the contract laboratory program Statement of Work (SOW) (include definition of data descriptor codes),

- h. Quantification of analytes in all blank analyses, as well as identification of method blank associated with each sample, and
 - i. Recovery assessments and a replicate sample summary, including all surrogate spike recovery data with spike levels/concentrations for each sample and all MS/MSD results (recoveries and spike amounts).
18. The following data deliverables for inorganic compounds will be required from the laboratory:
- a. A cover letter referencing the procedure used and discussing any analytical problems, deviations, and modifications; including signature from authority representative certifying to the quality and authenticity of data as reported,
 - b. Report of sample collection, digestion, and analysis dates, with sample holding conditions,
 - c. Tabulated results for samples in units as specified, including data qualification in conformance with the contract laboratory program (CLP) statement of work (including definition of data descriptor codes),
 - d. Results of all method QA/QC checks, including inductively coupled plasma (ICP) Interference Check Sample and ICP serial dilution results,
 - e. Tabulation of instrument and method practical detection/quantitation limits,
 - f. Raw data quantification report for each sample,
 - g. A calibration data summary reporting calibration range used and a measure of linearity, where appropriate,
 - h. Final digestate volumes (and dilutions required), sample size, and wet-to-dry weight ratios,
 - i. Quantification of analytes in all blank analyses, as well as identification of method blank associated with each sample, and
 - j. Recovery assessments and a replicate sample summary, including post-digestate spike analysis; all MS data (including spike concentrations) for each sample, if accomplished; all MS results (recoveries and spike amounts); and laboratory control sample analytical results).

4.4.5. Review of Field and Laboratory QA/QC Data

The sample data, field, and laboratory QA/QC results will be evaluated for acceptability with respect to the data quality objectives (DQOs). Each group of samples will be compared with the DQOs and evaluated using data validation guidelines contained in EPA guidance documents: Guidance Document for the Assessment of RCRA Environmental Data Quality, National Functional Guidelines for Organic Data Review, and Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses and the most recent version of SW-846, and industry-accepted QA/QC methods and procedures.

4.4.6. Blanks, Field Duplicates, Reporting Limits and Holding Times

4.4.6.1. Blanks

The analytical results of field blanks and field rinsate blanks will be reviewed to evaluate the adequacy of the equipment decontamination procedures and the possibility of cross-contamination caused by decontamination of sampling equipment. The analytical results of trip blanks will be reviewed to evaluate the possibility for contamination resulting from the laboratory-prepared sample containers or the sample transport containers. The analytical results of laboratory blanks will be reviewed to evaluate the possibility of contamination caused by the analytical procedures. If contaminants are detected in field or laboratory blanks, the sample data will be qualified, as appropriate.

4.4.6.2. Field Duplicates

Field duplicates will consist of two samples either split from the same sample device or collected sequentially. Field duplicate samples will be collected at a minimum frequency of ten percent of the total number of samples submitted for analysis. Relative percent differences for field duplicates will be calculated. The analytical DQO for precision will be used for water duplicates.

4.4.6.3. Method Reporting Limits

Method reporting limits for sample analyses will be established at the lowest level practicable for the method and analyte concentrations and will not exceed groundwater or surface water cleanup standards and screening levels. Detection limits that exceed established standards or screening levels and are reported as “not detected” will be considered data quality exceptions and an explanation for the exceedance and its acceptability for use will be provided.

4.4.6.4. Holding Times

The sampling, extraction, and analysis dates will be reviewed to confirm that extraction and analyses were completed within the recommended holding times, as specified by EPA protocol. Appropriate data qualifiers will be noted if holding times were exceeded.

4.4.7. Representativeness and Comparability

4.4.7.1. Representativeness

Representativeness is a qualitative parameter related to the degree to which the sample data represent the relevant specific characteristics of the media sampled. Procedures will be implemented to assure representative samples are collected and analyzed, such as repeated measurements of the same parameter at the same location over several distinct sampling events. Any procedures or variations that may affect the collection or analysis of representative samples will be noted and the data will be qualified.

4.4.7.2. Comparability

Comparability is a qualitative parameter related to whether similar sample data can be compared. To assure comparability, analytical results will be reported in appropriate units for comparison with other data (past studies, comparable sites, screening levels, and cleanup standards), and standard collection and analytical procedures will be implemented. Any procedure or variation that may affect comparability will be noted and the data will be qualified.

4.4.8. Laboratory Reporting, Documentation, Data Reduction, and Corrective Action

Upon receipt of each laboratory data package, data will be evaluated against the criteria outlined in the previous sections. Any deviation from the established criteria will be noted and the data will be qualified. A full review and discussion of analytical data QA/QC and all data qualifiers will be submitted as appendices or attachments to investigation and monitoring reports. Data validation procedures for all samples will include checking the following, when appropriate:

1. Holding times,
2. Detection limits,
3. Field equipment rinsate blanks,
4. Field blanks,
5. Field Duplicates,
6. Trip blanks,
7. Reagent blanks,
8. Laboratory duplicates,
9. Laboratory blanks,
10. Laboratory matrix spikes,
11. Laboratory matrix spike duplicates,
12. Laboratory blank spikes,
13. Laboratory blank spike duplicates, and
14. Surrogate recoveries.

If significant quality assurance problems are encountered, appropriate corrective action will be implemented. All corrective action will be reported and the corrected data will be qualified.

5. Monitoring and Sampling Program

The primary objective of groundwater monitoring is to provide data which will be used to assess groundwater quality at and near the Facility. Groundwater elevation data will also be collected to evaluate groundwater flow conditions. The groundwater monitoring program for the Facility will consist of sample collection and analysis from a series of monitoring wells, recovery wells, piezometers, outfalls, and river locations. The monitoring network is divided into four investigation areas (Refinery Complex; North Boundary Barrier Wall; Bluff Outfalls and Seeps; and River Terrace). The sampling frequency, analyses and target analytes will vary for each investigation area. The combined data from these investigation areas will be used to establish background groundwater quality, assess groundwater quality beneath and immediately downgradient of the Facility, and evaluate local groundwater flow conditions.

Samples will not be collected from monitoring wells that have measurable SPH. For wells that are purged dry, samples will be collected if recharge volume is sufficient for sample collection within 24 hours. Wells not sampled due to insufficient recharge will be documented in the field log. A summary of the Facility-Wide Monitoring Plan is provided in Table 3.

The following sections outline the monitoring program for each investigation area.

5.1. Refinery Complex

5.1.1. Sampling Locations

The following wells will be sampled within the Refinery Complex:

Background Wells

MW-3, MW-5, and MW-6

Cross-gradient Wells

MW-1, MW-13, MW-26, MW-27, MW-32, and MW-33

Refinery Area Wells

RW-1, MW-4, MW-8, RW-9, RW-15, RW-18, MW-20, RW-23, RW-28, MW-30, RW-42, and RW-43.

Downgradient Wells



MW-11, MW-34, MW-35, MW-37, MW-38, and MW-12

The location of the Refinery Complex monitor wells are shown in Figure 9. Information regarding the construction details of the monitor wells, including total well depth, screen interval, and top-of-casing elevation, is provided in Table 1.

5.1.2. Sampling Frequency and Analyses

On an annual basis, groundwater samples will be collected from each well and analyzed for the following chemical constituents:

- VOCs;
- dissolved metals;
- carbon dioxide;
- alkalinity (total, bicarbonate, and carbonate);
- anions

Groundwater samples collected during the initial annual sampling event will be analyzed for SVOCs (full method list) and total recoverable metals (target list) to assess baseline groundwater quality conditions. The results of the SVOC and total metals analysis will be included in the 2008 Annual Groundwater Report and will be used to assess whether additional metals, SVOC or PAH analyses will be necessary during future monitoring events. Analyses and target analytes are listed in Table 2.

On a semi-annual basis, only wells MW-1, MW-6, MW-12, MW-13, MW-20, MW-30, MW-33, MW-35, MW-37, and MW-38 will be sampled for the target VOCs (target list).

5.2. North Boundary Barrier

5.2.1. Sampling Locations

The following wells will be sampled within the North Boundary Barrier area:

Collection Wells

CW 0+60 and CW 25+95.

Observation Wells

OW 0+60, OW 1+50, OW 3+85, OW 5+50, OW 6+70, OW 8+10, OW 11+15, OW 14+10, OW 16+60, OW 19+50, OW 22+00, OW 23+10, OW 23+90, and OW 25+70.

Collection wells CW 0+60 and CW 25+95 will monitor groundwater quality at each end of the barrier wall. The remaining collection wells along the refinery side of the North Boundary Barrier will be monitored for groundwater elevation and the presence of SPH,

but will not be sampled. Samples had been collected from each collection well between May 2005 and April 2006 (see Appendix B). Sample collection from the observation wells eliminates the need for sampling at MW-45, MW-46, and MW-47. These wells will continue to be monitored for groundwater elevation data and the presence of SPH. Figure 10 shows the monitoring well network for the North Boundary Barrier. Information regarding the construction details of the monitor wells, including total well depth, screen interval, and top-of-casing elevation, is provided in Table 1.

5.2.2. Sampling Frequency and Analyses

On a semi-annual basis, groundwater samples collected from collection wells CW 0+60 and CW 25+95, and from each observation well will be analyzed for the following chemical constituents:

- VOCs (target list);
- TPH - DRO

Analyses and target analytes are listed in Table 2.

5.3. Bluff Outfalls and Seeps

5.3.1. Monitoring and Sampling Locations

Groundwater and surface water samples will be collected from the following locations along the Bluff, if water is present:

Outfalls

East Outfall #2, East Outfall #3, and Tank #33 (which receives water from East Outfall #1 via Tank #38).

Catchments associated with Seep North of MW-45, Seep North of MW-46, and Seep North of MW-47 are visually monitored bi-monthly. Samples will not be collected from these locations. Figure 11 shows the locations of the outfalls.

5.3.2. Sampling Frequency and Analyses

On a semi-annual basis, samples will be collected from East Outfall #2 and East Outfall #3 and analyzed for the following chemical constituents:

- VOCs (target list);
- dissolved metals;
- total recoverable metals (target list);
- carbon dioxide;
- alkalinity (total, bicarbonate, and carbonate);

■ anions

On a quarterly basis, samples will be collected from Tank #33 and analyzed for the following chemical constituents:

■ VOCs (target list)

Analyses and target analytes are listed in Table 2.

5.4. River Terrace

5.4.1. Sampling Locations

Groundwater and surface water samples will be collected from the following locations in the vicinity of the River Terrace:

Monitoring Wells

MW-49 and DW-1

Piezometers

TP-1, TP-2, TP-3, TP-5, TP-6, TP-7, TP-8, TP-9, TP-10, TP-11, TP-12, and TP-13. Figure 12 shows the groundwater sampling locations at the River Terrace.

San Juan River

Upstream (approximately 1,000 feet upstream of the River Terrace), River Bank north of MW-45, River Bank north of MW-46, and Downstream (approximately 300 feet downstream of the River Terrace). Figure 13 shows the sample locations for the San Juan River. Information regarding the construction details of the monitor wells, including total well depth, screen interval, and top-of-casing elevation, is provided in Table 1.

5.4.2. Sampling Frequency and Analyses

The sampling program detailed below has been developed to be compliant with the draft July 2007 NMED Order and is consistent with the Bioventing Monitoring Plan (Revised) River Terrace Voluntary Corrective Measures (October 28, 2005). If modifications to the Bioventing Monitoring Plan are approved by NMED that result in a change to the groundwater sampling frequency or analysis, then those approved changes will supersede the following specified activities.

On a quarterly basis, the samples collected from the River Terrace monitoring wells and piezometers will be analyzed for the following chemical constituents:

■ VOCs (target list)

- TPH-GRO
- TPH-DRO
- total recoverable metals (target list).

The analytes and sample frequency for the River Terrace monitoring wells is in compliance with the approved Bioventing System Monitoring Plan, dated October 28, 2005.

On a semi-annual basis, samples will be collected from the San Juan River and analyzed for the following chemical constituents:

- VOCs (target list)
- TPH-GRO
- TPH-DRO
- total recoverable metals (target list)
- dissolved metals
- TDS
- specific conductance
- alkalinity (total, carbonate and bicarbonate)
- anions (target list).

Analyses and target analytes are listed in Table 2.

Samples collected from the San Juan River locations in 2006 and 2007 have not contained any SVOCs; therefore, SVOCs have been removed from the list of target analytes in the River Terrace area.

5.5. Monitoring Program Revisions

Upon review of the analytical results from the initial annual monitoring event under this Plan, historic facility-wide monitoring data, available soil boring data, and Nacimiento Formation elevation data, Western Refining will assess the monitoring program presented in this Plan. Revisions to the Plan, as necessary, will then be presented for agency review and approval. These revisions may include, but not be limited to, a reduction or change in monitoring locations, monitoring frequency, and/or target analytes.

6. Schedule

As discussed in Section 5.0, groundwater and surface water sampling events at the Facility have been assigned varying sampling frequencies including quarterly, semi-annual and annual. Sampling events within each site investigation area (i.e., Refinery Complex, North Boundary Barrier, Bluff Outfalls, and River Terrace) will be completed within 15 working days of the start of the event. The initial annual sampling event conducted under this Plan will occur in the third quarter of 2007.

**MALCOLM
PIRNIE**

INDEPENDENT ENVIRONMENTAL
ENGINEERS, SCIENTISTS
AND CONSULTANTS

Tables



Table 1 Facility-Wide Monitoring Program Bloomfield Refinery- Bloomfield, New Mexico											
Well Type	Well ID	Installation Date	Well Diameter (in)	Measuring Point Elevation (Before 2006) (ft)	Measuring Point Elevation (2006) (ft)	Grade Elevation (before 2006) (ft)	Grade Elevation (2006) (ft)	Total Well Depth (ft bgs)	Screened Interval (ft bgs)	Depth to Nacimiento Formation (ft bgs)	Elevation of Nacimiento Surface (ft above msl)
Refinery Complex	MW-1	2/8/84	4	5515.78	5519.21	5514.08	5517.54	22.95	2.9-22.9	22	5492.08
	MW-3	2/9/84	4	5535.88	5539.27	5534.88	5538.61	38.35	18.4-38.4	40	5494.88
	MW-4	2/9/84	6	5524.46	5527.78	5523.06	5526.56	31.1	11.1-31.1	32	5491.06
Monitoring Well	MW-5	2/6/84	4	5545.13	5548.56	5544.13	5547.97	50.61	30.6-50.6	47	5497.13
Monitoring Well	MW-6	2/7/84	4	5551.2	5554.61	5549.6	5553.32	48.03	28-48	49	5500.6
Monitoring Well	MW-7	2/25/86	6	5524.25	5527.66	5523.15	5526.34	61.01	49-59	32	5491.15
Monitoring Well	MW-8	2/28/86	6	5531.17	5534.58	5530.17	5533.84	33.94	11.9-31.9	34	5496.17
Monitoring Well	MW-11	7/31/87	4	5506.89	5510.31	5503.29	5507.12	21.13	6.1-16.1	10	5493.29
Monitoring Well	MW-12	8/1/87	4	5498.42	5501.61	5495.92	5499.5	11.72	1.7-11.7	10	5485.92
Monitoring Well	MW-13	9/3/88	4	5538.54	5542.04	5535.24	5539.12	49.7	28.7-44.5	45	5490.24
Refinery Side Source Well (east-end)	MW-20	9/13/91	4	5516.46	5519.9	5514.66	5517.91	25.38	8.4-23.4	24	5490.66
Refinery Side Source Well (east-end)	MW-21	9/16/91	4	5518.62	5521.99	5517.02	5520.75	29.33	12.3-27.3	24.5	5492.52
Monitoring Well	MW-25	5/11/94	6	5530.45	5533.99	5527.35	5530.92	21.31	22-36	35	5492.35
Monitoring Well	MW-26	5/12/94	6	5514.54	5517.88	5512.44	5515.73	23.15	7-21	20	5492.44
Monitoring Well	MW-27	5/18/94	4	5515.26	5518.67	5512.46	5515.78	21.69	5-20	17	5495.46
Monitoring Well	MW-29	5/12/94	4	5521.55	5524.97	5518.55	5522.07	25.74	10-24	23	5495.55
Monitoring Well	MW-30	5/13/94	4	5533.42	5536.83	5531.42	5534.81	38.16	21-36	35	5496.42
Monitoring Well	MW-31	5/15/94	4	5532.17	5536.24	5530.57	5534.66	37.62	21-35	34	5496.57
Monitoring Well	MW-32	2/23/95	4	5522.22	5525.64	5521.42	5524.95	26.74	10.7-24.7	25	5496.42
Monitoring Well	MW-33	2/23/95	4	5518.46	5521.79	5515.86	5519.85	22.95	6.9-20.9	20	5495.86
Monitoring Well	MW-34	2/23/95	4	5508.23	5511.63	5505.53	5509.21	18.32	2.3-16.3	14	5491.53
Monitoring Well	MW-35	4/29/97	2	5512.39	5518.95	N/A	5516.25	23.1	13.1-23.1	21.5	5494.75
Monitoring Well	MW-36	4/29/97	2	5510.56	5516.95	N/A	5514.16	21	11-21.2	21.5	5492.66
Monitoring Well	MW-37	5/1/97	2	5513.04	5519.62	N/A	5516.89	25	15-25	22	5494.89
Monitoring Well	MW-38	4/29/97	2	5512.87	5519.19	N/A	5516.65	23.5	13.5-23.5	22	5494.65
Refinery Side Source Well (central)	MW-39	9/28/98	2	5522	5520.83	N/A	5519.1	36	N/A	22	5497.1
Monitoring Well	MW-40	3/11/97	2	5526.21	5527.31	5521.45	5527.86	34.5	N/A	31.5	5496.36
Monitoring Well	MW-41	3/12/97	2	5525.13	5526.41	5529.88	5527.07	33.00	N/A	30.00	5497.07
Monitoring Well	MW-44	10/1/98	2	5536.00	5535.44	5535.94	5532.27	47.50	N/A	33.50	5498.77
Monitoring Well	MW-45	1/15/03	4	5506.36	5506.36	5496.33	5504.40	17.80	4.0-14.0	N/A	N/A
Monitoring Well	MW-46	1/16/03	4	5504.65	5504.65	5496.43	5503.03	10.39	3.2-8.2	10.50	5492.53
Monitoring Well	MW-47	3/6/03	2	5506.77	5506.77	5501.30	5504.15	12.80	6.1-11.1	11.30	5492.85
Piezometers	P-01	8/30/88	4	5524.49	N/A	5523.69	N/A	41.65	20.5-36.5	36.50	5487.19
Piezometers	P-02	8/29/88	4	5523.86	N/A	5523.06	N/A	37.53	16.9-32.2	31.50	5491.56
Piezometers	P-03	9/1/88	4	5507.31	5510.77	5506.51	5510.34	22	6.2-16.6	14	5492.51
Recovery Well	RW-1	8/31/88	4	5526.01	5529.34	5524.61	5527.93	39.58	17.4-33	32.6	5492.01
Recovery Well	RW-2	8/29/88	4	5523.61	5526.94	5523.11	5526.42	25.4	16.5-32.2	32	5491.11
Recovery Well	RW-3	3/4/86	6	5516.96	5520.35	5515.56	5519.28	32.53	10.5-30.5	23	5492.56
Recovery Well	RW-9	3/3/86	6	5519.77	5523.21	5518.07	5521.23	32.29	10.3-30.3	28.3	5489.77
Recovery Well	RW-14	8/6/90	4	5534.13	5537.5	5532.23	5535.19	41.1	21.1-39.1	38.5	5493.73
Recovery Well	RW-15	8/7/90	4	5533.44	5536.83	5531.74	5534.56	41.7	21.7-39.7	35	5496.74
Recovery Well	RW-16	8/7/90	4	5532.09	5535.45	5530.29	5533.22	41.3	21.3-39.3	37.5	5492.79
Recovery Well	RW-17	8/7/90	4	5530.46	5533.84	5528.86	5532.01	39.95	19.9-35.3	35.3	5493.56

Table 1 Facility-Wide Monitoring Program Bloomfield Refinery- Bloomfield, New Mexico											
Well Type	Well ID	Installation Date	Well Diameter (in)	Measuring Point Elevation (Before 2006) (ft)	Measuring Point Elevation (2006) (ft)	Grade Elevation (before 2006) (ft)	Grade Elevation (2006) (ft)	Total Well Depth (ft bgs)	Screened Interval (ft bgs)	Depth to Nacimiento Formation (ft bgs)	Elevation of Nacimiento Surface (ft above msl)
Recovery Well	RW-18	8/9/90	4	5526.08	N/A	5523.48	N/A	N/A	17.3-35.3	29	5494.48
Recovery Well	RW-19	8/8/90	4	5527.27	5530.51	5525.77	5528.75	35.2	15.2-33.2	33	5492.77
Recovery Well	RW-22	7/19/93	6	5521.06	5524.44	5518.05	5521.44	35.6	14.7-30.7	27	5491.05
Recovery Well	RW-23	7/19/93	6	5517.74	5521.38	5515.74	5519.13	35.53	15.4-31.4	29	5486.74
Recovery Well	RW-28	5/13/94	4	5524.52	5527.93	5522.52	5525.69	35.15	18-33	32	5490.52
Recovery Well	RW-42	3/11/97	2	5527.48	5527.48	5529.80	5526.98	35.00	25-35	31.50	5495.98
Recovery Well	RW-43	9/25/98	2	N/A	5515.74	5522.18	5519.44	25.00	15-25	22.80	5492.94
North Barrier Wall											
Observation Well	OW 0+60	4/2005	2	5508.75	5506.62	5505.97	5506.75	12	4-12	12	5494.62
Observation Well	OW 1+50	4/2005	2	5508	5508.03	5504.6	5505.63	12	7-12	12	5496.03
Observation Well	OW 3+85	4/2005	2	5506.81	5507.31	5503.87	5505.09	14	7.5-12.5	12.5	5494.81
Observation Well	OW 5+50	4/2005	2	5507.14	5507.59	5503.87	5504.84	10.7	5.7-10.7	9.5	5498.09
Observation Well	OW 6+70	4/2005	2	5504.23	5504.78	5501.32	5502.14	13.5	7.5-13.5	13	5491.78
Observation Well	OW 8+10	4/2005	2	5506	5506.53	5503.15	5504.27	13	7-13	7	5499.53
Observation Well	OW 11+15	4/2005	2	5506.77	5506.7	5503.67	5504.07	13.5	6-13.5	9	5497.7
Observation Well	OW 14+10	4/2005	2	5507.36	5508.14	5504.51	5505.73	10	5-10	9	5499.14
Observation Well	OW 16+60	4/2005	2	5507.8	5508.43	5504.21	5505.42	12.5	7.5-12.5	12	5496.43
Observation Well	OW 19+50	4/2005	2	5507.24	5508.03	5504.14	5505.25	10	5-10	10	5498.03
Observation Well	OW 22+00	4/2005	2	5506.32	5506.91	5506.32	5506.97	14	9-14	12	5494.91
Observation Well	OW 23+10	4/2005	2	5510.66	5514.12	5510.16	5511.24	15	5-15	14	5500.12
Observation Well	OW 23+90	4/2005	2	5511.15	5515.18	5511.15	5512.17	15	10-15	13.5	5501.68
Observation Well	OW 25+70	4/2005	2	5508.56	5509	5508.01	5506.88	11	6-11	10	5499
Collection Well	CW 0+60	4/2005	6	5507.04	5506.68	5506.08	5507.01	14	4-14	12	5494.68
Collection Well	CW 1+50	4/2005	6	5505	5505.13	5504.4	5505.47	13	3-13	11	5494.13
Collection Well	CW 3+85	4/2005	6	5504.94	5503.87	5503.25	5504.11	13.5	3.5-13.5	11	5492.87
Collection Well	CW 5+50	4/2005	6	5503.23	5503.76	5504.17	5503.16	12.5	3.5-12.5	10	5493.76
Collection Well	CW 6+70	4/2005	6	5504.21	5503.84	5503.26	5504.11	12	4-12	9	5494.84
Collection Well	CW 8+10	4/2005	6	5503.96	5504.02	5503.33	5504.14	12	4-12	9.5	5494.52
Collection Well	CW 8+45	4/2005	6	5504.77	5503.8	5503.67	5504.09	13.3	3.3-13.3	9.5	5494.3
Collection Well	CW 11+15	4/2005	6	5504.69	5503.95	5503.73	5504.34	12.5	2.5-12.5	9	5494.95
Collection Well	CW 14+10	4/2005	6	5505.68	5504.39	5503.97	5504.69	13.5	3.5-13.5	9.5	5494.89
Collection Well	CW 16+60	4/2005	6	5505.72	5504.32	5504.02	5504.59	13.5	3.5-13.5	10	5494.32
Collection Well	CW 19+50	4/2005	6	5507.48	5504.52	5509.23	5504.75	11	3-11	8	5496.52
Collection Well	CW 22+00	4/2005	6	5510.82	5508.04	5510.16	5508.26	13.5	3.5-13.5	8	5500.04
Collection Well	CW 23+10	4/2005	6	5507.65	5510.04	5506.72	5510.27	15	5-15	13	5497.04
Collection Well	CW 23+90	4/2005	6	5507.65	5507.32	5506.72	5507.71	12	4-12	13	5494.32
Collection Well	CW 25+95	4/2005	6	5507	5505.9	5505.19	5505.89	11	3-11	13	5492.9
San Juan River Bluff											
Sump Well	SW1-0206	2/20/06	4	N/A	5508.27	N/A	5505.87	53	21-51	13.5	5494.77
Sump Well	SW2-0206	2/6/06	4	N/A	5507.75	N/A	5505.25	27	5-25	10	5497.75
Sump Well	SW3-0206	2/17/06	4	N/A	5505.29	N/A	5503.18	51.5	20-50	7.75	5497.54
Sump Well	SW4-0206	2/16/06	4	N/A	5504.45	N/A	5502.13	42	9.5-39.5	11	5493.45
Sump Well	SW5-0206	2/15/06	4	N/A	5514.34	N/A	5511.94	52	19-49	27.25	5487.09
Sump Well	SW6-0206	2/13/06	4	N/A	5519.72	N/A	5517.63	40	15-45	31.75	5487.97
Sump Well	SW7-0206	2/22/06	4	N/A	5508.42	N/A	5505.78	30	4-24	11	5497.42

Table 1 Facility-Wide Monitoring Program Bloomfield Refinery- Bloomfield, New Mexico											
Well Type	Well ID	Installation Date	Well Diameter (in)	Measuring Point Elevation (Before 2006) (ft)	Measuring Point Elevation (2006) (ft)	Grade Elevation ⁽¹⁾ (before 2006) (ft)	Grade Elevation ⁽¹⁾ (2006) (ft)	Total Well Depth (ft bgs)	Screened Interval (ft bgs)	Depth to Nacimiento Formation (ft bgs)	Elevation of Nacimiento Surface (ft above msl)
San Juan River Terrace											
Monitoring Well	MW-48	10/28/04	4	5421.37	5424.83	5418.48	5422.21	15	5-15	N/A	N/A
Monitoring Well	MW-49	10/28/04	4	5421.22	5425.2	5418.07	5422.52	15	4-14	N/A	N/A
Dewatering Well	DW-1	8/16/05	4	5423.80	5422.97	N/A	5420.73	15.62	5-14	N/A	N/A
Dewatering Well	DW-2	8/18/05	4	N/A	5423.81	N/A	5422.67	14	4-14	N/A	N/A
Temporary Piezometer	TP-1	10/28/04	2	5422.03	5422.03	5421.13	N/A	9	4-9	N/A	N/A
Temporary Piezometer	TP-2	10/28/04	2	N/A	N/A	N/A	N/A	9	4-9	N/A	N/A
Temporary Piezometer	TP-3	10/28/04	2	5423.88	5423.88	5422.66	N/A	9	4-9	N/A	N/A
Temporary Piezometer	TP-5	10/28/04	2	5422.83	5422.83	5422.00	N/A	8	N/A	N/A	N/A
Temporary Piezometer	TP-6	10/28/04	2	5422.56	5422.55	5421.40	N/A	10	5-10	N/A	N/A
Temporary Piezometer	TP-7	10/28/04	2	5422.00	5421.99	5420.90	N/A	10	5-10	N/A	N/A
Temporary Piezometer	TP-8	10/28/04	2	5422.52	5422.52	5421.13	N/A	10	5-10	N/A	N/A
Temporary Piezometer	TP-9	4/5/05	2	5422.14	5422.14	5421.55	N/A	10	5-10	N/A	N/A
Temporary Piezometer	TP-10	4/5/05	2	5422.56	5422.56	5422.56	N/A	8.5	3.5-8.5	N/A	N/A
Temporary Piezometer	TP-11	4/5/05	2	N/A	N/A	N/A	N/A	9.5	4.5-9.5	N/A	N/A
Temporary Piezometer	TP-12	4/5/05	2	5424.97	5424.97	5424.97	N/A	12	7-12	N/A	N/A
Temporary Piezometer	TP-13	4/5/05	2	5423.88	5423.88	5423.88	N/A	14.5	4.5-14.5	N/A	N/A

Notes:

ft = feet

in = inches

bgs = below grade surface

msl = mean sea level

N/A = not available

(1) Top of casing elevations well resurveyed in 2006

Table 2
Analytical Methods and Target Analytes
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

VOCs (EPA Method 8260B)

- Target List

Benzene

Toluene

Ethylbenzene

Xylenes

Methyl tert butyl ether (MTBE)

SVOCs - (EPA Method 8270)

- Method List

TPH-GRO (EPA Method 8015B)

- Gasoline Range Organics

TPH-DRO (EPA Method 8015B)

- Diesel Range Organics

- Motor Oil Range Organics

Total Recoverable Metals (EPA Method 6010B)

- Target List (for River Terrace)

Barium

Chromium

Lead

- Target List (for Refinery Complex, Outfalls, and River)

Arsenic

Barium

Cadmium

Chromium

Lead (Total)

Mercury (EPA Method 7470)

Selenium

Silver

Dissolved Metals (EPA Method 6010B / 7470)

- Arsenic

- Barium

- Cadmium

- Calcium

- Chromium

- Copper

- Iron

- Lead

- Magnesium

- Manganese

- Mercury *

- Potassium

- Selenium

- Silver

- Sodium

- Uranium

- Zinc

Anions (EPA Method 300.0)

- Fluoride

- Chloride

- Bromide

- Nitrogen, Nitrite (as N)

- Nitrogen, Nitrate (as N)

- Phosphorous, Orthophosphate (As P)

- Sulfate

Alkalinity (EPA Method 310.1)

- Alkalinity, Total

- Carbonate

- Bicarbonate

Total Carbon Dioxide (Laboratory Calculated)

- Dissolved CO₂

Specific Conductivity (EPA Method 120.1)

- Specific conductance

TDS (EPA Method 160.1)

- Total dissolved solids

Notes:

* = Mercury not analyzed for Bluff Outfalls

VOCs = volatile organic compounds

TPH = total petroleum hydrocarbons

GRO = gasoline range organics

DRO = diesel range organics

TDS = total dissolved solids

Table 3
Facility-Wide Monitoring Program
Bloomfield Refinery - Western Refining Company

Well ID	Sampling Frequency	VOCS (EPA Method 8260)	VOCS - Target List (EPA Method 8260)	SVOCs (EPA Method 8270)	TPH - Diesel Range Organics (DRO) (EPA Method 8015B)	TPH - Gasoline Range Organics (GRO) (EPA Method 8015B)	Dissolved Metals (EPA Method 6010/7470)	Total Recoverable Metals - Target List (EPA Method 6010/7470)	Total Dissolved Solids (TDS) (EPA Method 160.1 or Field Measurement)	Specific Conductance (EPA Method 120.1 or Field Measurement)	Carbon Dioxide (EPA Method 310.1)	Alkalinity (EPA Method 310.1)	Anions (EPA Method 300.0)
MW-3	Semi-Annually		X	X			X	X	X	X	X	X	X
	Annually		X		X		X	X	X	X	X	X	
	Semi-Annually		X		X		X	X	X	X	X	X	X
	Annually												
MW-5	Annually												
MW-6	Semi-Annually		X										
MW-6	Annually			X									
Refinery Wells													
RW-1	Semi-Annually		X		X		X	X	X	X	X	X	X
MW-4	Semi-Annually		X		X		X	X	X	X	X	X	X
MW-4	Annually		X		X		X	X	X	X	X	X	X
MW-8	Semi-Annually												
MW-8	Annually		X		X		X	X	X	X	X	X	X
RW-9	Semi-Annually												
RW-9	Annually		X		X		X	X	X	X	X	X	X
RW-15	Semi-Annually		X		X		X	X	X	X	X	X	X
RW-15	Annually												
RW-18	Semi-Annually												
RW-18	Annually		X		X		X	X	X	X	X	X	X
MW-20	Semi-Annually			X									
MW-20	Annually		X		X		X	X	X	X	X	X	X
RW-23	Semi-Annually		X		X		X	X	X	X	X	X	X
RW-23	Annually												
MW-26	Semi-Annually												
MW-26	Annually		X		X		X	X	X	X	X	X	X
MW-27	Semi-Annually		X		X		X	X	X	X	X	X	X
MW-27	Annually												
MW-32	Semi-Annually			X									
MW-32	Annually		X		X		X	X	X	X	X	X	X
MW-33	Semi-Annually			X									
MW-33	Annually		X		X		X	X	X	X	X	X	X
Downgradient Wells													
MW-11	Semi-Annually		X		X		X	X	X	X	X	X	X
MW-11	Annually												
MW-12	Semi-Annually		X										
MW-12	Annually				X		X	X	X	X	X	X	X
MW-34	Semi-Annually		X				X	X	X	X	X	X	X
MW-34	Annually												
MW-35	Semi-Annually			X			X	X	X	X	X	X	X
MW-35	Annually		X										
MW-37	Semi-Annually			X			X	X	X	X	X	X	X
MW-37	Annually		X										
MW-38	Semi-Annually			X									
MW-38	Annually		X		X		X	X	X	X	X	X	X
NORTH BARRIER WALL													
Collection Wells													
CW 0+60	Semi-Annually		X		X								
CW 25+95	Semi-Annually			X		X							
Observation Wells													
OW 0+60	Semi-Annually		X		X								
OW 1+50	Semi-Annually		X										
OW 3+85	Semi-Annually		X										
OW 5+50	Semi-Annually		X										
OW 6+70	Semi-Annually		X										
OW 8+10	Semi-Annually		X										
OW 11+15	Semi-Annually		X										
OW 14+10	Semi-Annually		X										
OW 16+60	Semi-Annually		X										
OW 19+50	Semi-Annually		X										
OW 22+00	Semi-Annually		X										
OW 23+10	Semi-Annually		X										
OW 23+90	Semi-Annually		X										
OW 25+70	Semi-Annually		X										

Table 3
Facility-Wide Monitoring Program
Bloomfield Refinery - Western Refining Company

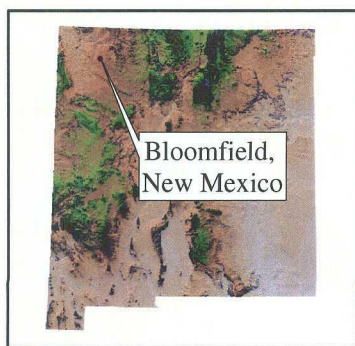
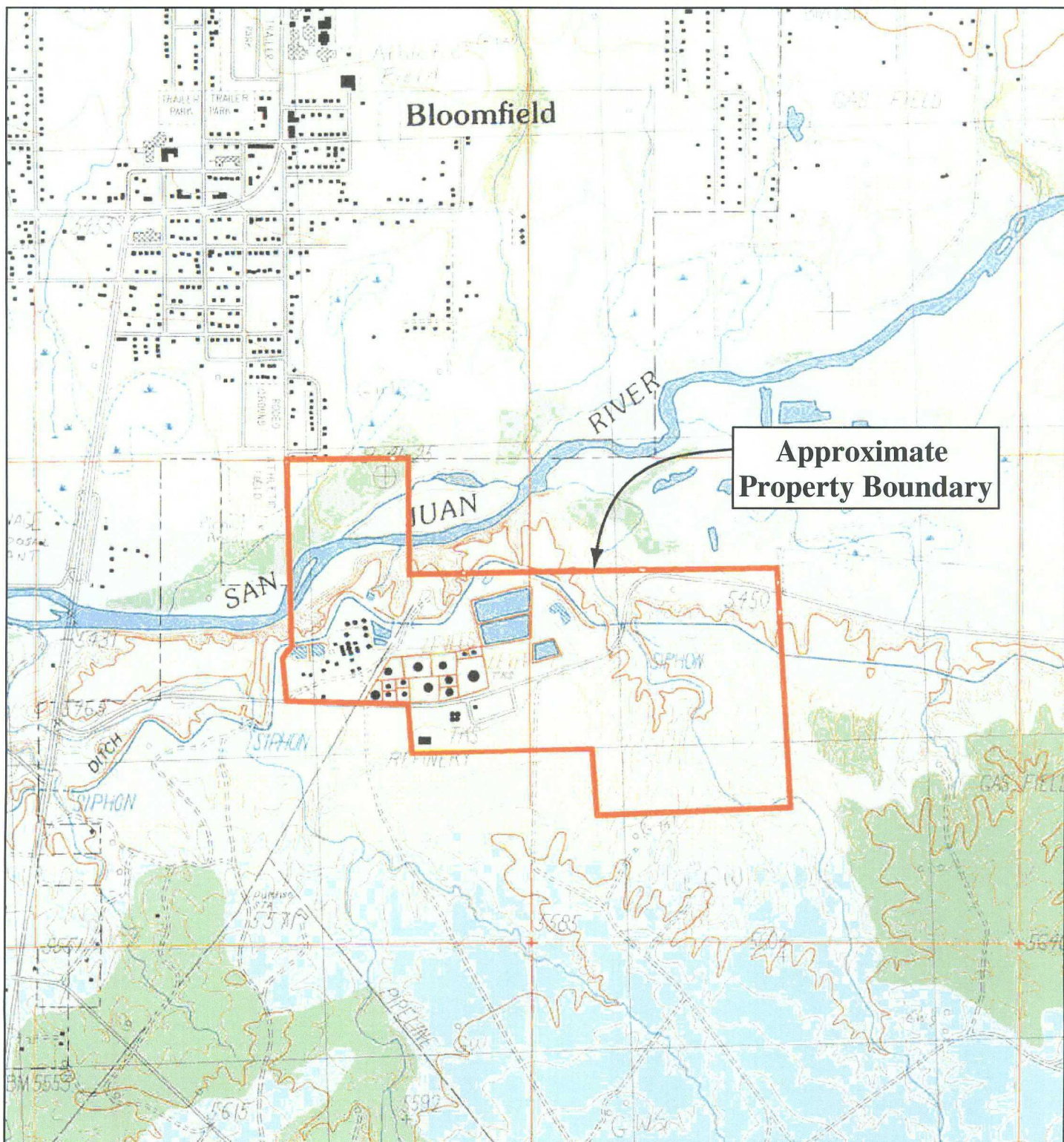
Well ID	Sampling Frequency	VOCs (EPA Method 8260)	VOCs - Target List (EPA Method 8260)	SVOCs (EPA Method 8270)	TPH - Diesel Range Organics (DRO) (EPA Method 8015B)	TPH - Gasoline Range Organics (GRO) (EPA Method 8015B)	Dissolved Metals (EPA Method 6010/7470)	Total Recoverable Metals - Target List (EPA Method 6010/7470)	Total Dissolved Solids (TDS) (EPA Method 160.1 or Field Measurement)	Specific Conductance (EPA Method 120.1 or Field Measurement)	Carbon Dioxide (EPA Method 310.1)	Alkalinity (EPA Method 310.1)	Anions (EPA Method 300.0)
SAN JUAN RIVER BLUFF													
Outfalls													
Tank #33 (Outfall #1)	Quarterly		X										
Out Fall #2	Semi-Annually		X				X	X	X	X	X	X	X
Out Fall #3	Semi-Annually		X				X	X	X	X	X	X	X
SAN JUAN RIVER TERRACE													
Monitoring Wells													
MW-49	Quarterly		X		X	X		X					
DW-1	Quarterly		X		X	X		X					
Piezometers													
TP-1	Quarterly		X		X	X		X					
TP-2	Quarterly		X		X	X		X					
TP-3	Quarterly		X		X	X		X					
TP-5	Quarterly		X		X	X		X					
TP-6	Quarterly		X		X	X		X					
TP-7	Quarterly		X		X	X		X					
TP-8	Quarterly		X		X	X		X					
TP-9	Quarterly		X		X	X		X					
TP-10	Quarterly		X		X	X		X					
TP-11	Quarterly		X		X	X		X					
TP-12	Quarterly		X		X	X		X					
TP-13	Quarterly		X		X	X		X					
San Juan River													
Upstream	Semi-Annually		X		X	X	X	X	X	X		X	X
North of MW#46	Semi-Annually		X		X	X	X	X	X	X		X	X
North of MW#45	Semi-Annually		X		X	X	X	X	X	X		X	X
Downstream	Semi-Annually		X		X	X	X	X	X	X		X	X

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INDEPENDENT ENVIRONMENTAL
ENGINEERS, SCIENTISTS
AND CONSULTANTS

Figures





0 1,250 2,500 3,750 5,000
Feet

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Site Location Map

Bloomfield Refinery
Facility-Wide Groundwater
Monitoring Plan

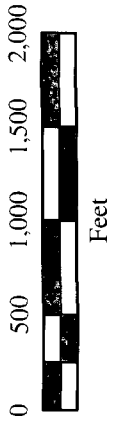
July 2007

Figure 1



Legend

- Injection Well
- ↗ Discharge Location
- ↘ Site



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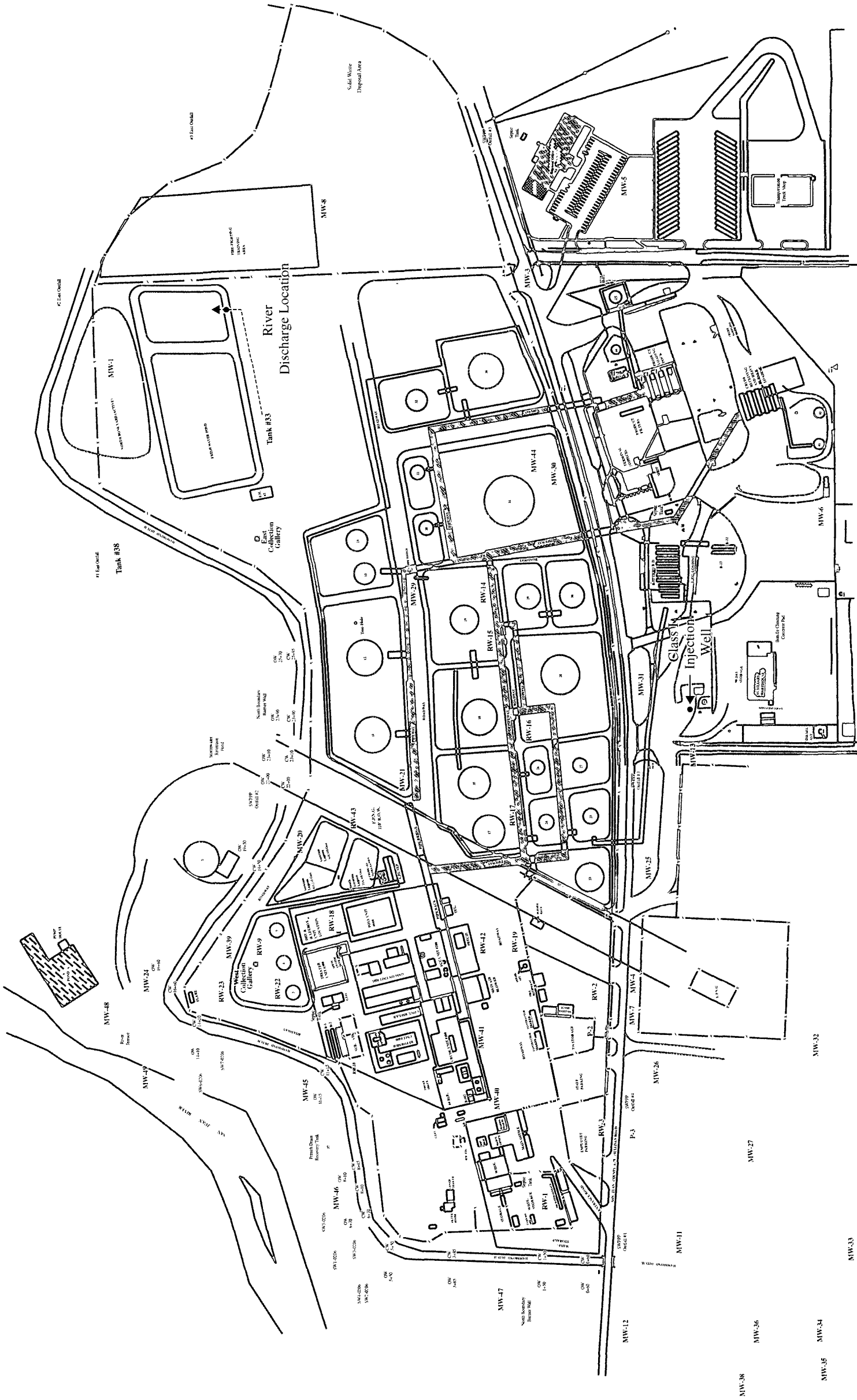
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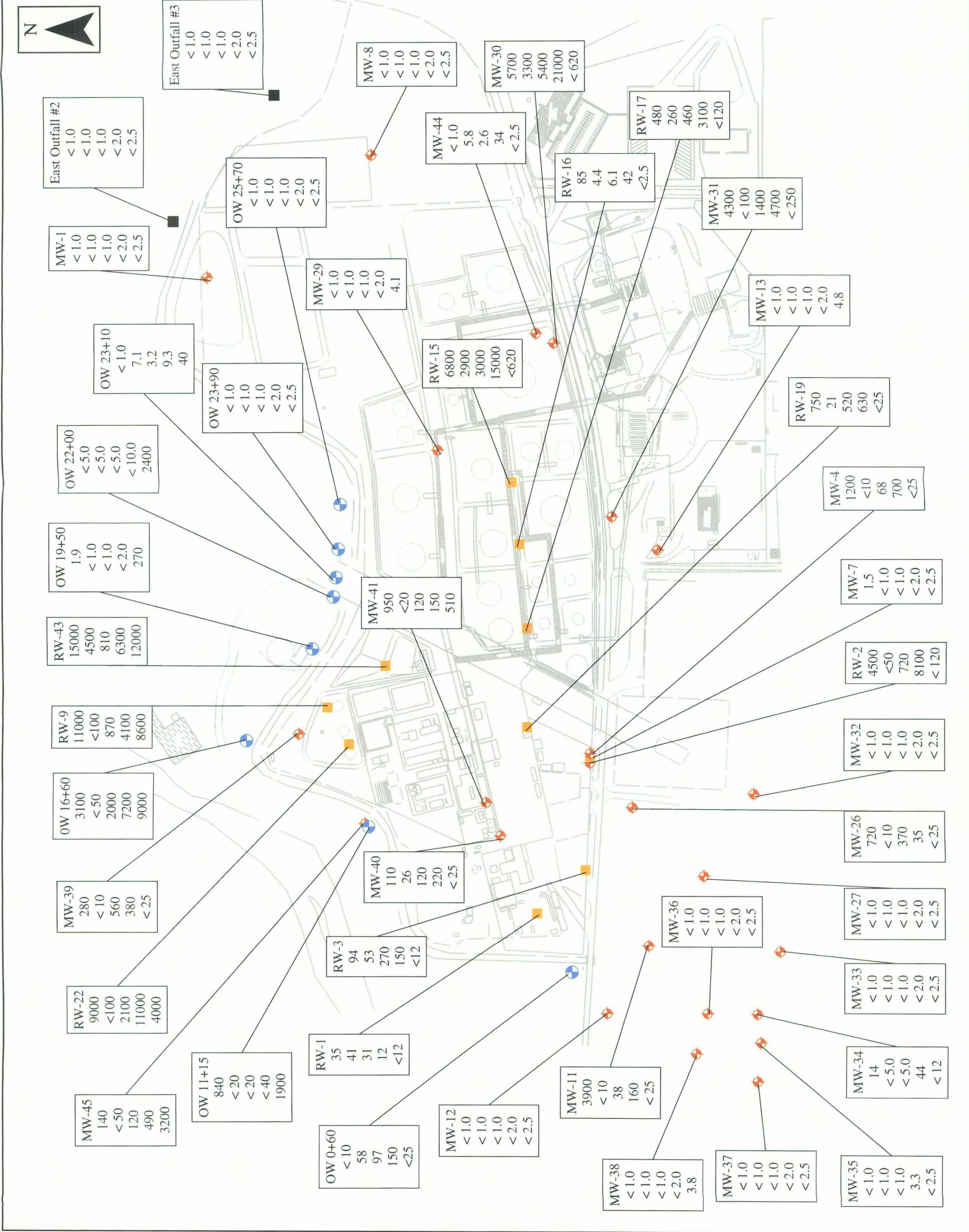
Site Plan

Bloomfield Refinery
Facility-Wide Groundwater
Monitoring Plan

July 2007

Figure 2



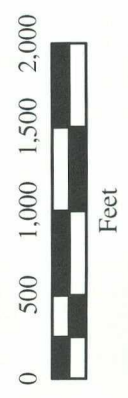


Legend

- Monitoring Well
- Observation Well
- Outfall
- Recovery Well
- Site

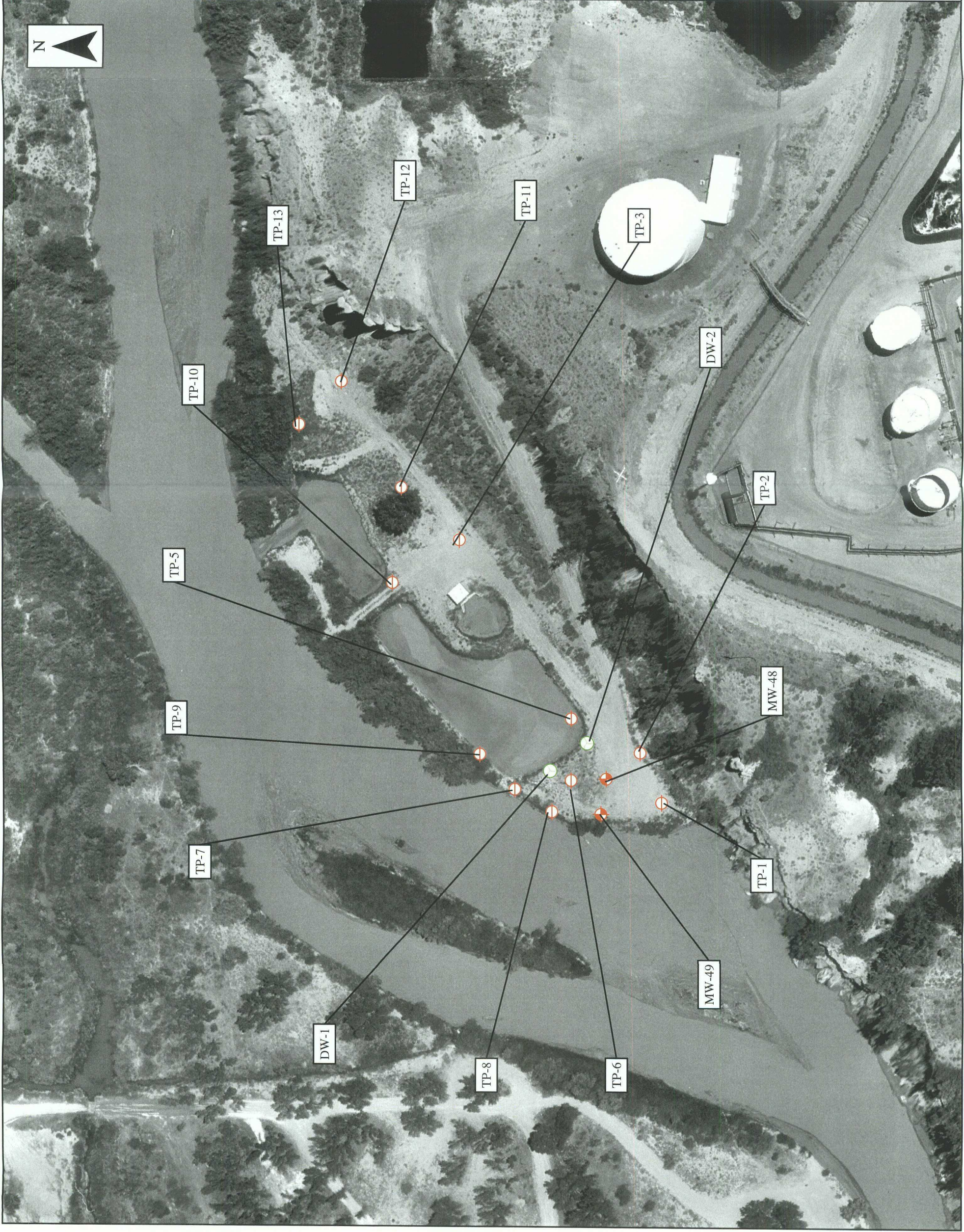
MW-35	- Benzene
< 1.0	- Toluene
< 1.0	- Ethylbenzene
< 1.0	- Xylenes, Total
3.3	- MTBE
< 2.5	

All concentrations in micrograms per liter (ug/L)



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Refinery Complex
Concentration Map
Spring 2007 Sampling Event
Bloomfield Refinery
Facility-Wide Groundwater
Monitoring Plan



Legend

- Monitor Well
- Dewatering Well
- Temporary Piezometer
- TP-8 - Well ID

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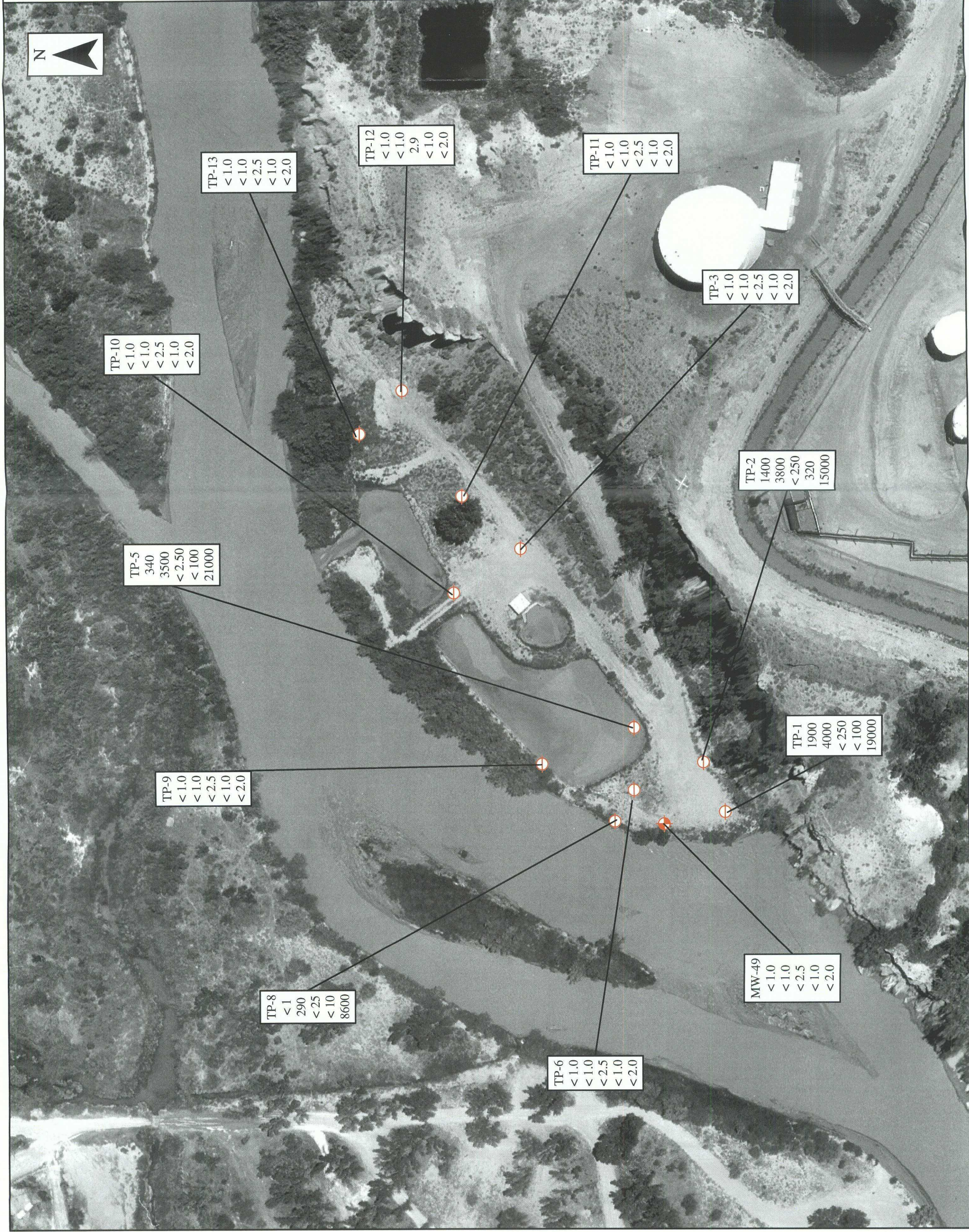
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River Terrace Well
Location Map

Bloomfield Refinery
Facility-Wide Groundwater
Monitoring Plan

July 2007

Figure 5



Legend

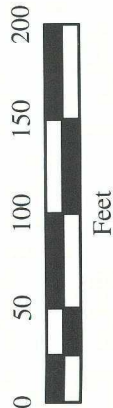
Monitor Well

Temporary Piezometer

TP-9
< 1.0
< 1.0
< 2.5
< 1.0
< 2.0

- Benzene
- Ethylbenzene
- MTBE
- Toluene
- Xylenes, Total

All concentrations in micrograms per liter (ug/L)



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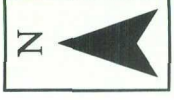
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River Terrace Concentration Map
Spring 2007 Sampling Event

Bloomfield Refinery
Facility-Wide Groundwater
Monitoring Plan

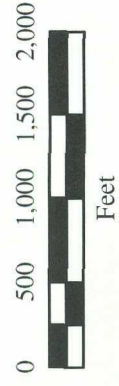
July 2007

Figure 6



Legend

- Monitoring Well
- Recovery Well
- Piezometer
- Groundwater Elevation Contours
- Site
- Well ID
- Groundwater Elevation (ft amsl)



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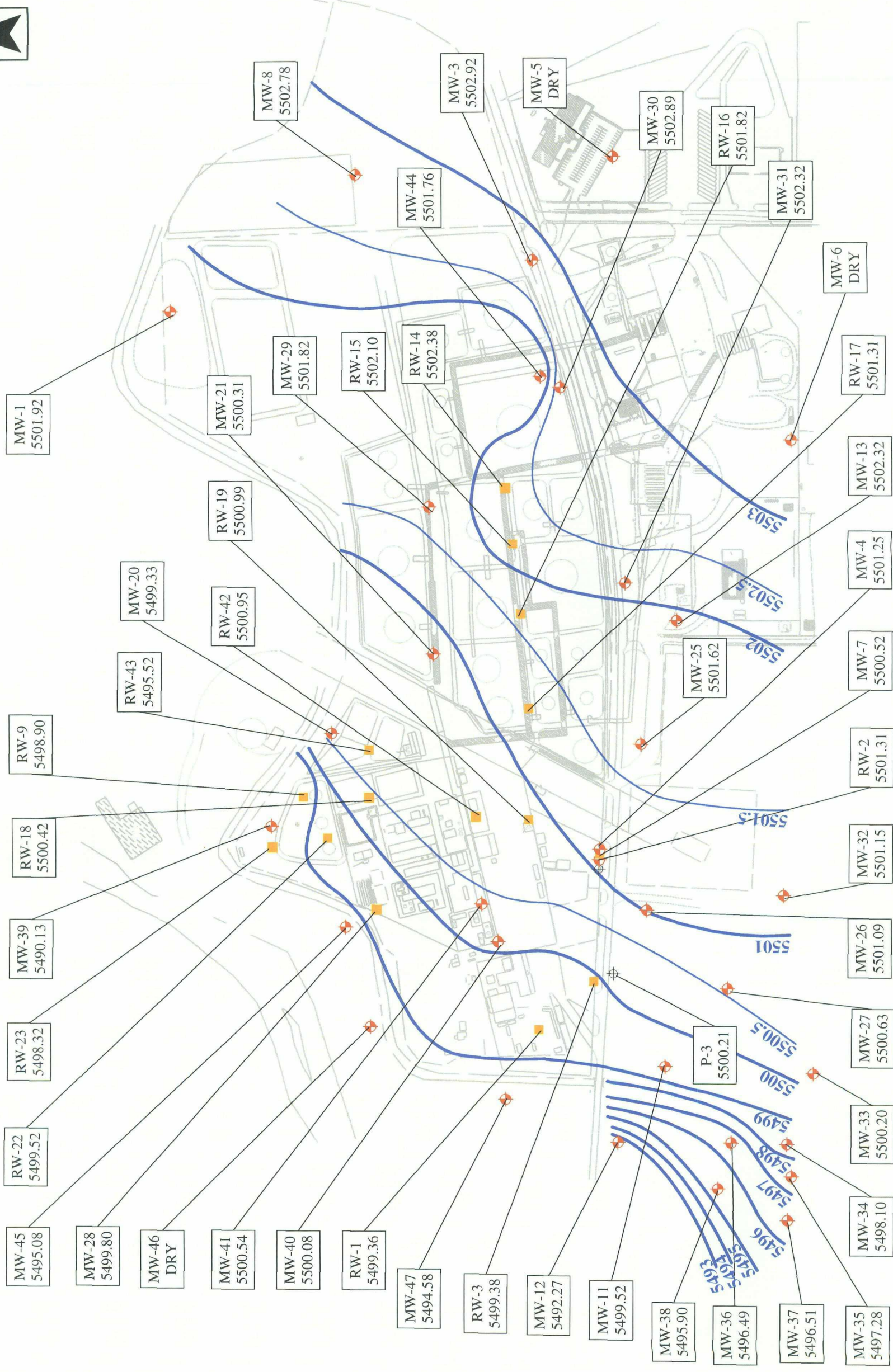
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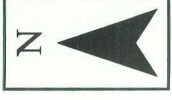
Groundwater Elevation Contours
Spring 2007

Bloomfield Refinery
Facility-Wide Groundwater
Monitoring Plan

July 2007

Figure 7





Legend

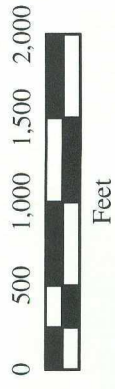
- Monitoring Well
- Observation Well
- Recovery Well
- Piezometer
- Collection Well
- Sump Well
- Site

MW-35
NPP
- Well ID

ft = Feet

NPP = No Product Present
NA = Not Available

Note:
OWs and CWs were collected on 1/15/07
SWs were collected on 1/2/07



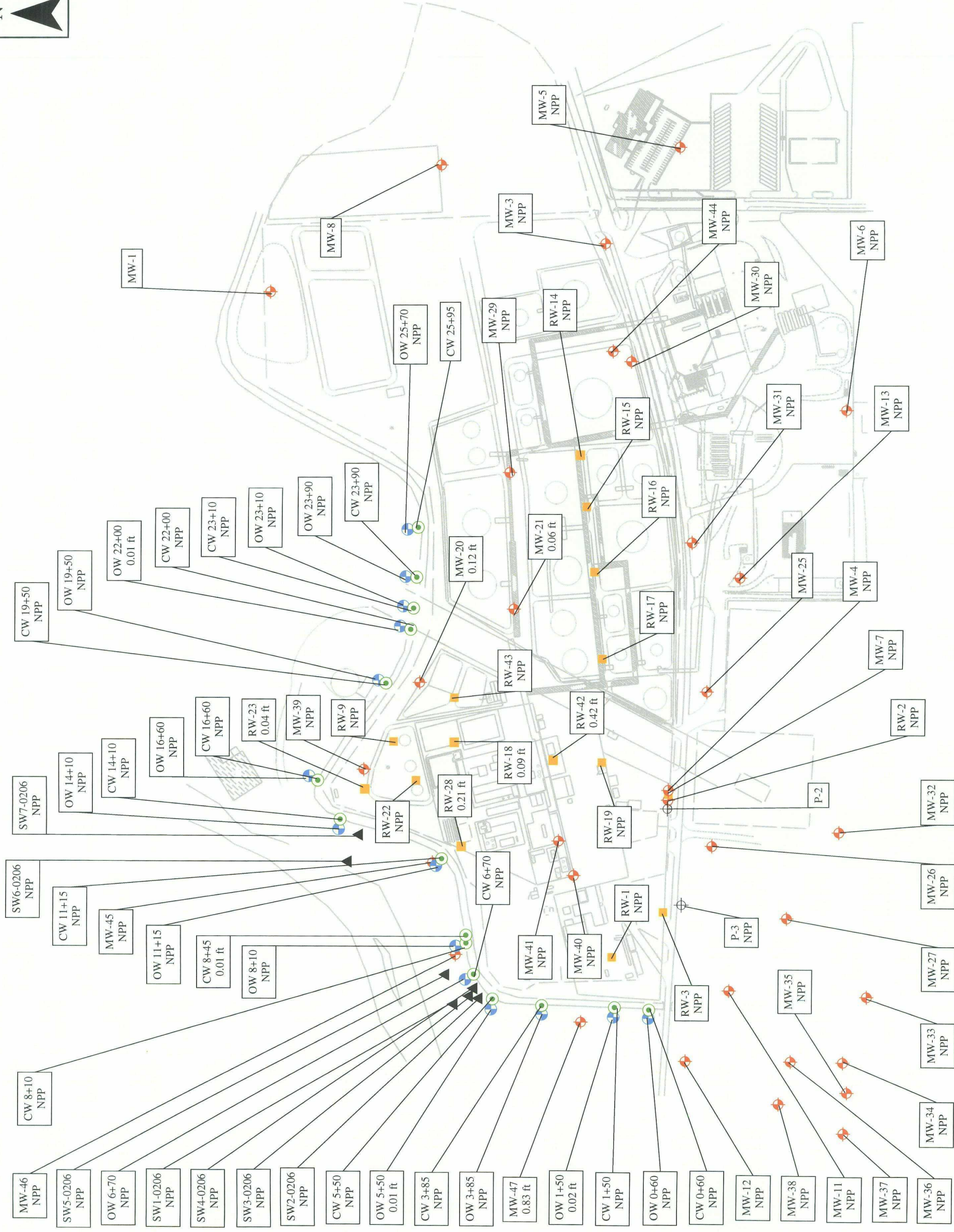
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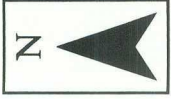
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Separate Phase Hydrocarbon
Thickness Summary Map
Spring 2007
Bloomfield Refinery
Facility-Wide Groundwater
Monitoring Plan

July 2007

Figure 8





Legend

Monitoring Well

Recovery Well

Site

MW-5 - Well ID



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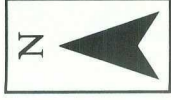
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Refinery Complex
Monitoring Well Location Map

Bloomfield Refinery
Facility-Wide Groundwater
Monitoring Plan

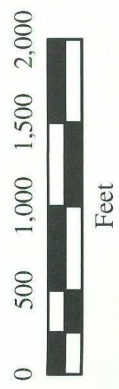
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Figure 9



Legend

- Observation Well
- Collection Well
- Site
- CW 25+95 - Well ID



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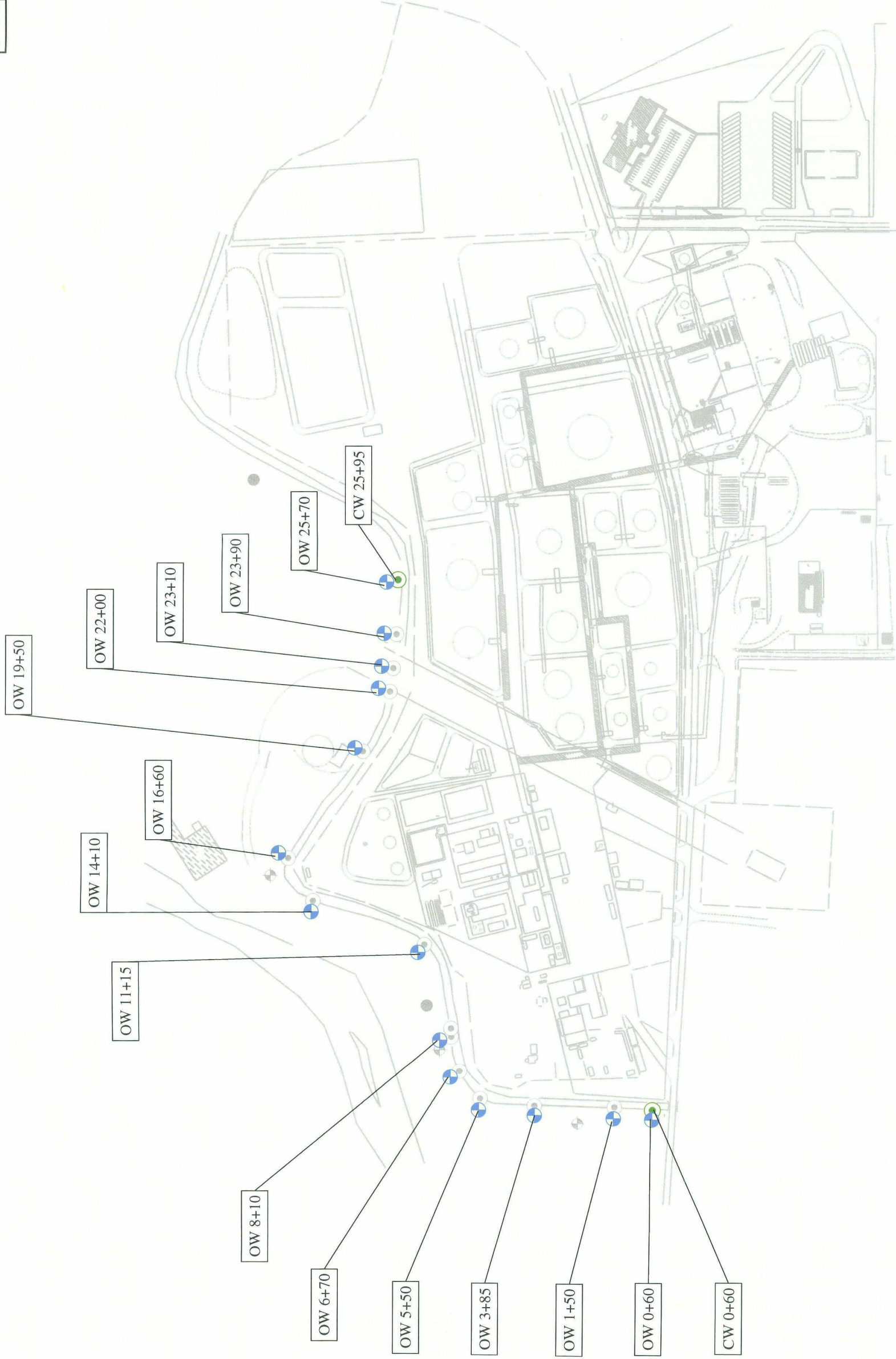
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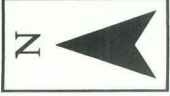
North Boundary Barrier
Monitoring Well Location Map

Bloomfield Refinery
Facility-Wide Groundwater
Monitoring Plan

July 2007

Figure 10





Legend

■ Outfall

● Tank

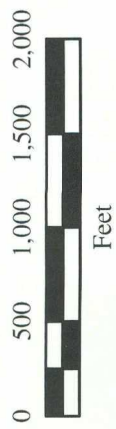
∨ Site

Tank #33 - Location ID

East Outfall #2

East Outfall #3

Tank #33



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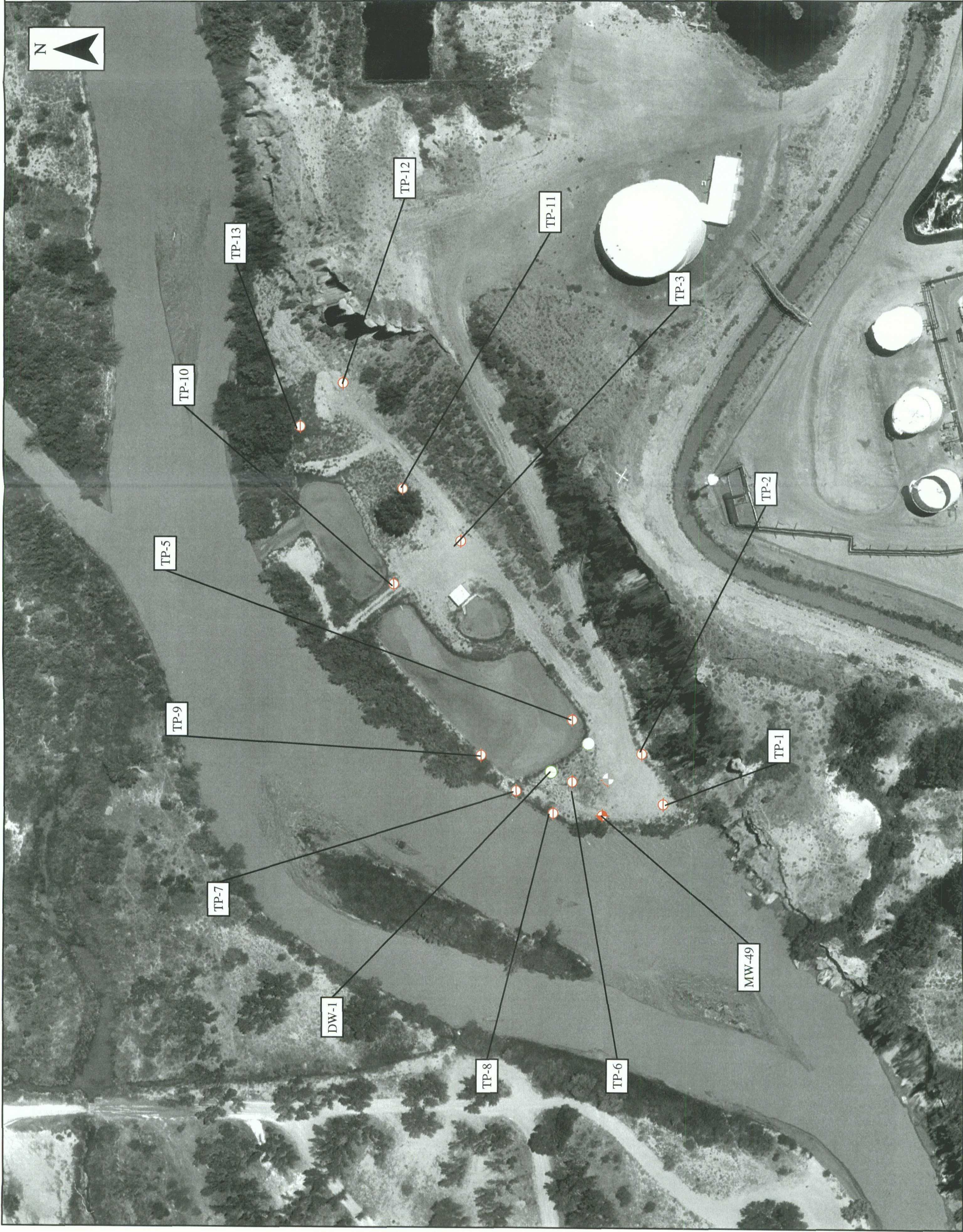
Bluff Outfall Monitoring
Location Map

Bloomfield Refinery
Facility-Wide Groundwater
Monitoring Plan

July 2007

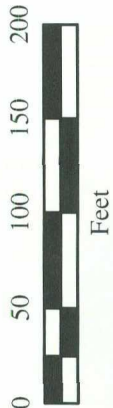
Figure 11





Legend

- Monitor Well
- Dewatering Well
- Temporary Piezometer
- TP-8 - Well ID



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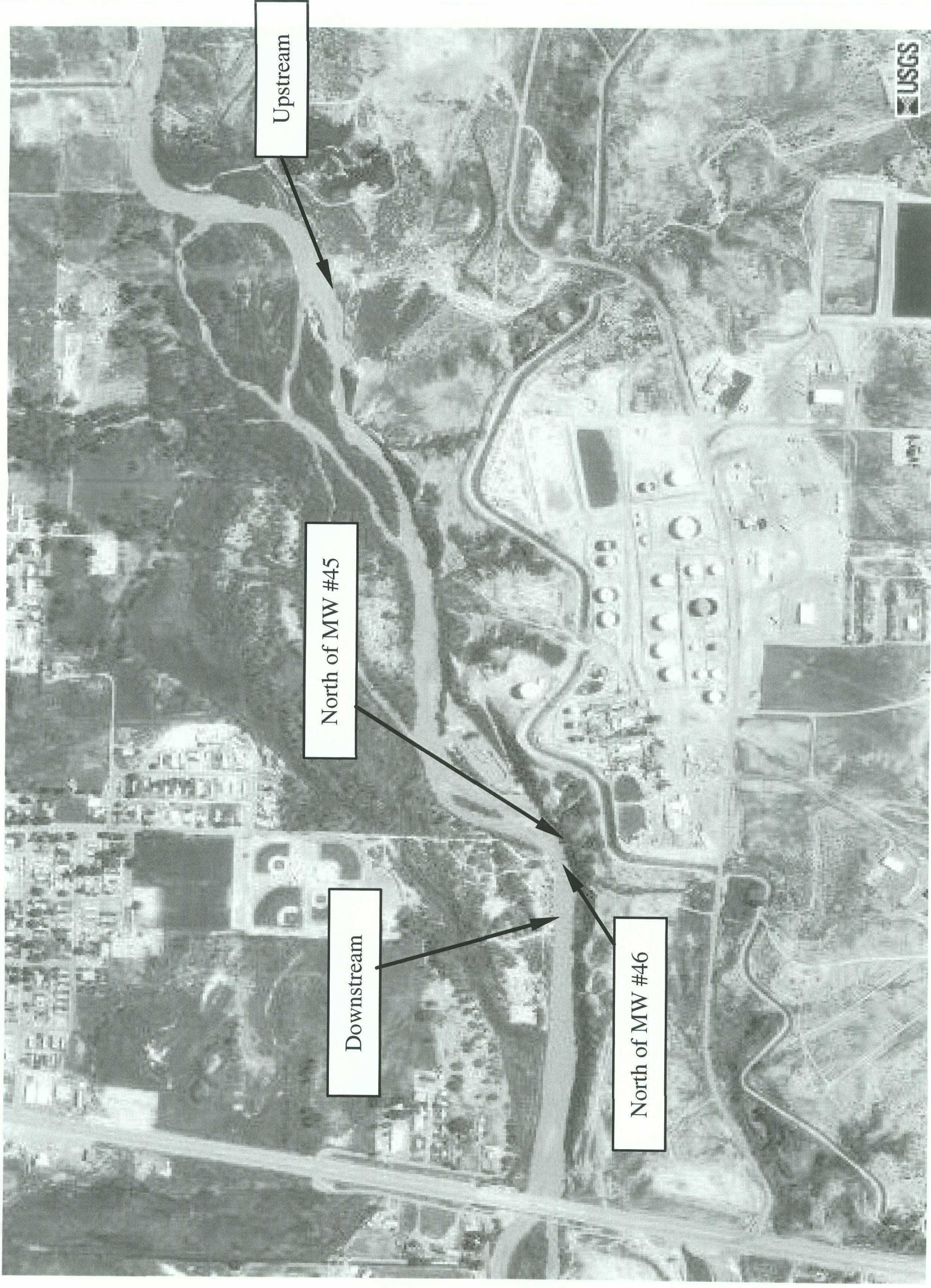
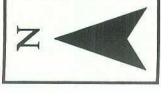
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River Terrace Monitoring
Well Location Map

Bloomfield Refinery
Facility-Wide Groundwater
Monitoring Plan

July 2007

Figure 12



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River Sampling Points
Location Map

Bloomfield Refinery
Facility-Wide Groundwater
Monitoring Plan

July 2007

Figure 13

A

APPENDIX



Appendix A
Volatile Organic Analytical Result Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters				
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.01	0.75	0.75	0.62	NE
Well ID:	Date Sampled:					
MW #1	4/1/2007	<0.001	<0.001	<0.001	<0.002	<0.0025
	8/15/2006	<0.001	<0.001	<0.001	<0.003	<0.0015
	4/5/2006	<0.001	<0.001	<0.001	<0.003	<0.0025
	8/5/2005	0.0011	<0.001	<0.001	<0.001	<0.001
	4/11/2005	0.0013	<0.0005	<0.0005	0.0011	<0.0025
	8/23/2004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025
	3/3/2004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025
	8/21/2003	<0.001	<0.001	<0.001	<0.001	<0.001
	3/3/2003	<0.0005	0.00063	0.00065	0.0043	<0.0025
MW #3	4/5/2006	<0.001	<0.001	<0.001	<0.003	<0.0025
	8/5/2005	<0.001	<0.001	<0.001	<0.001	<0.001
	4/11/2005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025
	8/21/2003	<0.001	<0.001	<0.001	<0.001	<0.001
MW #4	4/1/2007	1.2	<0.010	0.068	0.7	<0.025
MW #7	4/1/2007	0.0015	<0.001	<0.001	<0.002	<0.0025
	4/5/2006	<0.001	<0.001	<0.001	<0.003	<0.0025
	4/11/2005	<0.0005	<0.0005	<0.0005	0.00067	<0.0025
	8/23/2004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025
MW #8	4/1/2007	<0.001	<0.001	<0.001	<0.002	<0.0025
	8/15/2006	<0.001	<0.001	<0.001	<0.003	<0.0015
	4/5/2006	<0.001	<0.001	<0.001	<0.003	<0.0025
	8/5/2005	<0.001	<0.001	<0.001	<0.001	<0.001
	4/11/2005	0.00053	<0.0005	<0.0005	0.0008	<0.0025
	8/23/2004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025
	8/21/2003	<0.001	<0.001	<0.001	<0.001	<0.001
MW #11	4/1/2007	3.9	<0.010	0.038	0.16	<0.0025
	8/15/2006	0.24	<0.001	0.012	0.045	0.033
	4/5/2006	3.2	<0.005	<0.005	0.23	<0.120
	8/5/2005	4.2	<0.05	0.11	0.5	<0.05
	4/11/2005	0.4	<0.02	<0.02	0.28	<0.1
	8/23/2004	1.7	<0.02	0.064	0.015	<0.1
	8/21/2003	2.7	<0.010	0.17	0.65	0.079

Appendix A
Volatile Organic Analytical Result Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters				
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.01	0.75	0.75	0.62	NE
Well ID:	Date Sampled:					
MW #12	4/1/2007	<0.001	<0.001	<0.001	<0.002	<0.0025
	8/15/2006	<0.001	<0.001	<0.001	<0.003	<0.015
	4/5/2006	0.001	<0.001	<0.001	<0.003	<0.025
	8/5/2005	<0.001	<0.001	<0.001	0.0085	<0.001
	4/11/2005	<0.0005	<0.0005	<0.0005	0.00072	0.0025
	8/23/2004	<0.0005	<0.0005	<0.0005	0.00094	<0.0025
	3/3/2004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025
	8/21/2003	<0.001	<0.001	<0.001	<0.001	<0.001
	3/3/2003	<0.0005	0.00087	0.0013	0.015	<0.0025
MW #13	4/1/2007	<0.001	<0.001	<0.001	<0.002	0.0048
	8/15/2006	<0.001	<0.001	<0.001	<0.003	0.007
	4/5/2006	<0.001	<0.001	<0.001	<0.003	0.01
	8/5/2005	<0.001	<0.001	<0.001	<0.001	0.015
	4/11/2005	<0.0005	<0.0005	<0.0005	<0.0005	0.014
	8/23/2004	<0.0005	<0.0005	<0.0005	<0.0005	0.027
	3/3/2004	<0.0005	<0.0005	<0.0005	<0.0005	0.02
	8/21/2003	<0.001	<0.001	<0.001	<0.001	0.061
	3/3/2003	<0.0005	<0.0005	<0.0005	0.0012	0.049
MW #20	3/3/2004	21	1.2	0.1	0.5	95
	3/3/2003	1.4	0.15	0.092	0.16	0.59
MW #21	4/11/2005	0.13	<0.0025	0.025	0.028	0.041
	8/23/2004	0.13	<0.0025	0.0098	0.003	0.028
MW #26	4/1/2007	0.72	<0.010	0.37	0.035	<0.025
	8/15/2006	0.33	<0.002	0.48	<0.06	0.038
	4/5/2006	0.29	0.073	0.3	<0.060	<0.005
	8/5/2005	0.89	<0.01	0.47	0.25	<0.01
	4/11/2005	1.3	<0.02	0.44	0.45	<0.1
	8/23/2004	0.74	<0.025	0.46	0.19	<0.130
	8/21/2003	1.4	<0.05	0.63	0.35	<0.05

Appendix A
Volatile Organic Analytical Result Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters				
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.01	0.75	0.75	0.62	NE
Well ID:	Date Sampled:					
MW #27	4/1/2007	<0.001	<0.001	<0.001	<0.002	<0.0025
	8/15/2006	<0.001	<0.001	<0.001	<0.003	<0.0015
	4/5/2006	0.0058	<0.001	<0.001	0.0042	<0.0025
	8/5/2005	<0.001	<0.001	<0.001	<0.001	<0.001
	4/11/2005	<0.0005	<0.0005	<0.0005	0.001	<0.0025
	8/23/2004	<0.0025	<0.0025	<0.0025	<0.0025	<0.013
	8/21/2003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
MW #29	4/1/2007	<0.001	<0.001	<0.001	<0.002	0.0041
	4/5/2006	<0.001	<0.001	<0.001	<0.003	0.0045
	4/11/2005	<0.0005	<0.0005	<0.0005	<0.0005	0.0037
	8/23/2004	<0.0005	<0.0005	<0.0005	<0.0005	0.0026
MW #30	4/1/2007	5.7	3.3	5.4	21	<0.620
	4/5/2006	3.5	1.4	2.6	6.8	<0.620
	4/11/2005	5.7	3.7	4.4	12	<0.10
	8/23/2004	1.7	0.37	1.9	2.5	<0.10
MW #31	4/1/2007	4.3	<0.100	1.4	4.7	<0.250
	4/5/2006	6.1	1.5	0.94	4.5	<0.120
	4/11/2005	2.6	0.062	0.45	1.2	<0.250
	8/23/2004	3.7	0.4	0.32	1.2	<0.250
MW #32	4/1/2007	<0.001	<0.001	<0.001	<0.002	<0.0025
	8/15/2006	<0.001	<0.001	<0.001	<0.003	<0.0015
	4/5/2006	<0.001	<0.001	<0.001	<0.003	<0.0025
	8/5/2005	<0.001	<0.001	<0.001	<0.001	<0.001
	4/11/2005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025
	8/23/2004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025
	3/3/2004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025
	8/21/2003	<0.001	<0.001	<0.001	<0.001	<0.001
	3/3/2003	<0.001	<0.001	<0.001	<0.001	<0.001

Appendix A
Volatile Organic Analytical Result Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters				
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.01	0.75	0.75	0.62	NE
Well ID:	Date Sampled:					
MW #33	4/1/2007	<0.001	<0.001	<0.001	<0.002	<0.0025
	8/15/2006	<0.001	<0.001	<0.001	<0.003	<0.0015
	4/5/2006	<0.001	0.0016	<0.001	<0.003	<0.0025
	8/5/2005	<0.001	<0.001	<0.001	<0.001	<0.001
	4/11/2005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025
	8/23/2004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025
	3/3/2004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025
	8/21/2003	<0.001	<0.001	<0.001	<0.001	<0.001
	3/3/2003	<0.0005	<0.0005	<0.0005	0.00086	<0.0025
MW #34	4/1/2007	0.014	<0.005	<0.005	0.044	<0.012
	8/15/2006	0.032	<0.005	<0.005	<0.015	<0.075
	4/5/2006	<0.001	0.03	0.0055	0.021	<0.0025
	8/5/2005	<0.005	<0.005	<0.005	<0.005	0.0057
	4/11/2005	<0.0025	0.024	0.0041	0.0039	<0.013
	8/23/2004	<0.0025	0.0039	0.019	0.013	<0.013
	8/21/2003	<0.001	<0.001	<0.001	<0.001	<0.001
MW #35	4/1/2007	<0.001	<0.001	<0.001	0.0033	<0.0025
	8/15/2006	<0.005	<0.005	<0.005	<0.015	<0.075
	4/5/2006	<0.001	0.038	0.011	0.039	<0.0025
	8/5/2005	<0.001	<0.001	<0.001	<0.001	0.0065
	4/11/2005	<0.0025	<0.0025	<0.0025	0.0026	<0.013
	8/23/2004	0.00082	<0.0005	0.0061	0.0033	0.0096
	3/3/2004	0.006	<0.0005	<0.0005	0.003	0.011
	8/21/2003	<0.010	<0.010	<0.010	<0.010	0.02
MW #36	4/1/2007	<0.001	<0.001	<0.001	<0.002	<0.0025
	8/15/2006	<0.001	<0.001	<0.001	<0.003	<0.015
	4/5/2006	<0.001	0.016	0.0046	0.014	<0.0025
	8/5/2005	<0.001	<0.001	<0.001	0.0016	0.0032
	4/11/2005	<0.0005	<0.0005	<0.0005	0.0019	<0.0025
	8/23/2004	0.0009	<0.0005	<0.0005	0.004	0.0085
	3/3/2003	0.0038	<0.0025	0.0027	0.021	0.014

Appendix A
Volatile Organic Analytical Result Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters				
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.01	0.75	0.75	0.62	NE
Well ID:	Date Sampled:					
MW #37	4/1/2007	<0.001	<0.001	<0.001	<0.002	<0.0025
	8/15/2006	<0.001	<0.001	<0.001	<0.003	<0.0015
	4/5/2006	<0.001	0.0053	<0.001	0.003	<0.0025
	8/5/2005	<0.001	<0.001	<0.001	<0.001	0.0017
	4/11/2005	<0.0025	<0.0025	<0.0025	<0.0025	<0.013
	8/23/2004	<0.0005	<0.0005	0.0012	0.00062	0.0026
	8/21/2003	0.0013	<0.001	0.0014	0.0097	0.0059
	3/3/2003	<0.0025	0.0033	0.0038	0.031	<0.013
MW #38	4/1/2007	<0.001	<0.001	<0.001	<0.002	0.0038
	8/15/2006	<0.001	<0.001	<0.001	<0.003	0.0038
	4/5/2006	<0.001	0.0029	<0.001	<0.003	0.0045
	8/5/2005	<0.001	<0.001	<0.001	<0.001	0.0062
	4/11/2005	<0.0005	<0.0005	<0.0005	0.0015	0.0071
	8/23/2004	<0.0005	<0.0005	0.0012	0.00068	0.0085
	8/21/2003	<0.001	<0.001	<0.001	<0.001	0.017
	3/3/2003	<0.0005	<0.0005	<0.0005	0.0014	0.016
MW #39	4/1/2007	0.28	<0.010	0.56	0.38	<0.025
	4/5/2006	0.28	0.05	0.9	0.89	<0.005
	4/11/2005	0.52	0.057	1.3	1.5	<0.05
	8/23/2004	0.46	0.15	0.55	0.92	<0.050
MW #40	4/1/2007	0.11	0.026	0.12	0.22	<0.025
MW #41	4/1/2007	0.95	<0.020	0.12	0.15	0.51
MW #44	4/1/2007	<0.001	0.0058	0.0026	0.034	<0.0025
	4/5/2006	<0.001	<0.001	<0.001	<0.003	0.0028
	4/11/2005	<0.0005	<0.0005	<0.0005	<0.0005	0.0041
	8/23/2004	<0.0005	<0.0005	<0.0005	<0.0005	0.0048
MW #45	4/1/2007	0.14	<0.050	0.12	0.49	3.2
	3/3/2004	1	<0.86	7.5	28	<4.3
	3/3/2003	4.4	3	5.5	30	<1.3
MW #48	8/5/2005	0.62	0.026	2.5	9.9	<0.02
	4/11/2005	0.48	<0.025	1.7	7.5	<0.13
MW #49	8/5/2005	0.093	<0.002	0.015	0.004	<0.002
	4/11/2005	0.041	0.00068	0.015	0.024	<0.0025
RW #2	4/1/2007	4.5	<0.050	0.72	8.1	<0.120

Appendix A
Volatile Organic Analytical Result Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters				
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.01	0.75	0.75	0.62	NE
Well ID:	Date Sampled:					
RW #3	4/1/2007	0.094	0.053	0.27	0.15	<0.012
	4/5/2006	24	28	2.7	15	0.75
	4/11/2005	0.1	0.1	0.1	0.45	<0.05
	8/23/2004	0.33	<0.020	<0.020	1.4	<0.10
RW #9	4/1/2007	11	<0.100	0.87	4.1	8.6
RW #14	4/5/2006	1.2	10	2.5	15	<0.620
	4/11/2005	1.7	15	3.4	20	<0.5
	8/23/2004	1.9	17	3.2	20	<0.10
RW #15	4/1/2007	6.8	2.9	3	15	<0.620
	8/15/2006	20	20	7.2	43	<0.380
	4/11/2005	9	11	2.5	19	<0.1
	8/23/2004	9.4	15	2.8	22	<0.25
RW #16	4/1/2007	0.085	0.0044	0.0061	0.042	<0.0025
	4/5/2006	0.81	<0.002	0.056	<0.006	<0.005
	4/11/2005	1.8	<0.025	0.17	0.12	<0.13
	8/23/2004	2.1	<0.05	0.17	0.82	<0.25
RW #17	4/1/2007	0.48	0.26	0.46	3.1	<0.120
RW #18	8/5/2005	1.2	<0.1	0.28	0.54	<0.1
	4/11/2005	0.92	0.16	0.54	1.1	8.9
RW #19	4/1/2007	0.75	0.021	0.72	8.1	<0.120
RW #22	4/1/2007	9	<0.100	2.1	11	4
	4/11/2005	9.8	0.083	1.8	7.9	9.6
RW #43	4/1/2007	15	4.5	0.81	6.3	12

Notes:

mg/L = milligram per liter

MW = monitoring well

RW = recovery well

NA = not analyzed

NE = not established

MTBE = methyl tertiary butyl ether

WQCC 20NMAC 6.2.33103 = New Mexico Standard for Groundwater of 10,000 ug/L TDS or less.

Appendix A
Total Metals Analytical Result Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters							
		Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Selenium (mg/L)	Silver (mg/L)	Mercury (mg/L)
40 CFR 141.62 MCL (mg/L):		0.01 ⁽¹⁾	2.0	0.005	0.10	0.015	0.05	0.1 ⁽²⁾	0.002
Well ID:	Date Sampled:								
MW #1	8/15/2006	<0.020	0.023	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.0002
	8/5/2005	NA	NA	NA	<0.006	<0.005	NA	NA	NA
	8/23/2004	<0.02	0.052	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
MW #3	8/5/2005	NA	NA	NA	0.016	<0.005	NA	NA	NA
	8/21/2003	NA	NA	NA	0.029	0.022	NA	NA	<0.0002
MW #7	8/23/2004	<0.02	<0.002	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
MW #8	8/15/2006	<0.020	0.018	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	8/5/2005	NA	NA	NA	0.33	<0.005	NA	NA	NA
	8/23/2004	<0.02	0.071	<0.002	1.9	<0.005	<0.05	<0.005	<0.0002
	8/21/2003	NA	NA	NA	0.72	<0.005	NA	NA	<0.0002
MW #11	8/15/2006	<0.02	0.69	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	8/5/2005	NA	NA	NA	<0.006	0.011	NA	NA	NA
	8/23/2004	<0.02	0.54	<0.002	<0.006	0.027	<0.05	<0.005	<0.0002
	8/21/2003	NA	NA	NA	0.011	0.02	NA	NA	0.00026
MW #12	8/15/2006	<0.02	0.04	<0.002	0.0078	<0.005	<0.05	<0.005	<0.0002
	8/5/2005	NA	NA	NA	4.1	0.21	NA	NA	NA
	8/23/2004	<0.02	0.19	0.003	0.11	0.18	<0.05	<0.005	0.0005
	8/21/2003	NA	NA	NA	0.51	0.16	NA	NA	<0.0002
MW #13	8/15/2006	<0.02	0.025	<0.002	<0.006	0.0078	<0.05	<0.005	<0.0002
	8/5/2005	NA	NA	NA	0.012	<0.005	NA	NA	NA
	8/23/2004	<0.02	0.028	<0.002	0.085	<0.005	<0.05	<0.005	<0.0002
	8/21/2003	NA	NA	NA	0.45	<0.005	NA	NA	<0.0002
MW #21	8/23/2004	<0.02	0.029	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
MW #26	8/15/2006	<0.02	2.2	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	8/5/2005	NA	NA	NA	<0.006	<0.005	NA	NA	NA
	8/23/2004	<0.02	2	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	8/21/2003	NA	NA	NA	0.017	0.0084	NA	NA	<0.0002
MW #27	8/15/2006	<0.02	0.038	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	8/5/2005	NA	NA	NA	<0.006	<0.005	NA	NA	NA
	8/23/2004	<0.02	0.13	<0.002	0.019	<0.005	<0.05	<0.005	<0.0002
	8/21/2003	NA	NA	NA	0.014	<0.005	NA	NA	<0.0002
MW #29	8/23/2004	<0.02	0.039	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
MW #30	8/23/2004	<0.02	0.24	<0.002	0.0073	0.011	<0.05	<0.005	0.00023
MW #31	8/23/2004	<0.02	0.35	<0.002	0.0088	<0.005	<0.05	<0.005	0.00022
MW #32	8/15/2006	<0.02	0.032	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	8/5/2005	NA	NA	NA	<0.006	<0.005	NA	NA	NA
	8/23/2004	<0.02	0.049	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	8/21/2003	NA	NA	NA	<0.006	<0.005	NA	NA	<0.0002
MW #33	8/15/2006	<0.02	0.017	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	8/5/2005	NA	NA	NA	<0.006	<0.005	NA	NA	NA
	8/23/2004	<0.02	0.038	<0.002	<0.006	0.0067	<0.05	<0.005	0.00069
	8/21/2003	NA	NA	NA	<0.006	<0.005	NA	NA	<0.0002

Appendix A
Total Metals Analytical Result Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters							
		Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Selenium (mg/L)	Silver (mg/L)	Mercury (mg/L)
40 CFR 141.62 MCL (mg/L):		0.01 ⁽¹⁾	2.0	0.005	0.10	0.015	0.05	0.1 ⁽²⁾	0.002
Well ID:	Date Sampled:								
MW #34	8/15/2006	<0.02	0.44	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	8/5/2005	NA	NA	NA	0.011	0.0078	NA	NA	NA
	8/23/2004	<0.02	0.94	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	8/21/2003	NA	NA	NA	0.018	<0.005	NA	NA	<0.0002
MW #35	8/15/2006	0.027	0.71	<0.0020	<0.006	<0.005	<0.05	<0.005	<0.0002
	8/5/2005	NA	NA	NA	0.017	0.017	NA	NA	NA
	8/23/2004	<0.02	1.2	<0.002	<0.006	0.0067	<0.05	<0.005	<0.0002
	8/21/2003	NA	NA	NA	0.011	<0.005	NA	NA	<0.0002
MW #36	8/15/2006	<0.02	0.16	<0.002	<0.006	0.0053	<0.05	<0.005	<0.0002
	8/5/2005	NA	NA	NA	0.022	<0.005	NA	NA	NA
	8/23/2004	<0.02	2.6	<0.002	0.025	0.0072	<0.05	<0.005	0.00031
MW #37	8/15/2006	<0.02	0.3	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	8/5/2005	NA	NA	NA	0.082	0.072	NA	NA	NA
	8/23/2004	<0.02	1.3	<0.002	0.018	0.05	<0.05	<0.005	0.00044
	8/21/2003	NA	NA	NA	0.18	0.18	NA	NA	<0.0002
MW #38	8/15/2006	<0.02	0.093	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	8/5/2005	NA	NA	NA	0.34	0.18	NA	NA	NA
	8/23/2004	<0.02	0.74	<0.002	0.079	0.028	<0.05	<0.005	0.0012
	8/21/2003	NA	NA	NA	0.31	0.21	NA	NA	<0.0002
MW #39	8/23/2004	<0.02	0.71	<0.002	0.59	0.019	<0.05	<0.005	0.00021
MW #44	8/23/2004	<0.02	0.084	<0.002	0.1	0.036	<0.05	<0.005	0.00033
MW #48	8/5/2005	NA	NA	NA	<0.006	0.015	NA	NA	NA
MW #49	8/5/2005	NA	NA	NA	0.013	0.0075	NA	NA	NA
RW #3	8/23/2004	<0.02	0.17	<0.002	<0.006	0.0068	<0.05	<0.005	<0.0002
RW #14	8/23/2004	<0.02	1.8	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
RW #15	8/15/2006	<0.020	1.3	<0.002	<0.006	0.0094	<0.050	<0.0050	<0.0002
	8/23/2004	<0.02	1.2	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
RW #16	8/23/2004	<0.02	0.67	<0.002	0.012	<0.005	<0.05	<0.005	<0.0002
RW #18	8/5/2005	<0.02	0.038	<0.002	0.32	0.16	NA	NA	NA

Notes:

mg/L = milligram per liter

MW = monitoring well

RW = recovery well

NA= not analyzed

NE = not established

40 CFR 141.62 MCL = National Primary Drinking Water Regulations: Maximum Contaminant Levels and Maximum Residual Disinfectant Levels

(1) MCL as of 1/23/2006

(2) National secondary drinking water regulation

Appendix A
Dissolved Metals Analytical Result Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery- Bloomfield, New Mexico

		Parameters																
		Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Calcium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Selenium (mg/L)	Silver (mg/L)	Sodium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	
WQCC 20NMAC 6.2.3103 (mg/L):		0.10	1.0	0.01	NE	0.05	1.0	1.0	0.05	NE	0.20	NE	0.05	0.05	NE	0.03 (1)	10.0	
Well ID:	Date Sampled:																	
MW #1	8/15/2006	<0.02	0.023	<0.002	74	<0.006	<0.006	<0.02	<0.005	18	0.09	2.4	<0.05	<0.005	120	<0.1	0.047	
	8/5/2005	<0.02	0.022	<0.002	68	<0.006	<0.006	0.14	<0.005	18	0.14	2.7	<0.05	<0.005	140	<0.1	<0.005	
	8/23/2004	<0.02	0.025	<0.002	67	<0.006	<0.006	0.27	<0.005	18	0.13	2.1	<0.05	<0.005	110	<0.1	0.021	
MW #3	8/15/2006	<0.02	0.46	<0.002	61	<0.006	<0.006	<0.005	<0.005	16	0.08	2.6	0.043	<0.005	150	<0.1	0.12	
	8/5/2005	<0.02	0.018	<0.002	480	<0.006	<0.006	0.047	<0.005	130	0.43	7.6	<0.05	<0.005	1300	<0.1	0.018	
	8/21/2003	<0.02	0.3	<0.002	490	<0.006	<0.006	0.27	<0.005	140	0.58	10	0.024	<0.005	1100	<0.1	0.094	
MW #7	8/23/2004	<0.02	0.0097	<0.002	300	<0.006	<0.006	0.081	<0.005	31	0.28	8.1	<0.05	<0.005	1100	<0.1	0.0096	
	8/15/2006	<0.02	0.018	<0.002	230	<0.006	<0.006	0.033	<0.005	35	0.42	3.2	<0.05	<0.005	380	<0.1	0.044	
	8/5/2005	<0.02	0.021	<0.002	230	<0.006	<0.006	0.078	<0.005	37	0.65	3.1	<0.05	<0.005	360	<0.1	0.014	
MW #11	8/23/2004	<0.02	0.021	<0.002	210	<0.006	<0.006	0.059	<0.005	35	0.57	3	<0.05	<0.005	360	<0.1	0.022	
	8/21/2003	<0.02	0.36	<0.002	200	<0.006	<0.006	0.044	<0.005	38	0.68	4	0.09	<0.005	350	<0.1	0.13	
	8/15/2006	<0.02	0.69	<0.002	100	<0.006	<0.006	9.3	<0.005	22	1.8	1.4	<0.05	<0.005	390	<0.1	0.051	
MW #12	8/5/2005	<0.02	0.73	<0.002	96	<0.006	<0.006	7.6	<0.005	22	1.6	1.7	<0.05	<0.005	380	<0.1	0.014	
	8/23/2004	<0.02	0.47	<0.002	100	<0.006	0.021	6.9	0.022	23	1.7	1.5	<0.05	<0.005	390	<0.1	63	
	8/21/2003	<0.02	1.2	<0.002	120	<0.006	<0.006	7.6	<0.005	25	2	2.3	0.15	<0.005	420	<0.1	0.18	
MW #13	8/15/2006	<0.02	0.04	<0.002	73	0.0078	<0.006	0.069	<0.005	14	0.3	1.1	<0.05	<0.005	100	<0.1	0.036	
	8/5/2005	<0.02	0.07	<0.002	370	0.022	<0.006	0.55	<0.005	97	0.64	2.8	<0.05	<0.005	560	<0.1	0.022	
	8/23/2004	<0.02	0.06	<0.002	130	<0.006	<0.006	0.044	<0.005	NA	0.55	1.5	<0.05	<0.005	320	<0.1	0.035	
MW #13	8/21/2003	<0.02	0.12	<0.002	420	0.0066	<0.006	0.024	<0.005	130	1.8	4.3	0.084	<0.005	960	<0.1	0.088	
	8/15/2006	<0.02	0.025	<0.002	250	<0.006	0.0063	<0.02	0.0078	82	1.1	3.6	<0.05	<0.005	620	<0.10	0.061	
	8/5/2005	<0.02	0.028	<0.002	240	<0.006	<0.006	<0.02	<0.005	85	1.1	3.8	<0.05	<0.005	570	<0.1	0.0088	
	8/23/2004	<0.02	0.022	<0.002	210	<0.006	<0.006	0.046	<0.005	80	0.58	3.6	<0.05	<0.005	610	<0.1	0.021	
	8/21/2003	<0.02	0.33	<0.002	270	<0.006	0.0096	0.04	<0.005	110	1.1	5.3	0.16	<0.005	680	<0.1	0.09	

Appendix A
Dissolved Metals Analytical Result Summary - Refinery Complex

Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery- Bloomfield, New Mexico

		Parameters															
		Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Calcium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Selenium (mg/L)	Silver (mg/L)	Sodium (mg/L)	Uranium (mg/L)	Zinc (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.10	1.0	0.01	NE	0.05	1.0	0.05	NE	0.20	NE	0.05	0.05	0.05	NE	0.03 (n)	10.0
Well ID:	Date Sampled:																
MW #21	8/23/2004	<0.02	0.028	<0.002	450	<0.006	<0.006	2.9	<0.005	97	1.4	6.8	<0.05	<0.005	600	<0.1	0.028
MW #26	8/15/2006	<0.02	2.2	<0.002	10	<0.006	<0.006	6.8	<0.005	38	3.1	3	<0.05	<0.005	450	<0.1	0.048
	8/5/2005	<0.02	1.9	<0.002	92	<0.006	<0.006	6.3	<0.005	32	2.8	2.8	<0.05	<0.005	430	<0.1	0.17
	8/23/2004	<0.02	1.8	<0.002	75	<0.006	<0.006	5.1	0.0056	27	2	2.6	<0.05	<0.005	440	<0.1	0.013
	8/21/2003	<0.02	2.3	<0.002	91	0.0089	<0.006	5	<0.005	32	2.4	4.2	0.1	<0.005	430	<0.1	0.19
MW #27	8/15/2006	<0.02	0.038	<0.002	360	<0.006	<0.006	7.4	<0.005	52	8	3.7	<0.05	<0.005	440	<0.1	0.005
	8/5/2005	<0.02	0.063	<0.002	290	<0.006	<0.006	3.4	<0.005	45	2.7	3.4	<0.05	<0.005	430	<0.1	0.0066
	8/23/2004	<0.02	0.083	<0.002	170	<0.006	<0.006	0.15	<0.005	26	0.94	206	<0.05	<0.005	390	<0.1	0.011
	8/21/2003	<0.02	0.52	<0.002	210	<0.006	<0.006	0.44	<0.005	34	1.4	4	0.13	<0.005	420	<0.1	0.037
MW #29	8/23/2004	<0.02	0.025	<0.002	55	<0.006	<0.006	<0.005	<0.005	15	0.82	2.7	<0.05	<0.005	100	<0.1	0.017
MW #30	8/23/2004	<0.02	0.13	<0.002	350	<0.006	0.0061	4.7	0.0051	88	2.1	<10.0	<0.05	<0.005	750	<0.1	0.046
MW #31	8/23/2004	<0.02	0.35	<0.002	220	<0.006	<0.006	0.46	<0.005	67	0.58	4.8	<0.05	<0.005	640	<0.1	0.019
	8/15/2006	<0.02	0.032	<0.002	260	<0.006	<0.006	<0.02	<0.005	38	<0.002	3.1	<0.05	<0.005	700	<0.1	0.046
	8/5/2005	<0.02	0.026	<0.002	200	<0.006	<0.006	<0.02	<0.005	32	<0.002	3	<0.05	<0.005	580	<0.1	0.011
	8/23/2004	<0.02	0.022	<0.002	170	<0.006	<0.006	0.056	<0.005	26	<0.002	2.7	<0.05	<0.005	550	<0.1	0.019
MW #33	8/21/2003	<0.02	0.35	<0.002	370	<0.006	<0.006	0.031	<0.005	56	0.0037	5	0.05	<0.005	800	<0.1	0.095
	8/15/2006	<0.02	0.017	<0.002	320	<0.006	<0.006	<0.020	<0.005	47	0.0077	4.6	<0.05	<0.005	660	<0.1	0.12
	8/5/2005	<0.02	0.019	<0.002	340	<0.006	<0.006	<0.02	<0.005	48	0.0065	4.9	<0.05	<0.005	640	<0.1	0.012
	8/23/2004	<0.02	0.02	<0.002	350	<0.006	0.0062	0.11	<0.005	54	0.013	5.3	<0.05	<0.005	670	<0.1	0.031
MW #34	8/21/2003	<0.02	0.02	<0.002	330	<0.006	<0.006	<0.005	<0.005	51	0.01	6.2	0.023	<0.005	660	<0.1	0.0072
	8/15/2006	<0.02	0.44	<0.002	61	<0.006	0.0065	3	<0.005	12	2.4	<1.0	<0.05	<0.005	310	<0.1	0.11
	8/5/2005	<0.02	0.77	<0.002	110	<0.006	<0.006	4.9	<0.005	20	4.2	1.2	<0.05	<0.005	390	<0.1	0.1
	8/23/2004	<0.02	0.78	<0.002	110	<0.006	0.015	5.6	<0.005	20	4.3	1.3	<0.05	<0.005	400	<0.1	0.02
MW #35	8/21/2003	<0.02	1.5	<0.002	110	<0.006	<0.006	5.5	<0.005	21	4.6	2.1	0.15	<0.005	470	<0.1	0.15
	8/15/2006	0.027	0.71	<0.002	110	<0.006	<0.006	2.8	<0.005	26	2.9	2.1	<0.05	<0.005	410	<0.1	0.061
	8/5/2005	<0.02	0.54	<0.002	120	<0.006	<0.006	5.9	<0.005	22	3	2.9	<0.05	<0.005	310	<0.1	0.095
	8/23/2004	<0.02	0.71	<0.002	130	<0.006	0.0065	7.2	0.0063	23	3.1	3	<0.05	<0.005	300	<0.1	0.022
	8/21/2003	<0.02	1.00	<0.002	130	<0.006	<0.006	6.3	<0.005	22	3.3	3.7	0.15	<0.005	330	<0.1	0.078

Appendix A
Dissolved Metals Analytical Result Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery- Bloomfield, New Mexico

		Parameters																
		Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Calcium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Selenium (mg/L)	Silver (mg/L)	Sodium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	
WQCC 20NMAC 6.2.3103 (mg/L):		0.10	1.0	0.01	NE	0.05	1.0	1.0	0.05	NE	0.20	NE	0.05	0.05	NE	0.03 (1)	10.0	
Well ID:	Date Sampled:																	
MW #36	8/15/2006	<0.02	0.16	<0.002	110	<0.006	<0.006	0.75	0.0053	25	3.6	2.7	<0.05	<0.005	190	<0.1	0.04	
	8/5/2005	<0.02	0.26	<0.002	110	<0.006	<0.006	0.78	<0.005	23	1.7	4.8	<0.05	<0.005	210	<0.1	0.0051	
	8/23/2004	<0.02	0.59	<0.002	150	<0.006	<0.006	3.1	<0.005	30	4.1	7.2	<0.05	<0.005	180	<0.1	0.018	
MW #37	8/15/2006	<0.02	0.3	<0.002	180	<0.006	<0.006	1.3	<0.005	44	2.9	3.5	<0.05	<0.005	550	<0.1	0.032	
	8/5/2005	<0.02	0.38	<0.002	120	<0.006	<0.006	2.5	<0.005	20	1.4	4.2	<0.05	<0.005	370	<0.1	0.13	
	8/23/2004	<0.02	0.28	<0.002	100	<0.006	<0.006	1.5	<0.005	19	1.3	5	<0.05	<0.005	350	<0.1	0.028	
MW #38	8/21/2003	<0.02	1.5	<0.002	100	<0.006	<0.006	0.6	<0.005	20	1.4	6.6	0.13	<0.005	370	<0.1	0.29	
	8/15/2006	<0.02	0.093	<0.002	210	<0.006	<0.006	3.1	<0.005	36	3.5	4.3	<0.05	<0.005	290	<0.1	0.059	
	8/5/2005	<0.02	0.18	<0.002	200	<0.006	<0.006	7.1	<0.005	32	3.7	4.4	<0.05	<0.005	270	<0.1	0.016	
MW #39	8/23/2004	<0.02	0.19	<0.002	180	<0.006	<0.006	8	<0.005	32	3.6	4.7	<0.05	<0.005	250	<0.1	0.035	
	8/21/2003	<0.02	0.37	<0.002	170	<0.006	<0.006	7.5	<0.005	28	3	6.6	0.11	<0.005	240	<0.1	0.31	
	8/23/2004	<0.02	0.15	<0.002	290	<0.006	<0.006	0.18	<0.005	28	0.3	8.7	<0.05	<0.005	750	<0.10	<0.005	
MW #44	8/23/2004	<0.02	0.046	<0.002	520	0.034	0.027	76	0.015	87	1.7	44	<0.05	<0.005	970	<0.10	0.084	
MW #48	8/5/2005	<0.02	0.23	<0.002	100	<0.006	<0.006	<0.02	0.012	20	0.01	4	0.077	<0.005	510	<0.1	0.012	
MW #49	8/5/2005	<0.02	0.24	<0.002	120	<0.006	<0.006	0.72	<0.005	29	1.9	4.7	<0.05	<0.005	360	<0.1	0.0055	
RW #3	8/23/2004	<0.02	0.12	<0.002	85	<0.006	<0.006	0.48	<0.005	21	1.1	3.4	<0.05	<0.005	620	<0.10	0.036	
RW #14	8/23/2004	<0.02	1.7	<0.002	180	<0.006	<0.006	8.5	<0.005	87	3.6	<10.0	<0.05	<0.005	810	<0.10	0.044	
RW #15	8/15/2006	<0.02	1.3	<0.002	140	<0.006	<0.006	9.9	0.0094	43	3.2	3.2	<0.050	<0.005	560	<0.10	0.034	
RW #16	8/23/2004	<0.02	1.2	<0.002	160	<0.006	<0.006	6	<0.005	52	3.3	3.7	<0.05	<0.005	580	<0.10	0.043	
	8/23/2004	<0.02	0.35	<0.002	100	<0.006	<0.006	1.9	<0.005	56	1.7	3.3	<0.05	<0.005	560	<0.10	0.029	
RW #18	8/5/2005	<0.02	0.038	<0.002	220	<0.006	<0.006	5	<0.005	64	4.1	4.4	<0.05	<0.005	500	<0.1	0.021	

Notes:

mg/L = milligram per liter

MW = monitoring well

RW = recovery well

NE = not established

NA = Not Analyzed

WQCC 20NMAC 6.2.3103 = New Mexico Standard for Groundwater of 10,000 ug/L or less

(1) Standard effective as of June 1, 2007

Appendix A
General Chemistry Analytical Result Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters										
Well ID:	Date Sampled:	Fluoride (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Nitrite (mg/L)	Nitrogen (mg/L)	Phosphorus (mg/L)	Sulfate (mg/L)	TDS (mg/L)	E.C. (umhos/cm)	CO ₂ (mg/L)	Alk (mg/L)
WQCC 20NNMAC 6.2.3103 (mg/L):		1.6	250	NE	NE	10	NE	600	1000	NE	NE	NE
MW #1	8/15/2006	0.65	17	<0.50	1.2	NA	<0.50	190	640	940	240	270
	8/5/2005	0.68	31	<0.50	<0.10	2.1	<0.50	190	650	980	300	300
	8/23/2004	0.63	29	0.14	<0.10	1.9	<0.50	220	650	870	220	240
	8/15/2006	0.58	33	0.32	<0.10	1.6	<0.50	200	610	820	240	262
MW #3	8/5/2005	0.33	1200	4.5	<0.50	42	<0.50	2300	6200	8300	680	680
	8/21/2003	0.17	1400	22	NA	41	<0.50	1900	5700	8500	NA	NA
MW #7	8/23/2004	0.75	25	0.14	<0.10	<0.10	<0.50	5100	7400	7800	98	110
MW #8	8/15/2006	0.67	300	1.5	26	NA	<0.50	980	2200	3200	200	210
	8/5/2005	0.79	260	<2.5	<0.50	27	<0.50	740	2000	2900	260	260
	8/23/2004	0.64	250	1.2	NA	NA	<0.50	920	2100	2600	210	230
	8/21/2003	0.66	260	5	<0.10	14	<0.50	950	2100	2900	220	208
MW #11	8/15/2006	0.1	82	1	<0.10	<0.10	<0.50	19	1400	2200	1100	1100
	8/5/2005	0.56	85	1.4	<0.10	<0.10	<0.50	20	1500	2200	1100	1100
	8/23/2004	0.41	97	0.97	NA	NA	<0.50	13	1500	2100	330	390
	8/21/2003	0.44	150	5.3	<0.10	<0.10	<0.50	4.2	1100	2500	1300	1120
MW #12	8/15/2006	0.36	19	<0.50	<0.10	<0.10	<0.50	140	560	890	260	290
	8/5/2005	0.43	100	0.75	<0.10	<0.10	<0.50	2400	4000	4600	310	310
	8/23/2004	0.52	130	0.78	NA	NA	NA	680	1600	1900	970	1100
	8/21/2003	0.32	130	3.7	<0.10	<0.10	<0.50	3100	5500	6600	310	319
MW #13	8/15/2006	0.12	310	3.7	8.3	NA	<0.50	1100	3000	4300	910	960
	8/5/2005	0.15	320	4.6	0.23	6.1	<0.50	1000	3000	4600	1000	1000
	8/23/2004	0.2	330	4.3	1.6	6.6	<0.50	950	2800	3400	860	950
	8/21/2003	0.19	510	13	<0.10	12	<0.50	840	3100	5000	1000	917
MW #21	8/23/2004	0.18	420	3.4	<0.10	<0.10	<0.50	1400	3400	4000	600	670
MW #26	8/15/2006	0.36	410	5.2	<0.50	NA	<0.50	0.68	1700	2900	990	960
	8/5/2005	0.42	290	4.5	<0.50	<0.10	<0.50	<0.50	1600	2700	1000	1000
	8/23/2004	0.29	230	4.2	<0.10	<0.10	<0.50	<0.50	1600	2200	910	1000
	8/21/2003	0.39	160	2.9	<0.10	<0.10	<0.50	1.00	1400	1900	1300	1090

Appendix A
General Chemistry Analytical Result Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Parameters												
Fluoride (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Nitrite (mg/L)	Nitrogen (mg/L)	Phosphorus (mg/L)	Sulfate (mg/L)	TDS (mg/L)	E.C. (umhos/cm)	CO ₂ (mg/L)	Alk (mg/L)		
1.6	250	NE	NE	10	NE	600	1000	NE	NE	NE		
WQCC 20NMAC 6.2.3103 (mg/L):												
Well ID:	Date Sampled:											
MW #27	8/15/2006	0.38	150	1.1	<0.50	NA	<0.5	1700	3000	3700	380	370
	8/5/2005	0.24	260	2.1	<1.0	<0.1	<0.5	1000	2600	3500	600	600
	8/23/2004	0.2	290	3.1	<0.10	<0.1	<0.5	120	1700	2400	890	970
	8/21/2003	0.22	360	4.7	<0.10	<0.1	<0.5	6.8	1700	3100	1200	1040
MW #29	8/23/2004	0.31	35	<0.10	<0.10	0.6	<0.50	150	550	760	210	240
MW #30	8/23/2004	0.18	360	5.6	<0.10	<0.10	<0.10	720	3100	3900	1200	1400
MW #31	8/23/2004	0.19	370	7.2	<0.10	0.14	<0.50	750	2800	3700	980	1100
MW #32	8/15/2006	0.19	940	3.4	5.6	NA	<0.50	940	3100	4900	180	200
	8/5/2005	0.27	710	2.9	<2.0	8.7	<0.50	780	2600	4100	250	250
	8/23/2004	0.24	650	2.9	<0.10	5	<0.50	580	2400	3300	280	310
	8/21/2003	0.18	940	13	<1.0	22	<0.50	1200	3800	5800	250	242
MW #33	8/15/2006	0.23	560	3	33	NA	<0.50	1600	3400	4800	130	140
	8/5/2005	0.3	560	3.2	<0.5	26	<0.50	1500	3500	4700	160	160
	8/23/2004	0.21	550	3.2	NA	NA	<0.50	1600	3700	4400	140	150
	8/21/2003	0.24	750	19	<1.0	26	<0.50	1200	3400	5000	190	198
MW #34	8/15/2006	0.95	60	0.8	<1.0	<0.10	<0.50	27	1100	1600	730	760
	8/5/2005	0.81	100	1.2	<0.10	0.1	<0.50	9	1500	2200	1100	1200
	8/23/2004	0.62	100	1.2	<0.10	<0.10	<0.50	29	1500	2100	990	1100
	8/21/2003	0.57	120	5.1	<0.10	<0.10	<0.50	150	1700	2800	1300	1130
MW #35	8/15/2006	0.48	180	2.3	<1.0	<0.10	<0.50	3.2	1500	2400	980	1000
	8/5/2005	0.45	100	1.2	<0.10	0.1	<0.50	3.2	1400	2100	1100	1100
	8/23/2004	0.36	110	1.2	<0.10	<0.10	<0.50	1.7	1400	2000	910	1000
	8/21/2003	0.39	120	2.1	<0.10	<0.10	<0.50	6.6	1300	1900	1100	984
MW #36	8/15/2006	0.69	65	0.76	<1.0	<0.10	<0.50	71	910	1400	540	600
	8/5/2005	0.52	60	0.54	<0.10	<0.10	<0.50	66	920	1600	740	740
	8/23/2004	0.4	100	1	<0.10	<0.10	<0.50	16	1200	1700	880	970
MW #37	8/15/2006	0.45	390	4.2	<1.0	<0.10	<0.50	290	1900	3100	720	780
	8/5/2005	0.48	150	2.1	<0.10	<0.10	<0.50	52	1400	2200	960	960
	8/23/2004	0.46	98	1	<0.10	<0.10	<0.50	15	1300	1800	940	1000
	8/21/2003	0.49	110	1.3	<0.10	<0.10	<0.50	19	1400	1800	960	1010

Appendix A
General Chemistry Analytical Result Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters										
		Fluoride (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Nitrite (mg/L)	Nitrogen (mg/L)	Phosphorus (mg/L)	Sulfate (mg/L)	TDS (mg/L)	E.C. (umhos/cm)	CO ₂ (mg/L)	Alk (mg/L)
WQCC 20NNMAC 6.2.3103 (mg/L):		1.6	250	NE	NE	10	NE	600	1000	NE	NE	NE
Well ID:	Date Sampled:											
MW #38	8/15/2006	0.67	96	1.1	<0.10	<0.10	<0.50	490	1600	2300	600	640
	8/5/2005	0.62	100	1.1	<0.10	<0.10	<0.5	310	1500	2100	720	720
	8/23/2004	0.53	140	1.3	<0.10	<0.10	<0.5	330	1500	1800	590	660
	8/21/2003	0.67	120	1.3	<0.10	<0.10	<0.5	310	1600	1900	670	600
MW #39	8/23/2004	0.65	140	1.7	<0.10	<0.10	<0.50	3100	4900	5200	35	38
MW #44	8/23/2004	0.3	210	0.79	<0.10	<0.10	<0.50	2800	4800	5200	400	450
MW #48	8/5/2005	0.54	120	<0.5	<0.1	<0.10	0.53	140	1800	2703	110	1300
MW #49	8/5/2005	0.37	140	<2.5	<0.5	<0.10	<0.5	280	1600	2393	<2.0	960
RW #3	8/23/2004	<0.50	170	2	NA	NA	<0.50	340	200	2800	1100	1200
RW #14	8/23/2004	0.18	840	5.7	<0.10	<0.10	<0.50	2	2700	4000	1100	1200
RW #15	8/15/2006	<0.50	370	<0.50	7.6	NA	<2.5	<2.5	2000	3300	1200	1200
	8/23/2004	0.3	460	<0.10	6.7	<0.10	<0.50	3.4	2100	3100	1100	1300
RW #16	8/23/2004	0.3	460	<0.10	5.8	<0.10	<0.50	77	1900	2800	900	1000
RW #18	8/5/2005	<1.0	110	<1.0	<5.0	<1.0	<5.0	940	3900	3400	650	650

Notes:

Alk = alkalinity, total
CO₂ = Carbon Dioxide
E.C. = electrical conductivity
TDS = total dissolved solids
umhos/cm = micro-mhos per centimeter
mg/L = milligram per liter
NE = not established
NA = not analyzed
MW = monitoring well
RW = recovery well
WQCC 20NNMAC 6.2.3103 = New Mexico Standard for Groundwater of 10,000 ug/L or less

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APPENDIX



Appendix B
Volatile Organic Analytical Result Summary - North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters					
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)	DRO (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.01	0.75	0.75	0.62	NE	NE
Well ID:	Date Sampled:						
CW 0+60	4/6/2006	0.360	0.015	0.480	0.160	<0.025	NA
	8/5/2005	0.400	<0.005	0.800	0.350	NA	NA
	5/5/2005	0.200	0.032	0.180	1.000	NA	NA
CW 1+50	4/6/2006	0.130	0.024	0.120	1.700	<0.050	NA
	8/5/2005	1.000	<0.02	0.200	1.800	NA	NA
	5/5/2005	1.200	0.041	0.240	2.300	NA	NA
CW 3+85	4/6/2006	0.0120	0.0120	0.0200	0.2200	<0.012	NA
	8/5/2005	0.0045	<0.002	0.0075	0.036	NA	NA
	5/5/2005	0.035	0.022	0.020	0.250	NA	NA
CW 5+50	4/6/2006	0.044	<0.010	0.012	0.15	0.087	NA
	5/5/2005	0.2	0.011	0.064	0.24	NA	NA
CW 6+70	4/6/2006	0.019	<0.002	<0.002	<0.006	0.11	NA
	5/5/2005	0.0027	<0.005	<0.005	0.0013	NA	NA
CW 8+10	4/6/2006	0.17	<0.005	0.01	0.11	0.09	NA
	8/5/2005	0.18	<0.005	0.01	0.21	NA	NA
	5/5/2005	0.43	<0.025	0.05	0.66	NA	NA
CW 11+15	4/6/2006	1.70	<0.020	0.024	0.380	1.200	NA
CW 14+10	4/6/2006	8.80	<0.100	1.10	<0.300	1.20	NA
	8/5/2005	6.00	<0.100	1.20	0.24	NA	NA
	5/5/2005	9.80	<0.025	2.10	1.30	NA	NA
CW 16+60	4/6/2006	6.30	<0.100	3.10	6.30	7.60	NA
	8/5/2005	6.80	0.065	3.10	7.10	NA	NA
	5/5/2005	5.30	0.075	3.80	7.30	NA	NA
CW 19+50	4/6/2006	4.90	<0.001	1.30	2.60	80.00	NA
	8/5/2005	6.60	<0.05	2.80	4.30	NA	NA
	5/5/2005	4.80	0.021	1.70	5.10	NA	NA
CW 22+00	4/6/2006	7.20	<0.001	<0.001	<0.003	6.70	NA
	8/5/2005	6.50	<0.10	<0.10	0.15	NA	NA
	5/5/2005	7.00	0.090	0.10	0.20	NA	NA
CW 23+10	4/6/2006	4.20	<0.010	<0.010	1.1	2.9	NA
	8/5/2005	9.40	0.015	0.42	0.36	NA	NA
	5/5/2005	6.30	0.076	0.19	0.35	NA	NA
CW 23+90	4/6/2006	2.90	<0.100	0.11	<0.300	0.94	NA
	8/5/2005	3.30	<0.05	0.17	0.33	NA	NA
	5/5/2005	3.40	0.035	0.17	0.40	NA	NA
CW 25+95	4/6/2006	<0.001	<0.001	<0.001	<0.003	0.0054	NA
	8/5/2005	0.00059	<0.0005	<0.0005	<0.0005	NA	NA
	5/5/2005	0.001	<0.0005	<0.0005	<0.0005	NA	NA

Appendix B
Volatile Organic Analytical Result Summary - North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters					
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)	DRO (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.01	0.75	0.75	0.62	NE	NE
Well ID:	Date Sampled:						
OW 0+60	4/7/2007	<.01	0.058	0.097	0.15	<.025	NA
	8/21/2006	0.057	0.12	0.31	1.2	<0.025	34
	4/6/2006	0.065	0.033	0.34	1.6	<0.025	110
OW 5+50	4/6/2006	0.015	0.014	0.089	9.7	<0.0025	130
OW 11+15	4/7/2007	0.84	<.02	<.02	<.04	2	NA
	8/21/2006	0.86	<0.020	0.026	0.096	1.8	16
	4/6/2006	0.23	<0.020	<0.020	<0.060	1.6	15
	8/5/2005	0.75	<0.01	0.12	0.27	NA	NA
	5/5/2005	0.42	<0.025	0.14	0.52	NA	NA
OW 14+10	5/5/2005	10.00	<0.0005	3.90	3.20	NA	NA
OW 16+60	4/7/2007	3.1	<.05	2.0	7.2	9.0	NA
OW 19+50	4/7/2007	0.0019	<.001	<.001	<.002	0.27	NA
	4/6/2006	0.035	<0.001	0.012	0.077	0.18	3.4
	8/5/2005	0.0057	<0.0005	0.0011	0.0019	NA	NA
	5/5/2005	1.90	0.013	0.86	3.20	NA	NA
OW 22+00	4/7/2007	<0.005	<0.005	<0.005	<0.01	2.4	NA
	8/21/2006	<0.010	0.012	<0.010	<0.030	3.6	87
	4/6/2006	<0.001	<0.001	<0.001	<0.003	3.9	13
	5/5/2005	3.10	0.045	0.15	0.34	NA	NA
OW 23+10	4/7/2007	<0.001	0.0071	0.0032	0.0093	0.0400	NA
	8/21/2006	0.015	0.012	0.013	0.27	0.17	290
	4/6/2006	0.026	0.012	0.018	0.18	0.31	20
	8/5/2005	0.53	<0.01	<0.01	0.047	NA	NA
	5/5/2005	0.34	0.0092	0.011	0.08	NA	NA
OW 23+90	4/7/2007	<0.001	<0.001	<0.001	<0.002	<0.0025	NA
	8/21/2006	0.0017	0.0024	0.0039	<0.030	0.0034	4.5
	4/6/2006	0.012	0.0032	0.014	0.029	0.034	24
	8/5/2005	0.39	<0.02	0.03	0.072	NA	NA
	5/5/2005	0.98	0.016	0.031	0.13	NA	NA
OW 25+70	4/7/2007	<0.001	<0.001	<0.001	<0.002	<0.0025	NA
	8/21/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0
	4/6/2006	<0.0025	<0.001	<0.001	<0.003	<0.0025	<1.0
	8/5/2005	<0.0005	<0.0005	<0.0005	<0.0005	NA	NA
	5/5/2005	0.00079	<0.0005	<0.0005	<0.0005	NA	NA

Notes:

mg/L = milligrams per liter

CW = collection well

OW = observation well

NA = not analyzed

NE = not established

MTBE = methyl tertiary butyl ether

DRO = diesel range organics

WQCC 20NMAC 6.2.33103 = New Mexico Standard for Groundwater of 10,000 ug/L or less

Appendix B
Total Metals Analytical Result Summary - North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters							
		Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Selenium (mg/L)	Silver (mg/L)	Mercury (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.10	1.0	0.01	0.05	0.05	0.05	0.05	0.002
Well ID:	Date Sampled:								
CW 0+60	08/16/05	<0.02	0.55	<0.002	<0.006	0.011	<0.05	<0.005	0.4
	5/10/05	<0.02	0.33	<0.002	<0.006	0.012	<0.05	<0.005	<0.0002
CW 1+50	08/16/05	<0.02	0.33	<0.002	<0.006	0.012	<0.05	<0.005	<0.0002
	5/10/05	<0.02	0.59	<0.002	<0.006	0.007	<0.05	<0.005	<0.0002
CW 3+85	8/17/05	<0.02	0.61	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	5/10/05	<0.02	0.68	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
CW 5+50	5/10/05	<0.02	0.83	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
CW 6+70	5/11/05	<0.02	0.34	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
CW 8+10	8/22/05	<0.02	0.64	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	5/11/05	<0.02	0.49	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
CW 14+10	8/17/05	<0.02	0.12	<0.002	<0.006	0.0055	<0.05	<0.005	<0.0002
	5/11/05	<0.1	0.33	<0.01	<0.03	<0.025	<0.25	<0.025	<0.0002
CW 16+60	8/22/05	<0.02	1.1	<0.002	<0.006	0.008	<0.5	<0.005	<0.0002
	5/11/05	<0.02	0.6	<0.002	<0.006	0.01	<0.05	<0.005	<0.0002
CW 19+50	08/17/05	<0.02	0.68	<0.002	<0.006	<0.0005	<0.05	<0.005	<0.0002
	5/10/05	<0.02	0.2	<0.002	<0.006	0.0061	<0.05	<0.005	<0.0002
CW 22+00	8/17/05	<0.02	0.71	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	5/10/05	<0.02	0.61	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
CW 23+10	8/17/05	<0.02	1.1	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	5/12/05	<0.02	0.73	<0.002	<0.006	<0.005	<0.05	<0.005	0.00038
CW 23+90	8/17/05	<0.02	0.45	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	5/12/05	<0.02	0.4	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
CW 25+95	8/22/05	<0.02	0.057	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	5/12/05	<0.02	0.085	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
OW 11+15	8/17/05	0.038	0.82	<0.002	<0.006	0.0056	<0.05	<0.005	<0.0002
	5/11/05	0.037	1.9	<0.002	0.02	0.028	<0.05	<0.005	<0.0002
OW 14+10	5/11/05	0.11	11	<0.002	0.09	0.73	<0.05	<0.005	<0.0002
OW 19+50	5/10/05	<0.02	0.23	<0.002	<0.006	0.024	<0.05	<0.005	<0.0002
OW 22+00	5/10/05	<0.02	0.16	<0.002	<0.006	0.012	<0.05	<0.005	<0.0002
OW 23+10	8/17/05	<0.02	2.3	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	5/10/05	<0.02	0.75	<0.002	0.02	0.0091	<0.05	<0.005	0.00096
OW 23+90	8/17/05	<0.02	2.4	<0.002	0.0075	<0.005	<0.05	<0.005	<0.0002
OW 25+70	8/22/05	<0.02	0.6	<0.002	0.013	0.0065	<0.05	<0.005	<0.0002
	5/12/05	0.14	25	<0.01	0.44	0.13	<0.25	<0.025	<0.0002

Notes:

mg/L = milligram per liter

CW = collection well

OW = observation well

WQCC 20NMAC 6.2.33103 = New Mexico Standard for Groundwater of 10,000 ug/L or less

Appendix B
General Chemistry Analytical Result Summary -North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters				
		Fluoride (mg/L)	Chloride (mg/L)	Phosphorus (mg/L)	Sulfate (mg/L)	Nitrate (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		1.6	250	NE	600	10
Well ID:	Date Sampled:					
CW 0+60	8/16/05	0.53	37	<0.5	0.77	<0.1
	5/10/05	0.51	39	<0.5	75	<0.5
CW 1+50	8/16/05	0.59	45	<0.5	1.2	<0.1
	5/10/05	0.59	43	<0.5	5.8	<0.5
CW 3+85	8/17/05	0.25	170	<0.5	1.1	<0.1
	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	<0.5	2400	<0.5	170	<0.5
CW 8+10	8/22/05	0.37	1700	<0.5	210	<0.1
	5/11/05	0.29	1100	<0.5	720	<0.5
CW 14+10	8/17/05	1.6	55	<0.5	1400	<0.1
	5/11/05	2.1	78	<0.5	2300	<0.5
CW 16+60	8/22/05	0.55	150	<0.5	2.2	<0.1
	5/11/05	0.42	150	<0.5	150	<0.5
CW 19+50	8/17/05	0.41	270	<0.5	140	<0.5
	5/10/05	0.35	230	<0.5	260	<0.5
CW 22+00	8/17/05	0.64	560	<0.5	9	<0.1
	5/12/05	0.74	510	<0.5	38	<0.5
CW 23+10	8/17/05	0.6	500	<0.5	4.4	<0.1
	5/10/02	0.59	450	<0.5	9.7	<0.5
CW 23+90	8/17/05	0.51	480	<0.5	1.8	<0.1
	5/12/05	0.39	350	<0.5	4.9	<0.1
CW 25+95	8/22/05	0.38	80	<0.5	230	<0.1
	5/12/05	0.43	85	<0.5	270	<0.1
OW 11+15	8/17/05	0.42	340	<0.5	25	<0.1
	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 19+50	8/22/05	0.29	290	<0.5	660	<0.1
	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	8/17/05	0.49	260	<0.5	5.6	2.7
OW 23+90	8/17/05	0.63	230	<0.5	13	<0.1
	5/12/05	0.72	320	<0.5	77	<0.1
OW 25+70	8/22/05	0.53	50	<0.5	350	<0.1
	5/12/05	0.53	50	<0.5	350	<0.1

Notes:

CW = collection well

mg/L = milligram per liter

NE = not established

OW = observation well

NA = not analyzed

WQCC 20NMAC 6.2.33103 = New Mexico Standard for Groundwater of 10,000 ug/L TDS or less.

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APPENDIX



Appendix C
Volatile Organic Analytical Result Summary - Bluff Outfalls and Seeps
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters						
Well ID:	Date Sampled:	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)	Naphthalene (mg/L)	DRO (mg/L)
WQCC 20NMAC 6.2.3103(mg/L):		0.01	0.75	0.75	0.62	NE	NE	NE
SW3-0206	3/27/2006	<0.001	<0.001	<0.001	0.004	0.150	<0.0025	ND
SW4-0206	3/27/2006	<0.001	<0.001	<0.001	0.005	<0.003	NA	ND
SW5-0206	3/8/2006	<0.001	<0.001	0.002	0.011	8.300	<0.0025	ND
SW7-0206	3/13/2006	5	<0.1	6.80	11	0.24	0.12	ND
O/F #2	4/1/2007	<0.001	<0.001	<0.001	<0.002	<0.0025	NA	NA
	4/5/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	NA	NA
	8/5/2005	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA
	4/11/2005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	NA	NA
	8/23/2004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	NA	NA
	3/3/2004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	NA	NA
	3/3/2003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	NA	NA
O/F #3	4/1/2007	<0.001	<0.001	<0.001	<0.002	<0.0025	NA	NA
	8/15/2006	<0.001	<0.001	<0.001	<0.003	<0.0015	NA	NA
	4/5/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	NA	NA
	8/5/2005	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA
	4/11/2005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	NA	NA
	8/23/2004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	NA	NA
	3/3/2004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	NA	NA
	8/21/2003	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA
	3/3/2003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	NA	NA

Notes:

mg/L = milligram per liter

O/F = Outfall

SW = Sump Well

NA = not analyzed

ND = not-detect

NE = not established

MTBE = methyl tertiary butyl ether

DRO = diesel range organics

WQCC 20NMAC 6.2.3103 = New Mexico Standard for Groundwater of 10,000 ug/L or less

Appendix C
Total Metals Analytical Result Summary - Bluff Outfalls and Seeps
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters												
		Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Manganese (mg/L)	Selenium (mg/L)	Silver (mg/L)	Uranium (mg/L)	Zinc (mg/L)	Mercury (mg/L)
40 CFR 141.62 MCL		0.01 (1)	2.0	0.005	0.10	NE	0.3 (2)	0.015	NE	0.1	0.1 (2)	0.03 (3)	5 (2)	0.002
Well ID:	Date Sampled:													
SW3-0206	3/27/2006	<0.02	0.064	<0.002	<0.006	0.015	2.1	<0.005	0.68	<0.05	<0.005	<0.1	<0.05	0.0036
SW4-0206	3/27/2006	0.073	0.22	<0.002	0.0096	0.15	8.5	0.015	3.2	<0.25	<0.005	0.11	0.36	0.02
SW5-0206	3/8/2006	<0.02	0.024	<0.002	<0.006	<0.006	0.95	<0.005	2.3	<0.05	<0.005	<0.10	<0.05	<0.0002
SW7-0206	3/13/2006	<0.02	0.056	<0.002	<0.006	0.018	1.3	0.033	2.5	<0.05	<0.005	<0.10	<0.05	<0.0002
O/F #2	8/23/2004	<0.02	0.055	<0.002	0.0069	NA	NA	<0.005	NA	<0.05	<0.005	NA	NA	<0.0002
O/F #3	8/15/2006	<0.02	0.063	<0.002	<0.006	NA	NA	<0.005	NA	<0.05	<0.005	NA	NA	<0.0002
	8/23/2004	<0.02	0.032	<0.002	<0.006	NA	NA	<0.005	NA	<0.05	<0.005	NA	NA	<0.0002
	8/21/2003	NA	NA	NA	<0.006	NA	NA	<0.005	NA	NA	NA	NA	NA	<0.0002

Notes:

SW = Sump Well

O/F = Outfall

mg/L = milligram per liter

NA = not analyzed

NE = not established

40 CFR 141.62 MCL = National Primary Drinking Water Regulations: Maximum Contaminant Levels and Maximum Residual Disinfectant Levels

(1) MCL as of 1/23/2006

(2) National secondary drinking water regulation

(3) MCL as of 12/08/2003

Appendix C
General Chemistry Analytical Result Summary - Bluff Outfalls and Seeps
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters									
Well ID:	Date Sampled:	Fluoride (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Nitrogen (mg/L)	Phosphorus (mg/L)	Sulfate (mg/L)	TDS (mg/L)	E.C. (umhos/cm)	CO ₂ (mg/L)	Alk (mg/L)
WQCC 20NMAC 6.2.33103 (mg/L):		1.6	250	NE	10	NE	600	1000	NE	NE	NE
SW3-0206	3/27/2006	1.8	1100	0.82	<0.50	<0.50	3200	6900	8500	<2.0	100
SW4-0206	3/27/2006	0.44	230	0.98	<0.10	<0.50	4100	7400	8300	<2.0	680
SW5-0206	3/8/2006	0.28	340	<0.50	<0.10	<0.50	1400	3100	3800	<2.0	450
SW7-0206	3/13/2006	<0.50	500	9.1	<0.50	<2.5	2800	5600	6800	<2.0	420
O/F #2	8/5/2005	0.64	18	<0.10	2.2	<0.5	210	620	880	220	230
	8/23/2004	0.67	23	<0.10	2.5	<0.50	200	670	880	250	280
O/F #3	8/15/2006	0.25	5.5	<0.5	<0.5	<0.5	64	230	390	97	110
	8/5/2005	0.61	37	<0.1	5.2	<0.5	270	790	1100	270	270
	8/23/2004	0.46	28	NA	NA	<0.50	200	660	830	240	270
	8/21/2003	0.49	25	<0.10	3.9	<0.50	170	490	780	270	252

Notes:

Alk = alkalinity, total
CO₂ = Carbon Dioxide
E.C. = electrical conductivity
TDS = total dissolved solids
umhos/cm = micro-mhos per centimeter
mg/L = milligrams per liter
SW = Sump Well
O/F = Outfall
NA = not analyzed
NE = not established

WQCC 20NMAC 6.2.33103 = New Mexico Standard for Groundwater of 10,000 ug/L or less

Appendix C
Dissolved Metals Analytical Result Summary - Bluff Outfalls and Seeps
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters							
	Well ID:	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Calcium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):	Date Sampled:	0.10	1.00	0.01	NE	0.05	1.00	1.00	0.05
	SW3 - 0206	<0.02	0.039	<0.002	490	<0.006	<0.006	<0.02	<0.005
	SW4 - 0206	NA	NA	NA	470	NA	NA	NA	NA
	SW5 - 0206	<0.02	0.023	<0.002	500	<0.006	<0.006	<0.02	<0.005
	SW7 - 0206	<0.02	0.02	<0.002	550.0	<0.006	<0.006	0.069	0.032
	O/F #2	<0.002	0.054	<0.002	96	0.0076	<0.006	<0.02	<0.005
		<0.02	0.048	<0.002	95	0.0071	<0.006	<0.02	<0.005
	O/F #3	<0.02	0.063	<0.002	41	<0.006	<0.006	<0.02	<0.005
		<0.02	0.033	<0.002	110	<0.006	<0.006	<0.02	<0.005
		<0.02	0.03	<0.002	98	<0.006	<0.006	0.024	<0.005
	8/21/2003	<0.02	0.25	<0.002	79	<0.006	<0.006	<0.02	<0.005

Appendix C
Dissolved Metals Analytical Result Summary - Bluff Outfalls and Seeps
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters							
		Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Selenium (mg/L)	Silver (mg/L)	Sodium (mg/L)	Uranium (mg/L)	Zinc (mg/L)
WQCC 20NMAC 6.2.33103 (mg/L):		NE	0.20	NE	0.05	0.05	NE	0.03 (1)	10.00
Well ID:	Date Sampled:								
SW3-0206	3/27/2006	54	0.62	46	<0.05	<0.005	1500	<0.1	0.11
SW4-0206	3/27/2006	NA	3.1	17	NA	NA	1700	NA	NA
SW5-0206	3/8/2006	70	2.1	6.5	<0.05	<0.005	410	<0.1	0.082
SW7-0206	3/13/2006	48	2.2	11	<0.05	<0.005	1200	<0.1	0.074
O/F #2	8/5/2005	22	0.0033	2.2	<0.05	<0.005	85	<0.1	0.0066
	8/23/2004	23	0.0038	2.3	<0.05	<0.005	100	<0.1	0.034
O/F #3	8/15/2006	7.3	<0.002	1.8	<0.05	<0.005	23	<0.1	0.024
	8/5/2005	25	0.01	1.9	<0.05	<0.005	100	<0.1	0.0066
	8/23/2004	22	0.019	1.8	<0.05	<0.005	90	<0.1	0.014
	8/21/2003	18	0.017	2.1	0.032	<0.005	88	<0.1	0.04

Notes:

mg/L = milligram per liter

SW = sump well

O/F = outfall

NE = not established

NA = not analyzed

WQCC 20NMAC 6.2.33103 = New Mexico Standard for Groundwater of 10,000 ug/L or less

(1) Standard effective as of June 1, 2007

Appendix C
Volatile Organic Analytical Result Summary - Bluff Outfalls and Seeps
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters			
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.01	0.75	0.75	0.62
Well ID:	Date Sampled:				
Tank #33	10/17/2006	<0.001	<0.001	<0.001	<0.003
	9/13/2006	<0.001	<0.001	<0.001	<0.003
	6/15/2006	<0.001	<0.001	<0.001	<0.003
	1/30/2006	<0.001	<0.001	<0.001	<0.003
	12/5/2005	<0.0005	<0.0005	<0.0005	<0.0005
	11/9/2005	0.00061	<0.0005	<0.0005	<0.0005
	10/19/2005	0.00093	<0.0005	<0.0005	<0.0005
	9/21/2005	0.00084	<0.0005	<0.0005	<0.0005
	8/24/2005	<0.0005	<0.0005	<0.0005	<0.0005
	7/6/2005	<0.0005	<0.0005	<0.0005	<0.0005
	6/8/2005	0.0012	<0.0005	0.00063	0.0013
	5/4/2005	0.0018	<0.0005	0.0011	0.0014
	4/27/2005	0.0045	<0.0005	0.0024	0.0024
	3/7/2005	0.038	0.0043	0.0079	0.02
	2/23/2005	0.05	<0.005	0.02	0.022

Notes:

mg/L = milligram per liter

WQCC 20NMAC 6.2.33103 = New Mexico Standard for Groundwater of 10,000 ug/L or less

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ENGINEERS, SCIENTISTS
AND CONSULTANTS

D

APPENDIX



Appendix D
Volatile Organic Compounds Analytical Result Summary - River Samples
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters							
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)	DRO (mg/L)	MRO (mg/L)	GRO (mg/L)
WQCC 20NMAC 6.2.3103		0.01	0.75	0.75	0.62	NE	NE	NE	NE
Well ID:	Date Sampled:								
North of MW-46:	4/16/07	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	<5.0	<0.05
	2/8/07	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	<5.0	<0.05
	10/23/06	<0.001	<0.001	<0.001	<0.003	<0.0015	<1.0	<5.0	<0.050
	7/18/06	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<5.0	<0.050
	4/14/06	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<5.0	<0.050
	1/6/06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.050
	10/24/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	7/19/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	4/13/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	1/25/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	11/3/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	10/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	9/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
North of MW-45:	8/14/04	0.006	0.085	0.029	0.11	<0.0002	<0.1	<5.0	0.3
	4/16/07	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	<5.0	<0.05
	2/8/07	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	<5.0	<0.05
	10/23/06	<0.001	<0.001	<0.001	<0.003	<0.0015	<1.0	<5.0	<0.050
	7/18/06	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<5.0	<0.050
	4/14/06	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<5.0	<0.050
	1/6/06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.050
	10/24/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	7/19/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	4/13/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	1/25/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	11/3/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	10/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	9/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
Upstream of Refinery:	8/14/04	0.0097	0.061	0.022	0.081	<0.0002	<0.1	NA	0.2
	4/16/07	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	<5.0	<0.050
	2/8/07	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	<5.0	<0.05
	10/23/06	<0.001	<0.001	<0.001	<0.003	<0.0015	<1.0	<5.0	<0.050
	7/18/06	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<5.0	<0.050
	4/14/06	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<5.0	<0.050
	1/6/06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.050
	10/24/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	7/19/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	4/13/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	1/25/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	11/3/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	10/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	9/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	8/14/04	<0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.1	NA	<0.2

Appendix D
Volatile Organic Compounds Analytical Result Summary - River Samples
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters							
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)	DRO (mg/L)	MRO (mg/L)	GRO (mg/L)
WQCC 20NMAC 6.2.3103		0.01	0.75	0.75	0.62	NE	NE	NE	NE
Well ID:	Date Sampled:								
Downstream of Refinery:	4/16/07	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	<5.0	<0.050
	2/8/07	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	<5.0	<0.050
	10/23/06	<0.001	<0.001	<0.001	<0.003	<0.0015	<1.0	<5.0	<0.050
	7/18/06	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<5.0	<0.050
	4/14/06	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<5.0	<0.050
	1/6/06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.050
	10/24/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	7/19/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	4/13/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	1/25/05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	11/3/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	10/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
	9/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05

Notes:

mg/L = milligram per liter

MW = monitoring well

NA = not analyzed

NE = not established

MTBE = methyl tertiary butyl ether

MRO = motor oil range organics

DRO = diesel range organics

GRO = gasoline range organics

WQCC 20NMAC 6.2.33103 = New Mexico Standard for Groundwater of 10,000 ug/L or less

Appendix D
Volatile Organic Analytical Result Summary - River Terrace Area
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters						
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)	DRO (mg/L)	GRO (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.01	0.75	0.75	0.62	NE	NE	NE
Well ID:	Date Sampled:							
TP-1	2/26/2007	2	<0.1	6.3	32	<0.25	3	160
	12/4/2006	1.60	<0.100	3.20	20.00	<0.25	3.30	95.00
	9/11/2006	3.20	<0.100	3.80	20.00	<0.250	3.50	98.00
	6/17/2006	2.60	<0.250	3.30	18.00	<0.620	4.30	40.00
	3/6/2006	1.50	<0.050	4.10	30.00	<0.120	3.80	72.00
	8/5/2005	1.40	0.05	3.80	23.00	<0.050	1.90	66.00
TP-2	2/26/2007	4.3	<0.10	4.3	19	<0.25	2.1	94
	12/4/2006	1.70	<0.100	2.40	12.00	<0.250	1.50	41.00
	9/11/2006	3.30	0.27	2.80	15.00	<0.25	1.30	77.00
	6/17/2006	3.60	2.40	2.80	14.00	<0.120	4.90	42.00
	3/6/2006	6.20	1.70	0.51	5.00	<0.120	9.90	27.00
	8/5/2005	6.10	8.70	4.20	25.00	<0.05	1.10	84.00
TP-3	2/26/2007	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	85
	12/4/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.05
	9/11/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.05
	6/17/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.05
	3/6/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.05
	8/5/2005	<0.005	<0.005	<0.005	0.0012	<0.0025	<1.0	<0.05
TP-4	6/17/2006	<0.010	<0.001	<0.001	5.70	<0.025	1.1000	9.200
	8/5/2005	<0.01	<0.01	0.42	0.22	<0.05	1.1	8.2
TP-5	2/26/2007	<0.01	<0.01	1.3	18	<0.025	<1.0	85
	12/4/2006	0.069	<0.050	1.2	10	<0.120	<1.0	50
	9/11/2006	<0.01	<0.01	3.1	16	<0.025	<1.0	110
	6/17/2006	0.054	<0.001	1.6	16	<0.025	<3.0	34
	3/6/2006	0.2	<0.02	0.28	20	<0.05	<1.0	59
	8/5/2005	0.35	<0.005	3.5	21	<0.05	1.2	56
TP-6	2/26/2007	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	0.28
	12/4/2006	0.006	<0.001	<0.001	<0.003	<0.0025	<1.0	0.48
	9/11/2006	0.027	<0.01	0.41	0.045	<0.025	<1.0	5.3
	6/17/2006	<0.001	<0.001	4.4	0.35	<0.025	<1.0	1.9
	3/6/2006	<0.001	<0.001	0.18	0.75	<0.025	<1.0	2.7
	8/5/2005	0.28	<0.01	2.8	7.5	<0.05	1	26
TP-8	2/26/2007	<0.01	<0.01	1.3	13	<0.025	2.1	70
	12/4/2006	0.041	<0.010	1.30	12	<0.025	1.4	79
	9/11/2006	<0.01	<0.010	0.58	1.6	<0.025	5.6	57
	6/17/2006	0.26	<0.100	0.64	6.3	<0.025	6.8	19
	3/6/2006	0.35	<0.10	1.10	10	<0.025	18	37
	8/5/2005	1.1	<0.05	3.20	25	<0.25	7.8	84

Appendix D
Volatile Organic Analytical Result Summary - River Terrace Area
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters						
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)	DRO (mg/L)	GRO (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.01	0.75	0.75	0.62	NE	NE	NE
Well ID:	Date Sampled:							
TP-9	2/26/2007	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	<0.05
	12/4/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.05
	9/11/2006	<0.001	<0.001	0.001	<0.003	<0.0025	<1.0	0.72
	6/17/2006	<0.001	<0.001	0.001	<0.003	<0.0025	<1.0	<0.050
	3/6/2006	<0.001	<0.001	<0.003	<0.003	<0.0025	<1.0	0.094
	8/5/2005	<0.005	<0.001	<0.003	0.02	0.027	<1.0	1.1
TP-10	2/26/2007	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	<0.05
	12/4/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.05
	9/11/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.05
	6/17/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.05
	3/6/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.05
	8/5/2005	<0.0005	<0.0005	<0.0005	0.0025	<0.0025	<1.0	<0.05
TP-11	2/26/2007	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	<0.05
	12/4/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.050
	9/11/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.050
	6/17/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.050
	3/6/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.05
	8/5/2005	<0.0005	<0.0005	<0.0005	0.0028	<0.0025	<1.0	<0.05
TP-12	2/26/2007	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	<0.05
	12/4/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.050
	9/11/2006	<0.001	<0.001	<0.001	<0.003	0.0081	<1.0	<0.050
	6/17/2006	<0.001	<0.001	<0.001	<0.003	0.0049	<1.0	<0.050
	3/6/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.050
	8/5/2005	<0.0005	<0.0005	0.00055	0.0042	0.0028	1.00	<0.050
TP-13	2/26/2007	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	<0.05
	12/4/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.050
	9/11/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.050
	6/17/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.050
	3/6/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.050
	8/5/2005	<0.0005	<0.0005	<0.0005	0.0037	<0.0025	<1.0	<0.050
MW-49	2/26/2007	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	0.05
	12/4/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	0.081
	9/11/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	0.23
	6/17/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	<0.050
	3/6/2006	<0.001	<0.001	<0.001	0.0061	<0.0025	<1.0	0.074
	8/5/2005	0.093	<0.002	0.015	0.0041	<0.002	NR	NR

Appendix D
Volatile Organic Analytical Result Summary - River Terrace Area
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters						
		Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	MTBE (mg/L)	DRO (mg/L)	GRO (mg/L)
WQCC 20NMAC 6.2.3103 (mg/L):		0.01	0.75	0.75	0.62	NE	NE	NE
Well ID:	Date Sampled:							
DW-1	2/26/2007	<0.001	<0.001	<0.001	<0.002	<0.0025	<1.0	0.29
	12/4/2006	<0.001	<0.001	<0.001	<0.003	<0.0025	<1.0	0.09
	9/11/2006	<0.005	<0.005	<0.005	<0.015	<0.012	<1.0	1.2
	6/17/2006	<0.001	<0.001	0.016	0.12	<0.0025	1.6	0.9
	3/6/2006	<0.005	<0.005	0.041	0.23	<0.012	2.2	2.8
	8/5/2005	<0.001	<0.001	<0.001	0.0031	<0.001	NA	NA

Notes:

mg/L = milligrams per liter

DW = dewatering well

TP = temporary piezometer

MW = monitoring well

NA = not analyzed

NE = not established

MTBE = methyl tertiary butyl ether

DRO = diesel range organics

GRO = gasoline range organics

WQCC 20NMAC 6.2.33103 = New Mexico Standard for Groundwater of 10,000 ug/L TDS or less.

Appendix D
Total Metals Analytical Result Summary - River Samples
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters							
		Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Selenium (mg/L)	Silver (mg/L)	Mercury (mg/L)
40 CFR 141.62 MCL (mg/L):		0.01 ⁽¹⁾	2.0	0.005	0.10	0.015	0.05	0.1 ⁽²⁾	0.002
Well ID:	Date Sampled:								
North of MW-46:	4/16/07	<0.02	0.074	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	2/8/07	<0.020	0.082	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
	10/23/06	<0.020	0.062	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
	7/18/06	<0.020	0.078	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
	4/14/06	<0.020	0.069	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
	1/6/06	<0.0020	0.064	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
	10/24/05	<0.02	0.083	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	7/19/05	<0.02	0.07	<0.002	<0.006	<0.005	<0.05	<0.005	0.00031
	4/13/05	<0.02	0.083	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	1/25/05	<0.02	0.076	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
North of MW-45:	12/7/04	<0.02	0.087	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	11/3/04	<0.02	0.088	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	10/7/04	<0.02	0.074	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	9/7/04	<0.02	0.11	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	4/16/07	<0.020	0.073	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
	2/8/07	<0.020	0.079	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
	10/23/06	<0.020	0.061	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
	7/18/06	<0.020	0.081	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
	4/14/06	<0.020	0.068	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
	1/6/06	<0.0020	0.063	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
	10/24/05	<0.02	0.079	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	7/19/05	<0.02	0.069	<0.002	<0.006	<0.005	<0.05	<0.005	0.00031
	4/13/05	<0.02	0.084	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	1/25/05	<0.02	0.07	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	12/7/04	<0.02	0.08	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	11/3/04	<0.02	0.1	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	10/7/04	<0.02	0.072	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	9/7/04	<0.020	0.11	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020

Appendix D
Total Metals Analytical Result Summary - River Samples
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters								
	Well ID:	Date Sampled:	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Selenium (mg/L)	Silver (mg/L)	Mercury (mg/L)
40 CFR 141.62 MCL (mg/L):	Upstream of Refinery:	4/16/07	<0.020	0.068	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
		2/8/07	<0.020	0.075	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
		10/23/06	<0.020	0.056	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
		7/18/06	<0.020	0.076	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
		4/14/06	<0.020	0.070	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
		1/6/06	<0.020	0.063	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020
		10/24/05	<0.02	0.08	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
		7/19/05	<0.02	0.07	<0.002	<0.006	<0.005	<0.05	<0.005	0.00031
		4/13/05	<0.02	0.092	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
		1/25/05	<0.02	0.077	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
		12/7/04	<0.02	0.077	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
		11/3/04	<0.02	0.086	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002
	10/7/04	<0.02	0.083	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002	
	9/7/04	<0.020	0.1	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020	
Downstream of Refinery:	4/16/07	<0.020	0.085	<0.0020	<0.0060	0.01	<0.050	<0.0050	<0.00020	
	2/8/07	<0.020	0.088	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020	
	10/23/06	<0.020	0.062	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020	
	7/18/06	<0.020	0.076	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020	
	4/14/06	<0.020	0.068	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020	
	1/6/06	<0.020	0.063	<0.0020	<0.0060	<0.0050	<0.050	<0.0050	<0.00020	
	10/24/05	<0.02	0.089	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002	
	7/19/05	<0.02	0.07	<0.002	<0.006	<0.005	<0.05	<0.005	0.00031	
	4/13/05	<0.02	0.12	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002	
	1/25/05	<0.02	0.072	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002	
	12/7/04	<0.02	0.082	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002	
	11/3/04	<0.02	0.088	<0.002	<0.006	<0.005	<0.05	<0.005	<0.0002	

Notes:

mg/L = milligrams per liter

MW = monitoring well

NA = not analyzed

NE = not established

40 CFR 141.62 MCL = National Primary Drinking Water Regulations: Maximum Contaminant Levels and Maximum Residual Disinfectant Levels

(1) MCL as of 1/23/2006

(2) National secondary drinking water regulation

Appendix D
Dissolved Metals Analytical Result Summary - River Samples
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters																
		Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Calcium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Selenium (mg/L)	Silver (mg/L)	Sodium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	
WQCC 20NMAC 6.2.3103 (mg/L):		0.10	1.0	0.01	NE	0.05	1.0	0.05	NE	0.20	NE	0.05	NE	0.05	NE	0.03 (n)	10.0	
	Well ID:	Date Sampled:																
	North of MW#46:	4/16/07	<0.020	0.059	<0.002	30	<0.006	<0.006	<0.020	<0.005	5.5	0.007	1.5	<0.05	<0.005	18	<0.1	0.032
		2/8/07	<0.020	0.055	<0.002	31	<0.006	<0.006	<0.020	<0.005	5.4	0.011	1.6	<0.050	<0.005	19	<0.1	<0.053
		10/23/06	<0.020	0.062	<0.0020	33	<0.0060	<0.0060	0.075	<0.0050	5.3	0.013	1.6	<0.050	<0.0050	20	<0.10	<0.10
		7/18/06	<0.020	0.063	<0.0020	30	<0.0060	<0.0060	0.021	<0.0050	5.2	0.011	1.6	<0.050	<0.0050	15	<0.10	0.026
		4/14/06	<0.020	0.061	<0.0020	37	<0.0060	<0.0060	0.023	<0.0050	6.2	0.071	1.8	<0.050	<0.0050	28	<0.10	0.16
		1/6/06	<0.020	0.060	<0.0020	36	<0.0060	<0.0060	<0.020	<0.0050	6.2	0.021	<0.050	<0.050	<0.0050	20	<0.10	0.046
		10/24/05	<0.02	0.064	<0.002	38	<0.006	<0.006	<0.02	<0.005	6.5	0.014	1.9	<0.05	<0.005	<0.005	<0.1	0.067
		7/19/05	<0.02	0.07	<0.002	36	<0.006	<0.006	0.037	<0.005	6.7	0.021	2	<0.05	<0.005	<0.005	<0.1	0.027
4/13/05		<0.02	0.073	<0.002	38	<0.006	<0.006	0.041	<0.005	6.5	0.008	2.1	<0.05	<0.005	<0.005	<0.1	0.045	
1/25/05		<0.02	0.064	<0.002	48	<0.006	<0.006	0.022	<0.005	8.2	0.013	2.3	<0.05	<0.005	<0.005	<0.1	0.028	
North of MW#45:	12/7/04	<0.020	0.069	<0.0020	44	<0.0060	<0.0060	<0.02	<0.0050	7.7	0.01	2	<0.050	<0.0050	30	<0.10	0.012	
	11/3/04	<0.020	0.075	<0.0020	43	<0.0060	<0.0060	0.03	<0.0050	7.6	0.011	2	<0.050	<0.0050	30	<0.10	0.017	
	10/7/04	<0.020	0.063	<0.0020	46	<0.0060	NA	0.36	<0.0050	8.1	0.0084	2.2	<0.050	<0.0050	31	<0.10	NA	
	9/7/04	<0.020	0.082	<0.0020	39	<0.0060	<0.0060	0.036	<0.0050	7.5	0.004	2.1	<0.050	<0.0050	21	0.1	0.023	
	4/16/07	<0.020	0.056	<0.0020	31	<0.0060	0.006	<0.02	<0.005	5.7	0.059	1.4	0.05	<0.005	19	<0.1	0.034	
	2/8/07	<0.020	0.057	<0.0020	32	<0.0060	<0.0060	<0.02	<0.0050	5.7	0.012	1.5	<0.050	<0.005	20	<0.10	<0.097	
	10/23/06	<0.020	0.061	<0.0020	33	<0.0060	<0.0060	0.14	<0.0050	5.4	0.016	1.7	<0.050	<0.0050	21	<0.10	<0.10	
	7/18/06	<0.020	0.064	<0.0020	30	<0.0060	<0.0060	<0.020	<0.0050	5.2	0.011	1.4	<0.050	<0.0050	15	<0.10	0.031	
	4/14/06	<0.020	0.061	<0.0020	37	<0.0060	<0.0060	0.025	<0.0050	6.2	0.071	1.8	<0.050	<0.0050	28	<0.10	0.11	
	1/6/06	<0.020	0.060	<0.0020	35	<0.0060	<0.0060	0.025	<0.0050	6.1	0.022	1.90	<0.050	<0.0050	20	<0.10	0.42	
North of MW#45:	10/24/05	<0.02	0.065	<0.002	38	<0.006	<0.006	<0.02	<0.005	6.5	0.016	1.9	<0.05	<0.005	<0.005	<0.1	0.11	
	7/19/05	<0.02	0.07	<0.002	36	<0.006	<0.006	<0.02	<0.005	6.6	0.02	2	<0.05	<0.005	<0.005	<0.1	0.013	
	4/13/05	<0.02	0.075	<0.002	38	<0.006	<0.006	0.038	<0.005	6.6	0.0094	2.1	<0.05	<0.005	<0.005	<0.1	0.014	
	1/25/05	<0.02	0.065	<0.002	51	<0.006	<0.006	0.074	<0.005	8.1	0.074	2.3	<0.05	<0.005	<0.005	<0.1	0.016	
	12/7/04	<0.020	0.068	<0.0020	44	<0.0060	<0.0060	0.062	<0.0050	7.6	0.012	2	<0.050	<0.0050	30	<0.10	0.035	
	11/3/04	<0.020	0.073	<0.0020	44	<0.0060	<0.0060	<0.020	0.0071	7.8	0.017	2	<0.050	<0.0050	31	<0.10	0.011	
	10/7/04	<0.020	0.063	<0.0020	44	<0.0060	NA	0.11	<0.0050	7.8	0.0074	2.1	<0.050	<0.0050	28	<0.10	NA	
	9/7/04	<0.020	0.081	<0.0020	39	<0.0060	<0.0060	0.057	<0.0050	7.5	0.0052	2.1	<0.050	<0.0050	21	<0.10	0.023	

Appendix D
Dissolved Metals Analytical Result Summary - River Samples
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters																
		Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Calcium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Selenium (mg/L)	Silver (mg/L)	Sodium (mg/L)	Uranium (mg/L)	Zinc (mg/L)	
WQCC 20NMAC 6.2.3103 (mg/L):		0.10	1.0	0.01	NE	0.05	1.0	1.0	0.05	NE	0.20	NE	0.05	0.05	NE	0.03 (n)	10.0	
Well ID:	Date Sampled:																	
Upstream of Refinery:	4/16/07	<0.020	0.057	<0.0020	31	<0.0060	<0.0060	<0.020	<0.0050	5.8	0.011	1.6	<0.050	<0.0050	21	<0.10	0.050	
	2/8/07	<0.020	0.058	<0.0020	31	<0.0060	<0.0060	<0.020	<0.0050	5.5	0.012	1.7	<0.050	<0.0050	19	<0.10	0.069	
	10/23/06	<0.020	0.056	<0.0020	34	<0.0060	<0.0060	0.12	<0.0050	5.7	0.019	1.7	<0.050	<0.0050	25	<0.10	0.022	
	7/18/06	<0.020	0.065	<0.0020	32	<0.0060	<0.0060	<0.020	<0.0050	5.5	0.01	1.5	<0.050	<0.0050	15	<0.10	0.089	
	4/14/06	<0.020	0.061	<0.0020	36	<0.0060	<0.0060	<0.020	<0.0050	6.1	0.074	1.8	<0.050	<0.0050	28	<0.10	0.062	
	1/6/06	<0.020	0.061	<0.0020	35	<0.0060	<0.0060	<0.020	<0.0050	6.1	0.022	1.90	<0.050	<0.0050	20	<0.10	0.12	
	10/24/05	<0.02	0.067	<0.002	37	<0.006	<0.006	0.02	<0.005	6.4	0.015	1.8	<0.05	<0.005	<0.005	<0.1	0.029	
	7/19/05	<0.02	0.071	<0.002	36	<0.006	<0.006	<0.02	<0.005	6.7	0.035	2	<0.05	<0.005	<0.005	<0.1	0.029	
	4/13/05	<0.02	0.073	<0.002	38	<0.006	<0.006	0.037	<0.005	6.7	0.016	2.1	<0.05	<0.005	<0.005	<0.1	0.01	
	1/25/05	<0.02	0.066	<0.002	47	<0.006	<0.006	0.025	<0.005	8.1	0.016	2.3	<0.05	<0.005	<0.005	<0.1	0.028	
Downstream of Refinery:	12/7/04	<0.020	0.068	<0.0020	43	<0.0060	<0.0060	<0.020	<0.0050	7.6	0.011	2	<0.050	<0.0050	29	<0.10	0.024	
	11/3/04	<0.020	0.075	<0.0020	43	<0.0060	<0.0060	0.021	<0.0050	7.6	0.012	2.1	<0.050	<0.0050	31	<0.10	0.012	
	10/7/04	<0.020	0.065	<0.0020	45	<0.0060	NA	0.058	<0.0050	8.1	0.0081	2.2	<0.050	<0.0050	28	<0.10	NA	
	9/7/04	<0.020	0.081	<0.0020	39	<0.0060	<0.0060	0.031	<0.0050	7.5	0.0054	2.1	<0.050	0.005	20	<0.10	0.0057	
	4/16/07	<0.020	0.051	<0.0020	33	<0.0060	0.0081	<0.020	<0.0050	5.8	0.015	1.6	<0.050	<0.0050	20	<0.10	0.020	
	2/8/07	<0.020	0.057	<0.0020	37	<0.0060	<0.0060	<0.020	<0.0050	6	0.049	1.7	<0.050	<0.0050	24	<0.10	0.058	
	10/23/06	<0.020	0.062	<0.0020	42	<0.0060	<0.0060	0.11	<0.0050	6.4	0.078	2.1	<0.050	<0.0050	30	<0.10	0.032	
	7/18/06	<0.020	0.065	<0.0020	31	<0.0060	<0.0060	<0.020	<0.0050	5.3	0.017	1.4	<0.050	<0.0050	15	<0.10	0.14	
	4/14/06	<0.020	0.06	<0.0020	43	<0.0060	<0.0060	0.037	<0.0050	6.9	0.14	1.9	<0.050	<0.0050	36	<0.10	0.024	
	1/6/06	<0.020	0.058	<0.0020	40	<0.0060	<0.0060	0.03	<0.0050	6.7	0.07	2.00	<0.050	<0.0050	27	<0.10	0.056	
10/24/05	<0.02	0.061	<0.002	38	<0.006	<0.006	<0.02	<0.005	6.3	0.025	1.9	<0.05	<0.005	<0.005	<0.1	0.021		
7/19/05	<0.02	0.07	<0.002	39	<0.006	<0.006	<0.02	<0.005	6.9	0.034	2.1	<0.05	<0.005	<0.005	<0.1	0.015		
4/13/05	<0.02	0.074	<0.002	41	<0.006	<0.006	0.035	<0.005	6.8	0.033	2.2	<0.05	<0.005	<0.005	<0.1	0.018		
1/25/05	<0.02	0.064	<0.002	51	<0.006	<0.006	0.023	<0.005	8.5	0.042	2.3	<0.05	<0.005	<0.005	<0.1	0.048		

Notes:
mg/L = milligrams per liter
MW = monitoring well
NE = not established
NA = not analyzed
WQCC 20NMAC 6.2.33103 = New Mexico Standard for Groundwater of 10,000 ug/L or less
(1) Standard effective as of June 1, 2007

Appendix D
General Chemistry Analytical Result Summary - River Samples
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters										
Well ID:	Date Sampled:	Fluoride (mg/L)	Chloride (mg/L)	Nitrite (mg/L)	Bromide (mg/L)	Nitrate	Phosphorus (mg/L)	Sulfate (mg/L)	TDS (mg/L)	CO2 (mg/L)	Alk (mg/L)	E.C. (umhos/cm)
WQCC 20NNIAC 6.2.3103 (mg/L):		1.6	250	NE	NE	10	NE	600	1000	NE	NE	NE
North of MW-46:	4/16/07	0.2	3.1	NA	<0.5	NA	<0.2	61	200	<2.0	84	310
	2/8/07	0.13	2.9	<0.1	<0.5	<0.1	0.5	62	180	<2.0	83	280
	10/23/06	0.17	2.9	<0.10	<0.50	<0.10	<0.50	65	230	<2.0	86	320
	7/18/06	0.1	2.5	<0.10	<0.50	<0.10	<0.50	47	140	<2.0	78	270
	4/14/06	0.16	2.9	<0.10	<0.50	<0.10	<0.50	84	240	<2.0	88	360
	1/6/06	0.1	2.7	<0.10	<0.50	0.11	<0.50	62	190	<2.0	83	300
	10/24/05	0.12	3.3	<0.1	<0.5	<0.1	<0.5	67	190	<2.0	100	340
	7/19/05	0.21	3.6	<0.1	<0.5	<0.1	<0.5	73	240	<2.0	100	340
	4/13/05	0.16	4	<0.01	<0.5	<0.1	<0.5	82	260	<4.0	100	390
	1/25/05	0.16	3.9	<0.1	<0.5	<0.1	<0.5	110	280	<4.0	100	390
	10/7/04	0.19	4.4	<0.1	<0.1	0.13	<0.5	90	300	<4.0	110	370
	9/7/04	0.19	3.7	<0.1	<0.1	0.16	<0.5	74	230	<4.0	100	310
	8/14/04	0.18	23	0.004	<0.1	0.2	0.4	91	228	<0.1	87	402
	4/16/07	0.19	2.9	<0.5	<0.5	NA	<0.5	60	190	<2.0	84	310
	2/8/07	0.17	3	<0.1	<0.5	<0.1	<0.5	62	180	<2.0	82	280
Upstream of Refinery:	10/23/06	0.18	2.8	<0.10	<0.50	0.19	<0.50	66	220	<2.0	84	310
	7/18/06	0.11	2.4	<0.10	<0.50	<0.10	<0.50	46	150	<2.0	77	270
	4/14/06	0.16	2.9	<0.10	<0.50	<0.10	<0.50	85	230	<2.0	88	360
	1/6/06	<0.10	2.6	<0.10	<0.50	<0.10	<0.50	61	190	<2.0	81	300
	10/24/05	0.12	3.3	<0.1	<0.5	<0.1	<0.5	67	200	<2.0	100	340
	7/19/05	0.2	3.5	<0.1	<0.5	<0.1	<0.5	74	230	<2.0	97	340
	4/13/05	0.16	4	<0.1	<0.5	<0.1	<0.5	84	260	<4.0	100	390
	1/25/05	0.17	4	<0.1	<0.5	<0.1	<0.5	110	300	<4.0	10	390
	10/7/04	0.21	4.2	<0.1	<0.1	0.13	<0.5	88	260	<4.0	100	360
	9/7/04	0.22	3.7	<0.1	<0.1	0.18	<0.5	74	220	<4.0	100	310
	8/14/04	0.6	26	0.003	<0.1	0.2	0.2	89	244	<0.1	89	398
	4/16/07	0.18	3.0	<0.50	<0.50	<0.50	<0.50	64	190	<2.0	84	320
	2/8/07	1.2	2.9	<0.1	<0.5	<0.1	0.5	61	180	<2.0	81	270
	10/23/06	0.18	3.00	<0.10	<0.50	0.12	<0.50	68	230	<2.0	86	310
	7/18/06	<0.10	2.3	<0.10	<0.50	<0.10	<0.50	45	140	<2.0	78	260
4/14/06	0.16	2.9	<0.10	<0.50	<0.10	<0.50	83	250	<2.0	89	360	
1/6/06	0.11	2.4	<0.10	<0.50	<0.10	<0.50	58	180	<2.0	82	290	
10/24/05	0.1	3.3	<0.1	<0.5	<0.1	<0.5	65	200	2	110	330	
7/19/05	0.22	3.6	<0.1	<0.5	<0.1	<0.5	74	250	2	99	350	
4/13/05	0.22	4.1	<0.1	<0.5	<0.1	<0.5	88	260	<4.0	96	400	
1/25/05	0.16	3.9	<0.1	<0.5	<0.1	<0.5	110	290	<4.0	110	310	
10/7/04	0.19	4.3	<0.1	<0.1	0.16	<0.5	86	260	<4.0	102	360	
9/7/04	0.2	3.8	<0.1	<0.1	0.11	<0.5	74	220	<4.0	100	310	
8/14/04	0.45	23	0.2	<0.1	0.007	0.2	95	242	<0.1	86	391	

Appendix D
General Chemistry Analytical Result Summary - River Samples
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

		Parameters										
		Fluoride (mg/L)	Chloride (mg/L)	Nitrite (mg/L)	Bromide (mg/L)	Nitrate	Phosphorus (mg/L)	Sulfate (mg/L)	TDS (mg/L)	CO2 (mg/L)	Alk (mg/L)	E.C. (umhos/cm)
WQCC 20NMAC 6.2.3103 (mg/L):		1.6	250	NE	NE	10	NE	600	1000	NE	NE	NE
Well ID: Downstream of Refinery:	Date Sampled:											
	4/16/07	0.17	3.0	<0.50	<0.50	<0.50	<0.50	67	210	<2.0	86	330
	2/8/07	0.19	3.3	<0.1	<0.5	<0.1	<0.5	80	220	<2.0	87	330
	10/23/06	0.14	4.1	<0.10	<0.50	<0.10	<0.50	100	290	<2.0	94	410
	7/18/06	0.11	2.4	<0.10	<0.50	<0.10	<0.50	49	150	<2.0	78	280
	4/14/06	0.16	3.5	<0.10	<0.50	<0.10	<0.50	110	290	<2.0	99	430
	1/6/06	0.17	3.9	<0.10	<0.50	<0.10	<0.50	84	240	<2.0	86	370
	10/24/05	0.11	3.3	<0.1	<0.5	<0.1	<0.5	68	200	2	110	340
	7/19/05	0.22	3.6	<0.1	<0.5	<0.1	<0.5	80	250	2	99	380
	4/13/05	0.15	4.2	<0.1	<0.5	<0.1	<0.5	89	270	<4.0	100	400
	1/25/05	0.16	4.1	<0.1	<0.5	<0.1	<0.5	120	320	<4.0	110	410

Notes:

Alk = alkalinity, total
CO₂ = Carbon Dioxide
E.C. = electrical conductivity
TDS = total dissolved solids
umhos/cm = micro-mhos per centimeter
mg/L = milligrams per liter
MW = monitoring well
NA = not analyzed
NE = not established
WQCC 20NMAC 6.2.3103 = New Mexico Standard for Groundwater of 10,000 ug/L or less

**MALCOLM
PIRNIE**

INDEPENDENT ENVIRONMENTAL
ENGINEERS, SCIENTISTS
AND CONSULTANTS

E

APPENDIX



Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-1	3/3/2003	5501.64	NPP
MW-1	8/21/2003	5502.05	NPP
MW-1	3/2/2004	5512.48	NPP
MW-1	8/23/2004	5512.76	NPP
MW-1	8/1/2005	5501.23	NPP
MW-1	4/1/2006	5501.98	NPP
MW-1	8/1/2006	5501.86	NPP
MW-1	4/4/2007	5501.92	NPP
MW-3	8/25/2003	5502.96	NPP
MW-3	3/2/2004	5502.94	NPP
MW-3	8/23/2004	5502.96	NPP
MW-3	8/1/2005	5502.83	NPP
MW-3	4/1/2006	5503.08	NPP
MW-3	8/1/2006	5502.91	NPP
MW-3	4/11/2007	5502.92	NPP
MW-4	8/22/2003	5500.53	0.88
MW-4	8/25/2003	5500.53	0.88
MW-4	1/14/2004	5500.48	0.73
MW-4	3/2/2004	5499.89	3.24
MW-4	3/4/2004	5500.42	0.62
MW-4	8/25/2004	5500.34	0.65
MW-4	8/25/2004	5500.34	0.65
MW-4	4/4/2005	5500.89	0.03
MW-4	8/1/2005	5500.56	0.23
MW-4	4/1/2006	5501.00	0.01
MW-4	8/1/2006	5500.93	NPP
MW-4	4/3/2007	5501.25	NPP
MW-5	8/25/2003	NWP	NPP
MW-5	3/2/2004	NWP	NPP
MW-5	8/26/2004	NWP	NPP
MW-5	8/1/2005	NWP	NPP
MW-5	4/1/2006	NWP	NPP
MW-5	8/1/2006	NWP	NPP
MW-5	4/4/2007	NWP	NPP
MW-6	3/3/2003	NWP	NPP
MW-6	8/25/2003	NWP	NPP
MW-6	3/2/2004	NWP	NPP
MW-6	8/24/2004	NWP	NPP
MW-6	8/1/2005	NWP	NPP
MW-6	4/1/2006	NWP	NPP
MW-6	8/1/2006	NWP	NPP
MW-6	4/4/2007	NWP	NPP
MW-7	8/25/2003	5500.09	NPP
MW-7	1/15/2004	5500.02	NPP
MW-7	3/2/2004	5500.30	NPP
MW-7	3/2/2004	5500.30	NPP

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-7	8/25/2004	5499.87	NPP
MW-7	8/25/2004	5499.87	NPP
MW-7	4/11/2005	5500.11	NPP
MW-7	8/1/2005	5499.86	NPP
MW-7	4/1/2006	5499.86	NPP
MW-7	8/1/2006	5500.52	NPP
MW-7	4/3/2007	5500.52	NPP
MW-8	8/25/2003	5501.65	NPP
MW-8	3/4/2004	5501.81	NPP
MW-8	8/19/2004	5501.68	NPP
MW-8	8/1/2005	5501.76	NPP
MW-8	4/1/2006	5503.02	NPP
MW-8	8/1/2006	5502.79	NPP
MW-8	4/4/2007	5502.78	NPP
MW-11	8/19/2003	5498.62	NPP
MW-11	3/2/2004	5498.99	NPP
MW-11	8/16/2004	5498.59	NPP
MW-11	5/9/2005	5495.52	NPP
MW-11	5/12/2005	5495.50	NPP
MW-11	5/17/2005	5495.47	NPP
MW-11	5/19/2005	5495.45	NPP
MW-11	5/24/2005	5495.39	NPP
MW-11	5/26/2005	5495.42	NPP
MW-11	5/31/2005	5495.32	NPP
MW-11	6/2/2005	5495.30	NPP
MW-11	6/7/2005	5495.34	NPP
MW-11	6/9/2005	5495.25	NPP
MW-11	6/14/2005	5495.43	NPP
MW-11	6/16/2005	5495.42	NPP
MW-11	6/21/2005	5495.14	NPP
MW-11	6/23/2005	5495.17	NPP
MW-11	6/28/2005	5495.52	NPP
MW-11	7/7/2005	5495.04	NPP
MW-11	7/14/2005	5495.00	NPP
MW-11	7/19/2005	5494.95	NPP
MW-11	7/28/2005	5494.97	NPP
MW-11	8/1/2005	5499.22	NPP
MW-11	8/2/2005	5495.00	NPP
MW-11	8/11/2005	5494.95	NPP
MW-11	8/23/2005	5495.20	NPP
MW-11	9/6/2005	5495.10	NPP
MW-11	9/20/2005	5495.58	NPP
MW-11	10/4/2005	5498.53	NPP
MW-11	10/18/2005	5498.50	NPP
MW-11	11/1/2005	5498.88	NPP
MW-11	11/15/2005	5499.06	NPP

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-11	11/29/2005	5499.70	NPP
MW-11	12/13/2005	5500.30	NPP
MW-11	12/27/2005	5499.77	NPP
MW-11	1/10/2006	5499.53	NPP
MW-11	1/24/2006	5499.77	NPP
MW-11	2/8/2006	5499.26	NPP
MW-11	2/16/2006	5499.21	NPP
MW-11	3/1/2006	5499.19	NPP
MW-11	3/14/2006	5499.18	NPP
MW-11	3/20/2006	5499.16	NPP
MW-11	4/1/2006	5498.55	NPP
MW-11	4/3/2006	5499.12	NPP
MW-11	5/3/2006	5499.54	NPP
MW-11	5/30/2006	5499.81	NPP
MW-11	6/12/2006	5499.75	NPP
MW-11	6/26/2006	5499.77	NPP
MW-11	7/12/2006	5500.02	NPP
MW-11	7/24/2006	5499.99	NPP
MW-11	8/1/2006	5499.74	NPP
MW-11	8/7/2006	5499.83	NPP
MW-11	8/21/2006	5499.68	NPP
MW-11	9/5/2006	5499.82	NPP
MW-11	10/2/2006	5499.90	NPP
MW-11	4/3/2007	5499.52	NPP
MW-12	3/3/2003	5490.95	NPP
MW-12	8/19/2003	5490.22	NPP
MW-12	3/2/2004	5489.66	NPP
MW-12	8/16/2004	5489.23	NPP
MW-12	5/9/2005	5488.52	NPP
MW-12	5/12/2005	5488.50	NPP
MW-12	5/17/2005	5488.44	NPP
MW-12	5/19/2005	5488.38	NPP
MW-12	5/24/2005	5488.27	NPP
MW-12	5/26/2005	5488.32	NPP
MW-12	5/31/2005	5488.10	NPP
MW-12	6/2/2005	5488.06	NPP
MW-12	6/7/2005	5488.08	NPP
MW-12	6/9/2005	5487.90	NPP
MW-12	6/14/2005	5488.43	NPP
MW-12	6/16/2005	5488.43	NPP
MW-12	6/21/2005	5487.64	NPP
MW-12	6/23/2005	5487.58	NPP
MW-12	6/28/2005	5488.52	NPP
MW-12	7/7/2005	5487.53	NPP
MW-12	7/14/2005	5487.10	NPP
MW-12	7/19/2005	5486.85	NPP

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-12	7/28/2005	5486.81	NPP
MW-12	8/1/2005	5489.26	NPP
MW-12	8/2/2005	5486.91	NPP
MW-12	8/11/2005	5486.80	NPP
MW-12	8/23/2005	5486.55	NPP
MW-12	9/6/2005	5486.48	NPP
MW-12	9/20/2005	5486.57	NPP
MW-12	10/4/2005	5489.48	NPP
MW-12	10/18/2005	5489.36	NPP
MW-12	11/1/2005	5490.26	NPP
MW-12	11/15/2005	5489.25	NPP
MW-12	11/29/2005	5491.00	NPP
MW-12	12/13/2005	5492.59	NPP
MW-12	12/27/2005	5491.83	NPP
MW-12	1/10/2006	5491.73	NPP
MW-12	1/24/2006	5491.83	NPP
MW-12	2/8/2006	5492.11	NPP
MW-12	2/16/2006	5492.07	NPP
MW-12	3/1/2006	5491.64	NPP
MW-12	3/14/2006	5491.98	NPP
MW-12	3/20/2006	5491.97	NPP
MW-12	4/1/2006	5491.93	NPP
MW-12	4/3/2006	5491.90	NPP
MW-12	5/3/2006	5491.85	NPP
MW-12	5/30/2006	5491.73	NPP
MW-12	6/12/2006	5491.72	NPP
MW-12	6/26/2006	5491.60	NPP
MW-12	7/12/2006	5491.76	NPP
MW-12	7/24/2006	5491.70	NPP
MW-12	8/1/2006	5491.54	NPP
MW-12	8/7/2006	5491.70	NPP
MW-12	8/21/2006	5491.49	NPP
MW-12	9/5/2006	5491.52	NPP
MW-12	10/2/2006	5491.60	NPP
MW-12	4/3/2007	5492.27	NPP
MW-13	3/3/2003	5502.07	NPP
MW-13	8/21/2003	5501.81	NPP
MW-13	3/3/2004	5501.63	NPP
MW-13	8/18/2004	5501.53	NPP
MW-13	8/1/2005	5501.64	NPP
MW-13	4/1/2006	5501.95	NPP
MW-13	8/1/2006	5501.85	NPP
MW-13	4/4/2007	5501.94	NPP
MW-20	3/5/2003	5498.74	1.65
MW-20	8/22/2003	5498.73	0.88
MW-20	3/4/2004	5498.77	0.42

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-20	8/26/2004	5498.73	0.34
MW-20	5/9/2005	5495.32	0.27
MW-20	5/12/2005	5495.30	0.28
MW-20	5/17/2005	5495.33	0.29
MW-20	5/19/2005	5495.30	0.27
MW-20	5/24/2005	5495.31	0.28
MW-20	5/26/2005	5495.31	0.29
MW-20	5/31/2005	5495.32	0.28
MW-20	6/2/2005	5495.32	0.24
MW-20	6/7/2005	5495.32	0.27
MW-20	6/9/2005	5495.35	0.27
MW-20	6/14/2005	5495.33	0.27
MW-20	6/16/2005	5495.34	0.27
MW-20	6/21/2005	5495.33	0.24
MW-20	6/23/2005	5495.35	0.26
MW-20	6/28/2005	5495.32	0.27
MW-20	7/7/2005	5495.35	0.32
MW-20	7/14/2005	5495.31	0.30
MW-20	7/19/2005	5495.27	0.27
MW-20	7/28/2005	5495.36	0.23
MW-20	8/1/2005	5498.97	0.24
MW-20	8/2/2005	5495.36	0.24
MW-20	8/11/2005	5495.35	0.24
MW-20	8/23/2005	5495.38	0.22
MW-20	9/6/2005	5495.35	0.27
MW-20	9/20/2005	5495.43	0.36
MW-20	10/4/2005	5499.06	0.20
MW-20	10/18/2005	5499.07	0.26
MW-20	11/1/2005	5499.14	0.15
MW-20	11/15/2005	5499.16	0.15
MW-20	11/29/2005	5499.24	0.09
MW-20	12/13/2005	5499.16	0.15
MW-20	12/27/2005	5499.16	0.15
MW-20	1/10/2006	5498.82	0.07
MW-20	1/24/2006	5499.16	0.15
MW-20	2/8/2006	5499.22	0.03
MW-20	2/16/2006	5499.22	0.08
MW-20	3/1/2006	5499.21	0.06
MW-20	3/14/2006	5499.19	0.09
MW-20	3/20/2006	5499.20	0.10
MW-20	4/1/2006	5499.20	0.07
MW-20	4/3/2006	5499.19	0.10
MW-20	5/3/2006	5499.23	0.01
MW-20	5/30/2006	5499.17	0.10
MW-20	6/12/2006	5499.16	0.10
MW-20	6/26/2006	5499.15	0.10

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-20	7/12/2006	5499.16	0.13
MW-20	7/24/2006	5499.15	0.10
MW-20	8/1/2006	5499.14	0.12
MW-20	8/7/2006	5499.15	0.16
MW-20	8/21/2006	5499.14	0.12
MW-20	9/5/2006	5499.14	0.14
MW-20	10/2/2006	5499.16	0.13
MW-20	4/9/2007	5499.33	0.12
MW-21	3/2/2004	5499.66	0.03
MW-21	8/23/2004	5499.74	0.02
MW-21	5/9/2005	5497.74	0.01
MW-21	5/12/2005	5497.75	0.01
MW-21	5/17/2005	5497.76	0.01
MW-21	5/19/2005	5497.75	0.01
MW-21	5/24/2005	5497.75	0.01
MW-21	5/26/2005	5497.76	0.01
MW-21	5/31/2005	5497.75	0.01
MW-21	6/2/2005	5497.75	0.01
MW-21	6/7/2005	5497.75	0.01
MW-21	6/9/2005	5497.75	0.01
MW-21	6/14/2005	5497.75	0.01
MW-21	6/16/2005	5497.75	0.01
MW-21	6/21/2005	5497.74	0.01
MW-21	6/23/2005	5497.75	0.01
MW-21	6/28/2005	5497.74	0.01
MW-21	7/7/2005	5497.75	0.01
MW-21	7/14/2005	5497.75	0.01
MW-21	7/19/2005	5497.74	0.01
MW-21	7/28/2005	5497.77	0.01
MW-21	8/1/2005	5500.03	0.01
MW-21	8/2/2005	5497.76	0.01
MW-21	8/11/2005	5497.76	0.01
MW-21	8/23/2005	5497.75	0.01
MW-21	9/6/2005	5497.74	0.01
MW-21	9/20/2005	5497.74	0.01
MW-21	10/4/2005	5500.01	0.01
MW-21	10/18/2005	5500.02	0.01
MW-21	11/1/2005	5500.52	0.01
MW-21	11/15/2005	5500.46	0.01
MW-21	11/29/2005	5500.52	0.01
MW-21	12/13/2005	5500.40	0.01
MW-21	12/27/2005	5500.45	0.01
MW-21	1/10/2006	5500.47	0.01
MW-21	1/24/2006	5500.45	0.01
MW-21	2/8/2006	5500.25	0.01
MW-21	2/16/2006	5500.19	0.02

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-21	3/1/2006	5500.22	NPP
MW-21	3/14/2006	5500.21	0.02
MW-21	3/20/2006	5500.21	0.04
MW-21	4/1/2006	5500.19	0.05
MW-21	4/3/2006	5500.21	0.08
MW-21	5/3/2006	5500.17	0.09
MW-21	5/30/2006	5500.67	0.70
MW-21	6/12/2006	5500.16	0.04
MW-21	6/26/2006	5500.14	0.07
MW-21	7/12/2006	5500.16	0.04
MW-21	7/24/2006	5500.18	0.06
MW-21	8/1/2006	5500.14	0.06
MW-21	8/7/2006	5500.12	0.05
MW-21	8/21/2006	5500.14	0.06
MW-21	9/5/2006	5500.15	0.03
MW-21	10/2/2006	5500.14	0.07
MW-21	4/9/2007	5500.31	0.06
MW-24	3/5/2003	NWP	NPP
MW-24	8/22/2003	5507.08	0.02
MW-24	3/4/2004	NWP	NPP
MW-24	8/26/2004	NWP	0.06
MW-25	3/4/2004	5501.16	0.97
MW-25	8/19/2004	5501.09	0.63
MW-25	8/1/2005	5501.24	0.42
MW-25	4/1/2006	5501.32	1.25
MW-25	8/1/2006	5501.44	0.36
MW-25	4/3/2007	5501.62	0.20
MW-26	8/21/2003	5500.70	NPP
MW-26	3/2/2004	5500.56	NPP
MW-26	8/19/2004	5500.49	NPP
MW-26	8/1/2005	5499.98	NPP
MW-26	4/1/2006	5500.82	NPP
MW-26	8/1/2006	5500.82	NPP
MW-26	4/3/2007	5501.09	NPP
MW-27	8/21/2003	5500.17	NPP
MW-27	3/2/2004	5499.96	NPP
MW-27	8/18/2004	5499.97	NPP
MW-27	8/1/2005	5499.00	NPP
MW-27	4/1/2006	5500.29	NPP
MW-27	8/1/2006	5500.30	NPP
MW-27	4/2/2007	5500.63	NPP
MW-29	3/2/2004	5501.65	NPP
MW-29	8/19/2004	5501.82	NPP
MW-29	8/1/2005	5501.91	0.01
MW-29	4/1/2006	5501.96	NPP
MW-29	8/1/2006	5501.72	NPP

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-29	4/4/2007	5501.82	NPP
MW-30	3/3/2004	5502.87	NPP
MW-30	8/23/2004	5502.88	NPP
MW-30	8/1/2005	5502.93	NPP
MW-30	4/1/2006	5503.14	NPP
MW-30	8/1/2006	5502.90	NPP
MW-30	4/11/2007	5502.89	NPP
MW-31	3/4/2004	5502.11	NPP
MW-31	8/19/2004	5502.03	NPP
MW-31	8/1/2005	5502.17	NPP
MW-31	4/1/2006	5502.45	NPP
MW-31	8/1/2006	5502.32	NPP
MW-31	4/4/2007	5502.32	NPP
MW-32	3/4/2003	5501.06	NPP
MW-32	8/20/2003	5500.84	NPP
MW-32	3/2/2004	5500.66	NPP
MW-32	8/17/2004	5500.71	NPP
MW-32	8/1/2005	5500.30	NPP
MW-32	4/1/2006	5500.99	NPP
MW-32	8/1/2006	5500.89	NPP
MW-32	4/2/2007	5501.15	NPP
MW-33	3/4/2003	5499.66	NPP
MW-33	8/18/2003	5499.68	NPP
MW-33	3/2/2004	5499.41	NPP
MW-33	8/17/2004	5499.50	NPP
MW-33	8/1/2005	5499.15	NPP
MW-33	4/1/2006	5499.77	NPP
MW-33	8/1/2006	5499.80	NPP
MW-33	4/2/2007	5500.20	NPP
MW-34	8/19/2003	5497.06	NPP
MW-34	3/2/2004	5497.13	NPP
MW-34	8/17/2004	5497.39	NPP
MW-34	8/1/2005	5497.26	NPP
MW-34	4/1/2006	5497.86	NPP
MW-34	8/1/2006	5498.19	NPP
MW-34	4/2/2007	5498.10	NPP
MW-35	3/3/2003	5496.16	NPP
MW-35	8/19/2003	5495.91	NPP
MW-35	3/2/2004	5495.97	NPP
MW-35	8/17/2004	5496.14	NPP
MW-35	8/1/2005	5495.05	NPP
MW-35	4/1/2006	5497.71	NPP
MW-35	8/1/2006	5497.26	NPP
MW-35	4/2/2007	5497.28	NPP
MW-36	3/2/2004	5495.72	NPP
MW-36	8/17/2004	5495.65	NPP

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-36	8/1/2005	5495.38	NPP
MW-36	4/1/2006	5496.33	NPP
MW-36	8/1/2006	5496.76	NPP
MW-36	4/2/2007	5496.49	NPP
MW-37	3/3/2003	5495.62	NPP
MW-37	8/20/2003	5495.51	NPP
MW-37	3/2/2004	5495.68	NPP
MW-37	8/17/2004	5495.63	NPP
MW-37	8/1/2005	5495.42	NPP
MW-37	4/1/2006	5496.39	NPP
MW-37	8/1/2006	5496.12	NPP
MW-37	4/2/2007	5496.51	NPP
MW-38	3/3/2003	5495.00	NPP
MW-38	8/20/2003	5494.59	NPP
MW-38	3/2/2004	5494.87	NPP
MW-38	8/17/2004	5494.68	NPP
MW-38	8/1/2005	5494.06	NPP
MW-38	4/1/2006	5495.70	NPP
MW-38	8/1/2006	5495.90	NPP
MW-38	4/2/2007	5495.90	NPP
MW-39	3/4/2004	5496.38	NPP
MW-39	8/26/2004	5496.24	NPP
MW-39	5/9/2005	5488.50	NPP
MW-39	5/12/2005	5488.78	NPP
MW-39	5/17/2005	5489.24	NPP
MW-39	5/19/2005	5489.38	NPP
MW-39	5/24/2005	5489.61	NPP
MW-39	5/26/2005	5489.45	NPP
MW-39	5/31/2005	5489.62	NPP
MW-39	6/2/2005	5490.04	NPP
MW-39	6/7/2005	5489.97	NPP
MW-39	6/9/2005	5490.31	NPP
MW-39	6/14/2005	5490.68	NPP
MW-39	6/16/2005	5490.62	NPP
MW-39	6/21/2005	5490.58	NPP
MW-39	6/23/2005	5490.56	NPP
MW-39	6/28/2005	5490.73	NPP
MW-39	7/7/2005	5490.66	NPP
MW-39	7/14/2005	5490.52	NPP
MW-39	7/19/2005	5490.36	NPP
MW-39	7/28/2005	5491.18	NPP
MW-39	8/1/2005	5493.40	NPP
MW-39	8/2/2005	5490.56	NPP
MW-39	8/11/2005	5490.53	NPP
MW-39	8/23/2005	5491.46	NPP
MW-39	9/6/2005	5490.56	NPP

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-39	9/20/2005	5490.82	NPP
MW-39	10/4/2005	5494.71	NPP
MW-39	10/18/2005	5494.77	NPP
MW-39	11/1/2005	5495.31	NPP
MW-39	11/15/2005	5494.93	NPP
MW-39	11/29/2005	5496.10	NPP
MW-39	12/13/2005	5496.52	NPP
MW-39	12/27/2005	5495.86	NPP
MW-39	1/10/2006	5496.43	NPP
MW-39	1/24/2006	5495.86	NPP
MW-39	2/8/2006	5495.64	NPP
MW-39	2/16/2006	5495.68	NPP
MW-39	3/1/2006	5495.67	NPP
MW-39	3/14/2006	5495.52	NPP
MW-39	3/20/2006	5495.74	NPP
MW-39	4/1/2006	5495.62	NPP
MW-39	4/3/2006	5495.53	NPP
MW-39	5/3/2006	5490.02	NPP
MW-39	5/30/2006	5491.91	NPP
MW-39	6/12/2006	5493.24	NPP
MW-39	6/26/2006	5493.68	NPP
MW-39	7/12/2006	5493.85	NPP
MW-39	7/24/2006	5493.78	NPP
MW-39	8/1/2006	5494.59	NPP
MW-39	8/7/2006	5494.50	NPP
MW-39	8/21/2006	5494.59	NPP
MW-39	9/5/2006	5490.94	NPP
MW-39	10/2/2006	5492.85	NPP
MW-39	4/16/2007	5490.13	NPP
MW-40	8/26/2003	5498.23	1.14
MW-40	1/15/2004	5498.34	0.40
MW-40	3/4/2004	5498.08	0.90
MW-40	3/4/2004	5498.08	0.90
MW-40	8/25/2004	5498.21	0.82
MW-40	8/25/2004	5498.21	0.82
MW-40	4/13/2005	5499.09	0.08
MW-40	8/1/2005	5499.67	0.10
MW-40	4/1/2006	5499.92	0.34
MW-40	8/1/2006	5499.96	0.20
MW-40	4/16/2007	5500.08	NPP
MW-41	8/26/2003	5498.86	1.21
MW-41	1/15/2004	5498.95	1.20
MW-41	3/4/2004	5498.89	1.11
MW-41	3/4/2004	5498.89	1.11
MW-41	8/25/2004	5498.80	0.91
MW-41	8/25/2004	5498.80	0.91

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-41	4/13/2005	5499.57	0.33
MW-41	8/1/2005	5499.62	0.45
MW-41	4/1/2006	5500.40	0.21
MW-41	8/1/2006	5500.37	0.23
MW-41	4/16/2007	5500.54	NPP
MW-44	3/3/2004	5502.04	NPP
MW-44	8/23/2004	5501.64	NPP
MW-44	8/1/2005	5500.85	0.01
MW-44	4/1/2006	5501.68	NPP
MW-44	8/1/2006	5501.04	NPP
MW-44	4/11/2007	5501.76	NPP
MW-45	3/5/2003	5496.81	1.51
MW-45	8/22/2003	5496.24	3.84
MW-45	3/3/2004	5495.73	6.53
MW-45	8/16/2004	NWP	NPP
MW-45	11/8/2004	5485.00	0.73
MW-45	5/9/2005	5484.62	0.34
MW-45	5/12/2005	5485.19	0.36
MW-45	5/17/2005	5485.22	0.38
MW-45	5/19/2005	5485.09	0.44
MW-45	5/24/2005	5485.12	0.46
MW-45	5/26/2005	5485.13	0.46
MW-45	5/31/2005	5485.13	0.45
MW-45	6/2/2005	5487.24	0.42
MW-45	6/7/2005	5487.23	0.44
MW-45	6/9/2005	5487.12	0.37
MW-45	6/14/2005	5487.13	0.63
MW-45	6/16/2005	5487.12	0.62
MW-45	6/21/2005	5487.14	0.65
MW-45	6/23/2005	5487.14	0.62
MW-45	6/28/2005	5486.70	0.30
MW-45	7/7/2005	5486.70	0.33
MW-45	7/14/2005	5486.69	0.30
MW-45	7/19/2005	5486.68	0.31
MW-45	7/28/2005	5487.11	0.79
MW-45	8/1/2005	5495.12	0.83
MW-45	8/2/2005	5487.30	0.08
MW-45	8/11/2005	5487.19	0.83
MW-45	8/23/2005	5487.16	0.78
MW-45	9/6/2005	5487.04	0.74
MW-45	9/20/2005	5486.89	0.36
MW-45	10/4/2005	5494.96	0.47
MW-45	10/18/2005	5495.01	0.47
MW-45	11/1/2005	5496.07	0.36
MW-45	11/15/2005	5495.73	0.42
MW-45	11/29/2005	5494.59	0.26

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-45	12/13/2005	5494.98	0.25
MW-45	12/27/2005	5494.86	0.17
MW-45	1/10/2006	5494.58	0.22
MW-45	1/24/2006	5495.26	0.10
MW-45	2/8/2006	5495.17	0.03
MW-45	2/16/2006	5495.24	0.05
MW-45	3/1/2006	5495.14	0.03
MW-45	3/14/2006	5495.15	0.07
MW-45	3/20/2006	5495.17	0.02
MW-45	4/1/2006	5495.11	0.06
MW-45	4/3/2006	5495.05	0.04
MW-45	5/3/2006	5495.13	0.01
MW-45	5/30/2006	5495.08	0.10
MW-45	6/12/2006	5495.09	0.10
MW-45	6/26/2006	5495.07	0.08
MW-45	7/12/2006	5495.25	0.01
MW-45	7/24/2006	5495.31	0.02
MW-45	8/1/2006	5495.13	0.02
MW-45	8/7/2006	5495.07	0.03
MW-45	8/21/2006	5495.13	0.02
MW-45	9/5/2006	5495.22	0.02
MW-45	10/2/2006	5495.14	0.03
MW-45	4/16/2007	5495.08	NPP
MW-46	3/5/2003	NWP	NPP
MW-46	8/22/2003	NWP	NPP
MW-46	3/3/2004	NWP	NPP
MW-46	8/16/2004	NWP	NPP
MW-46	11/8/2004	NWP	NPP
MW-46	5/9/2005	5487.94	NPP
MW-46	5/12/2005	5487.94	NPP
MW-46	5/17/2005	5487.95	NPP
MW-46	5/19/2005	5487.96	NPP
MW-46	5/24/2005	5487.94	NPP
MW-46	5/26/2005	5487.94	NPP
MW-46	5/31/2005	5487.95	NPP
MW-46	6/2/2005	5487.95	NPP
MW-46	6/7/2005	5487.95	NPP
MW-46	6/9/2005	5487.97	NPP
MW-46	6/14/2005	5487.94	NPP
MW-46	6/16/2005	5487.96	NPP
MW-46	6/21/2005	5487.93	NPP
MW-46	6/23/2005	5487.95	NPP
MW-46	6/28/2005	5487.95	NPP
MW-46	7/7/2005	5487.95	NPP
MW-46	7/14/2005	5487.94	NPP
MW-46	7/19/2005	5487.93	NPP

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-46	7/28/2005	5487.92	NPP
MW-46	8/1/2005	5494.46	NPP
MW-46	8/2/2005	5487.94	NPP
MW-46	8/11/2005	5488.03	NPP
MW-46	8/23/2005	5488.01	NPP
MW-46	9/6/2005	5487.96	NPP
MW-46	9/20/2005	5487.92	NPP
MW-46	10/4/2005	5494.34	NPP
MW-46	10/18/2005	5494.44	NPP
MW-46	11/1/2005	NWP	NPP
MW-46	11/15/2005	NWP	NPP
MW-46	11/29/2005	NWP	NPP
MW-46	12/13/2005	NWP	NPP
MW-46	12/27/2005	NWP	NPP
MW-46	1/10/2006	NWP	NPP
MW-46	1/24/2006	NWP	NPP
MW-46	2/8/2006	NWP	NPP
MW-46	2/16/2006	NWP	NPP
MW-46	3/1/2006	NWP	NPP
MW-46	3/14/2006	NWP	NPP
MW-46	3/20/2006	NWP	NPP
MW-46	4/1/2006	NWP	NPP
MW-46	4/3/2006	NWP	NPP
MW-46	5/3/2006	NWP	NPP
MW-46	5/30/2006	NWP	NPP
MW-46	6/12/2006	NWP	NPP
MW-46	6/26/2006	NWP	NPP
MW-46	7/12/2006	NWP	NPP
MW-46	7/24/2006	NWP	NPP
MW-46	8/1/2006	NWP	NPP
MW-46	8/7/2006	NWP	NPP
MW-46	8/21/2006	NWP	NPP
MW-46	9/5/2006	NWP	NPP
MW-46	10/2/2006	NWP	NPP
MW-46	4/9/2007	NWP	NPP
MW-47	3/5/2003	NWP	NPP
MW-47	8/18/2003	5496.19	NPP
MW-47	3/3/2004	5496.16	1.48
MW-47	8/16/2004	5496.20	1.23
MW-47	11/8/2004	5488.72	1.08
MW-47	5/9/2005	5487.27	0.98
MW-47	5/12/2005	5487.16	1.00
MW-47	5/17/2005	5487.13	1.12
MW-47	5/19/2005	5487.12	1.07
MW-47	5/24/2005	5487.11	1.12
MW-47	5/26/2005	5487.12	1.11

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-47	5/31/2005	5487.13	1.11
MW-47	6/2/2005	5486.91	1.02
MW-47	6/7/2005	5486.97	1.05
MW-47	6/9/2005	5487.05	1.08
MW-47	6/14/2005	5486.86	1.05
MW-47	6/16/2005	5486.78	0.97
MW-47	6/21/2005	5486.90	1.04
MW-47	6/23/2005	5486.86	1.16
MW-47	6/28/2005	5486.92	1.04
MW-47	7/7/2005	5486.90	1.05
MW-47	7/14/2005	5486.86	1.03
MW-47	7/19/2005	5486.87	1.05
MW-47	7/28/2005	5486.20	0.01
MW-47	8/1/2005	5494.35	0.11
MW-47	8/2/2005	5486.50	0.94
MW-47	8/11/2005	5486.65	0.11
MW-47	8/23/2005	5486.39	1.04
MW-47	9/6/2005	5486.41	1.05
MW-47	9/20/2005	5486.84	0.63
MW-47	10/4/2005	5494.65	0.90
MW-47	10/18/2005	5494.77	0.66
MW-47	11/1/2005	5496.01	0.24
MW-47	11/15/2005	5495.72	0.12
MW-47	11/29/2005	5494.27	0.45
MW-47	12/13/2005	5496.00	0.05
MW-47	12/27/2005	5495.61	0.12
MW-47	1/10/2006	5495.72	0.07
MW-47	1/24/2006	5494.98	0.31
MW-47	2/8/2006	5494.91	0.06
MW-47	2/16/2006	5494.98	0.04
MW-47	3/1/2006	5494.85	0.03
MW-47	3/14/2006	5494.69	0.65
MW-47	3/20/2006	5494.79	0.54
MW-47	4/1/2006	5494.56	0.79
MW-47	4/3/2006	5494.56	0.79
MW-47	5/3/2006	5494.57	1.00
MW-47	5/30/2006	5494.54	1.09
MW-47	6/12/2006	5494.42	1.00
MW-47	6/26/2006	5494.47	1.15
MW-47	7/12/2006	5493.91	0.29
MW-47	7/24/2006	5494.83	0.51
MW-47	8/1/2006	5494.58	0.88
MW-47	8/7/2006	5494.78	1.20
MW-47	8/21/2006	5494.58	0.88
MW-47	9/5/2006	5494.55	0.96
MW-47	10/2/2006	5494.39	1.17

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
MW-47	4/9/2007	5494.58	0.83
MW-48	11/1/2004	5413.64	NPP
MW-49	11/1/2004	5412.22	NPP
P-3	8/26/2003	5499.39	NPP
P-3	1/13/2004	5499.55	NPP
P-3	3/4/2004	5500.70	NPP
P-3	8/26/2004	5488.05	0.03
P-3	4/5/2005	5500.50	NPP
P-3	8/16/2005	5500.46	NPP
P-3	4/20/2006	5500.12	NPP
P-3	8/16/2006	5500.21	NPP
RW-1	8/26/2003	5497.86	0.86
RW-1	1/15/2004	5497.84	0.62
RW-1	3/3/2004	5497.86	0.78
RW-1	8/25/2004	5497.92	0.52
RW-1	4/8/2005	5499.15	0.03
RW-1	8/16/2005	5499.20	0.01
RW-1	4/9/2007	5499.36	NPP
RW-2	8/26/2003	5500.44	NPP
RW-2	1/14/2004	5499.54	0.12
RW-2	3/3/2004	5499.64	0.07
RW-2	4/7/2004	5500.83	0.08
RW-2	8/16/2004	5500.56	0.01
RW-2	8/25/2004	5500.27	0.69
RW-2	4/9/2007	5501.31	NPP
RW-3	1/14/2003	5497.69	0.05
RW-3	8/25/2003	5497.67	NPP
RW-3	3/4/2004	5497.91	0.06
RW-3	8/26/2004	5497.63	0.03
RW-3	4/7/2005	5499.23	NPP
RW-3	8/1/2005	5498.62	0.01
RW-3	8/1/2006	5499.33	NPP
RW-3	4/9/2007	5499.38	NPP
RW-9	3/3/2004	5497.77	1.06
RW-9	8/25/2004	5497.96	0.59
RW-9	4/9/2007	5498.90	NPP
RW-14	3/3/2004	5502.00	1.44
RW-14	8/23/2004	5502.39	NPP
RW-14	8/1/2005	5502.46	NPP
RW-14	4/1/2006	5502.64	NPP
RW-14	8/1/2006	5502.38	NPP
RW-14	4/9/2007	5502.38	NPP
RW-15	3/3/2004	5500.90	NPP
RW-15	8/25/2004	5501.91	NPP
RW-15	8/1/2005	5502.10	NPP
RW-15	4/1/2006	5502.27	0.01

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
RW-15	8/1/2006	5502.00	NPP
RW-15	4/9/2007	5502.10	NPP
RW-16	3/3/2004	5500.41	NPP
RW-16	8/25/2004	5528.64	34.05
RW-16	8/1/2005	5501.63	0.02
RW-16	4/1/2006	5501.84	NPP
RW-16	8/1/2006	5501.72	NPP
RW-16	4/9/2007	5501.82	NPP
RW-17	8/26/2003	5500.54	0.05
RW-17	1/14/2004	5499.52	0.04
RW-17	3/3/2004	5498.37	0.10
RW-17	8/25/2004	5500.42	0.26
RW-17	4/7/2005	5500.88	0.03
RW-17	8/1/2005	5500.84	0.08
RW-17	4/1/2006	5501.14	0.02
RW-17	8/1/2006	5501.12	0.01
RW-17	4/9/2007	5501.31	NPP
RW-18	3/3/2004	5497.62	2.31
RW-18	8/25/2004	5498.82	0.38
RW-18	8/1/2005	5500.14	NPP
RW-18	4/1/2006	5500.13	1.41
RW-18	8/1/2006	5500.15	0.02
RW-18	4/9/2007	5500.42	0.09
RW-19	8/26/2003	5500.26	0.02
RW-19	1/14/2004	5499.38	0.95
RW-19	3/3/2004	5499.44	1.07
RW-19	8/25/2004	5499.91	1.02
RW-19	4/7/2005	5500.56	1.24
RW-19	8/15/2005	5500.48	0.07
RW-19	4/18/2006	5500.76	0.11
RW-19	4/9/2007	5500.99	NPP
RW-22	3/3/2004	5498.40	0.78
RW-22	8/25/2004	5494.48	0.03
RW-22	8/1/2005	5498.99	0.01
RW-22	4/1/2006	5499.44	0.01
RW-22	8/1/2006	5499.41	NPP
RW-22	4/9/2007	5499.52	NPP
RW-23	3/3/2004	5497.62	0.21
RW-23	8/25/2004	5497.83	0.10
RW-23	4/9/2007	5498.32	0.04
RW-28	3/3/2004	5497.92	2.28
RW-28	8/25/2004	5498.18	1.84
RW-28	4/9/2007	5499.80	0.21
RW-42	8/26/2003	5500.05	1.30
RW-42	1/14/2004	5499.98	0.58
RW-42	3/3/2004	5499.99	1.32

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - Refinery Complex
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
RW-42	8/25/2004	5499.89	1.01
RW-42	4/7/2005	5506.68	0.15
RW-42	8/16/2005	5500.47	0.54
RW-42	4/18/2006	5500.69	0.50
RW-42	8/22/2006	5501.16	0.82
RW-42	4/9/2007	5500.95	0.13
RW-43	3/3/2004	5493.84	0.07
RW-43	8/25/2004	5494.68	0.28
RW-43	4/9/2007	5495.52	NPP

Notes:

ft = feet

amsl = above mean level

NWP = No Water Present

NPP = No Product Present

MW = Monitoring Well

P= Piezometer

RW= Recovery Well

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 0+60	3/14/2005	5498.62	NPP
CW 0+60	5/9/2005	5498.22	NPP
CW 0+60	5/12/2005	5498.16	NPP
CW 0+60	5/17/2005	5498.14	NPP
CW 0+60	5/19/2005	5498.11	NPP
CW 0+60	5/24/2005	5498.10	NPP
CW 0+60	5/26/2005	5498.08	NPP
CW 0+60	5/31/2005	5498.08	NPP
CW 0+60	6/2/2005	5498.07	NPP
CW 0+60	6/7/2005	5498.08	NPP
CW 0+60	6/9/2005	5498.05	NPP
CW 0+60	6/14/2005	5498.00	NPP
CW 0+60	6/16/2005	5498.02	NPP
CW 0+60	6/21/2005	5498.06	NPP
CW 0+60	6/23/2005	5498.01	NPP
CW 0+60	6/28/2005	5497.99	NPP
CW 0+60	7/7/2005	5498.00	NPP
CW 0+60	7/14/2005	5497.98	NPP
CW 0+60	7/19/2005	5497.97	NPP
CW 0+60	7/28/2005	5498.00	NPP
CW 0+60	8/2/2005	5498.00	NPP
CW 0+60	8/11/2005	5497.98	NPP
CW 0+60	8/23/2005	5498.18	NPP
CW 0+60	9/6/2005	5498.16	NPP
CW 0+60	9/20/2005	5498.27	NPP
CW 0+60	10/4/2005	5498.81	NPP
CW 0+60	10/18/2005	5498.75	NPP
CW 0+60	11/1/2005	5499.36	NPP
CW 0+60	11/15/2005	5499.28	NPP
CW 0+60	11/29/2005	5500.82	NPP
CW 0+60	12/13/2005	5500.34	NPP
CW 0+60	12/27/2005	5500.21	NPP
CW 0+60	1/10/2006	5500.32	NPP
CW 0+60	1/24/2006	5498.69	NPP
CW 0+60	2/8/2006	5498.69	NPP
CW 0+60	2/16/2006	5498.53	NPP
CW 0+60	3/1/2006	5498.62	NPP
CW 0+60	3/20/2006	5498.67	NPP
CW 0+60	4/3/2006	5498.59	NPP
CW 0+60	5/3/2006	5498.74	NPP
CW 0+60	5/17/2006	5498.73	NPP
CW 0+60	5/30/2006	5498.76	NPP
CW 0+60	6/12/2006	5498.72	NPP
CW 0+60	6/26/2006	5498.72	NPP

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 0+60	7/12/2006	5498.93	NPP
CW 0+60	7/24/2006	5498.90	NPP
CW 0+60	8/7/2006	5498.82	NPP
CW 0+60	8/21/2006	5498.77	NPP
CW 0+60	9/5/2006	5498.84	NPP
CW 0+60	9/18/2006	5498.90	NPP
CW 0+60	10/2/2006	5498.91	NPP
CW 1+50	3/14/2005	5498.89	NPP
CW 1+50	5/9/2005	5497.75	NPP
CW 1+50	5/12/2005	5497.70	NPP
CW 1+50	5/17/2005	5497.66	NPP
CW 1+50	5/19/2005	5497.64	NPP
CW 1+50	5/24/2005	5497.64	NPP
CW 1+50	5/26/2005	5497.63	NPP
CW 1+50	5/31/2005	5497.61	NPP
CW 1+50	6/2/2005	5497.64	NPP
CW 1+50	6/7/2005	5497.63	NPP
CW 1+50	6/9/2005	5497.65	NPP
CW 1+50	6/14/2005	5497.61	NPP
CW 1+50	6/16/2005	5497.66	NPP
CW 1+50	6/21/2005	5497.65	NPP
CW 1+50	6/23/2005	5497.65	NPP
CW 1+50	6/28/2005	5497.59	NPP
CW 1+50	7/7/2005	5497.61	NPP
CW 1+50	7/14/2005	5497.59	NPP
CW 1+50	7/19/2005	5497.58	NPP
CW 1+50	7/28/2005	5497.59	NPP
CW 1+50	8/2/2005	5497.62	NPP
CW 1+50	8/11/2005	5497.59	NPP
CW 1+50	8/23/2005	5497.61	NPP
CW 1+50	9/6/2005	5497.62	NPP
CW 1+50	9/20/2005	5497.79	NPP
CW 1+50	10/4/2005	5498.96	NPP
CW 1+50	10/18/2005	5498.92	NPP
CW 1+50	11/1/2005	5499.02	NPP
CW 1+50	11/15/2005	5499.05	NPP
CW 1+50	11/29/2005	5499.09	0.02
CW 1+50	12/13/2005	5499.03	NPP
CW 1+50	12/27/2005	5499.01	0.02
CW 1+50	1/10/2006	5499.04	0.01
CW 1+50	1/24/2006	5498.99	NPP
CW 1+50	2/8/2006	5499.02	0.11
CW 1+50	2/16/2006	5498.80	NPP
CW 1+50	3/1/2006	5498.90	NPP

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 1+50	3/20/2006	5498.87	NPP
CW 1+50	4/3/2006	5498.84	NPP
CW 1+50	5/3/2006	5498.84	NPP
CW 1+50	5/17/2006	5498.85	NPP
CW 1+50	5/30/2006	5498.82	NPP
CW 1+50	6/12/2006	5498.79	NPP
CW 1+50	6/26/2006	5498.84	NPP
CW 1+50	7/12/2006	5498.92	NPP
CW 1+50	7/24/2006	5498.94	NPP
CW 1+50	8/7/2006	5498.92	NPP
CW 1+50	8/21/2006	5498.88	NPP
CW 1+50	9/5/2006	5498.94	NPP
CW 1+50	9/18/2006	5498.95	NPP
CW 1+50	10/2/2006	5498.97	NPP
CW 3+85	3/14/2005	5498.58	NPP
CW 3+85	5/9/2005	5503.57	7.41
CW 3+85	5/12/2005	5503.55	7.51
CW 3+85	5/17/2005	5503.55	7.48
CW 3+85	5/19/2005	5503.55	7.52
CW 3+85	5/24/2005	5503.54	7.56
CW 3+85	5/26/2005	5503.55	7.52
CW 3+85	5/31/2005	5503.55	7.52
CW 3+85	6/2/2005	5497.55	NPP
CW 3+85	6/7/2005	5497.54	NPP
CW 3+85	6/9/2005	5497.56	NPP
CW 3+85	6/14/2005	5497.64	NPP
CW 3+85	6/16/2005	5497.53	NPP
CW 3+85	6/21/2005	5497.53	NPP
CW 3+85	6/23/2005	5497.52	NPP
CW 3+85	6/28/2005	5497.53	NPP
CW 3+85	7/7/2005	5497.54	NPP
CW 3+85	7/14/2005	5497.52	NPP
CW 3+85	7/19/2005	5497.52	NPP
CW 3+85	7/28/2005	5497.52	NPP
CW 3+85	8/2/2005	5497.54	NPP
CW 3+85	8/11/2005	5497.52	NPP
CW 3+85	8/23/2005	5497.57	NPP
CW 3+85	9/6/2005	5497.57	NPP
CW 3+85	9/20/2005	5499.44	NPP
CW 3+85	10/4/2005	5498.44	NPP
CW 3+85	10/18/2005	5498.42	NPP
CW 3+85	11/1/2005	5492.52	0.01
CW 3+85	11/15/2005	5498.68	NPP
CW 3+85	11/29/2005	5498.80	0.02

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 3+85	12/13/2005	5498.82	0.02
CW 3+85	12/27/2005	5498.73	0.02
CW 3+85	1/10/2006	5498.78	0.02
CW 3+85	1/24/2006	5490.76	0.04
CW 3+85	2/8/2006	5498.74	0.19
CW 3+85	2/16/2006	5498.51	NPP
CW 3+85	3/1/2006	5498.56	NPP
CW 3+85	3/20/2006	5498.58	NPP
CW 3+85	4/3/2006	5498.48	NPP
CW 3+85	5/3/2006	5498.51	NPP
CW 3+85	5/17/2006	5498.48	NPP
CW 3+85	5/30/2006	5497.94	NPP
CW 3+85	6/12/2006	5498.46	NPP
CW 3+85	6/26/2006	5498.48	NPP
CW 3+85	7/12/2006	5498.41	NPP
CW 3+85	7/24/2006	5498.52	NPP
CW 3+85	8/7/2006	5498.48	NPP
CW 3+85	8/21/2006	5498.50	NPP
CW 3+85	9/5/2006	5498.51	NPP
CW 3+85	9/18/2006	5498.52	NPP
CW 3+85	10/2/2006	5498.53	NPP
CW 5+50	3/14/2005	5497.60	NPP
CW 5+50	5/9/2005	5496.74	NPP
CW 5+50	5/12/2005	5496.71	NPP
CW 5+50	5/17/2005	5496.74	NPP
CW 5+50	5/19/2005	5496.71	NPP
CW 5+50	5/24/2005	5496.73	NPP
CW 5+50	5/26/2005	5496.73	NPP
CW 5+50	5/31/2005	5496.73	NPP
CW 5+50	6/2/2005	5496.74	NPP
CW 5+50	6/7/2005	5496.73	NPP
CW 5+50	6/9/2005	5496.75	NPP
CW 5+50	6/14/2005	5496.73	NPP
CW 5+50	6/16/2005	5496.73	NPP
CW 5+50	6/21/2005	5496.72	NPP
CW 5+50	6/23/2005	5496.75	0.01
CW 5+50	6/28/2005	5496.76	0.01
CW 5+50	7/7/2005	5496.73	NPP
CW 5+50	7/14/2005	5496.76	0.02
CW 5+50	7/19/2005	5496.73	NPP
CW 5+50	7/28/2005	5496.74	NPP
CW 5+50	8/2/2005	5496.74	0.01
CW 5+50	8/11/2005	5496.76	0.02
CW 5+50	8/23/2005	5496.77	0.01

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 5+50	9/6/2005	5496.76	0.01
CW 5+50	9/20/2005	5496.74	NPP
CW 5+50	10/4/2005	5497.59	NPP
CW 5+50	10/18/2005	5497.06	NPP
CW 5+50	11/1/2005	5497.62	NPP
CW 5+50	11/15/2005	5497.71	NPP
CW 5+50	11/29/2005	5497.73	0.02
CW 5+50	12/13/2005	5497.72	NPP
CW 5+50	12/27/2005	5497.70	0.01
CW 5+50	1/10/2006	5497.73	0.01
CW 5+50	1/24/2006	5497.64	NPP
CW 5+50	2/8/2006	5497.71	0.11
CW 5+50	2/16/2006	5497.53	NPP
CW 5+50	3/1/2006	5497.56	NPP
CW 5+50	3/20/2006	5497.57	NPP
CW 5+50	4/3/2006	5497.53	NPP
CW 5+50	5/3/2006	5497.57	NPP
CW 5+50	5/17/2006	5497.54	NPP
CW 5+50	5/30/2006	5497.57	NPP
CW 5+50	6/12/2006	5497.57	NPP
CW 5+50	6/26/2006	5497.52	NPP
CW 5+50	7/12/2006	5497.57	NPP
CW 5+50	7/24/2006	5497.57	NPP
CW 5+50	8/7/2006	5497.57	NPP
CW 5+50	8/21/2006	5497.53	NPP
CW 5+50	9/5/2006	5497.60	NPP
CW 5+50	9/18/2006	5497.57	NPP
CW 5+50	10/2/2006	5497.62	NPP
CW 6+70	3/14/2005	5497.13	NPP
CW 6+70	5/9/2005	5496.51	NPP
CW 6+70	5/12/2005	5496.40	NPP
CW 6+70	5/17/2005	5496.45	NPP
CW 6+70	5/19/2005	5496.41	NPP
CW 6+70	5/24/2005	5496.43	NPP
CW 6+70	5/26/2005	5496.42	NPP
CW 6+70	5/31/2005	5496.46	NPP
CW 6+70	6/2/2005	5496.44	NPP
CW 6+70	6/7/2005	5496.45	NPP
CW 6+70	6/9/2005	5496.45	NPP
CW 6+70	6/14/2005	5496.41	NPP
CW 6+70	6/16/2005	5496.42	0.01
CW 6+70	6/21/2005	5496.41	0.01
CW 6+70	6/23/2005	5496.42	0.01
CW 6+70	6/28/2005	5496.42	0.01

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 6+70	7/7/2005	5496.40	NPP
CW 6+70	7/14/2005	5496.41	0.01
CW 6+70	7/19/2005	5496.41	0.01
CW 6+70	7/28/2005	5496.41	NPP
CW 6+70	8/2/2005	5496.41	0.01
CW 6+70	8/11/2005	5496.41	0.01
CW 6+70	8/23/2005	5496.40	0.02
CW 6+70	9/6/2005	5496.36	NPP
CW 6+70	9/20/2005	5496.33	NPP
CW 6+70	10/4/2005	5497.14	NPP
CW 6+70	10/18/2005	5497.14	NPP
CW 6+70	11/1/2005	5497.19	NPP
CW 6+70	11/15/2005	5497.24	NPP
CW 6+70	11/29/2005	5496.30	0.05
CW 6+70	12/13/2005	5497.26	0.01
CW 6+70	12/27/2005	5497.23	0.02
CW 6+70	1/10/2006	5497.33	0.02
CW 6+70	1/24/2006	5497.16	NPP
CW 6+70	2/8/2006	5497.29	0.18
CW 6+70	2/16/2006	5497.13	NPP
CW 6+70	3/1/2006	5497.11	NPP
CW 6+70	3/20/2006	5497.18	NPP
CW 6+70	4/3/2006	5497.15	NPP
CW 6+70	5/3/2006	5497.20	NPP
CW 6+70	5/17/2006	5497.21	NPP
CW 6+70	5/30/2006	5497.23	NPP
CW 6+70	6/12/2006	5497.20	NPP
CW 6+70	6/26/2006	5497.22	NPP
CW 6+70	7/12/2006	5497.17	NPP
CW 6+70	7/24/2006	5497.17	NPP
CW 6+70	8/7/2006	5497.13	NPP
CW 6+70	8/21/2006	5497.17	NPP
CW 6+70	9/5/2006	5497.19	NPP
CW 6+70	9/18/2006	5497.15	NPP
CW 6+70	10/2/2006	5497.16	NPP
CW 8+10	3/14/2005	5496.59	NPP
CW 8+10	5/9/2005	5495.74	NPP
CW 8+10	5/12/2005	5495.67	NPP
CW 8+10	5/17/2005	5495.72	NPP
CW 8+10	5/19/2005	5495.64	NPP
CW 8+10	5/24/2005	5495.68	NPP
CW 8+10	5/26/2005	5495.66	NPP
CW 8+10	5/31/2005	5495.67	NPP
CW 8+10	6/2/2005	5495.67	NPP

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 8+10	6/7/2005	5495.66	NPP
CW 8+10	6/9/2005	5495.65	NPP
CW 8+10	6/14/2005	5495.62	NPP
CW 8+10	6/16/2005	5495.64	0.01
CW 8+10	6/21/2005	5495.63	0.01
CW 8+10	6/23/2005	5495.66	0.01
CW 8+10	7/7/2005	5495.62	NPP
CW 8+10	7/14/2005	5495.62	0.01
CW 8+10	7/19/2005	5495.60	NPP
CW 8+10	7/28/2005	5495.55	NPP
CW 8+10	8/2/2005	5495.65	0.01
CW 8+10	8/11/2005	5495.62	0.01
CW 8+10	8/23/2005	5495.65	NPP
CW 8+10	9/6/2005	5495.65	NPP
CW 8+10	9/20/2005	5495.59	NPP
CW 8+10	10/4/2005	5496.78	NPP
CW 8+10	10/18/2005	5496.83	NPP
CW 8+10	11/1/2005	5496.80	NPP
CW 8+10	11/15/2005	5496.88	NPP
CW 8+10	11/29/2005	5496.86	0.02
CW 8+10	12/13/2005	5496.86	0.01
CW 8+10	12/27/2005	5496.79	0.01
CW 8+10	1/10/2006	5496.64	NPP
CW 8+10	1/24/2006	5496.57	NPP
CW 8+10	2/8/2006	5496.59	NPP
CW 8+10	2/16/2006	5496.58	NPP
CW 8+10	3/1/2006	5496.59	NPP
CW 8+10	3/20/2006	5496.61	NPP
CW 8+10	4/3/2006	5496.59	NPP
CW 8+10	5/3/2006	5496.63	NPP
CW 8+10	5/17/2006	5496.65	NPP
CW 8+10	5/30/2006	5496.69	NPP
CW 8+10	6/12/2006	5496.66	NPP
CW 8+10	6/26/2006	5496.64	NPP
CW 8+10	7/12/2006	5496.69	NPP
CW 8+10	7/24/2006	5496.75	NPP
CW 8+10	8/7/2006	5496.71	NPP
CW 8+10	8/21/2006	5496.73	NPP
CW 8+10	9/5/2006	5496.69	NPP
CW 8+10	9/18/2006	5496.70	NPP
CW 8+10	10/2/2006	5496.71	NPP
CW 8+45	3/14/2005	5496.29	0.12
CW 8+45	5/9/2005	5496.03	0.46
CW 8+45	5/12/2005	5495.96	0.20

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Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 8+45	5/17/2005	5496.01	0.42
CW 8+45	5/19/2005	5495.92	0.28
CW 8+45	5/24/2005	5495.98	0.18
CW 8+45	5/26/2005	5496.00	0.33
CW 8+45	5/31/2005	5495.96	0.48
CW 8+45	6/2/2005	5495.99	0.09
CW 8+45	6/7/2005	5496.00	0.20
CW 8+45	6/9/2005	5495.94	0.29
CW 8+45	6/14/2005	5495.52	2.09
CW 8+45	6/16/2005	5495.94	0.04
CW 8+45	6/21/2005	5495.94	0.15
CW 8+45	6/23/2005	5495.97	0.02
CW 8+45	6/28/2005	5495.99	0.12
CW 8+45	7/7/2005	5496.02	0.05
CW 8+45	7/14/2005	5495.93	0.12
CW 8+45	7/19/2005	5495.92	0.13
CW 8+45	7/28/2005	5495.95	0.16
CW 8+45	8/2/2005	5495.95	0.11
CW 8+45	8/11/2005	5495.93	0.12
CW 8+45	8/23/2005	5495.96	0.31
CW 8+45	9/6/2005	5495.95	0.29
CW 8+45	9/20/2005	5495.84	0.04
CW 8+45	10/4/2005	5496.57	0.14
CW 8+45	10/18/2005	5496.74	0.29
CW 8+45	11/1/2005	5496.59	0.11
CW 8+45	11/15/2005	5496.56	0.47
CW 8+45	11/29/2005	5496.61	0.23
CW 8+45	12/13/2005	5496.64	0.09
CW 8+45	12/27/2005	5496.62	0.08
CW 8+45	1/10/2006	5496.42	0.09
CW 8+45	1/24/2006	5496.34	0.07
CW 8+45	2/8/2006	5496.34	0.02
CW 8+45	2/16/2006	5496.35	0.02
CW 8+45	3/1/2006	5496.33	0.01
CW 8+45	3/20/2006	5496.39	0.02
CW 8+45	4/3/2006	5496.34	0.07
CW 8+45	5/3/2006	5496.45	NPP
CW 8+45	5/17/2006	5496.31	NPP
CW 8+45	5/30/2006	5496.39	NPP
CW 8+45	6/12/2006	5496.46	0.02
CW 8+45	6/26/2006	5496.39	0.03
CW 8+45	7/12/2006	5496.45	NPP
CW 8+45	7/24/2006	5496.49	0.02
CW 8+45	8/7/2006	5496.44	0.10

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Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 8+45	8/21/2006	5496.42	0.10
CW 8+45	9/5/2006	5496.39	0.41
CW 8+45	9/18/2006	5496.40	0.07
CW 8+45	10/2/2006	5496.44	0.05
CW 11+15	3/14/2005	5498.31	NPP
CW 11+15	5/9/2005	5497.79	0.12
CW 11+15	5/12/2005	5497.72	0.04
CW 11+15	5/17/2005	5497.73	0.07
CW 11+15	5/19/2005	5497.66	0.10
CW 11+15	5/24/2005	5497.69	0.10
CW 11+15	5/26/2005	5497.74	0.10
CW 11+15	5/31/2005	5497.69	0.10
CW 11+15	6/2/2005	5497.72	0.08
CW 11+15	6/7/2005	5497.71	0.12
CW 11+15	6/9/2005	5497.71	0.11
CW 11+15	6/14/2005	5497.67	0.07
CW 11+15	6/16/2005	5497.69	0.05
CW 11+15	6/21/2005	5497.70	0.12
CW 11+15	6/23/2005	5497.72	0.07
CW 11+15	6/28/2005	5497.72	0.06
CW 11+15	7/7/2005	5497.71	0.12
CW 11+15	7/14/2005	5497.70	0.11
CW 11+15	7/19/2005	547.70	0.04
CW 11+15	7/28/2005	5497.71	0.04
CW 11+15	8/2/2005	5497.73	0.07
CW 11+15	8/11/2005	5497.70	0.11
CW 11+15	8/23/2005	5497.78	0.01
CW 11+15	9/6/2005	5497.77	0.01
CW 11+15	9/20/2005	5497.79	0.01
CW 11+15	10/4/2005	5498.10	NPP
CW 11+15	10/18/2005	5498.13	NPP
CW 11+15	11/1/2005	5498.26	NPP
CW 11+15	11/15/2005	5498.30	NPP
CW 11+15	11/29/2005	5497.40	NPP
CW 11+15	12/13/2005	5498.53	0.01
CW 11+15	12/27/2005	5498.48	0.01
CW 11+15	1/10/2006	5498.48	0.02
CW 11+15	1/24/2006	5498.40	NPP
CW 11+15	2/8/2006	5498.45	0.16
CW 11+15	2/16/2006	5498.21	NPP
CW 11+15	3/1/2006	5498.28	NPP
CW 11+15	3/20/2006	5498.29	NPP
CW 11+15	4/3/2006	5498.30	NPP
CW 11+15	5/3/2006	5498.28	NPP

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Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 11+15	5/17/2006	5498.26	NPP
CW 11+15	5/30/2006	5498.24	NPP
CW 11+15	6/12/2006	5498.39	NPP
CW 11+15	6/26/2006	5498.21	NPP
CW 11+15	7/12/2006	5498.23	NPP
CW 11+15	7/24/2006	5498.27	NPP
CW 11+15	8/7/2006	5498.21	NPP
CW 11+15	8/21/2006	5498.19	NPP
CW 11+15	9/5/2006	5498.19	NPP
CW 11+15	9/18/2006	5498.24	NPP
CW 11+15	10/2/2006	5498.22	NPP
CW 14+10	3/14/2005	5497.93	NPP
CW 14+10	5/9/2005	5497.14	NPP
CW 14+10	5/12/2005	5497.05	NPP
CW 14+10	5/17/2005	5497.12	NPP
CW 14+10	5/19/2005	5497.01	NPP
CW 14+10	5/24/2005	5497.03	NPP
CW 14+10	5/26/2005	5497.05	NPP
CW 14+10	5/31/2005	5497.05	NPP
CW 14+10	6/2/2005	5497.07	NPP
CW 14+10	6/7/2005	5497.06	NPP
CW 14+10	6/9/2005	5497.11	NPP
CW 14+10	6/14/2005	5497.02	NPP
CW 14+10	6/16/2005	5497.03	NPP
CW 14+10	6/21/2005	5497.02	NPP
CW 14+10	6/23/2005	5497.05	0.01
CW 14+10	6/28/2005	5497.11	NPP
CW 14+10	7/7/2005	5497.06	0.01
CW 14+10	7/14/2005	5497.04	0.01
CW 14+10	7/19/2005	5497.11	NPP
CW 14+10	7/28/2005	5497.09	NPP
CW 14+10	8/2/2005	5497.14	0.01
CW 14+10	8/11/2005	5497.04	0.01
CW 14+10	8/23/2005	5497.12	NPP
CW 14+10	9/6/2005	5497.15	NPP
CW 14+10	9/20/2005	5497.07	NPP
CW 14+10	10/4/2005	5497.92	NPP
CW 14+10	10/18/2005	5497.95	NPP
CW 14+10	11/1/2005	5497.98	NPP
CW 14+10	11/15/2005	5491.48	NPP
CW 14+10	11/29/2005	5497.90	0.01
CW 14+10	12/13/2005	5498.01	0.02
CW 14+10	12/27/2005	5497.99	0.01
CW 14+10	1/10/2006	5497.98	0.04

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 14+10	1/24/2006	5497.92	NPP
CW 14+10	2/8/2006	5497.97	0.11
CW 14+10	2/16/2006	5497.82	NPP
CW 14+10	3/1/2006	5497.90	NPP
CW 14+10	3/20/2006	5497.97	NPP
CW 14+10	4/3/2006	5497.92	NPP
CW 14+10	5/3/2006	5497.95	NPP
CW 14+10	5/17/2006	5497.96	NPP
CW 14+10	5/30/2006	5497.98	NPP
CW 14+10	6/12/2006	5497.94	NPP
CW 14+10	6/26/2006	5497.97	NPP
CW 14+10	7/12/2006	5497.98	NPP
CW 14+10	7/24/2006	5498.03	NPP
CW 14+10	8/7/2006	5497.92	NPP
CW 14+10	8/21/2006	5497.96	NPP
CW 14+10	9/5/2006	5497.91	NPP
CW 14+10	9/18/2006	5497.94	NPP
CW 14+10	10/2/2006	5497.94	NPP
CW 16+60	5/9/2005	5497.31	NPP
CW 16+60	5/12/2005	5497.26	NPP
CW 16+60	5/17/2005	5497.30	NPP
CW 16+60	5/19/2005	5497.27	NPP
CW 16+60	5/24/2005	5497.27	NPP
CW 16+60	5/26/2005	5497.26	NPP
CW 16+60	5/31/2005	5497.25	NPP
CW 16+60	6/2/2005	5497.25	NPP
CW 16+60	6/7/2005	5497.25	NPP
CW 16+60	6/9/2005	5497.26	NPP
CW 16+60	6/14/2005	5497.26	0.01
CW 16+60	6/16/2005	5497.27	0.01
CW 16+60	6/21/2005	5497.25	NPP
CW 16+60	6/23/2005	5497.25	0.01
CW 16+60	6/28/2005	5497.26	0.01
CW 16+60	7/7/2005	5497.25	0.01
CW 16+60	7/14/2005	5497.24	0.01
CW 16+60	7/19/2005	5497.28	0.01
CW 16+60	7/28/2005	5497.28	0.02
CW 16+60	8/2/2005	5497.32	0.01
CW 16+60	8/11/2005	5497.24	0.01
CW 16+60	8/23/2005	5497.26	NPP
CW 16+60	9/6/2005	5497.32	NPP
CW 16+60	9/20/2005	5497.35	NPP
CW 16+60	10/4/2005	5497.92	NPP
CW 16+60	10/18/2005	5498.05	NPP

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Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 16+60	11/1/2005	5498.05	NPP
CW 16+60	11/15/2005	5497.95	NPP
CW 16+60	11/29/2005	5497.95	NPP
CW 16+60	12/13/2005	5497.98	NPP
CW 16+60	12/27/2005	5497.95	NPP
CW 16+60	1/10/2006	5497.94	NPP
CW 16+60	1/24/2006	5497.94	NPP
CW 16+60	2/8/2006	5497.95	NPP
CW 16+60	2/16/2006	5497.85	NPP
CW 16+60	3/1/2006	5497.96	NPP
CW 16+60	3/14/2006	5497.96	NPP
CW 16+60	3/20/2006	5498.01	NPP
CW 16+60	4/3/2006	5497.97	NPP
CW 16+60	5/3/2006	5498.00	NPP
CW 16+60	5/17/2006	5498.02	NPP
CW 16+60	5/30/2006	5498.04	NPP
CW 16+60	6/12/2006	5498.01	NPP
CW 16+60	6/26/2006	5498.06	NPP
CW 16+60	7/12/2006	5498.02	NPP
CW 16+60	7/24/2006	5498.01	NPP
CW 16+60	8/7/2006	5498.00	NPP
CW 16+60	8/21/2006	5497.99	NPP
CW 16+60	9/5/2006	5498.01	NPP
CW 16+60	9/18/2006	5497.99	NPP
CW 16+60	10/2/2006	5498.00	NPP
CW 19+50	5/9/2005	5497.12	NPP
CW 19+50	5/12/2005	5497.09	NPP
CW 19+50	5/17/2005	5497.13	NPP
CW 19+50	5/19/2005	5497.04	NPP
CW 19+50	5/24/2005	5497.08	NPP
CW 19+50	5/26/2005	5497.07	NPP
CW 19+50	5/31/2005	5497.09	NPP
CW 19+50	6/2/2005	5497.10	NPP
CW 19+50	6/7/2005	5497.09	NPP
CW 19+50	6/9/2005	5497.12	NPP
CW 19+50	6/14/2005	5497.08	NPP
CW 19+50	6/16/2005	5497.06	NPP
CW 19+50	6/21/2005	5497.05	NPP
CW 19+50	6/23/2005	5497.08	NPP
CW 19+50	6/28/2005	5497.10	NPP
CW 19+50	7/7/2005	5497.08	NPP
CW 19+50	7/14/2005	5497.04	NPP
CW 19+50	7/19/2005	5497.15	NPP
CW 19+50	7/28/2005	5497.05	NPP

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
Bloomfield Refinery - Bloomfield, New Mexico

Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 19+50	8/2/2005	5497.10	NPP
CW 19+50	8/11/2005	5497.04	NPP
CW 19+50	8/23/2005	5497.22	NPP
CW 19+50	9/6/2005	5497.18	NPP
CW 19+50	9/20/2005	5497.33	NPP
CW 19+50	10/4/2005	5498.15	NPP
CW 19+50	10/18/2005	54998.20	NPP
CW 19+50	11/1/2005	5498.25	NPP
CW 19+50	11/15/2005	5498.15	NPP
CW 19+50	12/13/2005	5498.17	0.02
CW 19+50	12/27/2005	54998.15	NPP
CW 19+50	1/10/2006	5498.16	NPP
CW 19+50	1/24/2006	54998.21	NPP
CW 19+50	2/8/2006	5498.18	NPP
CW 19+50	2/16/2006	54998.18	NPP
CW 19+50	3/1/2006	5498.25	NPP
CW 19+50	3/14/2006	5498.25	NPP
CW 19+50	3/20/2006	5498.29	NPP
CW 19+50	4/3/2006	5498.21	NPP
CW 19+50	5/3/2006	5498.26	NPP
CW 19+50	5/17/2006	5498.23	NPP
CW 19+50	5/30/2006	5498.29	NPP
CW 19+50	6/12/2006	5498.20	NPP
CW 19+50	6/26/2006	5498.31	NPP
CW 19+50	7/12/2006	5498.29	NPP
CW 19+50	7/24/2006	5498.02	NPP
CW 19+50	8/7/2006	5498.23	NPP
CW 19+50	8/21/2006	5498.23	NPP
CW 19+50	9/5/2006	5498.15	NPP
CW 19+50	9/18/2006	5498.20	NPP
CW 19+50	10/2/2006	5498.24	NPP
CW 22+00	5/9/2005	5498.07	NPP
CW 22+00	5/12/2005	5498.06	NPP
CW 22+00	5/17/2005	5498.06	NPP
CW 22+00	5/19/2005	5498.04	NPP
CW 22+00	5/24/2005	5498.04	NPP
CW 22+00	5/26/2005	5498.04	NPP
CW 22+00	5/31/2005	5498.27	NPP
CW 22+00	6/2/2005	5498.06	NPP
CW 22+00	6/7/2005	5498.04	NPP
CW 22+00	6/9/2005	5498.04	NPP
CW 22+00	6/14/2005	5498.06	NPP
CW 22+00	6/16/2005	5498.04	NPP
CW 22+00	6/21/2005	5497.94	NPP

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Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 22+00	6/23/2005	5498.07	0.01
CW 22+00	6/28/2005	5498.42	0.10
CW 22+00	7/7/2005	5498.32	0.10
CW 22+00	7/14/2005	5498.29	0.09
CW 22+00	7/19/2005	5498.07	NPP
CW 22+00	7/28/2005	5498.04	NPP
CW 22+00	8/2/2005	5498.04	NPP
CW 22+00	8/11/2005	5498.29	0.09
CW 22+00	8/23/2005	5498.07	NPP
CW 22+00	9/6/2005	5498.04	NPP
CW 22+00	9/20/2005	5498.10	NPP
CW 22+00	10/4/2005	5498.82	NPP
CW 22+00	10/18/2005	5498.86	NPP
CW 22+00	11/1/2005	5498.93	NPP
CW 22+00	11/15/2005	5498.92	NPP
CW 22+00	11/29/2005	5496.73	0.02
CW 22+00	12/13/2005	5498.96	0.01
CW 22+00	12/27/2005	5498.94	0.01
CW 22+00	1/10/2006	5498.91	NPP
CW 22+00	1/24/2006	5498.92	NPP
CW 22+00	2/8/2006	5498.90	NPP
CW 22+00	2/16/2006	5498.90	NPP
CW 22+00	3/1/2006	5498.94	NPP
CW 22+00	3/14/2006	5498.91	NPP
CW 22+00	3/20/2006	5498.91	NPP
CW 22+00	4/3/2006	5498.91	NPP
CW 22+00	5/3/2006	5498.92	NPP
CW 22+00	5/17/2006	5498.90	NPP
CW 22+00	5/30/2006	5498.92	NPP
CW 22+00	6/12/2006	5498.90	NPP
CW 22+00	6/26/2006	5498.92	NPP
CW 22+00	7/12/2006	5498.90	NPP
CW 22+00	7/24/2006	5498.91	NPP
CW 22+00	8/7/2006	5498.85	NPP
CW 22+00	8/21/2006	5498.90	NPP
CW 22+00	9/5/2006	5498.90	NPP
CW 22+00	9/18/2006	5498.81	NPP
CW 22+00	10/2/2006	5498.88	NPP
CW 23+10	5/9/2005	5498.53	NPP
CW 23+10	5/12/2005	5498.53	NPP
CW 23+10	5/17/2005	5498.53	NPP
CW 23+10	5/19/2005	5498.50	NPP
CW 23+10	5/24/2005	5498.52	NPP
CW 23+10	5/26/2005	5498.51	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 23+10	5/31/2005	5498.51	NPP
CW 23+10	6/2/2005	5498.54	NPP
CW 23+10	6/7/2005	5498.52	NPP
CW 23+10	6/9/2005	5498.53	NPP
CW 23+10	6/14/2005	5498.51	NPP
CW 23+10	6/16/2005	5498.51	NPP
CW 23+10	6/21/2005	5498.52	NPP
CW 23+10	6/23/2005	5498.52	NPP
CW 23+10	6/28/2005	5499.62	NPP
CW 23+10	7/7/2005	5498.53	NPP
CW 23+10	7/14/2005	5498.51	NPP
CW 23+10	7/19/2005	5498.52	NPP
CW 23+10	7/28/2005	5498.50	NPP
CW 23+10	8/2/2005	5498.54	NPP
CW 23+10	8/11/2005	5498.51	NPP
CW 23+10	8/23/2005	5498.53	NPP
CW 23+10	9/6/2005	5498.53	NPP
CW 23+10	9/20/2005	5498.59	NPP
CW 23+10	10/4/2005	5499.22	NPP
CW 23+10	10/18/2005	5499.21	NPP
CW 23+10	11/1/2005	5493.96	0.01
CW 23+10	11/15/2005	5499.31	NPP
CW 23+10	11/29/2005	5499.78	NPP
CW 23+10	12/13/2005	5499.34	NPP
CW 23+10	12/27/2005	5499.36	NPP
CW 23+10	1/10/2006	5499.35	NPP
CW 23+10	1/24/2006	5499.31	NPP
CW 23+10	2/8/2006	5499.33	NPP
CW 23+10	2/16/2006	5499.29	NPP
CW 23+10	3/1/2006	5499.32	NPP
CW 23+10	3/14/2006	5499.33	NPP
CW 23+10	3/20/2006	5499.28	NPP
CW 23+10	4/3/2006	5499.28	NPP
CW 23+10	5/3/2006	5499.31	NPP
CW 23+10	5/17/2006	5499.28	NPP
CW 23+10	5/30/2006	5499.30	NPP
CW 23+10	6/12/2006	5499.81	NPP
CW 23+10	6/26/2006	5499.29	0.23
CW 23+10	7/12/2006	5499.31	0.05
CW 23+10	7/24/2006	5499.25	NPP
CW 23+10	8/7/2006	5499.35	NPP
CW 23+10	8/21/2006	5499.26	NPP
CW 23+10	9/5/2006	5499.25	NPP
CW 23+10	9/18/2006	5499.25	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 23+10	10/2/2006	5499.26	NPP
CW 23+90	5/9/2005	5498.19	NPP
CW 23+90	5/12/2005	5498.19	NPP
CW 23+90	5/17/2005	5498.18	NPP
CW 23+90	5/19/2005	5498.17	NPP
CW 23+90	5/24/2005	5498.18	NPP
CW 23+90	5/26/2005	5498.18	NPP
CW 23+90	5/31/2005	5498.19	NPP
CW 23+90	6/2/2005	5498.23	NPP
CW 23+90	6/7/2005	5498.18	NPP
CW 23+90	6/9/2005	5498.18	NPP
CW 23+90	6/14/2005	5498.18	NPP
CW 23+90	6/16/2005	5498.18	NPP
CW 23+90	6/21/2005	5498.18	NPP
CW 23+90	6/23/2005	5498.19	NPP
CW 23+90	6/28/2005	5498.19	NPP
CW 23+90	7/7/2005	5505.60	9.28
CW 23+90	7/14/2005	5498.17	NPP
CW 23+90	7/19/2005	5498.21	NPP
CW 23+90	7/28/2005	5498.17	NPP
CW 23+90	8/2/2005	5498.19	NPP
CW 23+90	8/11/2005	5498.17	NPP
CW 23+90	8/23/2005	5498.25	NPP
CW 23+90	9/6/2005	5498.20	NPP
CW 23+90	9/20/2005	5498.28	NPP
CW 23+90	10/4/2005	5499.00	NPP
CW 23+90	10/18/2005	5498.98	NPP
CW 23+90	11/1/2005	5499.07	NPP
CW 23+90	11/15/2005	5499.05	NPP
CW 23+90	11/29/2005	5499.08	NPP
CW 23+90	12/13/2005	5499.07	NPP
CW 23+90	12/27/2005	5499.08	NPP
CW 23+90	1/10/2006	5499.05	NPP
CW 23+90	1/24/2006	5499.07	NPP
CW 23+90	2/8/2006	5499.04	NPP
CW 23+90	2/16/2006	5499.05	NPP
CW 23+90	3/1/2006	5499.08	NPP
CW 23+90	3/14/2006	5499.08	NPP
CW 23+90	3/20/2006	5499.08	NPP
CW 23+90	4/3/2006	5499.05	NPP
CW 23+90	5/3/2006	5499.06	NPP
CW 23+90	5/17/2006	5499.04	NPP
CW 23+90	5/30/2006	5499.09	NPP
CW 23+90	6/12/2006	5499.08	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 23+90	6/26/2006	5499.11	NPP
CW 23+90	7/12/2006	5499.15	NPP
CW 23+90	7/24/2006	5499.09	NPP
CW 23+90	8/7/2006	5499.06	NPP
CW 23+90	8/21/2006	5499.08	NPP
CW 23+90	9/5/2006	5499.10	NPP
CW 23+90	9/18/2006	5499.11	NPP
CW 23+90	10/2/2006	5499.11	NPP
CW 25+95	5/9/2005	5497.79	NPP
CW 25+95	5/12/2005	5497.79	NPP
CW 25+95	5/17/2005	5497.79	NPP
CW 25+95	5/19/2005	5497.79	NPP
CW 25+95	5/24/2005	5497.80	NPP
CW 25+95	5/26/2005	5497.79	NPP
CW 25+95	5/31/2005	5497.80	NPP
CW 25+95	6/2/2005	5497.84	NPP
CW 25+95	6/7/2005	5497.80	NPP
CW 25+95	6/9/2005	5497.80	NPP
CW 25+95	6/14/2005	5497.80	NPP
CW 25+95	6/16/2005	5497.80	NPP
CW 25+95	6/21/2005	5497.80	NPP
CW 25+95	6/23/2005	5497.81	NPP
CW 25+95	6/28/2005	5497.81	NPP
CW 25+95	7/7/2005	5497.80	NPP
CW 25+95	7/14/2005	5497.79	NPP
CW 25+95	7/19/2005	5497.80	NPP
CW 25+95	7/28/2005	5497.79	NPP
CW 25+95	8/2/2005	5497.79	NPP
CW 25+95	8/11/2005	5497.79	NPP
CW 25+95	8/23/2005	5497.81	NPP
CW 25+95	9/6/2005	5497.81	NPP
CW 25+95	9/20/2005	5497.83	NPP
CW 25+95	10/4/2005	5498.67	NPP
CW 25+95	10/18/2005	5498.65	NPP
CW 25+95	11/1/2005	5498.67	NPP
CW 25+95	11/15/2005	5498.64	NPP
CW 25+95	11/29/2005	5498.66	NPP
CW 25+95	12/13/2005	5498.67	NPP
CW 25+95	12/27/2005	5498.67	NPP
CW 25+95	1/10/2006	5498.63	NPP
CW 25+95	1/24/2006	5498.66	NPP
CW 25+95	2/8/2006	5498.67	NPP
CW 25+95	2/16/2006	5498.66	NPP
CW 25+95	3/1/2006	5498.67	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
CW 25+95	3/14/2006	5498.69	NPP
CW 25+95	3/20/2006	5498.67	NPP
CW 25+95	4/3/2006	5498.68	NPP
CW 25+95	5/3/2006	5498.71	NPP
CW 25+95	5/17/2006	5498.75	NPP
CW 25+95	5/30/2006	5498.71	NPP
CW 25+95	6/12/2006	5498.67	NPP
CW 25+95	6/26/2006	5498.71	NPP
CW 25+95	7/12/2006	5498.71	NPP
CW 25+95	7/24/2006	5498.68	NPP
CW 25+95	8/7/2006	5498.72	NPP
CW 25+95	8/21/2006	5498.75	NPP
CW 25+95	9/5/2006	5498.72	NPP
CW 25+95	9/18/2006	5498.69	NPP
CW 25+95	10/2/2006	5498.69	NPP
OW 0+60	5/9/2005	5495.00	0.42
OW 0+60	5/12/2005	5494.97	0.46
OW 0+60	5/17/2005	5495.22	1.05
OW 0+60	5/19/2005	5494.91	0.47
OW 0+60	5/24/2005	5494.87	0.50
OW 0+60	5/26/2005	5494.84	0.54
OW 0+60	5/31/2005	5494.80	0.69
OW 0+60	6/2/2005	5494.78	0.69
OW 0+60	6/7/2005	5494.80	0.68
OW 0+60	6/9/2005	5494.78	0.67
OW 0+60	6/14/2005	5494.65	0.56
OW 0+60	6/16/2005	5494.66	0.58
OW 0+60	6/21/2005	5494.65	0.55
OW 0+60	6/23/2005	5494.67	0.58
OW 0+60	6/28/2005	5494.66	0.57
OW 0+60	7/7/2005	5494.43	0.76
OW 0+60	7/14/2005	5494.45	0.68
OW 0+60	7/19/2005	5494.47	0.72
OW 0+60	7/28/2005	5493.77	0.01
OW 0+60	8/2/2005	5493.77	0.01
OW 0+60	8/11/2005	5494.45	0.68
OW 0+60	8/23/2005	5496.72	0.02
OW 0+60	9/6/2005	5493.73	0.05
OW 0+60	9/20/2005	5494.47	0.11
OW 0+60	10/4/2005	5495.11	0.04
OW 0+60	10/18/2005	5495.34	0.03
OW 0+60	11/1/2005	5496.78	NPP
OW 0+60	11/15/2005	5496.45	NPP
OW 0+60	11/29/2005	5495.91	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 0+60	12/13/2005	5495.96	NPP
OW 0+60	12/27/2005	5495.93	NPP
OW 0+60	1/10/2006	5496.43	NPP
OW 0+60	1/24/2006	5495.49	NPP
OW 0+60	2/8/2006	5495.43	NPP
OW 0+60	2/16/2006	5495.46	NPP
OW 0+60	3/1/2006	5494.99	NPP
OW 0+60	3/14/2006	5495.29	NPP
OW 0+60	3/20/2006	5495.23	NPP
OW 0+60	4/3/2006	5495.23	NPP
OW 0+60	5/3/2006	5495.33	NPP
OW 0+60	5/17/2006	5495.39	NPP
OW 0+60	5/30/2006	5495.41	NPP
OW 0+60	6/12/2006	5495.28	NPP
OW 0+60	6/26/2006	5495.23	NPP
OW 0+60	7/12/2006	5495.50	NPP
OW 0+60	7/24/2006	5495.67	NPP
OW 0+60	8/7/2006	5495.49	NPP
OW 0+60	8/21/2006	5495.39	NPP
OW 0+60	9/5/2006	5495.30	NPP
OW 0+60	9/18/2006	5495.21	NPP
OW 0+60	10/2/2006	5495.15	NPP
OW 1+50	5/9/2005	5492.03	0.02
OW 1+50	5/12/2005	5491.79	1.07
OW 1+50	5/17/2005	5491.47	0.48
OW 1+50	5/19/2005	5491.75	0.97
OW 1+50	5/24/2005	5491.69	1.02
OW 1+50	5/26/2005	5491.66	1.02
OW 1+50	5/31/2005	5491.61	1.01
OW 1+50	6/2/2005	5491.59	1.00
OW 1+50	6/7/2005	5491.64	1.04
OW 1+50	6/9/2005	5491.58	1.00
OW 1+50	6/14/2005	5491.43	0.96
OW 1+50	6/16/2005	5491.47	0.95
OW 1+50	6/21/2005	5491.46	0.93
OW 1+50	6/23/2005	5491.47	0.92
OW 1+50	6/28/2005	5491.45	0.93
OW 1+50	7/7/2005	5491.24	0.99
OW 1+50	7/14/2005	5491.22	0.99
OW 1+50	7/19/2005	5491.71	1.05
OW 1+50	7/28/2005	5491.22	0.02
OW 1+50	8/2/2005	5490.32	0.01
OW 1+50	8/11/2005	5491.22	0.99
OW 1+50	8/23/2005	5490.36	0.02

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 1+50	9/6/2005	5490.33	0.03
OW 1+50	9/20/2005	5491.41	0.42
OW 1+50	10/4/2005	5494.72	0.05
OW 1+50	10/18/2005	5495.43	0.01
OW 1+50	11/1/2005	5496.49	NPP
OW 1+50	11/15/2005	5496.10	NPP
OW 1+50	11/29/2005	5495.87	NPP
OW 1+50	12/13/2005	5495.79	NPP
OW 1+50	12/27/2005	5495.75	NPP
OW 1+50	1/10/2006	5496.06	NPP
OW 1+50	1/24/2006	5496.06	NPP
OW 1+50	2/8/2006	5495.08	0.18
OW 1+50	2/16/2006	5495.02	0.13
OW 1+50	3/1/2006	5494.98	0.10
OW 1+50	3/14/2006	5494.88	0.07
OW 1+50	3/20/2006	5494.89	0.12
OW 1+50	4/3/2006	5494.79	0.02
OW 1+50	5/3/2006	5494.77	0.05
OW 1+50	5/17/2006	5494.76	0.05
OW 1+50	5/30/2006	5494.73	0.01
OW 1+50	6/12/2006	5494.66	0.05
OW 1+50	6/26/2006	5494.52	0.06
OW 1+50	7/12/2006	5495.11	NPP
OW 1+50	7/24/2006	5495.14	0.18
OW 1+50	8/7/2006	5494.89	0.05
OW 1+50	8/21/2006	5494.76	0.05
OW 1+50	9/5/2006	5494.74	0.25
OW 1+50	9/18/2006	5494.65	0.66
OW 1+50	10/2/2006	5494.63	0.76
OW 3+85	5/9/2005	5493.99	1.15
OW 3+85	5/12/2005	5493.99	1.15
OW 3+85	5/17/2005	5493.93	1.12
OW 3+85	5/19/2005	5493.91	1.15
OW 3+85	5/24/2005	5493.87	1.15
OW 3+85	5/26/2005	5493.84	1.14
OW 3+85	5/31/2005	5493.80	1.18
OW 3+85	6/2/2005	5493.78	1.16
OW 3+85	6/7/2005	5493.77	1.16
OW 3+85	6/9/2005	5493.76	1.16
OW 3+85	6/14/2005	5493.69	1.19
OW 3+85	6/16/2005	5493.68	1.18
OW 3+85	6/21/2005	5493.69	1.17
OW 3+85	6/23/2005	5493.61	1.20
OW 3+85	6/28/2005	5493.62	1.22

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 3+85	7/7/2005	5493.61	1.20
OW 3+85	7/14/2005	5493.57	1.25
OW 3+85	7/19/2005	5493.58	1.23
OW 3+85	7/28/2005	5493.32	1.27
OW 3+85	8/2/2005	5493.56	0.03
OW 3+85	8/11/2005	5493.57	1.25
OW 3+85	8/23/2005	5493.36	0.06
OW 3+85	9/6/2005	5493.39	0.02
OW 3+85	9/20/2005	5493.62	0.63
OW 3+85	10/4/2005	5494.64	0.71
OW 3+85	10/18/2005	5495.15	0.02
OW 3+85	11/1/2005	5495.96	0.01
OW 3+85	11/15/2005	5495.71	0.01
OW 3+85	11/29/2005	5495.54	0.02
OW 3+85	12/13/2005	5496.37	0.01
OW 3+85	12/27/2005	5495.64	0.01
OW 3+85	1/10/2006	5495.67	0.01
OW 3+85	1/24/2006	5494.20	0.04
OW 3+85	2/8/2006	5494.91	0.02
OW 3+85	2/16/2006	5494.85	0.06
OW 3+85	3/1/2006	5494.70	NPP
OW 3+85	3/14/2006	5494.71	0.28
OW 3+85	3/20/2006	5494.68	0.60
OW 3+85	4/3/2006	5494.54	0.44
OW 3+85	5/3/2006	5494.56	0.19
OW 3+85	5/17/2006	5494.51	0.26
OW 3+85	5/30/2006	5494.65	1.30
OW 3+85	6/12/2006	5494.44	0.92
OW 3+85	6/26/2006	5494.36	1.01
OW 3+85	7/12/2006	5494.84	0.15
OW 3+85	7/24/2006	5494.81	0.61
OW 3+85	8/7/2006	5494.69	0.86
OW 3+85	8/21/2006	5494.55	0.75
OW 3+85	9/5/2006	5494.48	0.58
OW 3+85	9/18/2006	5494.44	0.80
OW 3+85	10/2/2006	5494.42	1.00
OW 5+50	5/9/2005	NWP	NPP
OW 5+50	5/12/2005	NWP	0.21
OW 5+50	5/17/2005	5494.69	1.14
OW 5+50	5/19/2005	NWP	0.69
OW 5+50	5/24/2005	NWP	0.82
OW 5+50	5/26/2005	NWP	0.85
OW 5+50	5/31/2005	NWP	0.87
OW 5+50	6/2/2005	NWP	0.87

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 5+50	6/7/2005	NWP	0.88
OW 5+50	6/9/2005	NWP	0.87
OW 5+50	6/14/2005	NWP	0.81
OW 5+50	6/16/2005	NWP	0.8
OW 5+50	6/21/2005	NWP	0.79
OW 5+50	6/23/2005	NWP	0.78
OW 5+50	6/28/2005	NWP	0.77
OW 5+50	7/7/2005	NWP	0.72
OW 5+50	7/14/2005	NWP	0.71
OW 5+50	7/19/2005	NWP	0.72
OW 5+50	7/28/2005	NWP	0.65
OW 5+50	8/2/2005	5496.18	0.64
OW 5+50	8/11/2005	5496.24	0.71
OW 5+50	8/23/2005	5495.95	0.35
OW 5+50	10/4/2005	5496.93	0.35
OW 5+50	10/18/2005	5497.05	0.5
OW 5+50	11/1/2005	5494.80	0.84
OW 5+50	11/15/2005	5494.75	0.11
OW 5+50	11/29/2005	5494.12	0.01
OW 5+50	12/13/2005	5494.10	0.01
OW 5+50	12/27/2005	5494.08	0.02
OW 5+50	1/10/2006	5494.10	0.03
OW 5+50	1/24/2006	5494.29	NPP
OW 5+50	2/8/2006	5494.13	NPP
OW 5+50	2/16/2006	5494.10	NPP
OW 5+50	3/1/2006	5493.88	NPP
OW 5+50	3/14/2006	5493.99	NPP
OW 5+50	3/20/2006	5494.06	0.02
OW 5+50	4/3/2006	5494.00	NPP
OW 5+50	5/3/2006	5494.14	0.01
OW 5+50	5/17/2006	5494.10	NPP
OW 5+50	5/30/2006	NWP	NPP
OW 5+50	6/12/2006	5494.08	NPP
OW 5+50	6/26/2006	NWP	NPP
OW 5+50	7/12/2006	5493.95	0.02
OW 5+50	7/24/2006	5494.13	NPP
OW 5+50	8/7/2006	5494.12	NPP
OW 5+50	8/21/2006	5494.22	0.05
OW 5+50	9/5/2006	5494.34	0.03
OW 5+50	9/18/2006	5494.34	0.01
OW 5+50	10/2/2006	5494.31	0.05
OW 6+70	5/9/2005	NWP	NPP
OW 6+70	5/12/2005	NWP	NPP
OW 6+70	5/17/2005	NWP	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 6+70	5/19/2005	NWP	NPP
OW 6+70	5/24/2005	NWP	NPP
OW 6+70	5/26/2005	NWP	NPP
OW 6+70	5/31/2005	NWP	NPP
OW 6+70	6/2/2005	NWP	NPP
OW 6+70	6/7/2005	NWP	NPP
OW 6+70	6/9/2005	NWP	NPP
OW 6+70	6/14/2005	NWP	NPP
OW 6+70	6/16/2005	NWP	NPP
OW 6+70	6/21/2005	NWP	NPP
OW 6+70	6/23/2005	NWP	NPP
OW 6+70	6/28/2005	NWP	NPP
OW 6+70	7/7/2005	NWP	NPP
OW 6+70	7/14/2005	NWP	NPP
OW 6+70	7/19/2005	NWP	NPP
OW 6+70	7/28/2005	NWP	NPP
OW 6+70	8/2/2005	NWP	NPP
OW 6+70	8/11/2005	NWP	NPP
OW 6+70	8/23/2005	NWP	NPP
OW 6+70	9/6/2005	NWP	NPP
OW 6+70	9/20/2005	NWP	NPP
OW 6+70	10/4/2005	NWP	NPP
OW 6+70	10/18/2005	NWP	NPP
OW 6+70	11/1/2005	NWP	NPP
OW 6+70	11/15/2005	NWP	NPP
OW 6+70	11/29/2005	NWP	NPP
OW 6+70	12/13/2005	NWP	NPP
OW 6+70	12/27/2005	NWP	NPP
OW 6+70	1/10/2006	NWP	NPP
OW 6+70	1/24/2006	NWP	NPP
OW 6+70	2/8/2006	NWP	NPP
OW 6+70	2/16/2006	NWP	NPP
OW 6+70	3/1/2006	NWP	NPP
OW 6+70	3/14/2006	NWP	NPP
OW 6+70	3/20/2006	NWP	NPP
OW 6+70	4/3/2006	NWP	NPP
OW 6+70	5/3/2006	NWP	NPP
OW 6+70	5/17/2006	NWP	NPP
OW 6+70	5/30/2006	NWP	NPP
OW 6+70	6/12/2006	NWP	NPP
OW 6+70	6/26/2006	5491.31	NPP
OW 6+70	7/12/2006	NWP	NPP
OW 6+70	7/24/2006	NWP	NPP
OW 6+70	8/7/2006	NWP	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 6+70	8/21/2006	NWP	NPP
OW 6+70	9/5/2006	NWP	NPP
OW 6+70	9/18/2006	NWP	NPP
OW 6+70	10/2/2006	NWP	NPP
OW 8+10	5/9/2005	NWP	NPP
OW 8+10	5/12/2005	NWP	NPP
OW 8+10	5/17/2005	NWP	NPP
OW 8+10	5/19/2005	NWP	NPP
OW 8+10	5/24/2005	NWP	NPP
OW 8+10	5/26/2005	NWP	NPP
OW 8+10	5/31/2005	NWP	NPP
OW 8+10	6/2/2005	NWP	NPP
OW 8+10	6/7/2005	NWP	NPP
OW 8+10	6/9/2005	NWP	NPP
OW 8+10	6/14/2005	NWP	NPP
OW 8+10	6/16/2005	NWP	NPP
OW 8+10	6/21/2005	NWP	NPP
OW 8+10	6/23/2005	NWP	NPP
OW 8+10	6/28/2005	NWP	NPP
OW 8+10	7/7/2005	NWP	NPP
OW 8+10	7/14/2005	NWP	NPP
OW 8+10	7/19/2005	NWP	NPP
OW 8+10	7/28/2005	NWP	NPP
OW 8+10	8/2/2005	NWP	NPP
OW 8+10	8/11/2005	NWP	NPP
OW 8+10	8/23/2005	NWP	NPP
OW 8+10	9/6/2005	NWP	NPP
OW 8+10	9/20/2005	NWP	NPP
OW 8+10	10/4/2005	NWP	NPP
OW 8+10	10/18/2005	NWP	NPP
OW 8+10	11/1/2005	NWP	NPP
OW 8+10	11/15/2005	NWP	NPP
OW 8+10	11/29/2005	NWP	NPP
OW 8+10	12/13/2005	NWP	NPP
OW 8+10	12/27/2005	NWP	NPP
OW 8+10	1/10/2006	NWP	NPP
OW 8+10	1/24/2006	NWP	NPP
OW 8+10	2/8/2006	NWP	NPP
OW 8+10	2/16/2006	NWP	NPP
OW 8+10	3/1/2006	NWP	NPP
OW 8+10	3/14/2006	NWP	NPP
OW 8+10	3/20/2006	NWP	NPP
OW 8+10	4/3/2006	NWP	NPP
OW 8+10	5/3/2006	NWP	NPP

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OW 8+10	5/17/2006	NWP	NPP
OW 8+10	5/30/2006	NWP	NPP
OW 8+10	6/12/2006	NWP	NPP
OW 8+10	6/26/2006	NWP	NPP
OW 8+10	7/12/2006	NWP	NPP
OW 8+10	7/24/2006	NWP	NPP
OW 8+10	8/7/2006	NWP	NPP
OW 8+10	8/21/2006	NWP	NPP
OW 8+10	9/5/2006	NWP	NPP
OW 8+10	9/18/2006	NWP	NPP
OW 8+10	10/2/2006	NWP	NPP
OW 11+15	5/9/2005	5493.98	NPP
OW 11+15	5/12/2005	5493.93	NPP
OW 11+15	5/17/2005	5493.94	NPP
OW 11+15	5/19/2005	5493.91	NPP
OW 11+15	5/24/2005	5493.89	NPP
OW 11+15	5/26/2005	5493.88	NPP
OW 11+15	5/31/2005	5493.87	NPP
OW 11+15	6/2/2005	5493.88	NPP
OW 11+15	6/7/2005	5493.86	NPP
OW 11+15	6/9/2005	5493.87	NPP
OW 11+15	6/14/2005	5493.84	NPP
OW 11+15	6/16/2005	5493.83	NPP
OW 11+15	6/21/2005	5493.82	NPP
OW 11+15	6/23/2005	5493.81	NPP
OW 11+15	6/28/2005	5493.81	NPP
OW 11+15	7/7/2005	5493.80	NPP
OW 11+15	7/14/2005	5493.78	NPP
OW 11+15	7/19/2005	5493.80	NPP
OW 11+15	7/28/2005	5493.76	NPP
OW 11+15	8/2/2005	5493.78	NPP
OW 11+15	8/11/2005	5493.78	NPP
OW 11+15	8/23/2005	5493.76	NPP
OW 11+15	9/6/2005	5493.78	NPP
OW 11+15	9/20/2005	5494.06	0.01
OW 11+15	10/4/2005	5495.29	NPP
OW 11+15	10/18/2005	5495.38	NPP
OW 11+15	11/1/2005	5495.69	NPP
OW 11+15	11/15/2005	5495.50	NPP
OW 11+15	11/29/2005	5495.38	0.01
OW 11+15	12/13/2005	5495.31	0.02
OW 11+15	12/27/2005	5495.32	0.03
OW 11+15	1/10/2006	5495.36	0.01
OW 11+15	1/24/2006	5495.04	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 11+15	2/8/2006	5493.75	NPP
OW 11+15	2/16/2006	5495.52	NPP
OW 11+15	3/1/2006	5494.96	0.02
OW 11+15	3/14/2006	5494.86	NPP
OW 11+15	3/20/2006	5494.88	NPP
OW 11+15	4/3/2006	5494.81	NPP
OW 11+15	5/3/2006	5494.89	0.01
OW 11+15	5/17/2006	5493.83	NPP
OW 11+15	5/30/2006	5494.86	NPP
OW 11+15	6/12/2006	5494.86	NPP
OW 11+15	6/26/2006	5494.82	NPP
OW 11+15	7/12/2006	5494.89	NPP
OW 11+15	7/24/2006	5494.93	NPP
OW 11+15	8/7/2006	5494.87	NPP
OW 11+15	8/21/2006	5494.86	NPP
OW 11+15	9/5/2006	5494.96	NPP
OW 11+15	9/18/2006	5494.96	NPP
OW 11+15	10/2/2006	5494.91	NPP
OW 14+10	5/9/2005	5494.70	NPP
OW 14+10	5/12/2005	5494.65	NPP
OW 14+10	5/17/2005	5494.65	NPP
OW 14+10	5/19/2005	5494.63	NPP
OW 14+10	5/24/2005	5494.62	NPP
OW 14+10	5/26/2005	5494.65	NPP
OW 14+10	5/31/2005	5494.59	0.01
OW 14+10	6/2/2005	5494.58	0.01
OW 14+10	6/7/2005	5494.59	0.01
OW 14+10	6/9/2005	5494.61	0.01
OW 14+10	6/14/2005	5494.51	0.03
OW 14+10	6/16/2005	5494.51	0.03
OW 14+10	6/21/2005	5494.52	0.04
OW 14+10	6/23/2005	5494.44	0.04
OW 14+10	6/28/2005	5494.43	0.09
OW 14+10	7/7/2005	5494.42	0.08
OW 14+10	7/14/2005	5494.42	0.07
OW 14+10	7/19/2005	5494.42	0.05
OW 14+10	7/28/2005	5494.31	0.20
OW 14+10	8/2/2005	5494.31	0.30
OW 14+10	8/11/2005	5494.42	0.07
OW 14+10	8/23/2005	5494.28	0.22
OW 14+10	9/6/2005	5494.27	0.22
OW 14+10	10/4/2005	5495.34	0.02
OW 14+10	10/18/2005	5495.40	0.03
OW 14+10	11/1/2005	5495.26	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 14+10	11/15/2005	5495.23	NPP
OW 14+10	11/29/2005	NWP	NPP
OW 14+10	12/13/2005	NWP	NPP
OW 14+10	12/27/2005	NWP	NPP
OW 14+10	1/10/2006	NWP	NPP
OW 14+10	1/24/2006	NWP	NPP
OW 14+10	2/8/2006	NWP	NPP
OW 14+10	2/16/2006	NWP	NPP
OW 14+10	3/1/2006	NWP	NPP
OW 14+10	3/14/2006	NWP	NPP
OW 14+10	3/20/2006	NWP	NPP
OW 14+10	4/3/2006	NWP	NPP
OW 14+10	5/3/2006	NWP	NPP
OW 14+10	5/17/2006	NWP	NPP
OW 14+10	5/30/2006	NWP	NPP
OW 14+10	6/12/2006	NWP	NPP
OW 14+10	6/26/2006	NWP	NPP
OW 14+10	7/12/2006	NWP	NPP
OW 14+10	7/24/2006	NWP	NPP
OW 14+10	8/7/2006	NWP	NPP
OW 14+10	8/21/2006	NWP	NPP
OW 14+10	9/5/2006	NWP	NPP
OW 14+10	9/18/2006	NWP	NPP
OW 14+10	10/2/2006	NWP	NPP
OW 16+60	5/9/2005	5494.94	0.86
OW 16+60	5/12/2005	5494.95	0.88
OW 16+60	5/17/2005	5494.86	0.77
OW 16+60	5/19/2005	5494.85	0.81
OW 16+60	5/24/2005	5494.83	0.72
OW 16+60	5/26/2005	5494.85	0.76
OW 16+60	5/31/2005	5494.79	0.63
OW 16+60	6/2/2005	5494.77	0.72
OW 16+60	6/7/2005	5494.80	0.64
OW 16+60	6/9/2005	5494.77	0.68
OW 16+60	6/14/2005	5494.67	0.73
OW 16+60	6/16/2005	5494.68	0.75
OW 16+60	6/21/2005	5494.67	0.72
OW 16+60	6/23/2005	5494.61	0.69
OW 16+60	6/28/2005	5494.50	0.51
OW 16+60	7/7/2005	5494.51	0.53
OW 16+60	7/14/2005	5494.50	0.54
OW 16+60	7/19/2005	5494.50	0.51
OW 16+60	7/28/2005	5494.45	0.56
OW 16+60	8/2/2005	5494.42	0.55

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 16+60	8/11/2005	5494.50	0.54
OW 16+60	8/23/2005	5494.40	0.47
OW 16+60	9/6/2005	5494.39	0.45
OW 16+60	9/20/2005	5494.37	0.45
OW 16+60	10/4/2005	5495.82	0.45
OW 16+60	10/18/2005	5495.87	0.16
OW 16+60	11/1/2005	5495.98	0.27
OW 16+60	11/15/2005	5494.97	0.21
OW 16+60	11/29/2005	5495.92	0.01
OW 16+60	12/13/2005	5495.86	0.01
OW 16+60	12/27/2005	5495.90	0.01
OW 16+60	1/10/2006	5495.80	0.01
OW 16+60	1/24/2006	5495.78	0.38
OW 16+60	2/8/2006	5495.86	0.32
OW 16+60	2/16/2006	5495.93	0.03
OW 16+60	3/1/2006	5495.80	0.10
OW 16+60	3/14/2006	5495.92	0.02
OW 16+60	3/20/2006	5496.00	0.04
OW 16+60	4/3/2006	5496.03	0.02
OW 16+60	5/3/2006	5495.97	0.01
OW 16+60	5/17/2006	5495.93	0.06
OW 16+60	5/30/2006	5495.83	0.01
OW 16+60	6/12/2006	5495.80	0.16
OW 16+60	6/26/2006	5495.75	0.39
OW 16+60	7/12/2006	5495.01	3.65
OW 16+60	7/24/2006	5495.73	0.20
OW 16+60	8/7/2006	5495.70	0.22
OW 16+60	8/21/2006	5495.64	0.25
OW 16+60	9/5/2006	5495.69	0.25
OW 16+60	9/18/2006	5495.69	0.26
OW 16+60	10/2/2006	5495.73	0.24
OW 19+50	5/9/2005	5495.64	NPP
OW 19+50	5/12/2005	5494.98	NPP
OW 19+50	5/17/2005	5494.27	NPP
OW 19+50	5/19/2005	5494.53	NPP
OW 19+50	5/24/2005	5494.88	NPP
OW 19+50	5/26/2005	5494.97	NPP
OW 19+50	5/31/2005	5495.11	NPP
OW 19+50	6/2/2005	5495.14	NPP
OW 19+50	6/7/2005	5495.15	NPP
OW 19+50	6/9/2005	5495.14	NPP
OW 19+50	6/14/2005	5495.08	NPP
OW 19+50	6/16/2005	5495.06	NPP
OW 19+50	6/21/2005	5495.07	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 19+50	6/23/2005	5494.97	NPP
OW 19+50	6/28/2005	5494.94	NPP
OW 19+50	7/7/2005	5494.95	NPP
OW 19+50	7/14/2005	5494.91	NPP
OW 19+50	7/19/2005	5494.68	NPP
OW 19+50	7/28/2005	5494.81	NPP
OW 19+50	8/2/2005	5494.66	NPP
OW 19+50	8/11/2005	5494.91	NPP
OW 19+50	8/23/2005	5493.96	NPP
OW 19+50	9/6/2005	5493.95	NPP
OW 19+50	9/20/2005	5494.18	NPP
OW 19+50	10/4/2005	5495.24	NPP
OW 19+50	10/18/2005	5495.36	NPP
OW 19+50	11/1/2005	5495.64	NPP
OW 19+50	11/15/2005	5495.56	NPP
OW 19+50	12/13/2005	5495.15	NPP
OW 19+50	12/27/2005	5495.17	NPP
OW 19+50	1/10/2006	5495.47	NPP
OW 19+50	1/24/2006	5495.77	NPP
OW 19+50	2/8/2006	5495.73	NPP
OW 19+50	2/16/2006	5495.89	NPP
OW 19+50	3/1/2006	5495.12	NPP
OW 19+50	3/14/2006	5495.05	NPP
OW 19+50	3/20/2006	5495.55	NPP
OW 19+50	4/3/2006	5495.38	NPP
OW 19+50	5/3/2006	5495.20	0.01
OW 19+50	5/17/2006	5495.46	NPP
OW 19+50	5/30/2006	5495.32	NPP
OW 19+50	6/12/2006	5495.29	NPP
OW 19+50	6/26/2006	5495.09	NPP
OW 19+50	7/12/2006	NWP	NPP
OW 19+50	7/24/2006	NWP	NPP
OW 19+50	8/7/2006	NWP	NPP
OW 19+50	8/21/2006	5495.21	0.20
OW 19+50	9/5/2006	NWP	NPP
OW 19+50	9/18/2006	NWP	NPP
OW 19+50	10/2/2006	NWP	NPP
OW 22+00	5/9/2005	5495.85	NPP
OW 22+00	5/12/2005	5495.80	NPP
OW 22+00	5/17/2005	5495.74	NPP
OW 22+00	5/19/2005	5495.75	NPP
OW 22+00	5/24/2005	5495.74	NPP
OW 22+00	5/26/2005	5495.72	NPP
OW 22+00	5/31/2005	5495.70	NPP

Appendix E
Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
Facility-Wide Groundwater Monitoring Plan
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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 22+00	6/2/2005	5495.69	NPP
OW 22+00	6/7/2005	5495.68	NPP
OW 22+00	6/9/2005	5495.68	NPP
OW 22+00	6/14/2005	5495.36	NPP
OW 22+00	6/16/2005	5495.33	NPP
OW 22+00	6/21/2005	5495.27	NPP
OW 22+00	6/23/2005	5495.33	NPP
OW 22+00	6/28/2005	5495.21	NPP
OW 22+00	7/7/2005	5495.25	NPP
OW 22+00	7/14/2005	5495.18	NPP
OW 22+00	7/19/2005	5494.79	NPP
OW 22+00	7/28/2005	5494.78	NPP
OW 22+00	8/2/2005	5494.75	NPP
OW 22+00	8/11/2005	5495.18	NPP
OW 22+00	8/23/2005	5494.76	NPP
OW 22+00	9/6/2005	5494.76	NPP
OW 22+00	9/20/2005	5495.20	0.10
OW 22+00	10/4/2005	5495.69	NPP
OW 22+00	10/18/2005	5495.60	NPP
OW 22+00	11/1/2005	5496.46	NPP
OW 22+00	11/15/2005	5496.29	0.01
OW 22+00	11/29/2005	5495.60	0.02
OW 22+00	12/13/2005	5495.73	0.02
OW 22+00	12/27/2005	5495.69	0.03
OW 22+00	1/10/2006	5495.67	0.02
OW 22+00	1/24/2006	5495.60	NPP
OW 22+00	2/8/2006	5495.64	0.15
OW 22+00	2/16/2006	5495.58	NPP
OW 22+00	3/1/2006	5495.49	NPP
OW 22+00	3/14/2006	5495.43	NPP
OW 22+00	3/20/2006	5495.44	NPP
OW 22+00	4/3/2006	5495.42	NPP
OW 22+00	5/3/2006	5495.36	0.02
OW 22+00	5/17/2006	5495.20	NPP
OW 22+00	5/30/2006	5495.10	NPP
OW 22+00	6/12/2006	5494.92	NPP
OW 22+00	6/26/2006	5494.82	NPP
OW 22+00	7/12/2006	5495.17	NPP
OW 22+00	7/24/2006	5495.02	NPP
OW 22+00	8/7/2006	5494.83	NPP
OW 22+00	8/21/2006	5494.70	NPP
OW 22+00	9/5/2006	5494.92	NPP
OW 22+00	9/18/2006	5494.92	NPP
OW 22+00	10/2/2006	5494.95	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 23+10	5/9/2005	5496.93	NPP
OW 23+10	5/12/2005	5496.93	NPP
OW 23+10	5/17/2005	5496.88	NPP
OW 23+10	5/19/2005	5496.89	NPP
OW 23+10	5/24/2005	5496.89	NPP
OW 23+10	5/26/2005	5496.90	NPP
OW 23+10	5/31/2005	5496.90	NPP
OW 23+10	6/2/2005	5496.90	NPP
OW 23+10	6/7/2005	5496.89	NPP
OW 23+10	6/9/2005	5496.88	NPP
OW 23+10	6/14/2005	5496.87	NPP
OW 23+10	6/16/2005	5496.88	NPP
OW 23+10	6/21/2005	5496.85	NPP
OW 23+10	6/23/2005	5496.88	NPP
OW 23+10	6/28/2005	5496.87	NPP
OW 23+10	7/7/2005	5496.86	NPP
OW 23+10	7/14/2005	5496.81	NPP
OW 23+10	7/19/2005	5496.85	NPP
OW 23+10	7/28/2005	5496.80	NPP
OW 23+10	8/2/2005	5496.81	NPP
OW 23+10	8/11/2005	5496.81	NPP
OW 23+10	8/23/2005	5496.82	NPP
OW 23+10	9/6/2005	5496.81	NPP
OW 23+10	9/20/2005	5496.90	NPP
OW 23+10	10/4/2005	5497.86	NPP
OW 23+10	10/18/2005	5498.06	NPP
OW 23+10	11/1/2005	5498.04	0.01
OW 23+10	11/15/2005	5497.95	NPP
OW 23+10	11/29/2005	5497.39	NPP
OW 23+10	12/13/2005	5498.00	NPP
OW 23+10	12/27/2005	5497.91	0.01
OW 23+10	1/10/2006	5497.93	NPP
OW 23+10	1/24/2006	5497.87	NPP
OW 23+10	2/8/2006	5496.84	NPP
OW 23+10	2/16/2006	5497.85	NPP
OW 23+10	3/1/2006	5497.81	NPP
OW 23+10	3/14/2006	5497.84	NPP
OW 23+10	3/20/2006	5497.83	NPP
OW 23+10	4/3/2006	5497.83	NPP
OW 23+10	5/3/2006	5497.81	NPP
OW 23+10	5/17/2006	5497.84	NPP
OW 23+10	5/30/2006	5497.83	NPP
OW 23+10	6/12/2006	5496.62	NPP
OW 23+10	6/26/2006	5497.83	NPP

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Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 23+10	7/12/2006	5497.86	0.10
OW 23+10	7/24/2006	5497.85	0.05
OW 23+10	8/7/2006	5497.83	0.02
OW 23+10	8/21/2006	5497.80	NPP
OW 23+10	9/5/2006	5497.81	NPP
OW 23+10	9/18/2006	5497.84	0.01
OW 23+10	10/2/2006	5497.83	NPP
OW 23+90	5/9/2005	5497.19	NPP
OW 23+90	5/12/2005	5497.19	NPP
OW 23+90	5/17/2005	5499.66	NPP
OW 23+90	5/19/2005	5497.16	NPP
OW 23+90	5/24/2005	5497.16	NPP
OW 23+90	5/26/2005	5497.16	NPP
OW 23+90	5/31/2005	5497.17	NPP
OW 23+90	6/2/2005	5497.16	NPP
OW 23+90	6/7/2005	5497.15	NPP
OW 23+90	6/9/2005	5497.15	NPP
OW 23+90	6/14/2005	5497.15	NPP
OW 23+90	6/16/2005	5497.15	NPP
OW 23+90	6/21/2005	5497.14	NPP
OW 23+90	6/23/2005	5497.14	NPP
OW 23+90	6/28/2005	5497.14	NPP
OW 23+90	7/7/2005	5497.15	NPP
OW 23+90	7/14/2005	5496.65	NPP
OW 23+90	7/19/2005	5497.11	NPP
OW 23+90	7/28/2005	5496.83	NPP
OW 23+90	8/2/2005	5497.14	NPP
OW 23+90	8/11/2005	5496.65	NPP
OW 23+90	8/23/2005	5497.09	NPP
OW 23+90	9/6/2005	5497.07	NPP
OW 23+90	9/20/2005	5497.13	NPP
OW 23+90	10/4/2005	5498.08	NPP
OW 23+90	10/18/2005	5498.20	NPP
OW 23+90	11/1/2005	5498.21	NPP
OW 23+90	11/15/2005	5498.12	NPP
OW 23+90	11/29/2005	5498.08	NPP
OW 23+90	12/13/2005	5498.05	NPP
OW 23+90	12/27/2005	5498.05	NPP
OW 23+90	1/10/2006	5498.04	NPP
OW 23+90	1/24/2006	5498.05	NPP
OW 23+90	2/8/2006	5498.03	NPP
OW 23+90	2/16/2006	5498.04	NPP
OW 23+90	3/1/2006	5498.02	NPP
OW 23+90	3/14/2006	5498.02	NPP

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Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 23+90	3/20/2006	5498.00	NPP
OW 23+90	4/3/2006	5498.00	NPP
OW 23+90	5/3/2006	5498.08	0.02
OW 23+90	5/17/2006	5498.07	NPP
OW 23+90	5/30/2006	5498.04	NPP
OW 23+90	6/12/2006	5497.99	NPP
OW 23+90	6/26/2006	5497.99	NPP
OW 23+90	7/12/2006	5498.09	NPP
OW 23+90	7/24/2006	5497.99	NPP
OW 23+90	8/7/2006	5497.99	NPP
OW 23+90	8/21/2006	5498.03	NPP
OW 23+90	9/5/2006	5498.06	NPP
OW 23+90	9/18/2006	5498.02	NPP
OW 23+90	10/2/2006	5498.03	NPP
OW 25+70	5/9/2005	5496.90	NPP
OW 25+70	5/12/2005	5496.90	NPP
OW 25+70	5/17/2005	5496.88	NPP
OW 25+70	5/19/2005	5496.87	NPP
OW 25+70	5/24/2005	5496.87	NPP
OW 25+70	5/26/2005	5496.87	NPP
OW 25+70	5/31/2005	5496.87	NPP
OW 25+70	6/2/2005	5496.88	NPP
OW 25+70	6/7/2005	5496.87	NPP
OW 25+70	6/9/2005	5496.86	NPP
OW 25+70	6/14/2005	5496.86	NPP
OW 25+70	6/16/2005	5496.86	NPP
OW 25+70	6/21/2005	5496.87	NPP
OW 25+70	6/23/2005	5496.86	NPP
OW 25+70	6/28/2005	5496.87	NPP
OW 25+70	7/7/2005	5496.86	NPP
OW 25+70	7/14/2005	5496.83	NPP
OW 25+70	7/19/2005	5496.86	NPP
OW 25+70	7/28/2005	5496.85	NPP
OW 25+70	8/2/2005	5496.88	NPP
OW 25+70	8/11/2005	5496.83	NPP
OW 25+70	8/23/2005	5496.84	NPP
OW 25+70	9/6/2005	5496.83	NPP
OW 25+70	9/20/2005	5496.87	NPP
OW 25+70	10/4/2005	5498.29	NPP
OW 25+70	10/18/2005	5498.27	NPP
OW 25+70	11/1/2005	5498.36	NPP
OW 25+70	11/15/2005	5497.30	NPP
OW 25+70	11/29/2005	5498.29	NPP
OW 25+70	12/13/2005	5498.25	NPP

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Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - North Boundary Barrier
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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
OW 25+70	12/27/2005	5498.27	NPP
OW 25+70	1/10/2006	5498.29	NPP
OW 25+70	1/24/2006	5498.25	NPP
OW 25+70	2/8/2006	5498.18	NPP
OW 25+70	2/16/2006	5498.22	NPP
OW 25+70	3/1/2006	5498.19	NPP
OW 25+70	3/14/2006	5498.21	NPP
OW 25+70	3/20/2006	5498.17	NPP
OW 25+70	4/3/2006	5498.21	NPP
OW 25+70	5/3/2006	5498.27	NPP
OW 25+70	5/17/2006	5498.28	NPP
OW 25+70	5/30/2006	5498.25	NPP
OW 25+70	6/12/2006	5498.21	NPP
OW 25+70	6/26/2006	5498.21	NPP
OW 25+70	7/12/2006	5498.32	NPP
OW 25+70	7/24/2006	5498.19	NPP
OW 25+70	8/7/2006	5498.24	NPP
OW 25+70	8/21/2006	5498.22	NPP
OW 25+70	9/5/2006	5498.27	NPP
OW 25+70	9/18/2006	5498.21	NPP
OW 25+70	10/2/2006	5498.22	NPP

Notes:

ft = feet

amsl = above mean level

NWP = No Water Present

NPP = No Product Present

CW = Collection Well

OW = Observation Well

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Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - San Juan River Bluff
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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
SW1-0206	2/22/2006	NWP	NPP
SW1-0206	3/3/2006	NWP	NPP
SW1-0206	3/6/2006	NWP	NPP
SW1-0206	3/14/2006	NWP	NPP
SW1-0206	3/20/2006	NWP	NPP
SW1-0206	4/3/2006	NWP	NPP
SW1-0206	4/19/2006	NWP	NPP
SW1-0206	5/3/2006	NWP	NPP
SW1-0206	5/17/2006	NWP	NPP
SW1-0206	5/22/2006	NWP	NPP
SW1-0206	5/30/2006	NWP	NPP
SW1-0206	6/12/2006	NWP	NPP
SW1-0206	6/19/2006	NWP	NPP
SW1-0206	6/26/2006	NWP	NPP
SW1-0206	7/10/2006	NWP	NPP
SW1-0206	7/12/2006	NWP	NPP
SW1-0206	7/17/2006	NWP	NPP
SW1-0206	7/24/2006	NWP	NPP
SW1-0206	7/31/2006	NWP	NPP
SW1-0206	8/7/2006	NWP	NPP
SW1-0206	8/21/2006	NWP	NPP
SW1-0206	8/28/2006	NWP	NPP
SW1-0206	9/5/2006	NWP	NPP
SW1-0206	9/11/2006	NWP	NPP
SW1-0206	9/18/2006	NWP	NPP
SW1-0206	10/2/2006	NWP	NPP
SW1-0206	10/6/2006	NWP	NPP
SW1-0206	10/30/2006	NWP	NPP
SW1-0206	11/6/2006	NWP	NPP
SW1-0206	11/13/2006	NWP	NPP
SW1-0206	11/20/2006	NWP	NPP
SW1-0206	11/29/2006	NWP	NPP
SW1-0206	1/2/2007	NWP	NPP
SW1-0206	1/8/2007	NWP	NPP
SW1-0206	1/15/2007	NWP	NPP
SW1-0206	1/29/2007	NWP	NPP
SW1-0206	2/12/2007	NWP	NPP
SW1-0206	2/26/2007	NWP	NPP
SW1-0206	3/12/2007	NWP	NPP
SW1-0206	3/26/2007	NWP	NPP
SW1-0206	4/9/2007	NWP	NPP
SW2-0206	2/22/2006	5480.14	NPP
SW2-0206	3/3/2006	NWP	NPP
SW2-0206	3/6/2006	NWP	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
SW2-0206	3/14/2006	NWP	NPP
SW2-0206	3/20/2006	NWP	NPP
SW2-0206	4/3/2006	NWP	NPP
SW2-0206	4/19/2006	NWP	NPP
SW2-0206	5/3/2006	NWP	NPP
SW2-0206	5/17/2006	NWP	NPP
SW2-0206	5/22/2006	NWP	NPP
SW2-0206	5/30/2006	NWP	NPP
SW2-0206	6/12/2006	NWP	NPP
SW2-0206	6/19/2006	NWP	NPP
SW2-0206	6/26/2006	NWP	NPP
SW2-0206	7/10/2006	NWP	NPP
SW2-0206	7/12/2006	NWP	NPP
SW2-0206	7/17/2006	NWP	NPP
SW2-0206	7/24/2006	NWP	NPP
SW2-0206	7/31/2006	NWP	NPP
SW2-0206	8/7/2006	NWP	NPP
SW2-0206	8/21/2006	NWP	NPP
SW2-0206	8/28/2006	NWP	NPP
SW2-0206	9/5/2006	NWP	NPP
SW2-0206	9/11/2006	NWP	NPP
SW2-0206	9/18/2006	NWP	NPP
SW2-0206	10/2/2006	NWP	NPP
SW2-0206	10/6/2006	NWP	NPP
SW2-0206	10/30/2006	NWP	NPP
SW2-0206	11/6/2006	NWP	NPP
SW2-0206	11/13/2006	NWP	NPP
SW2-0206	11/20/2006	NWP	NPP
SW2-0206	11/29/2006	NWP	NPP
SW2-0206	1/2/2007	NWP	NPP
SW2-0206	1/8/2007	NWP	NPP
SW2-0206	1/15/2007	NWP	NPP
SW2-0206	1/29/2007	NWP	NPP
SW2-0206	2/12/2007	NWP	NPP
SW2-0206	2/26/2007	NWP	NPP
SW2-0206	3/12/2007	NWP	NPP
SW2-0206	3/26/2007	NWP	NPP
SW2-0206	4/9/2007	NWP	NPP
SW2-0206	4/23/2007	NWP	NPP
SW2-0206	5/7/2007	NWP	NPP
SW2-0206	5/21/2007	NWP	NPP
SW2-0206	6/4/2007	NWP	NPP
SW2-0206	6/18/2007	NWP	NPP
SW2-0206	7/2/2007	NWP	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
SW2-0206	7/16/2007	NWP	NPP
SW2-0206	7/30/2007	NWP	NPP
SW3-0206	2/22/2006	NWP	NPP
SW3-0206	3/3/2006	NWP	NPP
SW3-0206	3/6/2006	NWP	NPP
SW3-0206	3/14/2006	5461.23	NPP
SW3-0206	3/20/2006	5461.90	NPP
SW3-0206	4/3/2006	5459.73	NPP
SW3-0206	4/19/2006	5471.95	0.01
SW3-0206	5/3/2006	5477.18	NPP
SW3-0206	5/17/2006	5476.19	NPP
SW3-0206	5/22/2006	5478.33	NPP
SW3-0206	5/30/2006	5478.43	NPP
SW3-0206	6/12/2006	5473.94	NPP
SW3-0206	6/19/2006	5477.84	NPP
SW3-0206	6/26/2006	5478.58	NPP
SW3-0206	7/10/2006	5478.79	NPP
SW3-0206	7/12/2006	5466.82	NPP
SW3-0206	7/17/2006	5478.66	NPP
SW3-0206	7/24/2006	5478.84	NPP
SW3-0206	7/31/2006	5478.96	NPP
SW3-0206	8/7/2006	5479.48	NPP
SW3-0206	8/21/2006	5478.82	NPP
SW3-0206	8/28/2006	5478.86	NPP
SW3-0206	9/5/2006	5479.10	NPP
SW3-0206	9/11/2006	5479.28	NPP
SW3-0206	9/18/2006	5478.37	NPP
SW3-0206	10/2/2006	5479.31	NPP
SW3-0206	10/6/2006	5479.52	NPP
SW3-0206	10/30/2006	5479.41	NPP
SW3-0206	11/6/2006	5479.20	NPP
SW3-0206	11/13/2006	5479.27	NPP
SW3-0206	11/20/2006	5484.27	NPP
SW3-0206	11/29/2006	5479.20	NPP
SW3-0206	1/2/2007	5479.14	NPP
SW3-0206	1/8/2007	5479.12	NPP
SW3-0206	1/15/2007	5479.19	NPP
SW3-0206	1/29/2007	5479.11	NPP
SW3-0206	2/12/2007	5479.56	NPP
SW3-0206	2/26/2007	5500.15	25.70
SW3-0206	3/12/2007	5479.45	NPP
SW3-0206	3/26/2007	5479.57	NPP
SW3-0206	4/9/2007	5479.61	NPP
SW3-0206	4/23/2007	5479.65	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
SW3-0206	5/7/2007	5479.65	NPP
SW3-0206	5/21/2007	5479.67	NPP
SW3-0206	6/4/2007	5479.64	NPP
SW3-0206	6/18/2007	5479.65	NPP
SW3-0206	7/2/2007	5479.65	NPP
SW3-0206	7/16/2007	5476.06	NPP
SW3-0206	7/30/2007	NWP	NPP
SW4-0206	2/22/2006	NWP	NPP
SW4-0206	3/3/2006	NWP	NPP
SW4-0206	3/6/2006	NWP	NPP
SW4-0206	3/14/2006	5463.56	NPP
SW4-0206	3/20/2006	5463.42	NPP
SW4-0206	4/3/2006	5463.43	NPP
SW4-0206	4/19/2006	5465.17	0.01
SW4-0206	5/3/2006	5466.20	NPP
SW4-0206	5/17/2006	5466.96	NPP
SW4-0206	5/22/2006	5467.26	NPP
SW4-0206	5/30/2006	5468.00	NPP
SW4-0206	6/12/2006	5463.45	NPP
SW4-0206	6/19/2006	5463.40	NPP
SW4-0206	6/26/2006	5463.38	NPP
SW4-0206	7/10/2006	5464.46	NPP
SW4-0206	7/12/2006	5462.52	NPP
SW4-0206	7/17/2006	5463.33	NPP
SW4-0206	7/24/2006	5463.44	NPP
SW4-0206	7/31/2006	5463.36	NPP
SW4-0206	8/7/2006	5463.77	NPP
SW4-0206	8/21/2006	5463.51	NPP
SW4-0206	8/28/2006	5463.35	NPP
SW4-0206	9/5/2006	5463.61	NPP
SW4-0206	9/11/2006	5463.16	NPP
SW4-0206	9/18/2006	5463.36	NPP
SW4-0206	10/2/2006	5463.89	NPP
SW4-0206	10/6/2006	5464.34	NPP
SW4-0206	10/30/2006	5463.47	NPP
SW4-0206	11/6/2006	5463.52	NPP
SW4-0206	11/13/2006	5463.36	NPP
SW4-0206	11/20/2006	5463.56	NPP
SW4-0206	11/29/2006	5463.76	NPP
SW4-0206	1/2/2007	5465.33	NPP
SW4-0206	1/8/2007	5465.82	NPP
SW4-0206	1/15/2007	5466.26	NPP
SW4-0206	1/29/2007	5464.65	NPP
SW4-0206	2/12/2007	5465.95	NPP

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Groundwater Elevation and Separate Phase Hydrocarbon Thickness Summary - San Juan River Bluff
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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
SW4-0206	2/26/2007	5467.03	NPP
SW4-0206	3/12/2007	5464.05	NPP
SW4-0206	3/26/2007	5465.60	NPP
SW4-0206	4/9/2007	5466.82	NPP
SW4-0206	4/23/2007	5467.74	NPP
SW4-0206	5/7/2007	5468.38	NPP
SW4-0206	5/21/2007	5468.93	NPP
SW4-0206	6/4/2007	5469.71	NPP
SW4-0206	6/18/2007	5469.71	NPP
SW4-0206	7/2/2007	5469.93	NPP
SW4-0206	7/16/2007	5470.33	NPP
SW4-0206	7/30/2007	NWP	NPP
SW5-0206	2/22/2006	5480.85	NPP
SW5-0206	3/3/2006	5481.12	NPP
SW5-0206	3/6/2006	5481.13	NPP
SW5-0206	3/14/2006	5481.11	NPP
SW5-0206	3/20/2006	5481.29	NPP
SW5-0206	4/3/2006	5481.07	NPP
SW5-0206	4/19/2006	5494.44	0.01
SW5-0206	5/3/2006	5481.09	NPP
SW5-0206	5/17/2006	5480.95	NPP
SW5-0206	5/22/2006	5480.98	NPP
SW5-0206	5/30/2006	5480.82	NPP
SW5-0206	6/12/2006	5480.59	NPP
SW5-0206	6/19/2006	5480.61	NPP
SW5-0206	6/26/2006	5480.49	NPP
SW5-0206	7/10/2006	5480.57	NPP
SW5-0206	7/12/2006	5480.44	NPP
SW5-0206	7/17/2006	5480.49	NPP
SW5-0206	7/24/2006	5480.47	NPP
SW5-0206	7/31/2006	5480.50	NPP
SW5-0206	8/7/2006	5480.36	NPP
SW5-0206	8/21/2006	5480.30	NPP
SW5-0206	8/28/2006	5480.40	NPP
SW5-0206	9/5/2006	5480.34	NPP
SW5-0206	9/11/2006	5480.37	NPP
SW5-0206	9/18/2006	5480.38	NPP
SW5-0206	10/2/2006	5480.47	NPP
SW5-0206	10/6/2006	5480.82	NPP
SW5-0206	10/30/2006	5481.00	NPP
SW5-0206	11/6/2006	5480.95	NPP
SW5-0206	11/13/2006	5480.92	NPP
SW5-0206	11/20/2006	5480.96	NPP
SW5-0206	11/29/2006	5481.44	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
SW5-0206	1/2/2007	5480.97	NPP
SW5-0206	1/8/2007	5480.90	NPP
SW5-0206	1/15/2007	5480.91	NPP
SW5-0206	1/29/2007	5480.91	NPP
SW5-0206	2/12/2007	5480.89	NPP
SW5-0206	2/26/2007	5480.79	NPP
SW5-0206	3/12/2007	5480.70	NPP
SW5-0206	3/26/2007	5480.85	NPP
SW5-0206	4/9/2007	5481.01	NPP
SW5-0206	4/23/2007	5481.00	NPP
SW5-0206	5/7/2007	5480.95	0.01
SW5-0206	5/21/2007	5480.96	0.03
SW5-0206	6/4/2007	5480.73	0.03
SW5-0206	6/18/2007	5480.59	0.11
SW5-0206	7/2/2007	5480.31	0.21
SW5-0206	7/16/2007	5480.20	0.08
SW5-0206	7/30/2007	NWP	NPP
SW6-0206	2/22/2006	5472.32	NPP
SW6-0206	3/3/2006	5473.22	NPP
SW6-0206	3/6/2006	5473.31	0.03
SW6-0206	3/14/2006	5474.75	NPP
SW6-0206	3/20/2006	5475.83	0.20
SW6-0206	4/3/2006	5476.94	0.34
SW6-0206	4/19/2006	5477.33	0.52
SW6-0206	5/3/2006	5477.29	0.60
SW6-0206	5/17/2006	5475.82	0.19
SW6-0206	5/22/2006	5476.21	NPP
SW6-0206	5/30/2006	5476.13	0.08
SW6-0206	6/12/2006	5473.33	0.08
SW6-0206	6/19/2006	5473.59	0.12
SW6-0206	6/26/2006	5473.88	0.10
SW6-0206	7/10/2006	5474.45	0.28
SW6-0206	7/12/2006	5472.94	0.10
SW6-0206	7/17/2006	5473.56	0.15
SW6-0206	7/24/2006	5473.45	0.05
SW6-0206	7/31/2006	5473.38	0.07
SW6-0206	8/7/2006	5473.41	0.01
SW6-0206	8/21/2006	5473.69	0.07
SW6-0206	8/28/2006	5474.38	NPP
SW6-0206	9/5/2006	5473.46	0.22
SW6-0206	9/11/2006	5473.66	NPP
SW6-0206	9/18/2006	5473.58	NPP
SW6-0206	10/2/2006	5474.28	NPP
SW6-0206	10/6/2006	5475.11	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
SW6-0206	10/30/2006	5473.95	NPP
SW6-0206	11/6/2006	5474.08	NPP
SW6-0206	11/13/2006	5474.01	NPP
SW6-0206	11/20/2006	5474.04	NPP
SW6-0206	11/29/2006	5474.29	NPP
SW6-0206	1/2/2007	5475.80	NPP
SW6-0206	1/8/2007	5476.59	0.01
SW6-0206	1/15/2007	5475.33	NPP
SW6-0206	1/29/2007	5475.51	NPP
SW6-0206	2/12/2007	5474.40	0.01
SW6-0206	2/26/2007	5474.56	0.05
SW6-0206	3/12/2007	5474.06	0.20
SW6-0206	3/26/2007	5475.92	0.36
SW6-0206	4/9/2007	5476.79	0.30
SW6-0206	4/23/2007	5477.23	0.33
SW6-0206	5/7/2007	5477.32	0.32
SW6-0206	5/21/2007	5477.11	0.34
SW6-0206	6/4/2007	5477.13	0.37
SW6-0206	6/18/2007	5477.09	0.36
SW6-0206	7/2/2007	5476.90	0.35
SW6-0206	7/16/2007	5473.73	0.20
SW6-0206	7/30/2007	NWP	NPP
SW7-0206	2/22/2006	5498.11	NPP
SW7-0206	4/3/2006	5495.90	NPP
SW7-0206	4/19/2006	5484.44	0.01
SW7-0206	5/3/2006	5498.18	0.02
SW7-0206	5/17/2006	5497.65	NPP
SW7-0206	5/22/2006	5498.08	NPP
SW7-0206	5/30/2006	5498.12	NPP
SW7-0206	6/12/2006	5496.78	NPP
SW7-0206	6/19/2006	5496.41	NPP
SW7-0206	6/26/2006	5496.16	NPP
SW7-0206	7/10/2006	5497.12	NPP
SW7-0206	7/12/2006	5494.96	NPP
SW7-0206	7/17/2006	5496.62	NPP
SW7-0206	7/24/2006	5487.11	NPP
SW7-0206	7/31/2006	5496.54	NPP
SW7-0206	8/7/2006	5496.17	NPP
SW7-0206	8/21/2006	5497.17	NPP
SW7-0206	8/28/2006	5498.42	NPP
SW7-0206	9/5/2006	5497.99	NPP
SW7-0206	9/11/2006	5496.61	NPP
SW7-0206	9/18/2006	5496.97	NPP
SW7-0206	10/2/2006	5496.59	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
SW7-0206	10/6/2006	5496.81	NPP
SW7-0206	10/30/2006	5496.56	NPP
SW7-0206	11/6/2006	5496.54	NPP
SW7-0206	11/13/2006	5496.72	NPP
SW7-0206	11/20/2006	5496.41	NPP
SW7-0206	11/29/2006	5495.19	NPP
SW7-0206	1/2/2007	5496.71	NPP
SW7-0206	1/8/2007	5498.01	0.01
SW7-0206	1/15/2007	5497.81	NPP
SW7-0206	1/29/2007	5498.04	NPP
SW7-0206	2/12/2007	5497.16	NPP
SW7-0206	2/26/2007	5498.57	NPP
SW7-0206	3/12/2007	5497.81	NPP
SW7-0206	3/26/2007	5498.17	NPP
SW7-0206	4/9/2007	5498.13	NPP
SW7-0206	4/23/2007	5498.89	NPP
SW7-0206	5/7/2007	5499.21	NPP
SW7-0206	5/21/2007	5499.68	NPP
SW7-0206	6/4/2007	5499.99	NPP
SW7-0206	6/18/2007	5500.37	NPP
SW7-0206	7/2/2007	5500.51	NPP
SW7-0206	7/16/2007	5497.80	1.06

Notes:

ft = feet

amsl = above mean level

NWP = No Water Present

NPP = No Product Present

SW = Sump Well

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
TP-1	10/28/2004	5415.59	NPP
TP-1	8/15/2005	5416.68	NPP
TP-1	2/20/2006	5420.88	NPP
TP-1	1/09/2006	5417.89	NPP
TP-1	1/16/2006	5416.15	NPP
TP-1	1/30/2006	5419.75	NPP
TP-1	12/04/2006	5425.61	NPP
TP-1	2/13/2006	5420.22	NPP
TP-1	2/26/2007	5426.24	NPP
TP-1	2/6/2006	5419.78	NPP
TP-1	3/06/2006	5421.99	NPP
TP-1	6/17/2006	5424.23	NPP
TP-1	6/18/2007	5429.36	NPP
TP-1	9/11/2006	5426.35	NPP
TP-2	10/28/2004	NA	NPP
TP-2	8/15/2005	NA	NPP
TP-2	2/20/2006	NA	NPP
TP-2	1/09/2006	NA	NPP
TP-2	1/16/2006	NA	NPP
TP-2	1/30/2006	NA	NPP
TP-2	12/04/2006	NA	NPP
TP-2	2/13/2006	NA	NPP
TP-2	2/26/2007	NA	NPP
TP-2	2/6/2006	NA	NPP
TP-2	3/06/2006	NA	NPP
TP-2	6/17/2006	NA	NPP
TP-2	6/18/2007	NA	NPP
TP-2	9/11/2006	NA	NPP
TP-3	10/28/2004	5415.86	NPP
TP-3	8/15/2005	5417.27	NPP
TP-3	1/09/2006	5418.44	NPP
TP-3	1/16/2006	5419.40	NPP
TP-3	1/30/2006	5420.87	NPP
TP-3	12/04/2006	5427.11	NPP
TP-3	2/13/2006	5423.73	NPP
TP-3	2/26/2007	5428.36	NPP
TP-3	2/6/2006	5421.74	NPP
TP-3	3/06/2006	5423.79	NPP
TP-3	6/17/2006	5425.65	NPP
TP-3	6/18/2007	5429.86	NPP
TP-3	9/11/2006	5426.47	NPP
TP-4	10/28/2004	5415.74	NPP
TP-4	8/15/2005	5418.02	NPP
TP-4	2/20/2006	NWP	NWP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
TP-4	1/09/2006	5419.06	NPP
TP-4	1/16/2006	NWP	NWP
TP-4	1/30/2006	5421.28	NPP
TP-4	2/13/2006	5422.78	NPP
TP-4	2/6/2006	5421.96	NPP
TP-4	3/06/2006	NWP	NWP
TP-4	6/17/2006	5426.69	NPP
TP-5	10/28/2004	5416.65	NPP
TP-5	8/15/2005	5416.92	NPP
TP-5	2/20/2006	5421.98	NPP
TP-5	1/09/2006	5419.13	NPP
TP-5	1/16/2006	5417.33	NPP
TP-5	1/30/2006	5419.50	NPP
TP-5	12/04/2006	5427.88	NPP
TP-5	2/13/2006	5421.10	NPP
TP-5	2/26/2007	5429.24	NPP
TP-5	2/6/2006	5420.23	NPP
TP-5	3/06/2006	5423.02	NPP
TP-5	6/17/2006	5426.59	NPP
TP-5	6/18/2007	5429.21	NPP
TP-5	9/11/2006	5427.51	NPP
TP-6	10/28/2004	5416.60	NPP
TP-6	8/15/2005	5416.78	NPP
TP-6	2/20/2006	5420.97	NPP
TP-6	1/09/2006	5417.93	NPP
TP-6	1/16/2006	5416.03	NPP
TP-6	1/30/2006	5418.41	NPP
TP-6	12/04/2006	5426.95	NPP
TP-6	2/13/2006	5420.02	NPP
TP-6	2/26/2007	5428.17	NPP
TP-6	2/6/2006	5419.16	NPP
TP-6	3/06/2006	5421.95	NPP
TP-6	6/17/2006	5425.38	NPP
TP-6	6/18/2007	5428.24	NPP
TP-6	9/11/2006	5426.39	NPP
TP-7	10/28/2004	5415.21	NPP
TP-7	6/18/2007	5416.60	NPP
TP-8	10/28/2004	5416.56	NPP
TP-8	8/15/2005	5415.91	NPP
TP-8	2/20/2006	5420.30	NPP
TP-8	1/09/2006	5417.91	NPP
TP-8	1/16/2006	5416.29	NPP
TP-8	1/30/2006	5419.28	NPP
TP-8	12/04/2006	5425.31	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
TP-8	2/13/2006	5419.50	NPP
TP-8	2/26/2007	5425.95	NPP
TP-8	2/6/2006	5419.14	NPP
TP-8	3/06/2006	5421.60	NPP
TP-8	6/17/2006	5424.02	NPP
TP-8	6/18/2007	5429.30	NPP
TP-8	9/11/2006	5426.31	NPP
TP-9	8/15/2005	5417.02	NPP
TP-9	2/20/2006	5423.86	NPP
TP-9	1/09/2006	5418.06	NPP
TP-9	1/16/2006	5419.00	NPP
TP-9	1/30/2006	5420.92	NPP
TP-9	12/04/2006	5427.75	NPP
TP-9	2/13/2006	5422.90	NPP
TP-9	2/26/2007	5429.07	NPP
TP-9	2/6/2006	5421.89	NPP
TP-9	3/06/2006	5424.93	NPP
TP-9	6/17/2006	5425.88	NPP
TP-9	6/18/2007	5430.41	NPP
TP-9	9/11/2006	5426.66	NPP
TP-10	8/15/2005	5417.46	NPP
TP-10	2/20/2006	5423.71	NPP
TP-10	1/09/2006	5418.48	NPP
TP-10	1/16/2006	5419.47	NPP
TP-10	1/30/2006	5421.02	NPP
TP-10	12/04/2006	5418.99	NPP
TP-10	2/13/2006	5422.82	NPP
TP-10	2/26/2007	5420.33	NPP
TP-10	2/6/2006	5421.89	NPP
TP-10	3/06/2006	5424.70	NPP
TP-10	6/17/2006	5417.33	NPP
TP-10	6/18/2007	5421.94	NPP
TP-10	9/11/2006	5418.30	NPP
TP-11	8/15/2005	NA	NPP
TP-11	2/20/2006	NA	NPP
TP-11	1/09/2006	NA	NPP
TP-11	1/16/2006	NA	NPP
TP-11	1/23/2006	NA	NS
TP-11	1/30/2006	NA	NPP
TP-11	12/04/2006	NA	NPP
TP-11	2/13/2006	NA	NPP
TP-11	2/26/2007	NA	NPP
TP-11	2/6/2006	NA	NPP
TP-11	3/06/2006	NA	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
TP-11	6/17/2006	NA	NPP
TP-11	6/18/2007	NA	NPP
TP-11	9/11/2006	NA	NPP
TP-12	8/15/2005	5417.54	NPP
TP-12	2/20/2006	5424.03	NPP
TP-12	1/09/2006	5418.59	NPP
TP-12	1/16/2006	5419.56	NPP
TP-12	1/30/2006	5421.24	NPP
TP-12	12/04/2006	5428.30	NPP
TP-12	2/13/2006	5423.11	NPP
TP-12	2/26/2007	5429.57	NPP
TP-12	2/6/2006	5422.18	NPP
TP-12	3/06/2006	5425.03	NPP
TP-12	6/17/2006	5426.53	NPP
TP-12	6/18/2007	5431.15	NPP
TP-12	9/11/2006	5427.49	NPP
TP-13	8/15/2005	5417.61	NPP
TP-13	2/20/2006	5424.09	NPP
TP-13	1/09/2006	5418.64	NPP
TP-13	1/16/2006	5419.61	NPP
TP-13	1/30/2006	5421.29	NPP
TP-13	12/04/2006	5428.37	NPP
TP-13	2/13/2006	5423.19	NPP
TP-13	2/26/2007	5429.72	NPP
TP-13	2/6/2006	5422.24	NPP
TP-13	3/06/2006	5425.10	NPP
TP-13	6/17/2006	5426.53	NPP
TP-13	6/18/2007	5431.25	NPP
TP-13	9/11/2006	5427.55	NPP
MW-48	11/1/2004	5404.15	NPP
MW-49	11/1/2004	5404.74	NPP
MW-49	8/15/2005	5411.65	NPP
MW-49	2/20/2006	5418.11	NPP
MW-49	1/09/2006	5412.53	NPP
MW-49	1/16/2006	5413.46	NPP
MW-49	1/30/2006	5415.18	NPP
MW-49	2/13/2006	5417.17	NPP
MW-49	2/26/2007	5424.43	NPP
MW-49	2/6/2006	5416.16	NPP
MW-49	3/06/2006	5419.15	NPP
MW-49	6/17/2006	5420.24	NPP
MW-49	6/18/2007	5425.81	NPP
MW-49	9/11/2006	5421.84	NPP
MW-49	12/04/2006	5423.06	NPP

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Well ID	Date	Corrected Groundwater Elevation (ft amsl)	Separate Phase Hydrocarbon Thickness (ft)
DW-1	8/15/2005	NA	NPP
DW-1	2/20/2006	NA	NPP
DW-1	1/09/2006	NA	NPP
DW-1	1/16/2006	NA	NPP
DW-1	1/23/2006	NA	NS
DW-1	1/30/2006	NA	NPP
DW-1	12/04/2006	NA	NPP
DW-1	2/13/2006	NA	NPP
DW-1	2/26/2007	NA	NPP
DW-1	2/6/2006	NA	NPP
DW-1	3/06/2006	NA	NPP
DW-1	6/17/2006	NA	NPP
DW-1	6/18/2007	NA	NPP
DW-1	9/11/2006	NA	NPP

Notes:

ft = feet

amsl = above mean level

NWP = No Water Present

NPP = No Product Present

MW = Monitoring Well

DW = Dewatering Well

TP = Temporary Piezometer

NA = Top of Casing Elevation Not Available

**MALCOLM
PIRNIE**

INDEPENDENT ENVIRONMENTAL
ENGINEERS, SCIENTISTS
AND CONSULTANTS

F

APPENDIX



MW-1

WELL NUMBER: 1
DATE: 8 February 1984
LOCATION: 29.11.27.24221

DEPTH IN FEET	DESCRIPTION
0-5	Light brown clayey sand, coarse, poorly sorted, quartzose and slightly calcareous
5-10	Yellowish gray sandy pebbles and cobbles, poorly sorted, rounded to subrounded
10-12	Yellowish gray pebbly sand, very coarse, poorly sorted, feldspathic and noncalcareous
12-22	Dark gray pebbly and sandy cobbles, some quartz pebbles, most are volcanic, subrounded cobbles and pebbles, some clay, a little water at about 18 feet
22-25	Gray-green clayey sand becoming light yellow clayey sandstone and sandy claystone

mw-3

WELL NUMBER: 3
DATE: 8 February 1984
LOCATION: 29.11.27.24442

DEPTH IN FEET	DESCRIPTION
0-5	Yellow brown sandy silt and clay, very calcareous, quartzose
5-10	yellow brown sand, calcareous, silty and clayey, quartzose
10-15	Yellow brown sand, silty and clayey, fine-grained, very calcareous, quartzose
15-27	Light brown clay, sandy, very calcareous, becoming pebbly with depth
27-35	Gray yellow brown cobbly sand, coarse, poorly sorted, silty and clayey, volcanic pebbles, small amount of water at about 35 feet
35-40	Gray cobbles, pebbly and sandy, coarse sand, yellow gray clayey sandstone at about 40 feet

mw-4

WELL NUMBER: 4
DATE: 9 February 1984
LOCATION: 29.11.27.23344

O = 5522.90

Sand 15 =

DEPTH IN FEET	DESCRIPTION
0-5	Yellow gray-brown sandy silt and clay, calcareous
5-10	Yellow brown silty sandy clay and clayey silt, very slightly calcareous
10-15	Reddish yellow-brown clayey sandy silt, silty clay, fine-grained quartzose sand, noncalcareous
15-19	Light brown coarse sand with clay and pebbles, calcareous
19-25	Gray pebbly sand, very coarse, poorly sorted, some clay and silt, subrounded to subangular, quartzose, pebbles rounded, slightly calcareous
25-30	Gray cobbles and pebbles, subrounded to rounded, volcanic; at about 28 feet, hydrocarbon smell and color
30-32	Gray cobbly sand, with hydrocarbon smell and color, coarse grained, sand is quartzose and feldspathic, subrounded and subangular quartz grains are clear
32	Yellow gray clayey sandstone

WELL NUMBER:

mw-5

5

DATE:

6 February 1934

LOCATION:

29.11.26.31112

DEPTH
IN FEET

DESCRIPTION

0-5	Pale yellow brown clay, silty, some sand, calcareous
5-10	Pale yellow brown clayey sand and quartzose silt, poorly sorted, calcareous
10-15	Yellow brown sand, subrounded quartzose sand slightly calcareous
15-20	Yellow brown sand, clayey, moderately coarse grained, very slightly calcareous
20-25	Yellow brown sand, clayey, silty, fine to medium grained, moderately sorted, noncalcareous
25-35	Yellow brown sand, silty and slightly clayey, fine-to-medium grained, well sorted, subangular, noncalcareous, becoming more clayey with depth
35-37	Yellow brown pebbly and cobbly sand, clayey, calcareous
37-47	Dark gray sandy and clayey cobbles and pebbles, water at 42 feet
47-50	Dark gray cobbles with greenish clay
50-54	Green-gray pebbly clay

MW-6

WELL NUMBER: 6
DATE: 7 February 1984
LOCATION: 29.11.27.42144 or 42233

DEPTH IN FEET	DESCRIPTION
0-15	Pale yellow brown sand, clayey and silty, subangular, poorly sorted, quartzose, very calcareous, becoming more clayey with depth
15-20	Pale yellow brown silt, sandy and clayey, silt is coarse, sand is very fine, moderate sorting, quartzose and calcareous
20-25	Pale yellow sand, slightly clayey, subrounded, well sorted, quartzose, noncalcareous
25-35	Pale yellow sand, coarse to medium grained, quartzose, noncalcareous
35-41	Pale yellow sand, clayey, fine grained, silty, quartzose, slightly calcareous
41-49	Gray-black cobbles and pebbles, volcanic
49-52	Gray-green clayey sandstone and sandy claystone

TABLE 3.1

WELL LOG FOR MONITORING WELL NUMBER 7

Drilling Date: February 25 1986

<u>Depth in Feet</u>	<u>Description</u>
0-1	Gravel fill
1-5	Brown sandy silt and clay with small gravels
5-10	Brown sandy silt and clay, more firm and sticky
10-15	Lighter brown sandy silt and sticky clay
15-20	Lighter brown sandy silt and clay, larger cobbles and pebbles
20-25	Sand with cobbles and pebbles
25-30	Sand
30-35	Greenish clay with pebbles, top of Nacimiento estimated at 32 feet
35-40	Greenish clay, few pebbles
40-45	Green to gray clay, smooth drilling
45-50	Green to gray clay, smooth drilling
50-65	Sticky gray to green clay

Elevation of Top of Pipe: 5524.09 feet

Total Depth of Casing: 62.11 feet

Description of Casing: Bottom of casing has a 2 foot stainless steel blank section for a silt trap, followed by a 10 foot section of 6" I.D. stainless steel screen, in turn followed by 6" I.D. schedule 40 PVC casing to the top of pipe. Sand was added to 45 feet below grade, bentonite to 41 feet below grade, and grout to the surface.

TABLE 3.2

WELL LOG FOR MONITORING WELL NUMBER 8

Drilling Date: February 28, 1986

<u>Depth in Feet</u>	<u>Description</u>
0-20	Light brown sandy clay, similar to that found on the ground surface
20-34	Cobbles and pebbles
34	Green-gray clay and sandstone, intermixed with small pebbles and sand. Top of Nacimiento.

Elevation of Top of Casing: 5531.12 feet

Total Depth of Casing: 34.94 feet

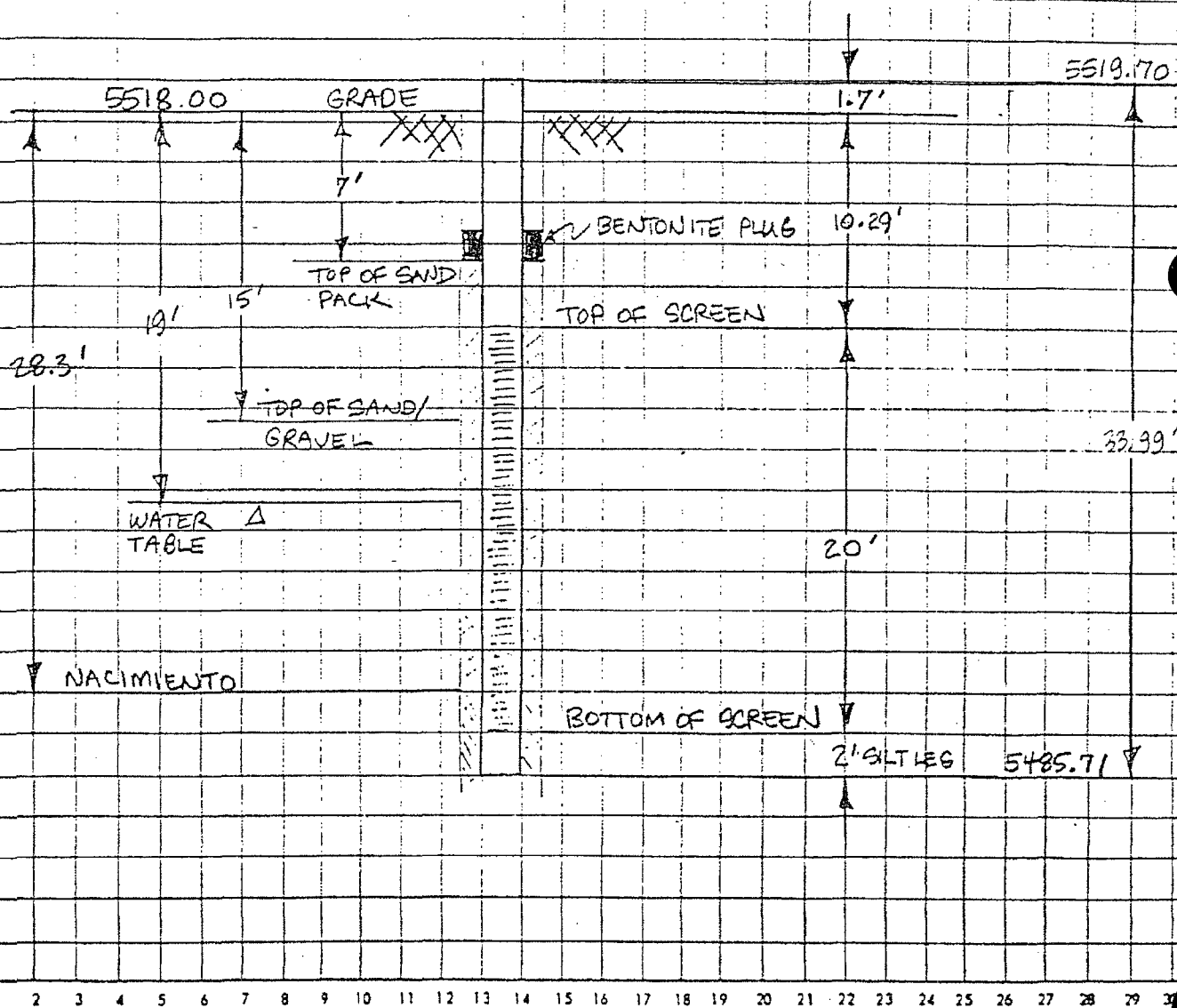
Description of Casing: Bottom of casing has a 2 foot stainless steel blank section for a silt trap, followed by 20 feet of 6" I.D. stainless steel screen, followed by 6" I.D. schedule 40 PVC to the surface. The screened section of the hole was sanded to within 7 feet of the surface, a bentonite seal (1/2 bucket) was added and concrete was used for a surface seal.

CALCULATION SHEET

MW-9

CONSTRUCTION COMMENTS: DRILLED UTILIZING DRILLING MUD THEN THOROUGHLY DEVELOPED. BOTTOM OF CASING TO THE TOP OF SCREEN IS 6" I.D. STAINLESS STEEL, REST OF CASING TO SURFACE IS 6" SCH. 40 PVC. TOP OF CASING HAS CONCRETE SURFACE SEAL AND STEEL PIPE WITH LOCKING WD, CASING PROTECTOR (NOT SHOWN).

LOCATION: NEAR TANK 5,
NORTHWEST OF
NOWP.



INITIALS MA PROJECT No. GROUNDWATER MONITORING - SOWP & NOWP
DATE 9-17-91 SUBJECT MW-9
DATE OF INSTALLATION: 3-3-86 SHEET 1 OF 1

TABLE 3.3
WELL LOG FOR MONITORING WELL NUMBER 9

Drilling Date: March 3, 1986

<u>Depth in Feet</u>	<u>Description</u>
0-5	Fill material, some rock
5-10	Sticky reddish brown silty clay
10-15	Lighter color silty clay, some pebbles
15-20	Lighter color silty clay, some pebbles
20-25	Cobbles, pebbles, sand
25-30	Cobbles, greenish clay, top of Nacimiento

Elevation of Top of Casing: 5519.70 feet

Total Depth of Casing: 33.99 feet

Description of Casing: Bottom of casing has a 2 foot stainless steel blank section for a silt trap followed by 20 feet of 6" I.D. stainless steel screen, followed by 6" I.D. schedule 40 PVC to the surface. The screened section of the hole was sanded to within 7 feet of the surface, a bentonite seal (1/2 bucket) was added and concrete was used for a surface seal.

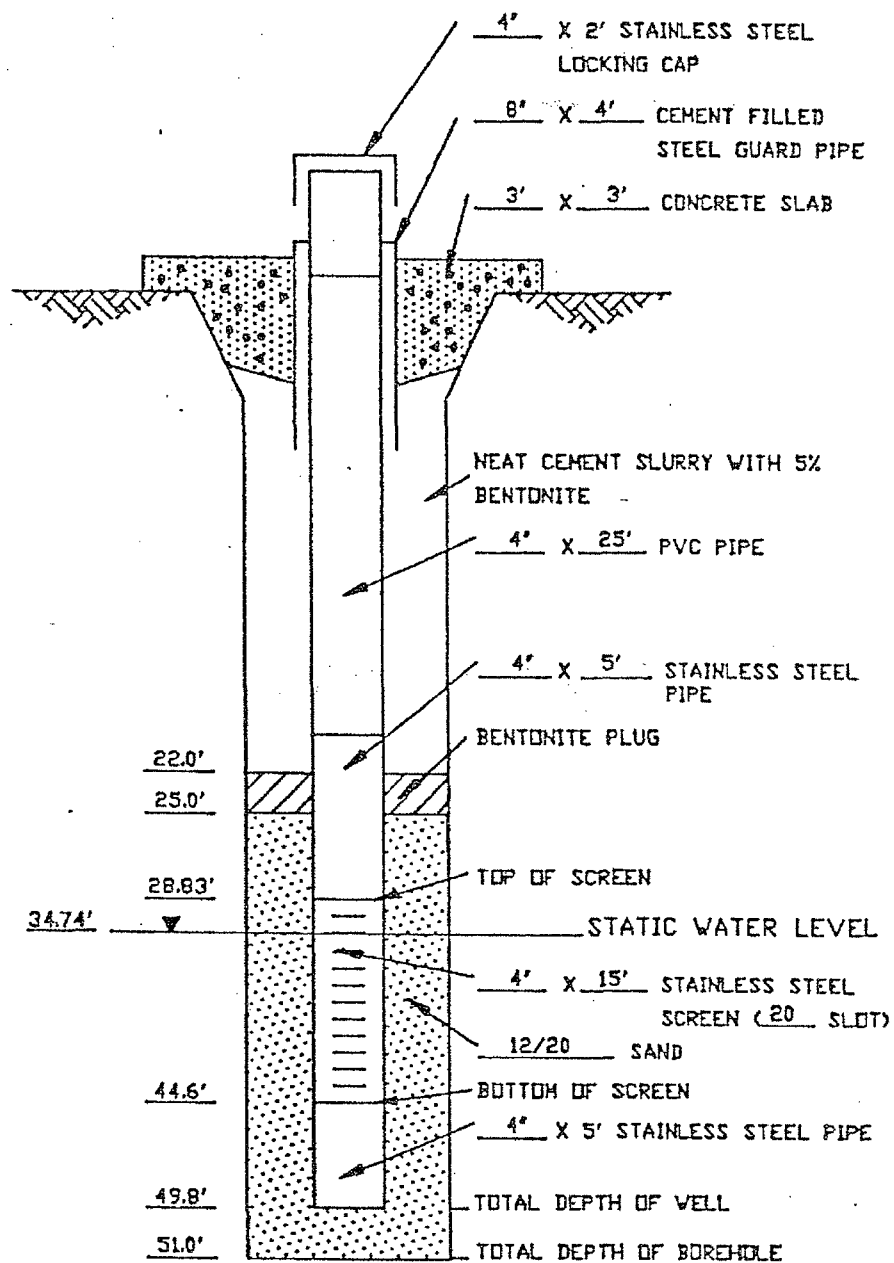


FIGURE B-7

COMPLETION DIAGRAM
PIEZOMETER P-4

(MW-13)

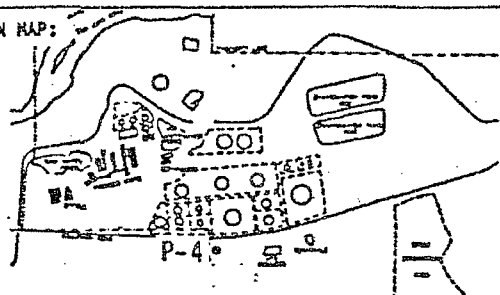
FIGURE B-14

LITHOLOGIC LOG (SOIL)

PIEZOMETER P-4 (MW-13)

Page 1 of 1

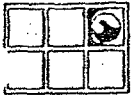
LOCATION MAP:



SITE ID: BRC LOCATION ID: P-4 (MW-13)
 SITE COORDINATES (ft.): _____
 N _____ E _____
 GROUND ELEVATION (ft. MSL): 5538.42
 STATE: New Mexico COUNTY: San Juan
 DRILLING METHOD: Casing Driver
 DRILLING CONTR.: Beeman Brothers
 DATE STARTED: 2 September 1988 DATE COMPLETED: 3 September 1988
 FIELD REP.: U.S. Dubyk
 COMMENTS: Static on September 9, 1988: 37.91' from TOC.

LOCATION DESCRIPTION:

Depth	Visual %	Lith	Drilling Time Scale:	Sample Type and Interval	Lithologic Description
0					0'-27' <u>Silt and Clay</u> - Moderate brown (5 YR 4/4) to light brown (5 YR 5/6).
5					
10					
15					
20					
25			1233		27'-30' <u>Sand</u> - Very pale or (5 YR 8/2) fine to coarse grained, angular to subangular predominantly quartz.
30					30'-40' <u>Gravel and Sand</u> - Light gray (N7). Sand is medium to coarse grained, subrounded to rounded. Gravel is subangular to rounded, up to 3" diameter.
35					
40			1415		41'-43' <u>Clay</u> - Pale olive (10 Y 6/2), plastic.
					43'-45' <u>Gravel and Sand</u> - As above.
45			1420		45'-51' <u>Sand</u> : <u>Macimiento Formation</u> - light bluish grey (5B7/1) Fine grained, silty.
50			1455		
		T.D. 51'			



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-25

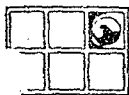
Project BRC Owner Bloomfield Refining Co.
Location 50 County Road 4990, Bloomfield, New Mexico Proj. No. 023353014
Surface Elev. 5527.45 Total Hole Depth 38 ft. Diameter 11 in.
Top of Casing 5530.45 Water Level Initial 28 ft. Static _____
Screen: Dia 6 in. Length 14 ft. Type/Size FRE 0.020 in.
Casing: Dia 6 in. Length 24 1/2 ft. Type FRE
Filter Material 10/20 Co. Silica Rig/Core Drill Systems 180
Drill Co. Layne Method Air Percussion
Driller Gabby Rodriguez Log By Jerry May Date 05/11/94 Permit # _____
Checked By _____ License No. _____

See Site Map
For Boring Location

COMMENTS:

Start @ 1000 hrs. 2 ft. silty leg installed
from 36 feet to 38 feet.

Depth (ft.)	Well Completion	PTD (ppm)	Sample ID	Blow Count/ X Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							Brown clayey SILT (dry-moist)
2						ML	
4							
6		0					
8						SM SC	Brown fine poorly-graded silty/clayey SAND (moist)
10		0					
12							Tan fine poorly-graded SAND (moist)
14							
16		0					
18						SP	
20		0					
22							
24							



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-25

Project BRC

Owner Bloomfield Refining Co.

Location 50 County Road 4990, Bloomfield, New Mexico

Proj. No. 023353014

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ X Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		120			SP	
26					GP GM	Tan fine-coarse, poorly-graded SAND with gravel and cobbles (moist)
28						Dark gray-stained at 28 feet. Groundwater encountered at 28 feet 5/11/94
30		550			GP	Dark gray-stained cobbles (little fines)
32						
34					CL SP	Brown silty clay lens at 34 feet (moist) Tan very fine poorly-graded SAND (dry)
36						Encountered weathered limestone at 35 feet (dry)
38						End of boring at 38 feet (1110 hrs.). Installed well screened from 22 to 36 feet on 5/11/94.
40						
42						
44						
46						
48						
50						
52						
54						
56						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-26

Project BRC Owner Bloomfield Refining Co.
Location 50 County Road 4990, Bloomfield, New Mexico Proj. No. 023353014
Surface Elev. 5512.54 Total Hole Depth 23 ft. Diameter 15 in.
Top of Casing 5514.54 Water Level Initial 15 ft. Static _____
Screen: Dia 6 in. Length 14 ft. Type/Size FRE 0.020 in.
Casing: Dia 6 in. Length 9/2 ft. Type FRE
Fill Material 10/20 Co. Silica Rig/Core Drill Systems 180
Drill Co. Layne Method Air Percussion
Driller Gabby Rodriguez Log By Jerry May Date 05/12/94 Permit # _____
Checked By _____ License No. _____

See Site Map
For Boring Location

COMMENTS:

Start @ 0730 hrs. Silt leg installed from
21 feet to 23 feet.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ X Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							Tan fine poorly-graded silty SAND (moist)
2						SM	
4							
6		22				SP	Tan fine poorly-graded SAND (moist)
8							Tan fine-coarse SAND with a little pea gravel and cobbles (dry)
10		37				SP	
12						GP	Cobbles with some fines (dry)
14						SP	Tan fine-coarse poorly-graded SAND (dry)
16							Gray-stained cobbles with some fines dry-wet Groundwater encountered at 15 feet on 5/12/94
18						GP	Dark gray-stained silty clay lens at 16 feet
20							Dark gray-stained silty clay lens at 19 feet Encountered weathered limestone (moist)
22							Dry at 22 feet
24							End of boring at 23 feet (0820 hrs.). Installed well screened from 7 to 21 feet on 5/12/94.



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-28

Project BRC Owner Bloomfield Refining Co.
Location 50 County Road 4990, Bloomfield, New Mexico Proj. No. 023353014
Surface Elev. 5521.52 Total Hole Depth 33 ft. Diameter 10 in.
Top of Casing 5524.52 Water Level Initial 25 ft. Static _____
Screen: Dia 4 in. Length 15 ft. Type/Size FRE 0.020 in.
Casing: Dia 4 in. Length 20/2 ft. Type FRE
Fill Material 10/20 Co. Silica Rig/Core Drill Systems 180
Drill Co. Layne Method Air Percussion
Driller Gabby Rodriguez Log By Jerry May Date 05/13/94 Permit # _____
Checked By _____ License No. _____

See Site Map
For Boring Location

COMMENTS:

Start @ 1020 hrs. Installed silt leg from
33 to 35 feet.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ x Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure)
							Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							Tan fine poorly-graded silty SAND (dry-moist)
2						SM	
4							
6		124				SM	Gray-stained/tan fine poorly-graded silty SAND (moist)
8							
10		452				CL	Black-stained silty CLAY (moist)
12							
14		365				SM	Tan fine poorly-graded silty SAND (moist)
16							
18							Tan fine-coarse poorly-graded SAND with gravel and cobbles
20		333				SP GM	
22							
24		2507					



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-28

Project BRC Owner Bloomfield Refining Co.
Location 50 County Road 4990, Bloomfield, New Mexico Proj. No. 023353014

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		2507			SP GM	(Dark gray-stained at 24 feet)
		3226				Groundwater encountered at 25 feet on 5/13/94
26						
28						
30						
32						Encountered weathered limestone
34		174				
36						End of boring at 35 feet (1100 hrs). Installed well screened from 18 to 33 feet on 5/13/94.
38						
40						
42						
44						
46						
48						
50						
52						
54						
56						



GROUNDWATER
TECHNOLOGY

Drilling Log

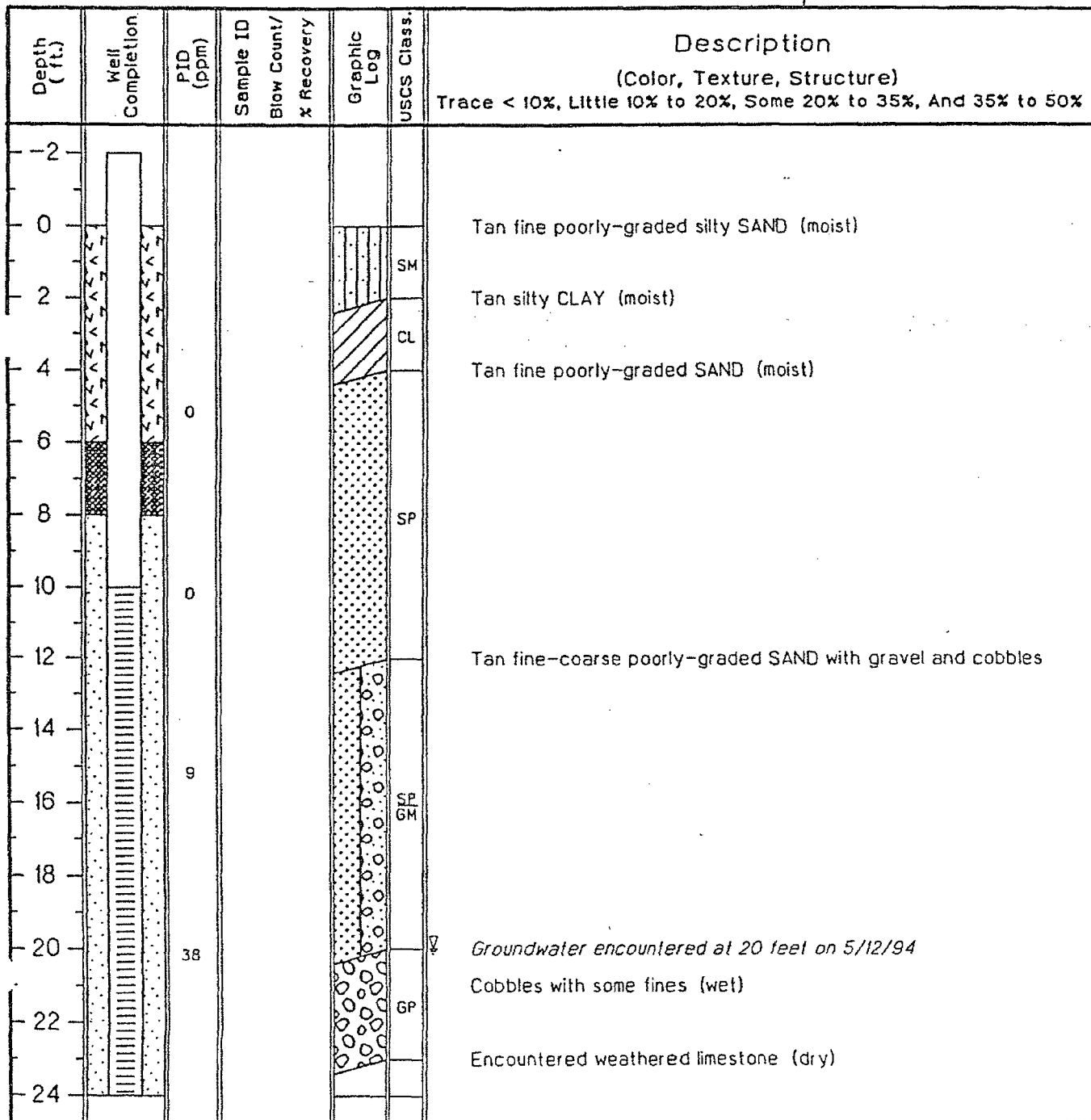
Monitoring Well MW-29

Project BRC Owner Bloomfield Refining Co.
Location 50 County Road 4990, Bloomfield, New Mexico Proj. No. 023353014
Surface Elev. 5518.55 Total Hole Depth 26 ft. Diameter 10 in.
Top of Casing 5524.55 Water Level Initial 20 ft. Static _____
Screen: Dia 4 in. Length 14 ft. Type/Size FRE 0.020 in.
Casing: Dia 4 in. Length 12/2 ft. Type FRE
Fill Material 10/20 Co. Silica Rig/Core Drill Systems 180
Drill Co. Layne Method Air Percussion
Driller Gabby Rodriguez Log By Jerry May Date 05/12/94 Permit # _____
Checked By _____ License No. _____

See Site Map
For Boring Location

COMMENTS:

Start @ 1445 hrs. Installed silt leg 24 to
26 feet.





GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-29

Project BRC

Owner Bloomfield Refining Co.

Location 50 County Road 4990, Bloomfield, New Mexico

Proj. No. 023353014

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						End of boring at 26 feet (1510 hrs). Installed well screened from 10 to 24 feet.
26						
28						
30						
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						
52						
54						
56						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-30

Project BRC Owner Bloomfield Refining Co.
Location 50 County Road 4990, Bloomfield, New Mexico Proj. No. 023353014
Surface Elev. 5520.42 Total Hole Depth 38 ft. Diameter 10 in.
Top of Casing 5533.42 Water Level Initial 31 ft. Static _____
Screen: Dia 4 in. Length 15 ft. Type/Size FRE 0.020 in.
Casing: Dia 4 in. Length 23/2 ft. Type FRE
Fill Material 10/20 Co. Silica Rig/Core Drill Systems 180
Drill Co. Layne Method Air Percussion
Driller Gabby Rodriguez Log By Jerry May Date 05/13/94 Permit # _____
Checked By _____ License No. _____

See Site Map
For Boring Location

COMMENTS:

Start @ 0720 hrs. Installed silt leg from
36 to 38 feet.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						Tan fine poorly-graded silty SAND (moist)
2						
4						
6		22				(Same as above)
8						
10		15				(Same as above)
12					SM	
14						
16		30				(Same as above)
18						
20						
22						
24					SP GM	Tan fine-coarse poorly-graded SAND with pea gravel and cobbles



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-30

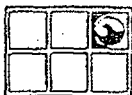
Project BRC

Owner Bloomfield Refining Co.

Location 50 County Road 4990, Bloomfield, New Mexico

Proj. No. 023353014

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ X Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure)
						Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24		62			SP GM	(Same as above)
26						
28						
30		620			GP	Dark gray-stained cobbles with some fines (moist-very moist) Assume groundwater encountered at 31 feet on 5/13/94
32						
34						(Some clay and silt at 34 feet)
36		203				Encountered weathered limestone (dry)
38						End of boring at 38 feet (0800 hrs). Installed well screened from 21 to 36 feet.
40						
42						
44						
46						
48						
50						
52						
54						
56						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-31

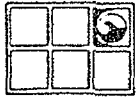
Project BRC Owner Bloomfield Refining Co.
Location 50 County Road 4990, Bloomfield, New Mexico Proj. No. 023353014
Surface Elev. 5530.17 Total Hole Depth 37 ft. Diameter 10 in.
Top of Casing 5532.17 Water Level Initial 30 ft. Static _____
Screen: Dia 4 in. Length 14 ft. Type/Size FRE 0.020 in.
Casing: Dia 4 in. Length 23/2 ft. Type FRE
Fill Material 10/20 Co. Silica Rig/Core Drill Systems 180
Drill Co. Layne Method Air Percussion
Driller Gabby Rodriguez Log By Jerry May Date 05/12/94 Permit # _____
Checked By _____ License No. _____

See Site Map
For Boring Location

COMMENTS:

Start @ 1200 hrs.

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						Tan fine poorly-graded silty SAND (moist)
2						
4						
6		NA				
8					SM	
10		0				
12						
14						
16		0				Tan fine poorly-graded SAND (moist)
18						
20		119			SP	
22						
24						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-31

Project BRC Owner Bloomfield Refining Co.
Location 50 County Road 4990, Bloomfield, New Mexico Proj. No. 023353014

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24						
26		85			SP	Fine-coarse poorly-graded SAND with gravel and cobbles (moist)
28						
30		91			SP GM	Groundwater encountered at 30 feet on 5/12/94 Gray-stained cobbles with a little fines (wet)
32		2026			GP	(Dark gray-stained at 32 feet)
34						Encountered weathered limestone (moist-dry)
36		539				
38						End of boring at 37 feet (1225 hrs). Installed well screened from 21 to 35 feet on 5/12/94.
40						
42						
44						
46						
48						
50						
52						
54						
56						



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-32

Project Bloomfield Refining Company Owner Bloomfield Refining Company
 Location 50 County Road 4990, Bloomfield, NM Proj. No. 023353014
 Surface Elev. 5524.42 Total Hole Depth 27.5 ft. Diameter 9 in.
 Top of Casing 5522.22 Water Level Initial 23 ft. Static _____
 Screen: Dia 4 in. Length 14 ft. Type/Size FRE/0.020 in.
 Casing: Dia 4 in. Length 13.9 ft. Type FRE
 Fill Material 10/20 Silica Sand Rig/Core Drill Systems 180
 Drill Co. Layne Method Air Hammer Percussion
 Driller B. Morris Log By E. Shannon Date 02/23/85 Permit # _____
 Checked By BS 3-14-95 License No. _____

See Site Map
For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PIG (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						
2		0			SH	0-7 ft.: Brown medium to fine poorly-graded SAND, little coarse to fine gravel, occasional rounded cobbles (up to 4" dia.), dry.
4						
6						
8		3			SH	7-10 ft.: Grades to grayish brown coarse to fine well-graded SAND, trace silt, little coarse to fine grained gravel, occasional rounded cobbles.
10						
12						
14		1			SH	10-18 ft.: Brown coarse to fine SAND, and coarse to fine GRAVEL/COBBLES (up to 8" dia.), little silt.
16						
18						
20		1			SH	18-25 ft.: Coarse to fine GRAVEL/COBBLES and coarse to fine SAND, trace silt.
22						
24						Damp at 23 feet.



GROUNDWATER
TECHNOLOGY

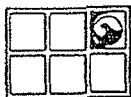
Drilling Log

Monitoring Well MW-32

Project Bloomfield Refining Company Owner Bloomfield Refining Company
Location 50 County Road 4990, Bloomfield, NM Proj. No. 023353014

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ x Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24					GP SP	
26						25-28 ft.: Yellowish brown weathered silty LIMESTONE.
28						28-27.5 ft.: Gray LIMESTONE.
30						End of boring at 27.5 feet.
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						
52						
54						
56						

Set MW-32 with screened interval from 11-25 feet below grade.



GROUNDWATER
TECHNOLOGY

Drilling Log

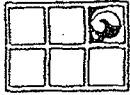
Monitoring Well MW-33

Project Bloomfield Refining Company Owner Bloomfield Refining Company
Location 50 County Road 4990, Bloomfield, NM Proj. No. 023353014
Surface Elev. 5515.86 Total Hole Depth 23 ft. Diameter 9 in.
Top of Casing 5518.46 Water Level Initial 19 ft. Static Dry ft.
Screen: Dia 4 in. Length 14 ft. Type/Size FRE/0.020 in.
Casing: Dia 4 in. Length 11.6 ft. Type FRE
Fill Material 10/20 Silica Sand Rig/Core Drill Systems 180
Drill Co. Layne Method Air Hammer Percussion
Driller G. Rodriguez Log By E. Shannon Date 02/23/95 Permit #
Checked By ELS 3-14-95 License No.

See Site Map
For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PTD (ppm)	Sample ID	Blow Count/ X Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0							
2							
4						SM	0-7 ft.: Brown medium to fine SAND, little silt, little coarse to fine gravel, occasional cobbles, dry.
6							
8							7-20 ft.: Coarse to fine GRAVEL/COBBLES, some coarse to fine well graded sand, trace silty, dry.
10						GP SP	
12							
14							
16							
18							
20							Cuttings damp at 19'
22							20-22.8 ft.: Tanish brown SILT/weathered Limestone, dry.
24							22.8-23 ft.: Gray Limestone, weathered, dry. End of boring at 23 feet. Set MW-33 with screened interval from 6.9-20.9 feet below grade.



GROUNDWATER
TECHNOLOGY

Drilling Log

Monitoring Well MW-34

Project Bloomfield Refining Company Owner Bloomfield Refining Company
Location 50 County Road 4990, Bloomfield, NM Proj. No. 023353014
Surface Elev. 5505.53 Total Hole Depth 19 ft. Diameter 10 in.
Top of Casing 5508.23 Water Level Initial 12 ft. Static _____
Screen: Dia 4 in. Length 14 ft. Type/Size FRE/0.020 in.
Casing: Dia 4 in. Length 7.8 ft. Type FRE
Fill Material 10/20 Silica Sand Rig/Core Drill Systems 180
Drill Co. Layne Method Air Hammer Percussion
Driller G. Rodriguez Log By E. Shannon Date 02/23/95 Permit # _____
Checked By ES 3-14-95 License No. _____

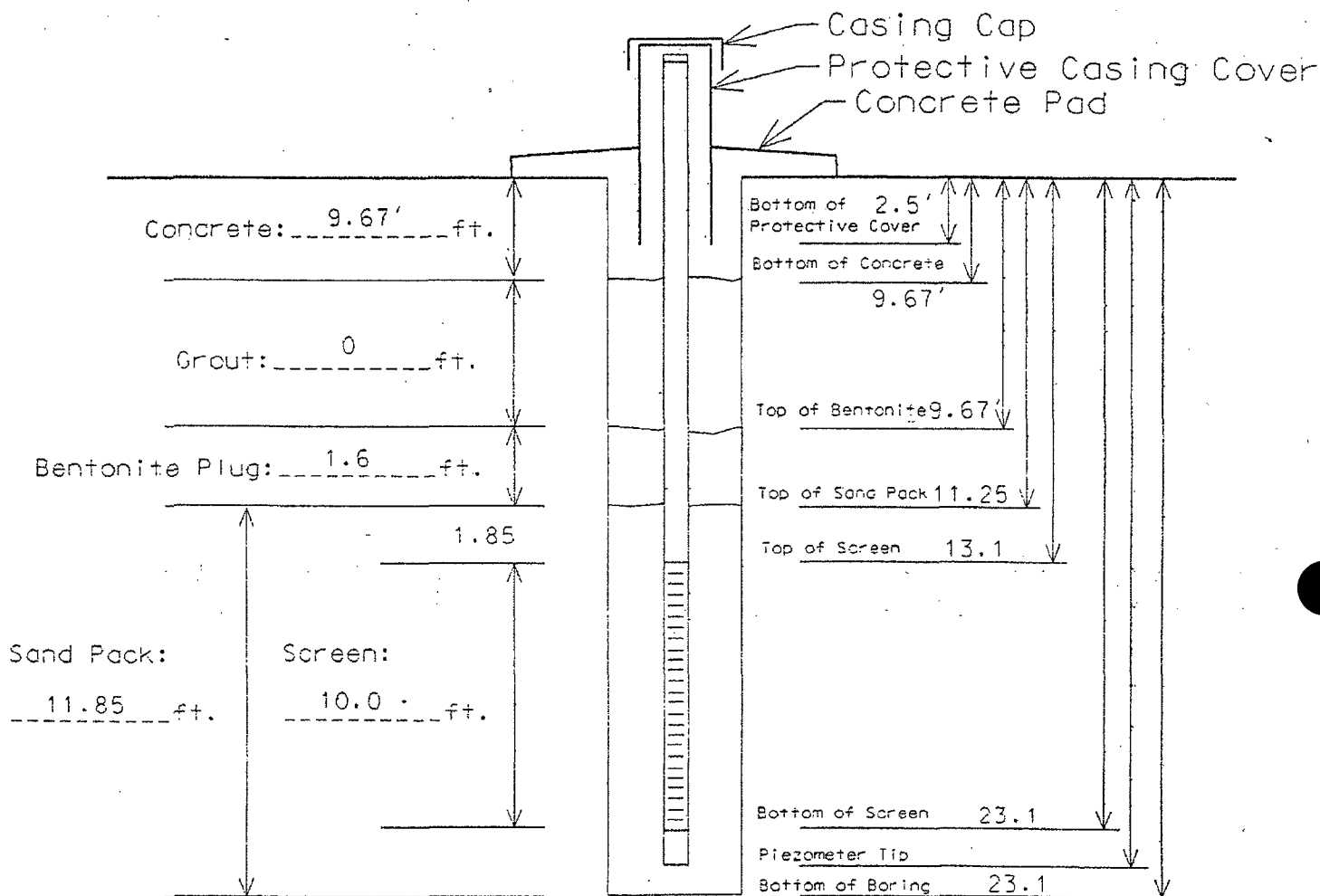
See Site Map
For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure)
						Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						
2						0-9 ft.: Brown coarse to fine poorly graded SAND, little coarse to fine gravel, little silt, occasional cobbles.
4					SM	
6						
8						
10						9-14 ft.: Coarse to fine GRAVEL/COBBLES, some coarse to fine sand, trace silt, dry.
12					GP	Wet at 12', gray-staining.
14						Yellowish brown SILT/weathered LIMESTONE, dry.
16						14.7-19 ft.: Gray LIMESTONE.
18						
20						End of boring at 19 feet.
22						Set MW-34 with screened interval from 2.5-16.5 feet below grade
24						

Installation Diagram

Monitoring Well No. MW-35



Boring Diameter: 8-5/8"

Sand Type: 16-40

Bollards, Type/Size: 3" STEEL

Bentonite: 3/8 CHIPS

Screen Type/Size: 0.010

Cement/Grout: _____

Riser Type/Size: 2" SCH 40, PVC

Water: _____

Locking Expandable Casing Plug? YES

Other: _____

Bottom Cap Used? YES

Project #: 97-028

Project Name: BLOOMFIELD REFINING

Elevation: 5512.39



505-523-7674

Site Northing: 4392.54

Site Easting: 1723.01

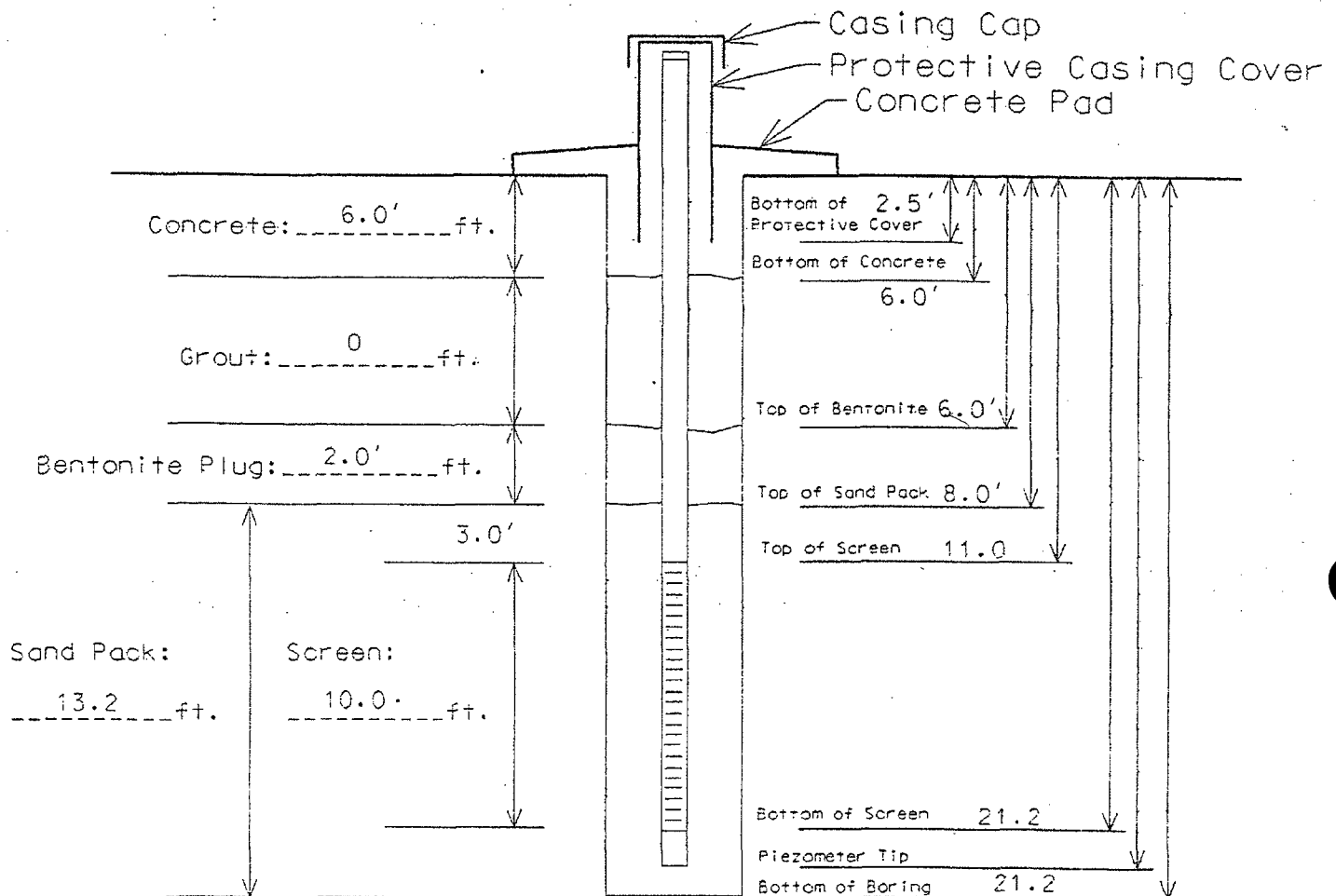
FILE #: 97-028
ELEVATION: 5512.39
TOTAL DEPTH: 23.1'
LOGGED BY: TM
DATE: 4-29-97
STATIC WATER: 20.5
BORING ID: MW-35
PAGE: 1

LOGGED BY: TM

AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

Installation Diagram

Monitoring Well No. MW-36



Boring Diameter: 8-5/8"

Sand Type: 16-40

Bollards, Type/Size: 3" STEEL

Bentonite: 3/8 CHIPS

Screen Type/Size: 0.010

Cement/Grout:

Riser Type/Size: 2" SCH 40, PVC

Water:

Locking Expandable Casing Plug? YES

Other:

Bottom Cap Used? YES

Project #: 97-028

Project Name: BLOOMFIELD REFINING

Elevation: 5510.56



505-523-7674

Site Northing: 4652.99

Site Easting: 1779.57

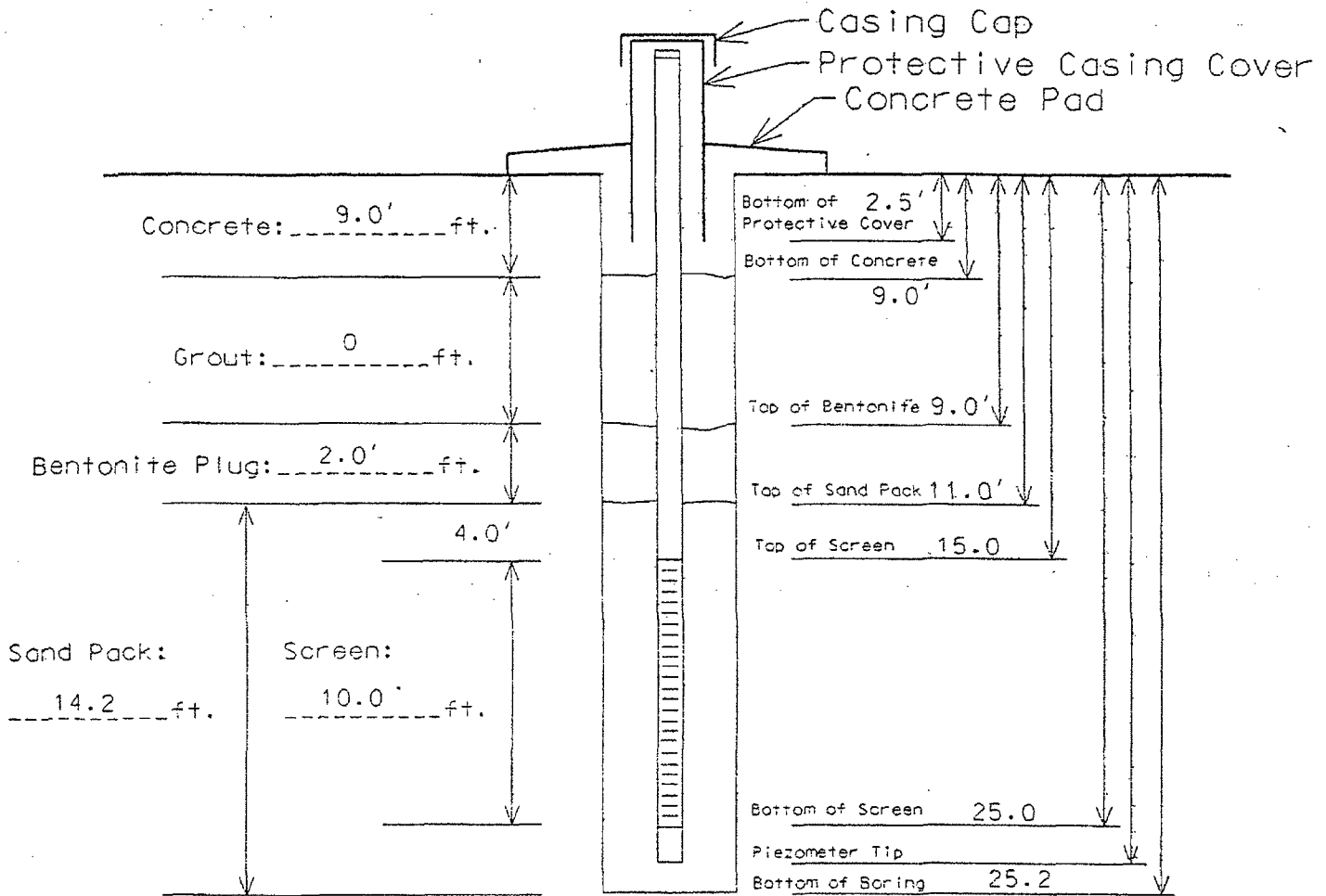
FILE #: 97-028
ELEVATION: 5510.56
TOTAL DEPTH: 21.0'
LOGGED BY: TM
DATE: 4-29-97
STATIC WATER: 19.5
BORING ID: MW-36
PAGE: 1

[illegible]

AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT WSA

Installation Diagram

Monitoring Well No. MW-37



Boring Diameter: 8-5/8"

Sand Type: 16-40

Ballards, Type/Size: 3" STEEL

Bentonite: 3/8 CHIPS

Screen Type/Size: 0.010

Cement/Grout: -----

Riser Type/Size: 2" SCH 40. PVC

Water: -----

Locking Expandable Casing Plug? YES

Other: -----

Bottom Cap Used? YES

Project #: 97-028

Project Name: BLOOMFIELD REFINING

Elevation: 5513.04



505-523-7674

Site Northing: 4413.84

Site Easting: 1496.01

FILE #: 97-028
ELEVATION: 5513.04
TOTAL DEPTH: 25.0'
LOGGED BY: TM
DATE: 5-1-97
STATIC WATER: 21.0
BORING ID: MW-37
PAGE: 1

DEPTH	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-7.0	*****		C	<u>SAND</u> , FINE, SILTY, DAMP, LOOSE, RED BROWN	0
	*****		C		
	*****		C		
	*****		C		
	*****		C		
	*****		C		
	*****		C		
	*****		C		
	*****		C		
	*****	5.0	C		
	*****		C		
	*****		C		
	*****		C		
7.0-11.0	***-/***		C	<u>SAND</u> , VERY FINE, SILTY, SLIGHTLY CLAYEY, DAMP, MODERATELY DENSE, RED BROWN, SOME FINE GRAVEL AT 10.0'	0
	-/		C		
	-/		C		
	-/		C		
	-/		C		
	-/		C		
	-/	10	C		
11.0	***-/***		C		
11.0-11.5	000000000		C	<u>GRAVEL</u> , COARSE, SOME FINE, SOME COBBLES, SLOW DRILLING, DAMP	0
11.5-12.5	***-//**		C	<u>SAND</u> ; FINE, SILTY, CLAYEY, DAMP, RED BROWN, NO ODOR	0
12.5	***-//**		C		
12.5-17.0	000000000		C	<u>GRAVEL</u> , COARSE, COBBLES, SLOW DRILLING, DENSE, DAMP	0
	000000000		C		
	000000000		C		
	000000000		C		
	000000000	15	C		
	000000000		C		
	000000000		C		
	000000000		C		
	000000000		C		
17.0-22.0	000000000		C	<u>COBBLES</u> , GRAVELLY, COARSE, VERY SLOW DRILLING, NO ODOR, DENSE, DAMP,	
	000000000		C		
	000000000		C		
	000000000		C		
	000000000		C		
	000000000		C		
	000000000	20	C		
	000000000		C		
	000000000		C		
22.0	000000000		C	WEAKLY WATER BEARING 21.0-22.0	
22.0-25.0	=====		C	<u>NACIMIENTO FORMATION</u>	0
	=====		C	GREEN, FISSILE, DAMP, NO ODOR, NOT WATER BEARING	

AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PRECISION ENGINEERING, INC.
LOG OF TEST BORINGS

FILE #: 97-028
ELEVATION: 5513.04
TOTAL DEPTH: 25.0'
LOGGED BY: TM
DATE: 5-1-97
STATIC WATER: 21.0
BORING ID: MW-37
PAGE: 2

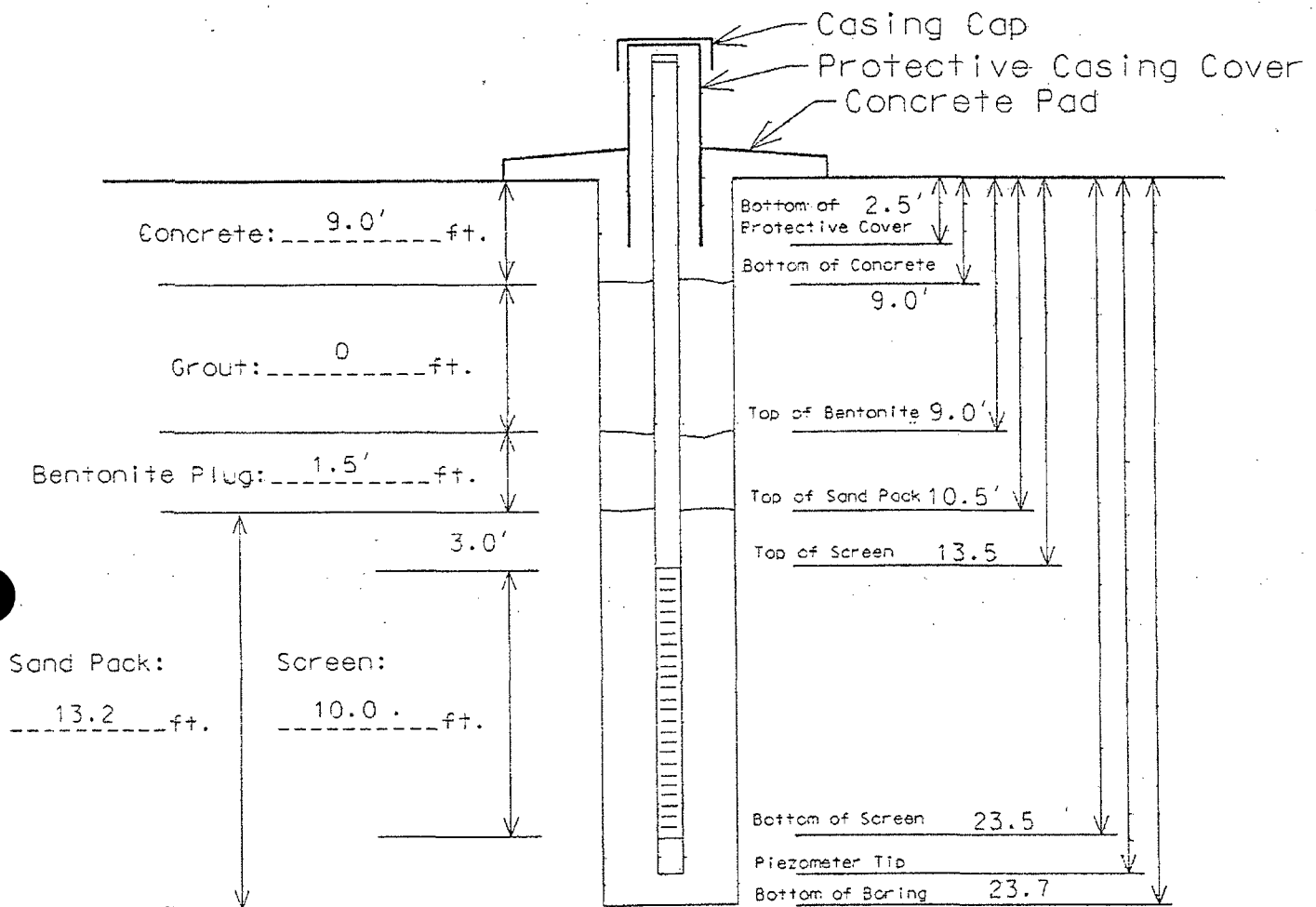
		P L O T	S C A L E	S A M P L E	LOGGED BY:	DATE:	5-1-97
					STATIC WATER:	21.0	
					BORING ID:	MW-37	
					PAGE:	2	
DEPTH					MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)		PID (ppm)
22.0-25.0	=====		C	<u>NACIMIENTO FORMATION</u>			
	=====		C	GREEN, FISSLE, DAMP, NO ODOR, NOT WATER BEARING			
25.0	=====	25	C				
TOTAL DEPTH							
		<u>30</u>					
		<u>35</u>					
		<u>40</u>					
		<u>45</u>					

AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

LOGGED BY: TM

Installation Diagram

Monitoring Well No. MW-38



Boring Diameter: 8-5/8"

Sand Type: 16-40

Bollards, Type/Size: 3" STEEL

Bentonite: 3/8 CHIPS

Screen Type/Size: 0.010

Cement/Grout:

Riser Type/Size: 2" SCH 40, PVC

Water:

Locking Expandable Casing Plug? YES

Other:

Bottom Cap Used? YES

Project #: 97-028

Project Name: BLOOMFIELD REFINING

Elevation: 5512.87



505-523-7674

Site Northing: 4674.24

Site Easting: 1587.4

FILE #: 97-028
ELEVATION: 5512.87
TOTAL DEPTH: 23.5'
LOGGED BY: TM
DATE: 4-29-97
STATIC WATER: 21.0
BORING ID: MN-38
PAGE: 1

AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

PROJECT: Bloomfield Refinery
CMS Wells & Borings

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 98-149
ELEVATION: 5522 ft
TOTAL DEPTH: 36 ft
LOGGED BY: WHK
DATE: 9-28-98
STATIC WATER: 18 ft
BORING ID: MW-39
PAGE: 1 of 5

DEPTH	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	PID (ppm)
0.0 - 1.5	*-**-**			Sand, fine, silty, EOLIAN	
1.5 - 3.0	0*00*00*0 0*00*00*0			Gravel, sandy	
3.0 - 4.5	*-**-** *-**-** *-**-**	5.0		Sand, silty, clayey, moist, loose, brown more clayey, soft, wet, black	
7.0	*-**-**				
	0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0	10 15 20		Gravel, sandy, moist, moderately dense, grey-black, JACKSON LAKE more cobbly at 14' water bearing at 18', sandier from 18-20' gravel & cobbles, moist, very dense, black	
22.0	0*00*00*0				
	SSS*S*SSS SSS*S*SSS SSS*S*SSS SSS*S*SSS SSS*S*SSS SSS*S*SSS SSS*S*SSS SSS*S*SSS SSS*S*SSS SSS*S*SSS SSS*S*SSS SSS*S*SSS SSS*S*SSS SSS*S*SSS SSS*S*SSS	25 30 35		Sandstone, slightly sandy, moist, dense, NACIMIENTO	
36.0	SSS*S*SSS				
total depth		40 45			

SIZE AND TYPE OF BORING: 4.25" ID HSA

LOGGED BY: WHK

FILE #: 97-028
ELEVATION: 5526.21
TOTAL DEPTH: 34.5'
LOGGED BY: TM
DATE: 3-11-97
STATIC WATER: NOT FOUND
BORING ID: MW-40
PAGE: 1

PAGE: 1

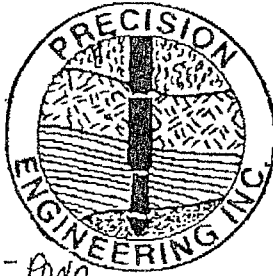
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SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT HSA

FILE #: 97-028
ELEVATION: 5525.13
TOTAL DEPTH: 33.0'
LOGGED BY: TM
DATE: 3-12-97
STATIC WATER: NOT FOUND
BORING ID: MW-41
PAGE: 2

						LOGGED BY:		
						DATE:	3-12-97	
						STATIC WATER:	NOT FOUND	
						BORING ID:	MW-41	
						PAGE:	2	
						MATERIAL CHARACTERISTICS		
						(MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)		
DEPTH	T	E	E	S	A	PID	(DDM)	
	000000000	C	COBBLES, VERY SLOW DRILLING, SOME SMALL BOULDERS					
	000000000	C						
	000000000	C						
	000000000	25	C					
	000000000	C						
	000000000	C						
	000000000	C						
	000000000	C						
	000000000	C						
	000000000	C						
	000000000	C						
	000000000	C						
	000000000	C						
	000000000	C						
	000000000	C						
30.0	000000000	30	C					
30.0-33.0	SSSSSSSSS	C	NACIMIENTO, GREYISH BROWN, DAMP, VERY SLIGHT ODOR					
	SSSSSSSSS	C						
	SSSSSSSSS	C						
	SSSSSSSSS	C						
	SSSSSSSSS	C						
	SSSSSSSSS	C						
33.0	SSSSSSSSS	C						
TOTAL DEPTH								

1. SIZE AND TYPE OF BORING: 4 1/4" ID CONTINUOUS FLIGHT USA



SHEET ____ OF ____

Boring Location: _____

Hole Number: 3MW-43File No. N 56 62.87Location E 3346.15Surface Elevation 5522Water Level 18.0 Date 9-25

LAR	SACF	DEPTH	FLUSH BLOWS/N	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	IM	LL	PI	CLASS
		0-5		CLAY, SILTY, WET, BROWN No odor SOFT				
		5.0-6.5		CLAY → SAND FINE Grey 3 in No odor(?) MOIST, SOFT				
		7.5						
		7.5 9.0		GRAVEL 8.0 PUNE, Silty Medium Dense DRY				JACKSON LAKE TERRACE
		9.0-10.5		SAND GRAVEL COARSE SAND DENSE SLIGHT OODR DRY Grey (faint)				
		10.5-11.0		SAND, COARSE SMALL GRAVEL Damp DENSE SLIGHT OODR Grey (Discolored)				
		11.0		COBBLY				
		14.5-16.0		SAND, MEDIUM → COARSE, DRY GRAVEL, Grey (Discolored) med Dense No odor WATER 18 FT				
		19-20.5		GRAVEL SAND, COARSE, WATER BEARING, DARK GRAY, OODR med Dense				
		22.8						
		23.8		NACIAIENTO ! - SS, DENSE, POORLY POORLY SORTED, LAY TO YELLOW				CONSOLIDATED
		25.0 TD						

PROJECT: Bloomfield Refinery
CMS Wells & Borings

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 98-149
ELEVATION: 5522 ft
TOTAL DEPTH: 25 ft
LOGGED BY: NS
DATE: 9-25-98
STATIC WATER: 18 ft
BORING ID: MW-43
PAGE: 2 of 5

98-149
5522 ft
25 ft
NS
9-25-98
18 ft
MW-43
2 of 5

		S A M P L E		LOGGED BY: NS DATE: 9-25-98 STATIC WATER: 16 ft BORING ID: MW-43 PAGE: 2 of 5	
DEPTH	P L O T	S C A L E		MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	PID (ppm)
0.0-5.0	/-//--//-/			Clay, silty, wet, soft, brown	
5.0-6.5	/-//--//-/	5.0		sandy(fine), moist, soft, grey	
7.5	/-x/-/-x/				
9.0-10.5	0000000000	10		Gravel, dry, medium dense, purple, silicified, JACKSON LAKE TERRACE	
10.5-11.5	*0*0*0*0*			Sand-Gravel, coarse sand, dry, dense, grey(natural)	
	*0*0*0*0*			Sand(coarse), geavelly, damp, dense, grey	
	*0*0*0*0*			cobbly at 11'	
14.5-16.0	*0*0*0*0*	15		Sand(medium to coarse), dry, medium dense, grey	

19.0-20.5	0*0*0*0*0	20		water bearing at 18'	
	0*0*0*0*0			Gravel, sandy(coarse), medium dense, dark grey	
22.8	0*0*0*0*0				
25.0	SSSSSSSSSS	25		Sandstone, dense, poorly consolidated, poorly sorted, grey to yellow, NACTMIENTO	
total depth					
		30			
		35			
		40			
		45			

SIZE AND TYPE OF BORING: 4.25" ID HSA

LOGGED BY: NS

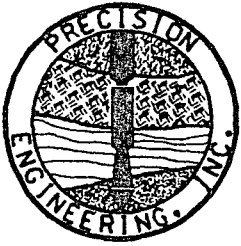
PROJECT: Bloomfield Refinery
CMS Wells & Borings

PRECISION ENGINEERING, INC.

LOG OF TEST BORINGS

FILE #: 98-149
ELEVATION: 5536 ft
TOTAL DEPTH: 47.5 ft
LOGGED BY: WHK
DATE: 10-01-98
STATIC WATER: 34 ft
BORING ID: MW-44*
PAGE: 3 of 5

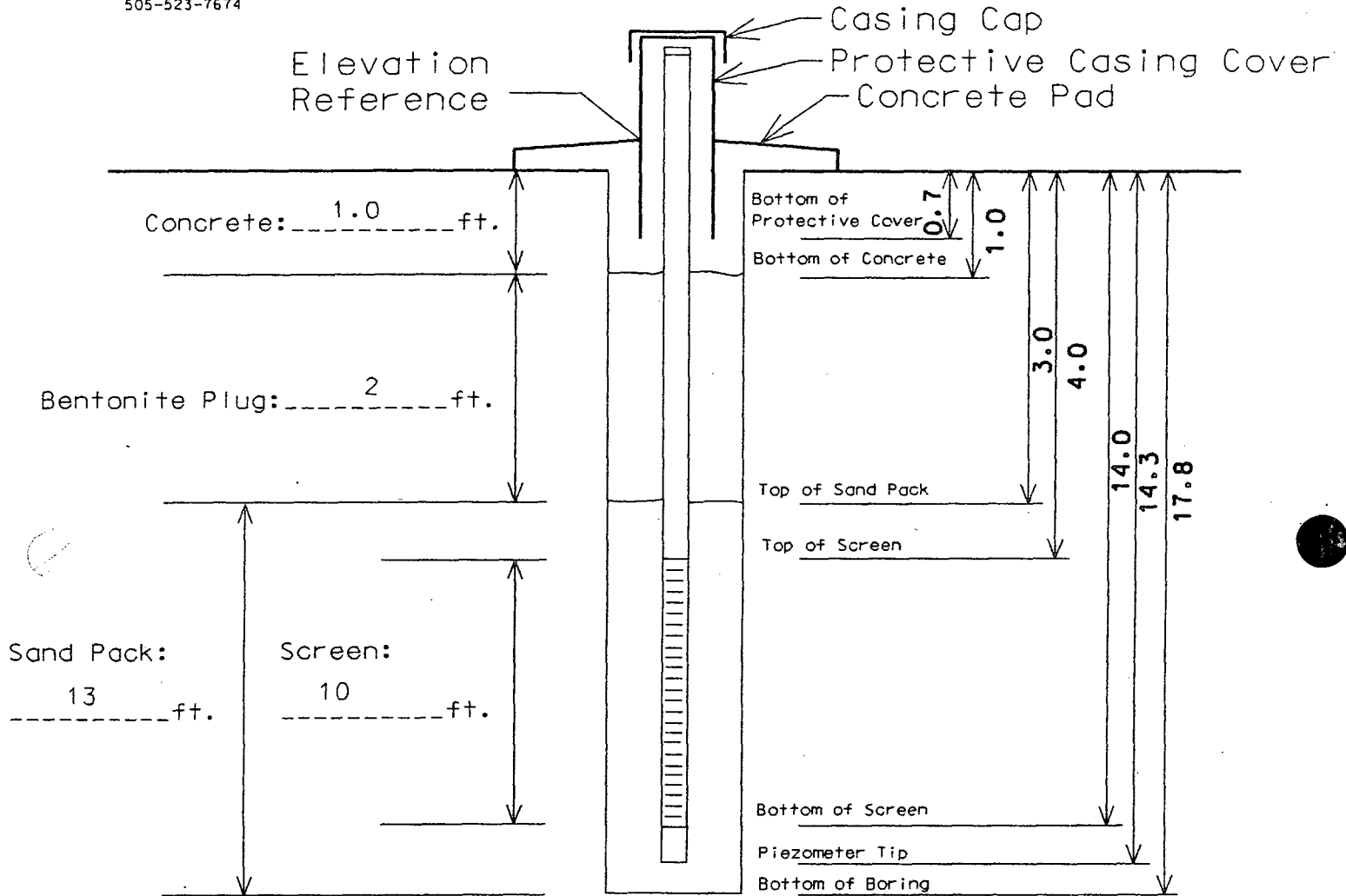
DEPTH	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	PID (ppm)
0.0 - 5.0	*-/+-/++ *-/+-/++ *-/+-/++ *-/+-/++ *-/+-/++ *-/+-/++ *-/+-/++ *-/+-/++ *-/+-/++	5.0		Sand, fine, silty, slightly clayey, moist-wet, loose, light brown, Qe	
9.0					
9.0-10.0	/-/-/-/-	10		Clay, silty, sandy(fine), wet, soft, brown	
10.0-15.0	*-++++-+ *-++++-+ *-++++-+ *-++++-+ *-++++-+ *-++++-+ *-++++-+ *-++++-+ *-++++-+	15		Sand, fine, slightly silty, damp, loose, brown	
20.2	*-++/+-+	20		some clay at 19'	
	0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0 0*00*00*0	25 30		Gravel (up to 3"), sandy, damp, moderately dense, interbeds of sand (medium-coarse) brown to grey no odor appears to be natural color some cobble or boulder material	
33.5					
	SSSSSSSSSS SSSSSSSSSS SSSSSSSSSS SSSSSSSSSS SSSSSSSSSS SSSSSSSSSS SSSSSSSSSS SSSSSSSSSS SSSSSSSSSS SSSSSSSSSS SSSSSSSSSS SSSSSSSSSS	35 40 45		Sandstone, argillaceous, liesgaing banded, dense, yellow brown orange banded in random pattern, fine to medium, NACIMIENTO water bearing at 34'	
47.5					
total depth					
SIZE AND TYPE OF BORING: 4.25" HSA					
LOGGED BY: WHK					



505-523-7674

Installation Diagram

Monitoring Well No. MW - 45



Boring Diameter: 11-5/8" $R = 5.8125$

Sand Type: 10-20 Silica

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

Bentonite: 3/8" Chip

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

Cement/Grout: -----

Riser Type/Size: 4" PVC Sch. 40 = 1.9745

Water: Potable

Locking Expandable Casing Plug? Yes

Site Northing: 5790.85

Other: N/A

Bottom Cap Used? Yes

Site Easting: 2837.78

Project #: 03-015

Project Name: Bloomfield Wells

Elevation: 5496.33

Bore Point: N5790.85'

B2837.78

Water Elev: 9.54'

LOG OF TEST BORINGS

Site:Giant Refinery

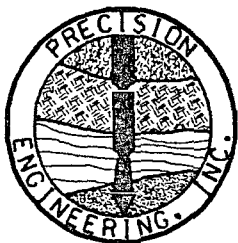
Bloomfield, NM

Elevation: 5496.33

Boring No.: MW 45

Date:1-15-03

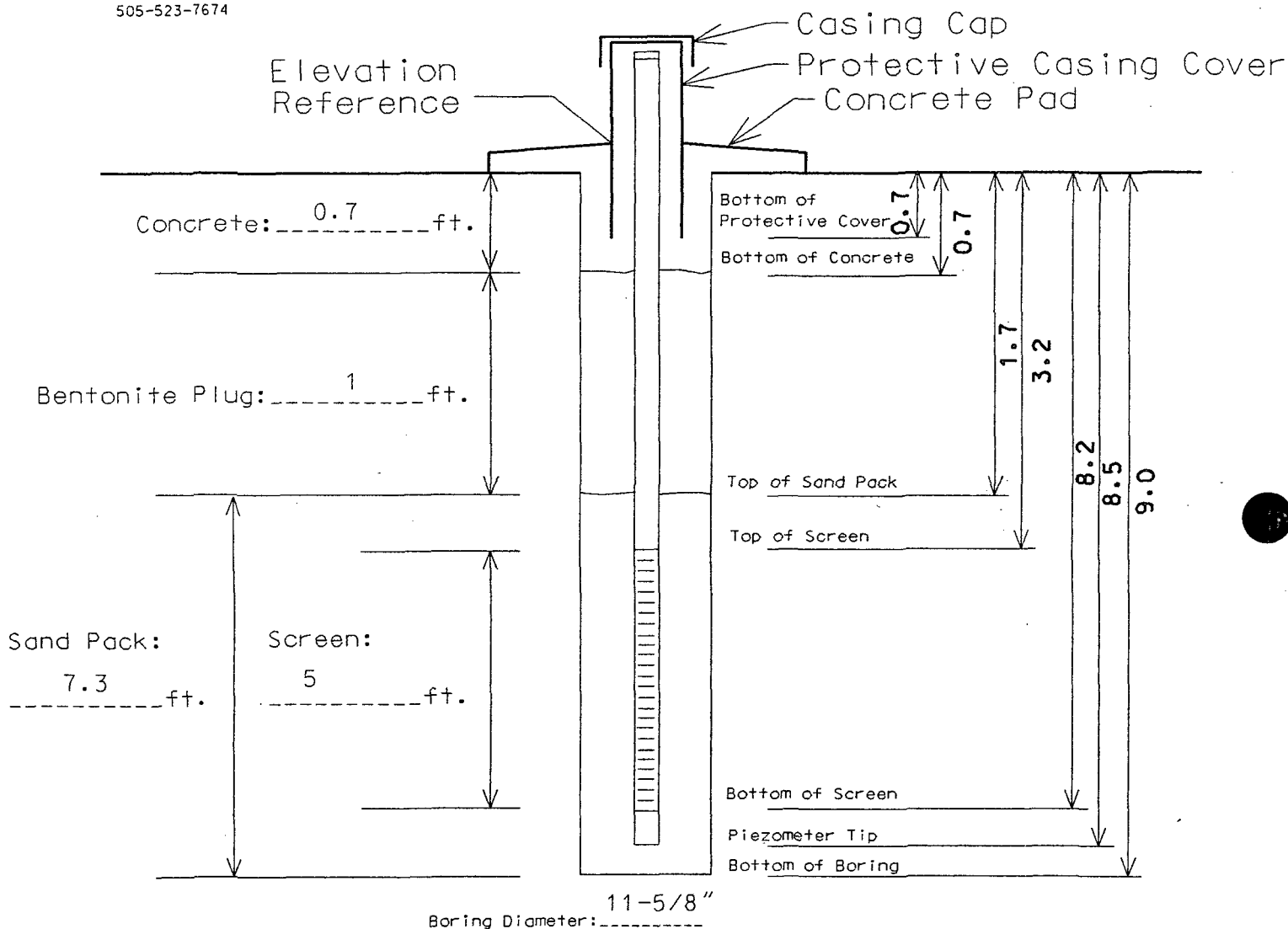
Water Elev: 9.54'						Elevation: 5496.33				
Boring No.: MW 45						Date: 1-15-03				
LAB #	DEPTH	BLOW COUNT	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAIN SIZE, ETC.)	%M	L	PI	CLASS.
	0-1.0 1.0-5.0	Grab	00*00* 							



505-523-7674

Installation Diagram

Monitoring Well No. MW - 46



Sand Type: 10-20 Silica Bollards, Type/Size: Steel, 3" min.

Bentonite: 3/8" Chip Screen Type/Size: 4" PVC Sch. 40, 0.010" Slotted

Cement/Grout: Riser Type/Size: 4" PVC Sch. 40

Water: Potable Locking Expandable Casing Plug? Yes Site Northing: 5560.48

Other: N/A Bottom Cap Used? Yes Site Easting: 2576.06

Project #: 03-015 Project Name: Bloomfield Wells Elevation: 5496.43

Boring No.: MW 46

PRECISION ENGINEERING, INC.

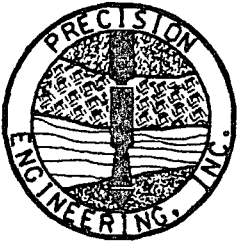
File #:03-015

Site:Giant Refinery
Bloomfield, NM
Elevation: 5496.43

Date:1-16-03

LOG OF TEST BORINGS

Water Elev: 5496.43						Elevation: 5496.43				
Boring No.: MW 46						Date: 1-16-03				
LAB #	DEPTH	BLOW COUNT	P L O T	S C A L E	S A M P L E	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, GRAINSIZE, ETC.)	%M	L	PI	CLASS.
	0-1.0	Grab	**0**0		G	<u>SAND</u> , VERY GRAVELLY, COBBLY, LIGHT BROWN, LOOSE				
			00		G					
			00							
			00							
			00	2.5						
			00							
			00							
			00							
			00							
			00	5.0						
	5.0-6.5	3-4-4	**0**0		S	SAME				
			00		S					
			00		S	NACIMIENTO FORMATION				
	6.5-8.0	13-18-18	-- --	7.5	S	<u>MUDSTONE</u> , SILTY, HARD, DRY, LIGHT GREEN				
			-- --		S					
			-- --		S					
	9.0		-- --							
	TOTAL DEPTH									
				10.0						
				15.0						
				20.0						
Size & Type of Boring: 4 1/4" ID HOLLOW STEMMED AUGER						Logged By: WHK				

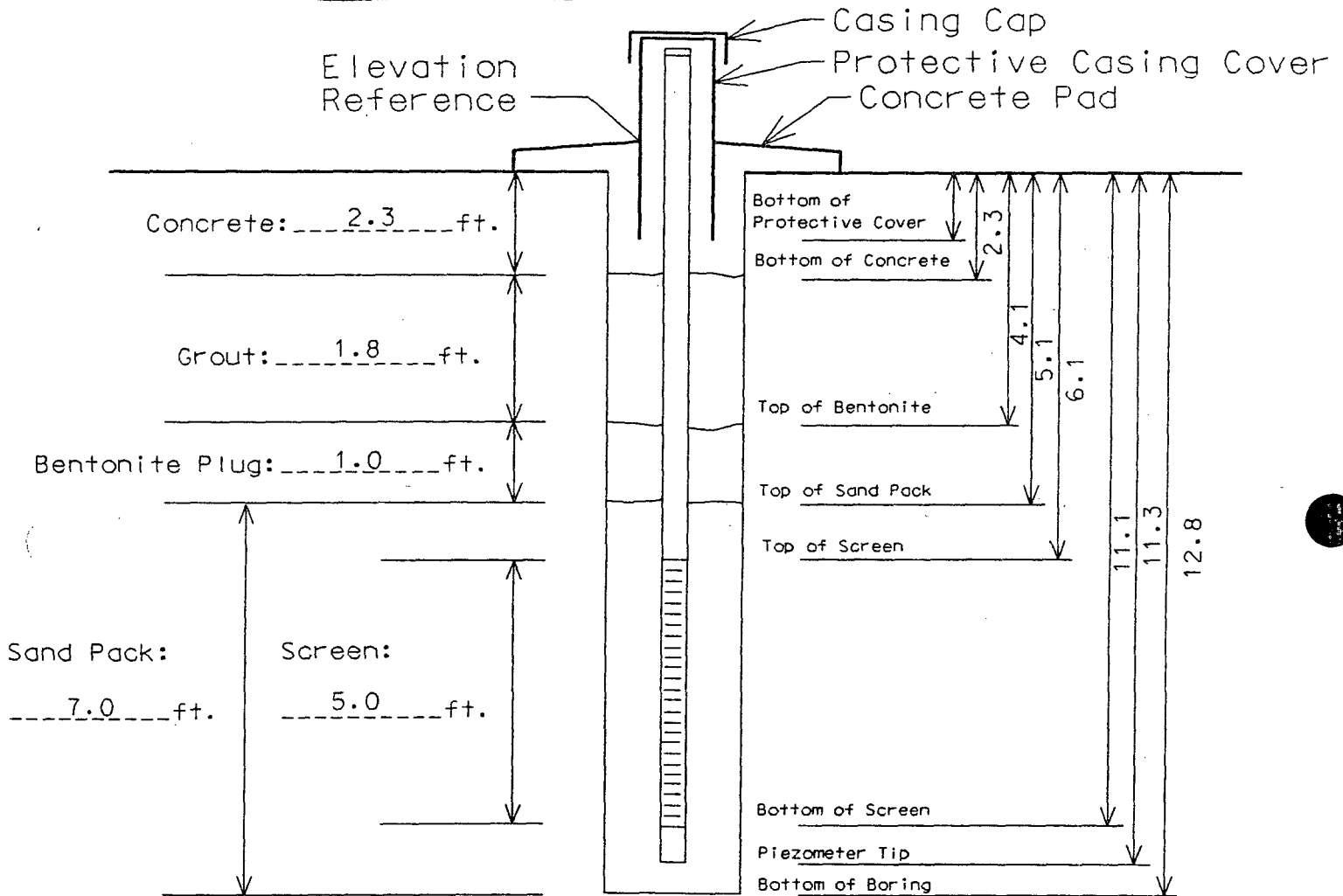


505-523-7674

Installation Diagram

Monitoring Well No. Seep 5

STA 4+25

Boring Diameter: 8 5/8"Sand Type: 10-20 SilicaBollards, Type/Size: Steel, 3"Bentonite: 3/8" ChipsScreen Type/Size: 2" PVC Sch. 40, 0.010" SlottedCement/Grout: 6% BentoniteRiser Type/Size: 2" PVC Sch. 40Water: PotableLocking Expandable Casing Plug? YesSite Northing: 5413.57Other: N/ABottom Cap Used? YesSite Easting: 2220.90Project #: 03-015Project Name: Giant Refining Co. Bloomfield WellsElevation: TBD

Date: 3-6-03

Logged By: WHK

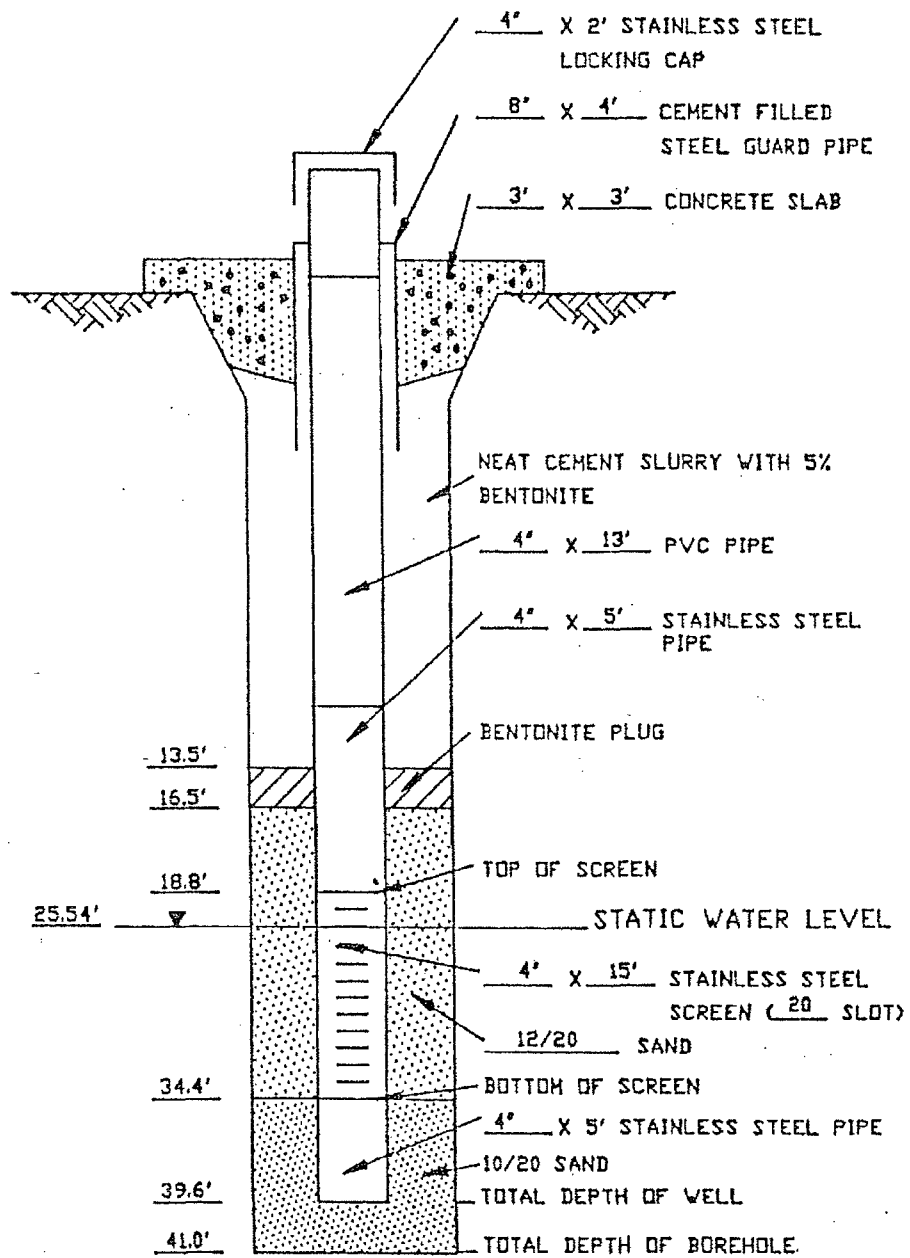


FIGURE B-1

COMPLETION DIAGRAM
RECOVERY WELL RV-1

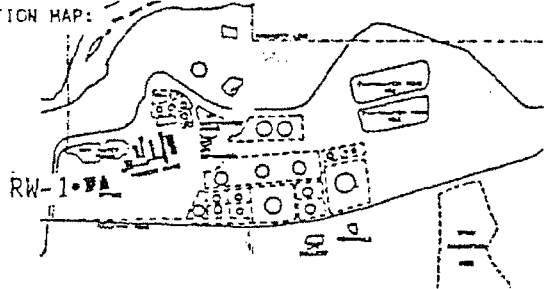
FIGURE B-8

LITHOLOGIC LOG (SOIL)

RECOVERY WELL RW-1

Page 1 of 1

LOCATION MAP:

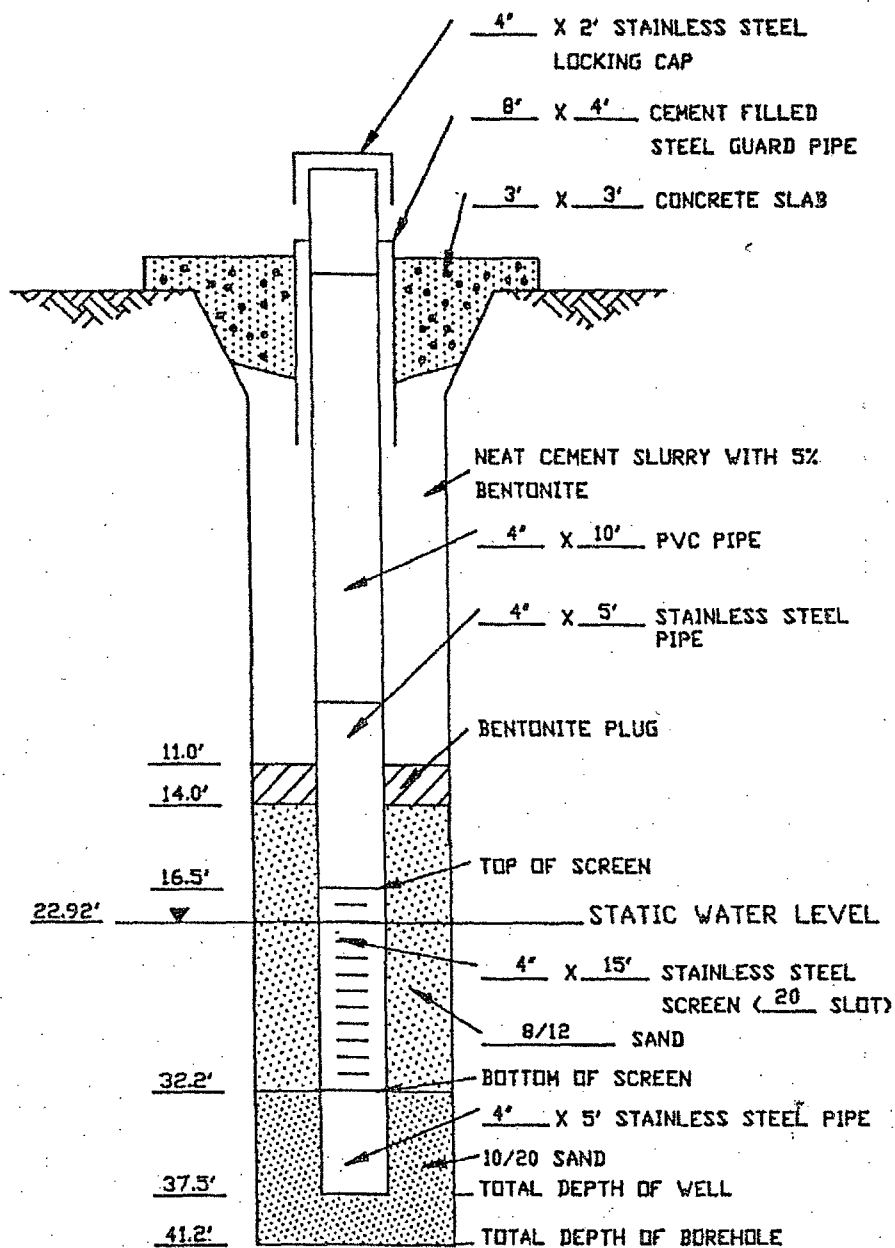


SITE ID: BRC LOCATION ID: RW-1
 SITE COORDINATES (ft.): _____
 N _____ E _____
 GROUND ELEVATION (ft. MSL): 5524.52
 STATE: New Mexico COUNTY: San Juan
 DRILLING METHOD: Casing Driver
 DRILLING CONTR.: Beeman Brothers
 DATE STARTED: 30 August 1988 DATE COMPLETED: 31 August 1988
 FIELD REP.: W.S. Dobyk
 COMMENTS: Static on September 2, 1988: 26.65 from TOC.

1/4 1/4 1/4 1/4 S T R

LOCATION DESCRIPTION:

Depth	Visual X	Lith	Drilling Time Scale:	Sample Type and Interval	Lithologic Description
5			1642		0'-18' Silt and Sand - Dark yellowish brown (10 YR 4/2) to grayish brown (5 YR 3/2). Minor to strong hydrocarbon odor.
10			1646		
15			1710		
20			1720		18'-34' Sand and Gravel - Medium dark gray (N4). Sand is medium to very coarse grained, subangular to subrounded. Gravel is subrounded to well rounded, to 2" diameter. Strong hydrocarbon odor.
25			1725		
30			1730		
35			1738		34'-41' Shale - Nacimiento Formation - Dusky yellow (5 YR 6/4) to light olive gray (5 Y 6/1) shale.
40			1758		
45		T.O. 41'			
50					

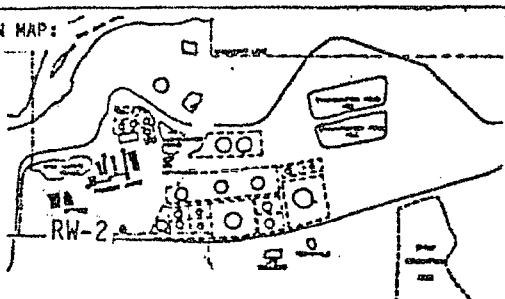


COMPLETION DIAGRAM
RECOVERY WELL RV-2

LITHOLOGIC LOG (SOIL)

Page 1 of 1

LOCATION MAP:



SITE ID: BRC LOCATION ID: RW-2
 SITE COORDINATES (ft.): _____
 N _____ E _____
 GROUND ELEVATION (ft. MSL): 5523.48
 STATE: New Mexico COUNTY: San Juan
 DRILLING METHOD: Casing Driver
 DRILLING CONTR.: Beeman Brothers
 DATE STARTED: 29 August 1988 DATE COMPLETED: 29 August 1988
 FIELD REP.: W.S. Dubyk
 COMMENTS: Static on September 2, 1988; 23.42 from TOC.

LOCATION DESCRIPTION:

Depth	Visual %	Lith	Drilling Time Scale:	Sample Type and Interval	Lithologic Description
5			0948		0'-10' Silt and Clay - Medium dark gray (N4) to brownish gray (5 YR 4/1). Slightly effervescent in HCl. Faint hydrocarbon odor.
10			0953		10'-15' Sand and Silt - Moderate brown (5 YR 4/4), very fine grained and well sorted.
15			0958		15'-32' Sand and Gravel - Olive gray (5 Y 4/1) to brownish gray (5 YR 4/1). Sand is medium to very coarse grained, subangular to subrounded. Gravel is subangular to well rounded, to 2" diameter. Noticeable hydrocarbon odor below 25'.
20			1024		
25			1029		
30			1033		
35			1050		
40			1100		
45		T.D. 41.2'			
50					

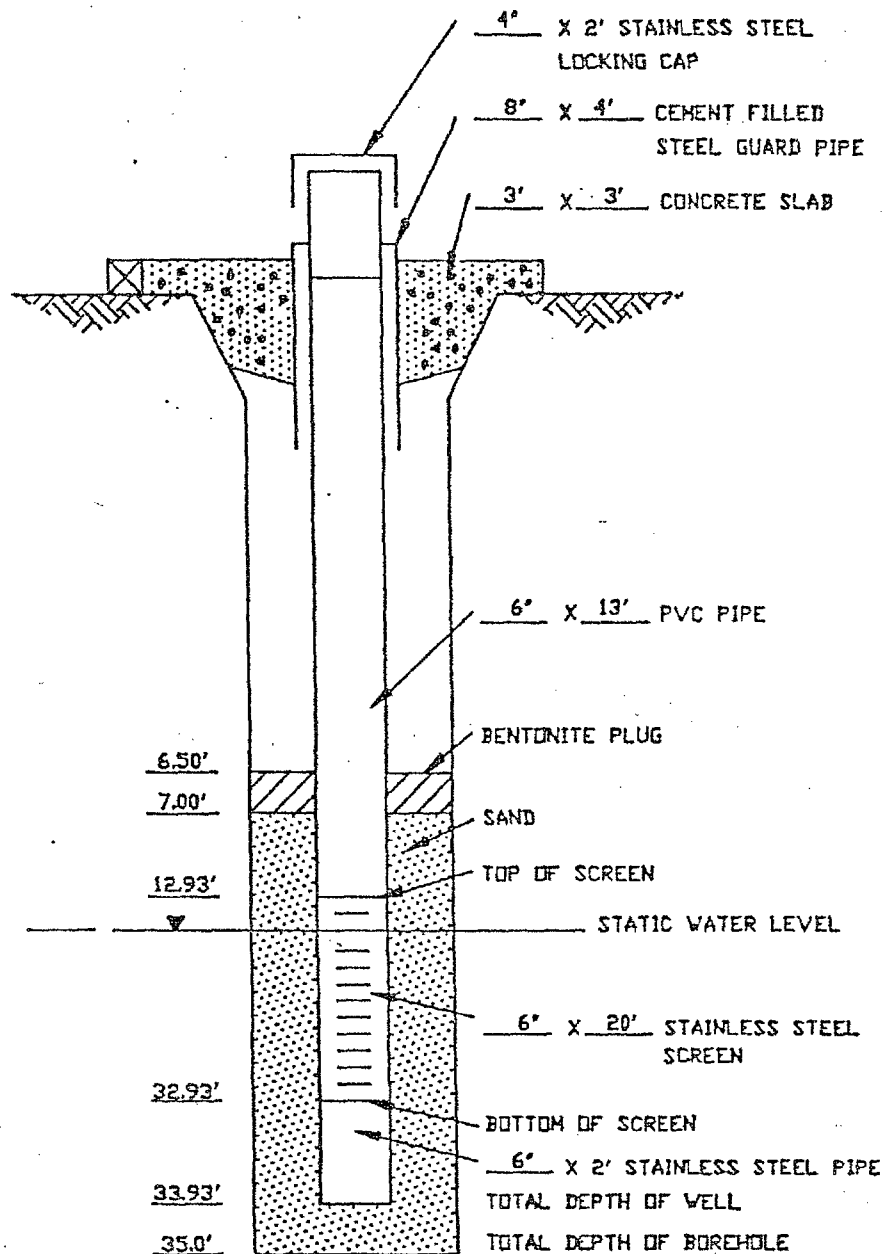


FIGURE B-3

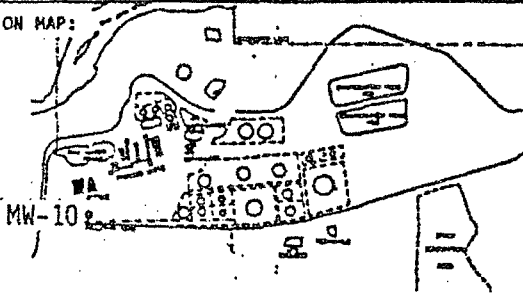
COMPLETION DIAGRAM
RECOVERY WELL MW-10 (RV-3)
(RECONSTRUCTED FROM VERBAL DESCRIPTION
SUPPLIED BY ENGINEERING-SCIENCE, 1987)

← Currently Constructed
as RW-3

LITHOLOGIC LOG (SOIL)

Page 1 of 1

LOCATION MAP:



SITE ID: BRC LOCATION ID: MW-10 (RW-3)
 SITE COORDINATES (ft.): _____
 N _____ E _____
 GROUND ELEVATION (ft. MSL): -5516
 STATE: New Mexico COUNTY: San Juan
 DRILLING METHOD: Auger
 DRILLING CONTR.: Earl & Sons, Inc.
 DATE STARTED: 4 March 1986 DATE COMPLETED: 4 March 1986
 FIELD REP.: Engineering-Science, Inc.
 COMMENTS: _____

1/4 1/4 1/4 1/4 S T R

LOCATION DESCRIPTION: _____

Depth	Visual %	Lith	Drilling Time Scale:	Sample Type and Interval	Lithologic Description
0					0'-5' <u>Topsoil, Roadbase, Sandy Clay</u>
5					5'-10' <u>Silty, Sandy Clay</u>
10					10'-15' <u>Cobbles and Pebbles</u>
15					15'-20' <u>Gravel, Cobbles, and Pebbles</u>
20					20'-30' <u>Green Clay; Nacimiento Formation</u>
25					30'-35' <u>Nacimiento Formation</u> - Yellow-green to blue-gray.
30					
35					
40					
45					
50					

TABLE 3.4

WELL LOG FOR MONITORING WELL NUMBER 10 (RW-3)

Drilling Date: March 4, 1986

<u>Depth in Feet</u>	<u>Description</u>
0-5	Topsoil, roadbase, reddish brown sandy clay
5-10	Reddish brown silty, sandy clay
10-15	Cobbles, pebbles
15-20	Gravel, cobbles, pebbles
20-25	Greenish clay at 23 feet, top of Nacimiento
25-30	Greenish clay, Nacimiento
30-35	Nacimiento, color changed from yellow-green to blue-gray

Elevation of Top of Casing: 5516.86 feet

Total Depth of Casing: 33.93 feet

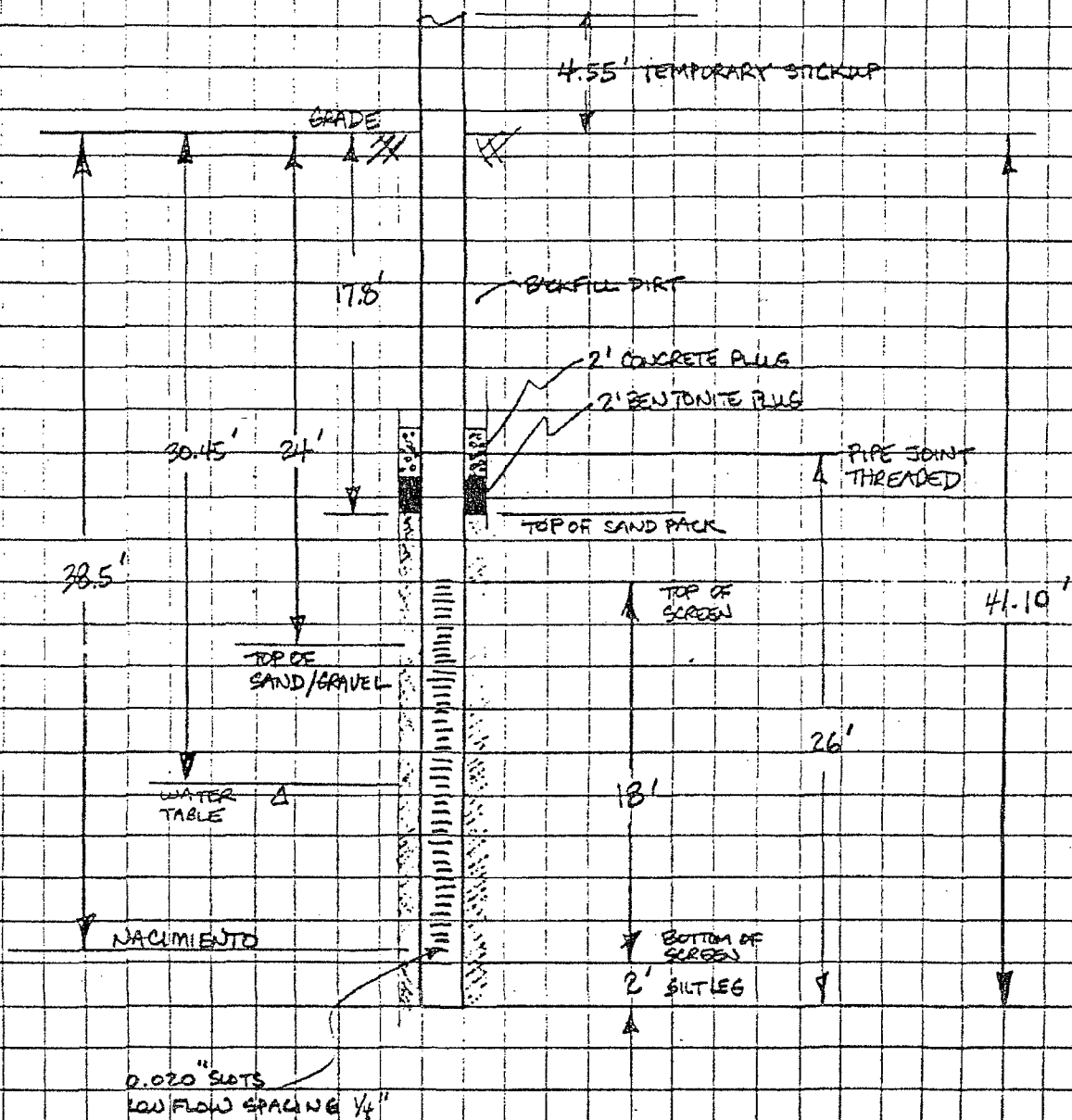
Description of Casing: Bottom of casing has a 2 foot stainless steel blank section for a silt trap, followed by 20 feet of 6" I.D. stainless steel screen, followed by 6" I.D. schedule 40 PVC to the surface. The screened section of the hole was sanded to within 7 feet of the surface, a bentonite seal (1/2 bucket) was added and concrete was used for a surface seal.

CALCULATION SHEET

RW-14

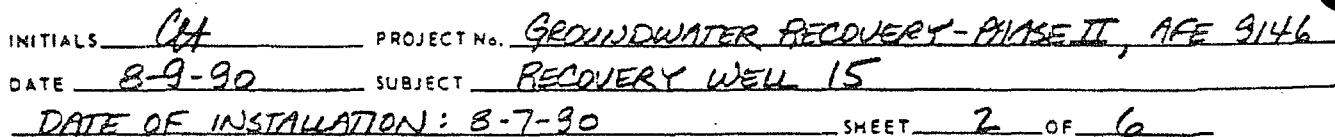
CONSTRUCTION COMMENTS: DRILLED BY CASING DRIVER, 8" BIT; 4.5" O.D. FIBERGLAS CASING SET TO DEPTH INSIDE DRIVEN CASING; ANNULAR SPACE FILLED WITH 10/20 SAND AS DRIVEN CASING REMOVED. 50 LBS. OF BENTONITE DRILLING MUD & 100 LBS OF CONCRETE PLACED ON TOP OF SAND PACK; BACKFILLED WITH DIRT TO SURFACE.

LOCATION: END OF ROAD BETWEEN TANKS 19 & 29.



INITIALS CH PROJECT NO. GROUNDWATER RECOVERY - PHASE II, AFE 9146
 DATE 8-9-90 SUBJECT RECOVERY WELL 14
 DATE OF INSTALLATION: 8-6-90 SHEET 1 OF 6

LOCATION: ROADWAY BETWEEN TANKS 18 & 28

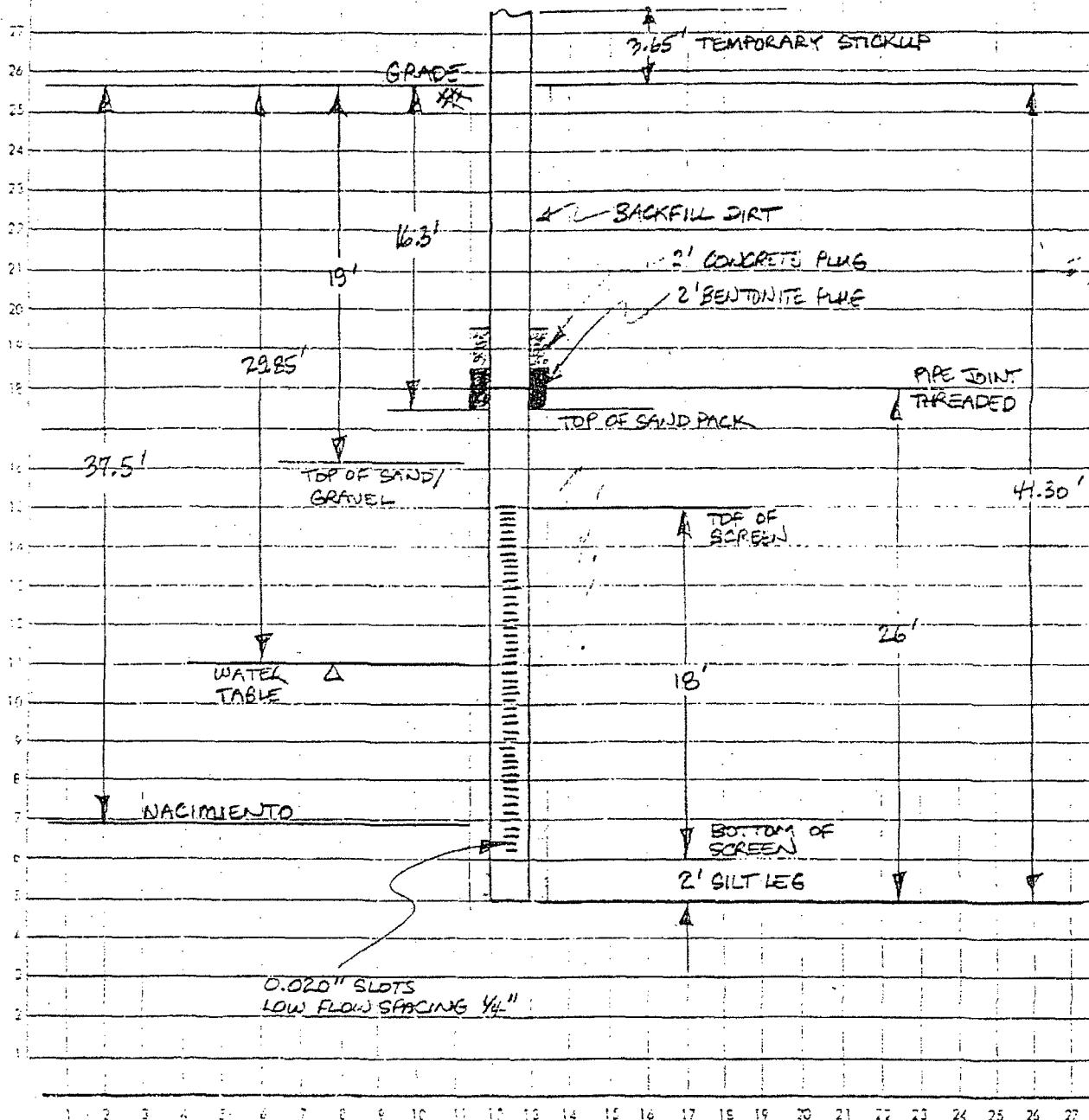


RW-16

CALCULATION SHEET

CONSTRUCTION COMMENTS: SAME AS RW-14

LOCATION: ROADWAY BETWEEN TANKS 26 & 18



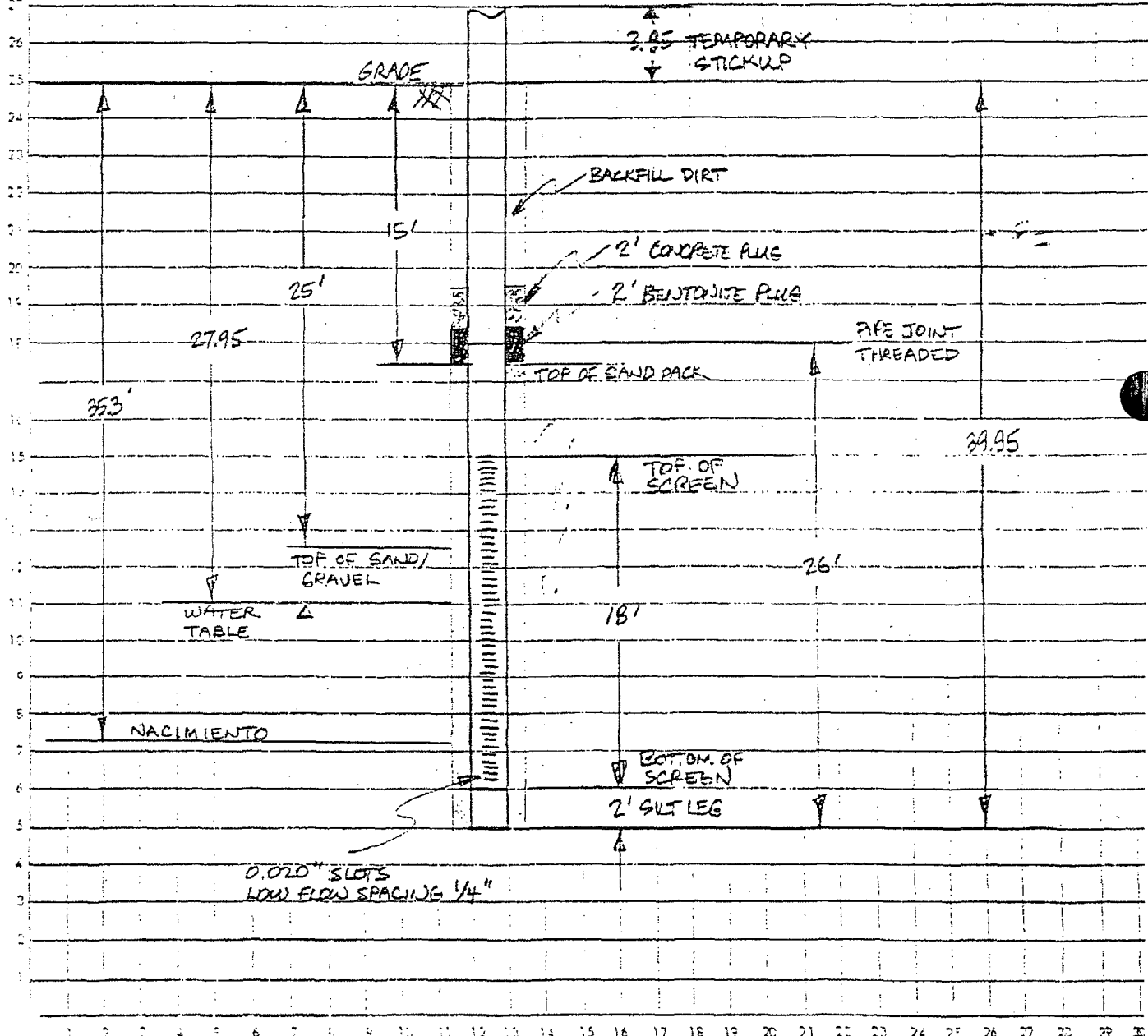
INITIALS GH PROJECT NO. GROUNDWATER RECOVERY- PHASE II, AFE 9146
 DATE 8-8-90 SUBJECT RECOVERY WELL 16
 DATE OF INSTALLATION: 8-7-90 SHEET 3 OF 6

RW-17

CALCULATION SHEET

CONSTRUCTION COMMENTS: SAME AS RW-14

LOCATION: ROAD BETWEEN TANK 17 & 24

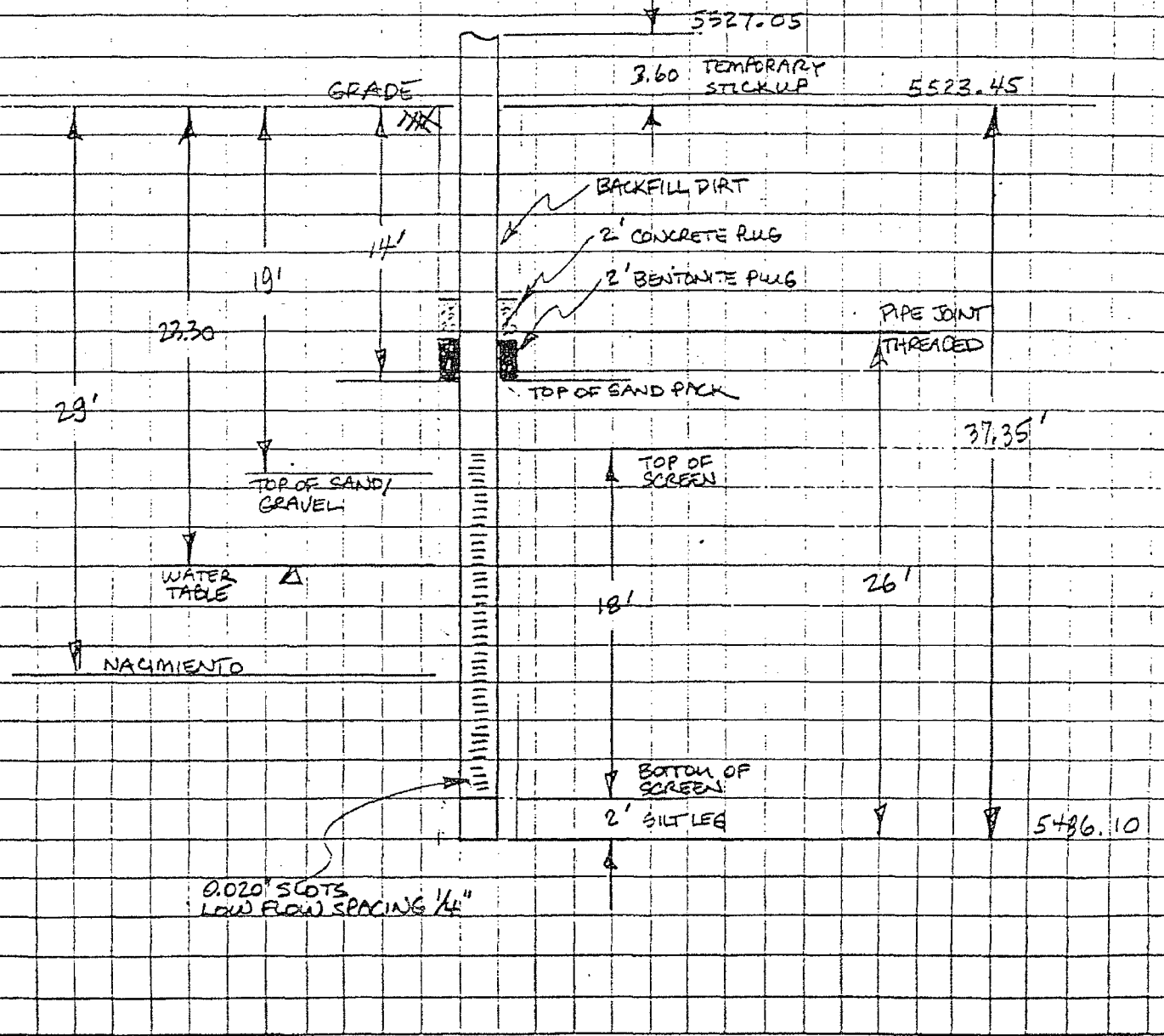


INITIALS CH PROJECT NO. GROUNDWATER RECOVERY - PHASE II AFE 9
 DATE 2-9-90 SUBJECT RECOVERY WELL 17
 DATE OF INSTALLATION: 8-7-90 SHEET 4 OF 6

CALCULATION SHEET

RW-18

CONSTRUCTION COMMENTS: DRILLED BY CASING DRIVER, 8" BIT; 4.5" O.D. FIBERGLASS CASING SET TO DEPTH INSIDE DRIVEN CASING;
 LOCATION: WEST OF SOWP & NOUNP, NORTH OF CAT/POLY
 ANNUAL SPACE FILLED WITH 10/20 SAND AS DRIVE CASING REMOVED; 50 LBS OF BENTONITE DRILLING MUD & 100 LBS OF CONCRETE PLACED ON TOP OF SAND PACK; BACKFILLED WITH DIRT TO SURFACE
 CONCRETE PAD SURFACE SEAL (NOT SHOWN)



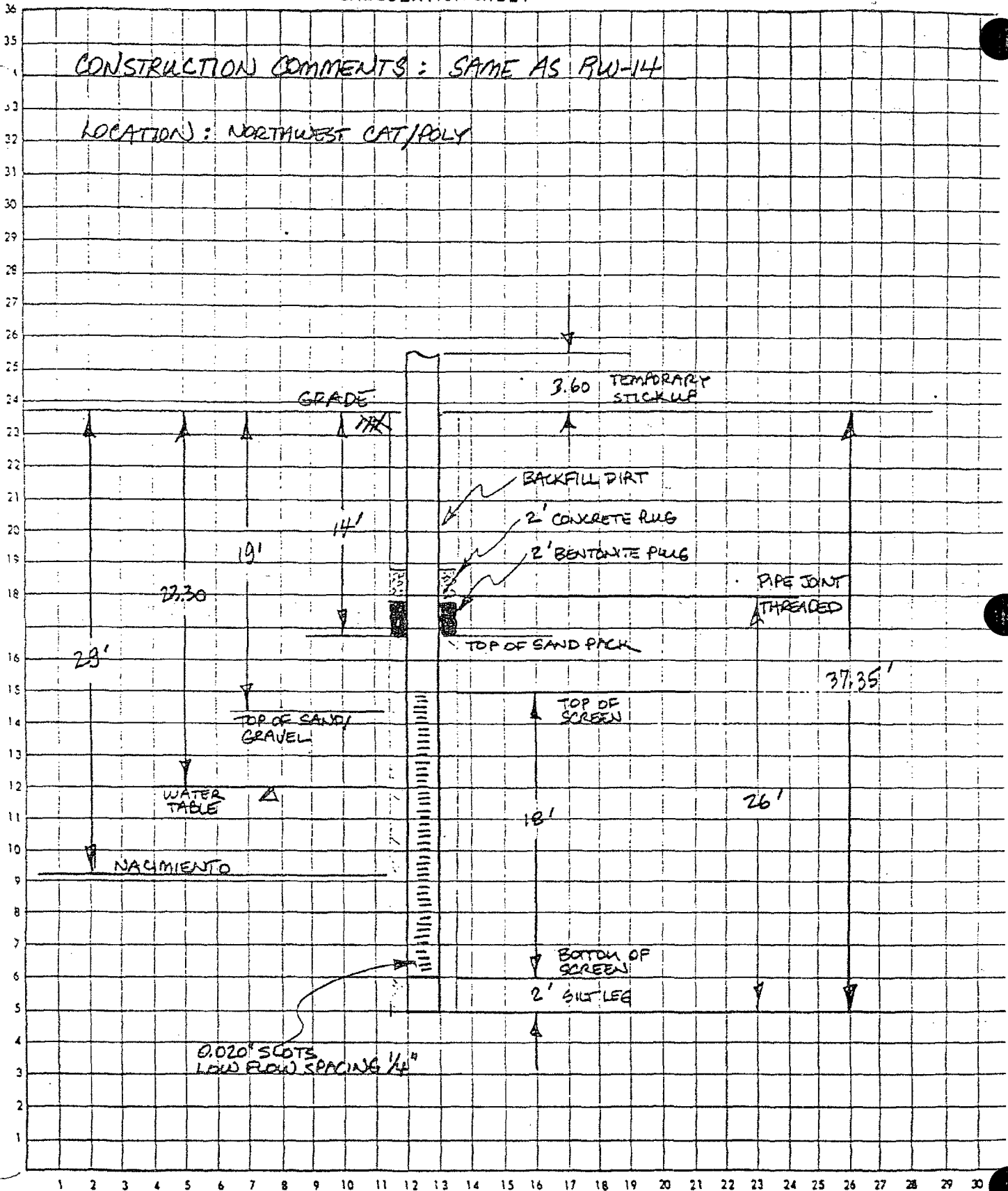
INITIALS CHA PROJECT NO. GROUNDWATER MONITORING - SOWP & NOUNP
 DATE 8-9-90 SUBJECT GROUNDWATER RECOVERY - OVERALL FACILITY
 DATE OF INSTALLATION: 8-8-90 SHEET 5 OF 6

CALCULATION SHEET

RW-18

CONSTRUCTION COMMENTS: SAME AS RW-14

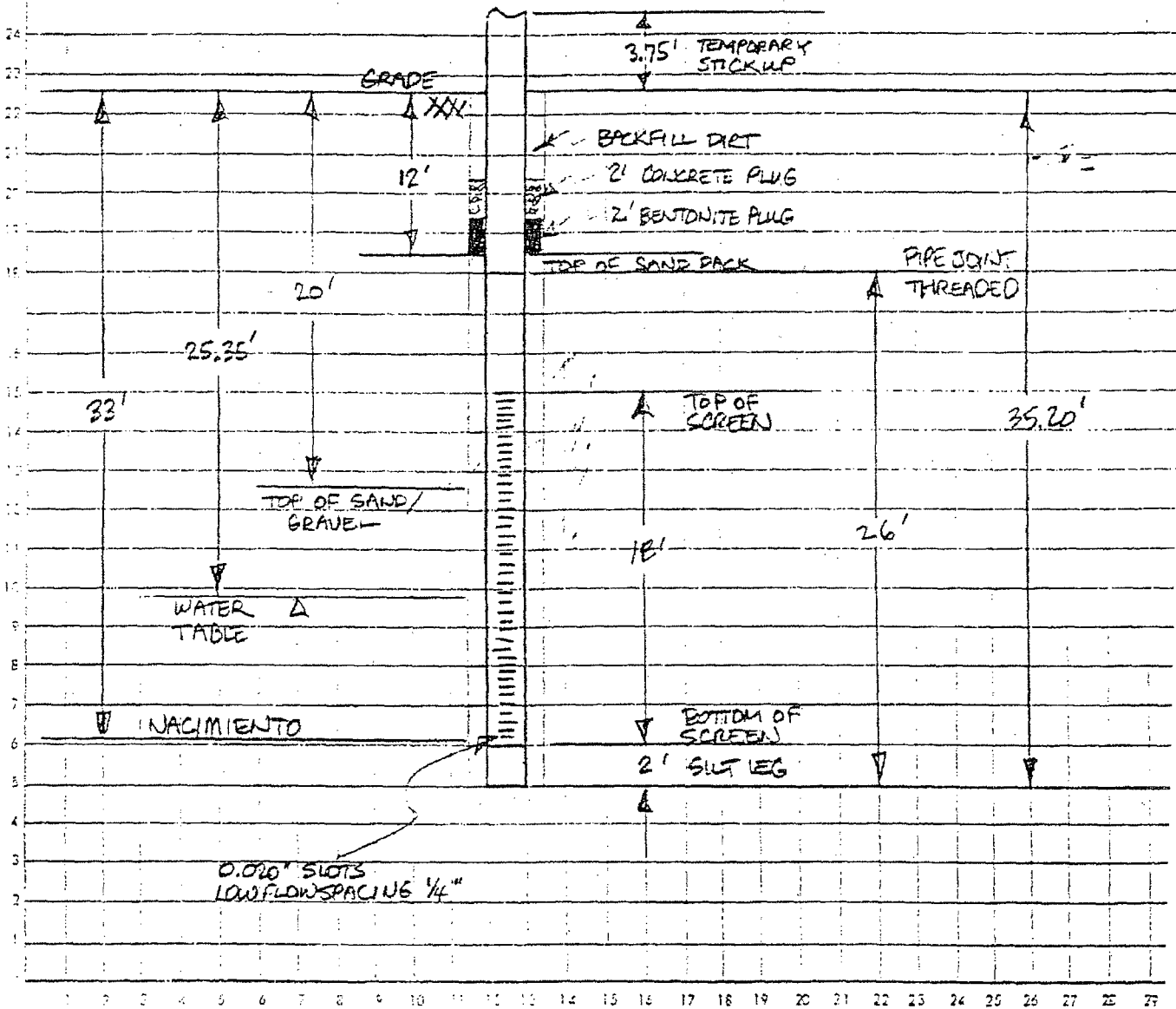
LOCATION: NORTHWEST CAT/POLY



INITIALS CH PROJECT No. GROUNDWATER RECOVERY-PHASE II, AFE 9146
 DATE 8-9-90 SUBJECT RECOVERY WELL 18
 DATE OF INSTALLATION: 8-8-90 SHEET 5 OF 6

CONSTRUCTION COMMENTS: SAME AS RW-14

LOCATION: NEAR NE CORNER FIRE EQUIP. BLDG.



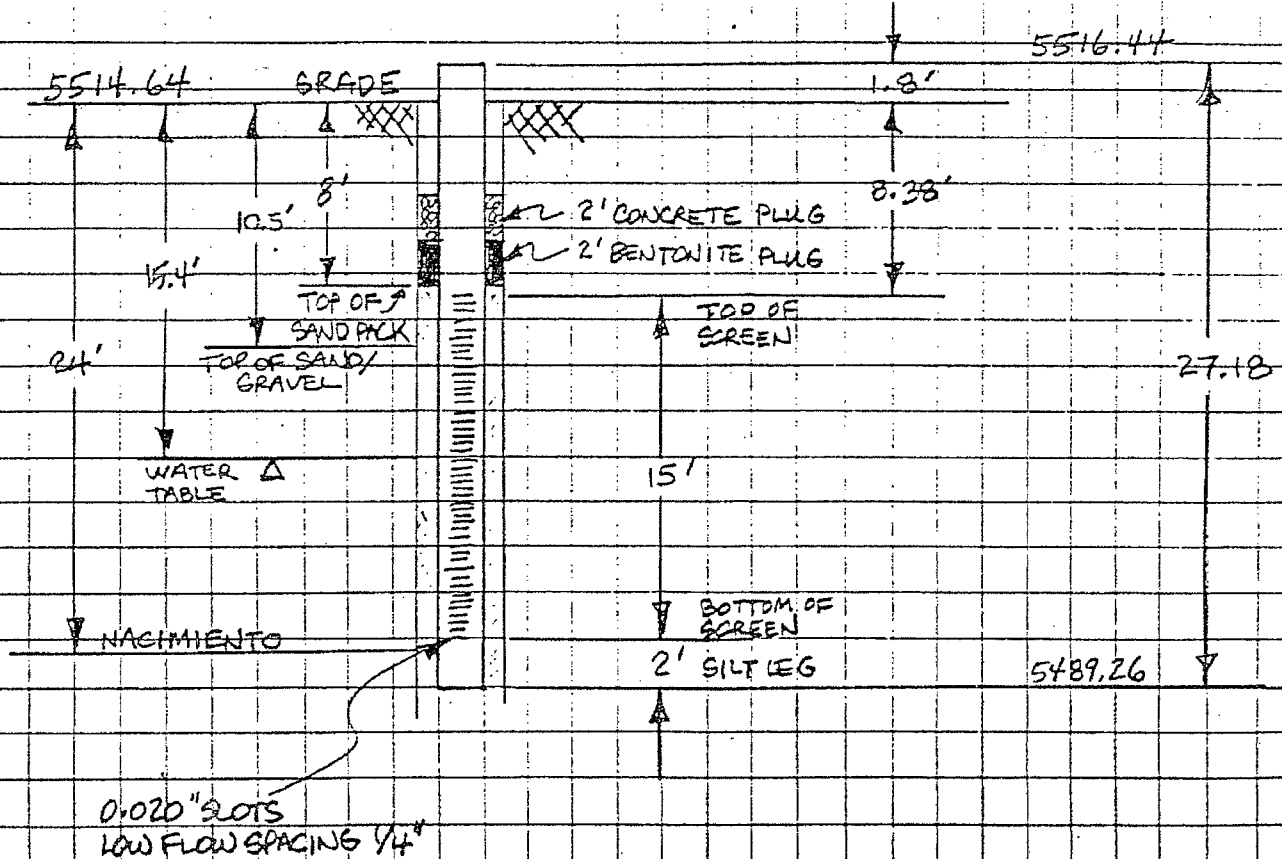
INITIALS CH PROJECT NO. GROUNDWATER RECOVERY - PHASE II, AFE 9146
 DATE 8-9-90 SUBJECT RECOVERY WELL 19
 DATE OF INSTALLATION: 8-8-90 SHEET 10 OF 6

CALCULATION SHEET

MW-20

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

CONCRETE PAD SURFACE SEAL (NOT SHOWN)

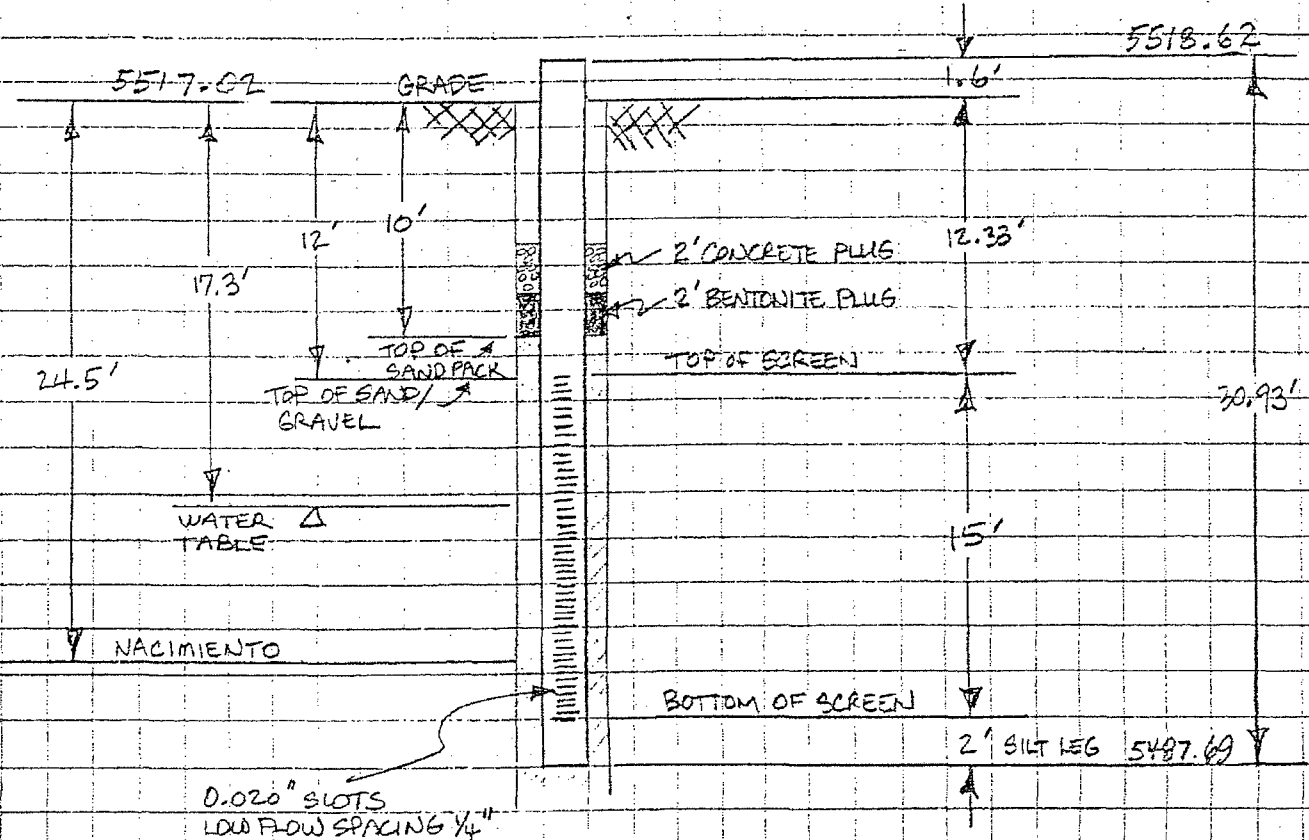


INITIALS MA PROJECT No. GROUNDWATER MONITORING - SOWP & NOWP
 DATE 9-16-91 SUBJECT MW-20
 DATE OF INSTALLATION: 9-13-91 SHEET 1 OF 2

CONSTRUCTION COMMENTS: DRILLED BY CASING DRIVER, 3" BIT, 4.5" O.D. FIBERGLASS CASING SET TO DEPTH INSIDE DRIVEN CASING; ANNULAR SPACE FILLED WITH 30/40 SAND AS DRIVEN CASING REMOVED; 50 LBS OF BENTONITE DRILLING MUD & 100 LBS OF CONCRETE PLACED ON TOP OF SAND PACK; BACKFILLED WITH DIRT TO SURFACE.

LOCATION: ALONG PIPERACK
SW FROM TK 11

CONCRETE PAD SURFACE SEAL (NOT SHOWN)



INITIALS CH PROJECT NO. GROUNDWATER MONITORING - SOWP & NOWP
DATE 9-16-91 SUBJECT MW-21, UPGRADIENT FROM SOWP & NOWP
DATE OF INSTALLATION: 9-16-91 SHEET 2 OF 2



GROUNDWATER
TECHNOLOGY

Drilling Log

Recovery Well RW-22

Project Bloomfield/50 CR4990 Owner Bloomfield Refining Co.
Location Bloomfield, New Mexico Proj. No. 023353014
Surface Elev. 5518.05 ft. Total Hole Depth 34 ft. Diameter 10 in.
Top of Casing 5521.05 ft. Water Level Initial 19 ft. Static _____
Screen: Dia 6 in. Length 16 ft. Type/Size FRE/0.020 in.
Casing: Dia 6 in. Length 17 1/2 ft. Type FRE
Fill Material 12/20 Co. Silica Rig/Core Speedstar 15-THH
Drill Co. Beeman Bros. Method Air Percussion
Driller Leo Beeman Log By Jerry May Date 07/19/93 Permit # _____
Checked By _____ License No. _____

See Site Map
For Boring Location

COMMENTS:

Start @ 1230 hrs. 2 ft silt leg installed
from 31 to 33 feet

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2						
0						
2						Tan SILT (moist)
4						Same as above
6		214			ML	
8						
10		46				Same as above
12						Gray COBBLES (trace or no fines)
14						
16		NA			GW	
18						Light gray-stained poorly-graded fine SAND with trace of gravel (moist-wet)
20		1,450			SP	Groundwater encountered at 19' on 7/19/93
22						Dark-gray-stained COBBLES with trace fines (moist)
24					GW	



GROUNDWATER
TECHNOLOGY

Drilling Log

Recovery Well RW-22

Project Bloomfield/50 CR4990

Owner Bloomfield Refining Co.

Location Bloomfield, New Mexico

Proj. No. 023353014

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%			
24		1,146			GW	Encountered weathered limestone (moist) (Dry at 28 feet)			
26									
28		858							
30									
32		96				End of boring at 34 feet (1355 hrs.). Installed recovery well screened from 15 to 31 feet on 7/19/93.			
34									
36									
38									
40									
42									
44									
46									
48									
50									
52									
54									
56									



GROUNDWATER TECHNOLOGY

Drilling Log

Recovery Well RW-23

Project Bloomfield/50 CR4990 Owner Bloomfield Refining Co.
 Location Bloomfield, New Mexico Proj. No. 023353014
 Surface Elev. 5515.74 ft. Total Hole Depth 33 ft. Diameter 10 in.
 Top of Casing 5517.74 ft. Water Level Initial 19 ft. Static _____
 Screen: Dia 6 in. Length 16 ft. Type/Size FRE/0.020 in.
 Casing: Dia 6 in. Length 15/2 ft. Type FRE
 Fill Material 12/20 Co. Silica Rig/Core Speedstar 15-THH
 Drill Co. Beeman Bros. Method Air Percussion
 Driller Leo Beeman Log By Jerry May Date 07/19/93 Permit # _____
 Checked By _____ License No. _____

See Site Map
For Boring Location

COMMENTS:

Start @ 1630 hrs. 2 ft. silt leg installed
from 31 to 33 feet

Depth (ft.)	Well Completion	PID (ppm)	Sample ID	Blow Count/ X Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2							
0						GW	Gravel with fines (dry)
2						GW	Brown silty CLAY (moist, medium plasticity)
4						CL	
6		0					
8							Gravel and COBBLES (no fines)
10		32					
12							Same as above with little fines
14						GW	
16		54					Gravel and COBBLES with trace of fines (dry)
18		74					Gray-stained, same as above
20		2,914					Black-stained GRAVEL with some fines (moist)
22							Groundwater encountered at 19 feet on 7/19/93
24						GM	
		105					

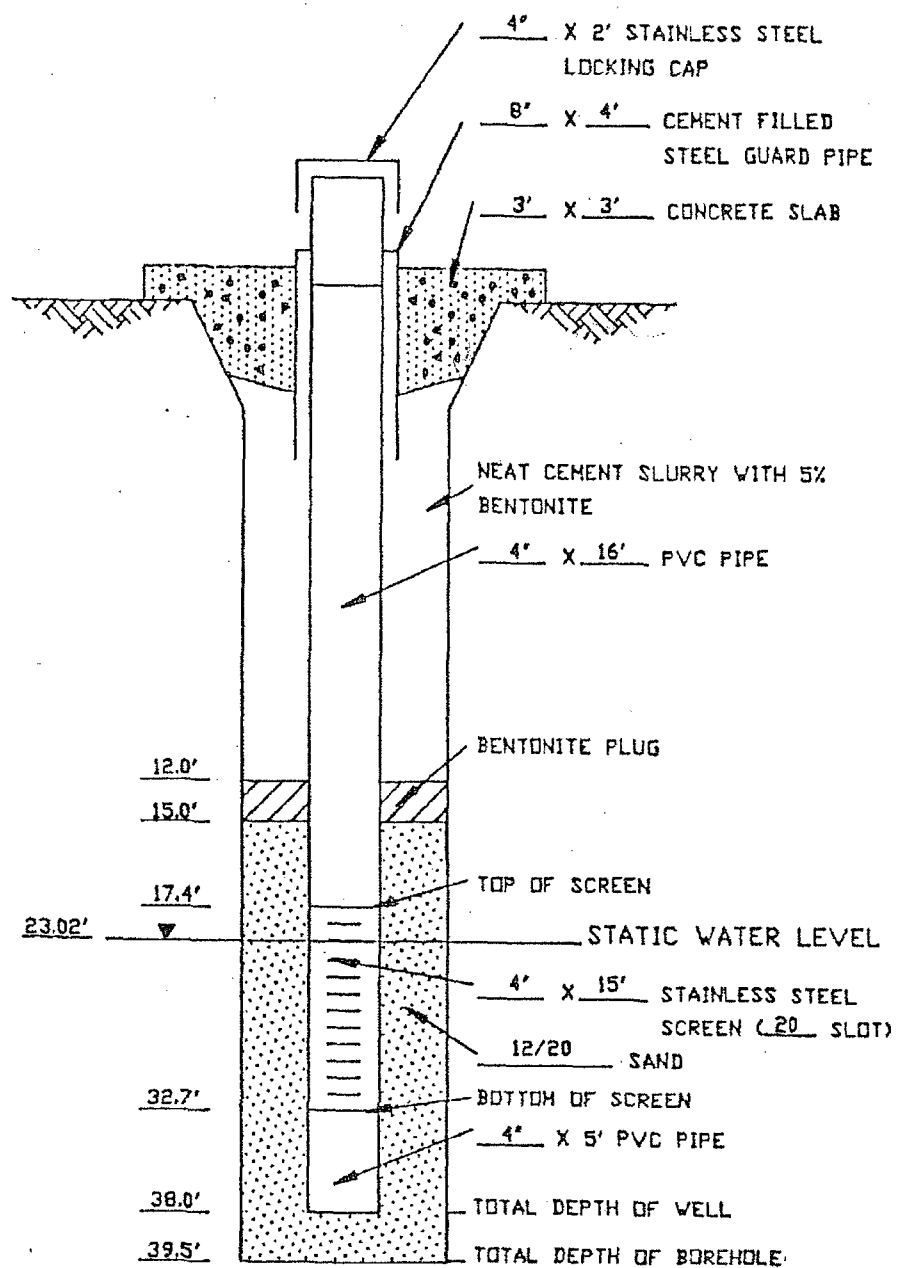


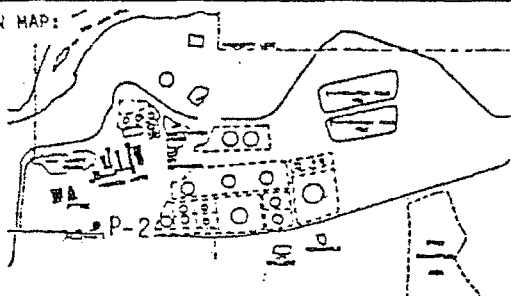
FIGURE B-5
COMPLETION DIAGRAM
PIEZOMETER P-2

LITHOLOGIC LOG (SOIL)

PIEZOMETER P-2

Page 1 of 1

LOCATION MAP:



SITE ID: BRC LOCATION ID: P-2
 SITE COORDINATES (ft.): _____
 N _____ E _____
 GROUND ELEVATION (ft. MSL): 5522.93
 STATE: New Mexico COUNTY: San Juan
 DRILLING METHOD: Casing Driver
 DRILLING CONTR.: Beeman Brothers
 DATE STARTED: 29 August 1988 DATE COMPLETED: 29 August 1988
 FIELD REP.: W.S. DUBYK
 COMMENTS: This well replaced by P-2a. Static on September 2, 1988: 23.75 from TOC.

LOCATION DESCRIPTION:

Depth	Visual %	Lith	Drilling Time Scale:	Sample Type and Interval	Lithologic Description
5			1650		0'-13' Silty and Clay - Dark gray (N3) to grayish black (N2) to dark yellowish brown (10 YR 4/2). Intense hydrocarbon odor.
10			1656		
15			1710		13'-31.5' Sand and Gravel - Moderate yellowish brown (10 YR 5/4) to medium gray (N5). Sand is medium to very coarse grained, subangular to subrounded. Gravel is subangular to well rounded, to 2" diameter. Strong hydrocarbon odor below 25'.
20			1720		
25			1730		
30			1734		
35			1752		
40		T.O. 39.5'	1808		31.5'-39.5' Shale - <u>Nacimiento Formation</u> - Dusky yellow (5 Y 6/4) to olive gray (5 Y 3/2).
45					
50					

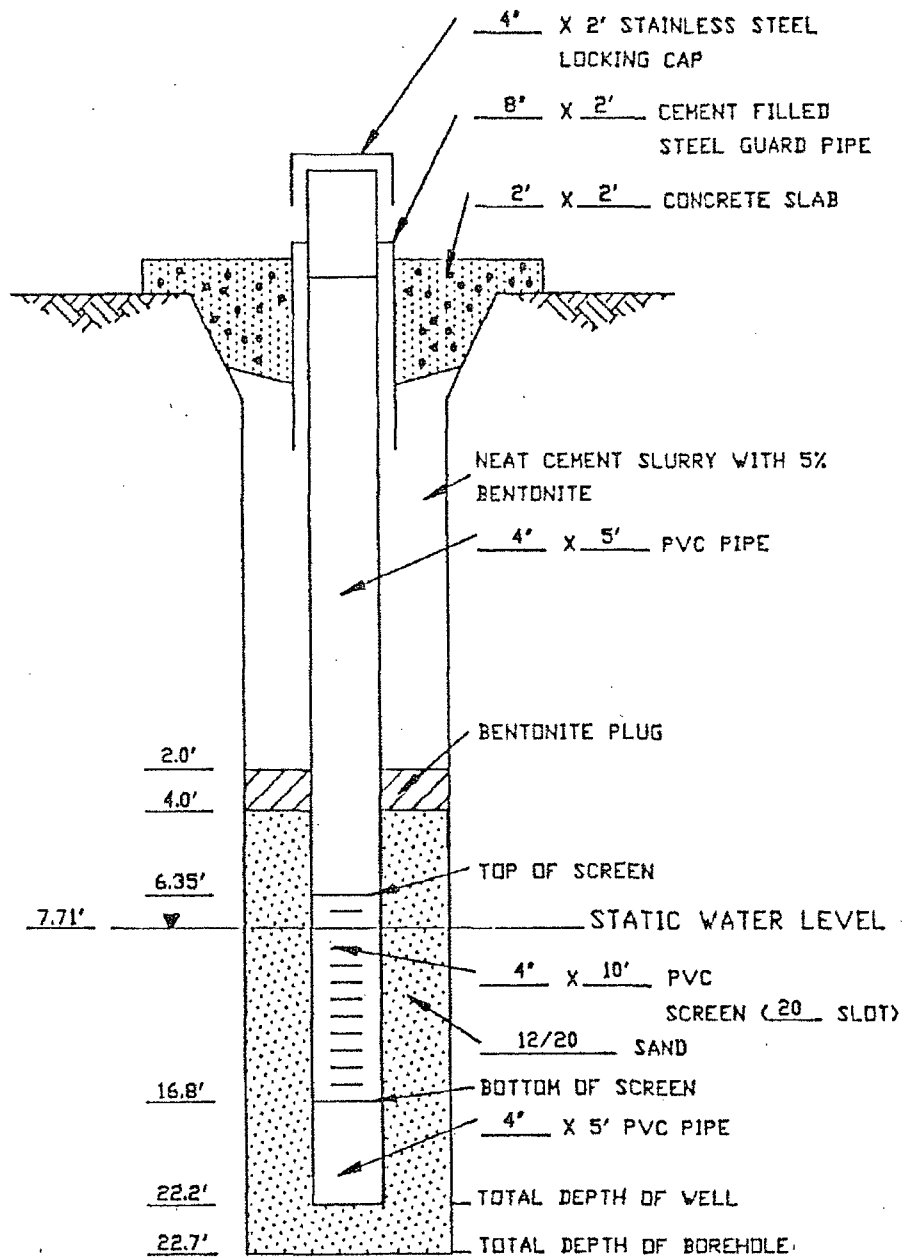


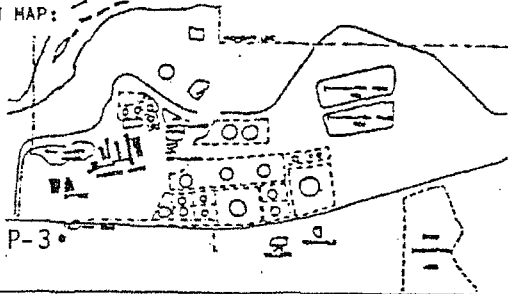
FIGURE B-6
COMPLETION DIAGRAM
PIEZOMETER P-3

LITHOLOGIC LOG (SOIL)

PIEZOMETER P-3

Page 1 of 1

LOCATION MAP:



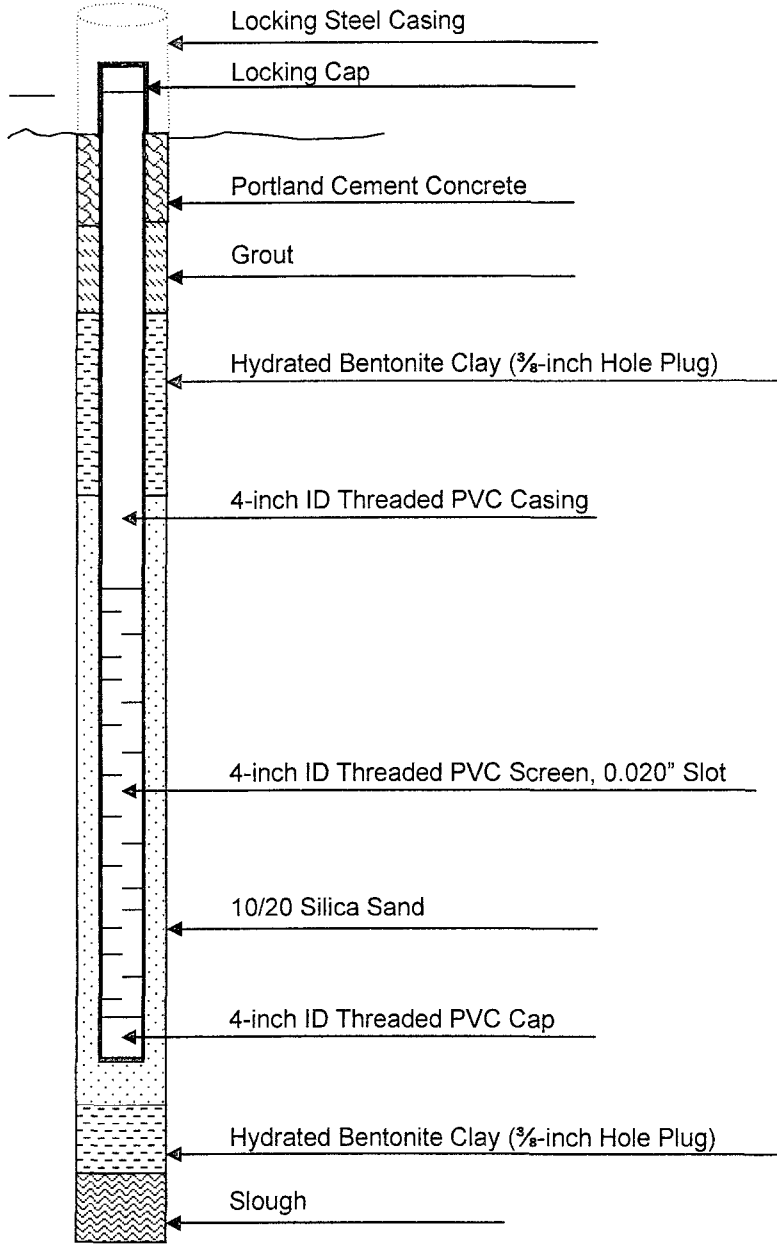
SITE ID: BRC LOCATION ID: P-3
 SITE COORDINATES (ft.): _____
 N _____ E _____
 GROUND ELEVATION (ft. MSL): 5506.40
 STATE: New Mexico COUNTY: San Juan
 DRILLING METHOD: Casing Driver
 DRILLING CONTR.: Beeman Brothers
 DATE STARTED: 1 September 1988 DATE COMPLETED: 1 September 1988
 FIELD REP.: W.S. Dubyk
 COMMENTS: Static on September 2, 1988: 8.30' from TOC.

____ 1/4 ____ 1/4 ____ 1/4 ____ 1/4 S ____ T ____ R ____

LOCATION DESCRIPTION:

Depth	Visual %	Lith	Drilling Time Scale:	Sample Type and Interval	Lithologic Description
5	• • • • •	• • • • •	0902		0'-14' Sand and Gravel - Medium gray (N5) to dark gray (N3). Sand is medium to coarse grained, subangular to subrounded. Gravel is subrounded to rounded, to 2" diameter. Strong hydrocarbon odor.
10	• • • • •	• • • • •	0913		
15	• • • • •	• • • • •	0920		14'-22.7' Shale: <u>Nacimiento Formation</u> - Dusky yellow (5 YR 6/4) to light olive gray (5 Y 6/1) shale.
20	• • • • •	• • • • •	0925		
25	• • • • •	• • • • •	1000		
30	• • • • •	• • • • •			
35	• • • • •	• • • • •			
40	• • • • •	• • • • •			
45	• • • • •	• • • • •			
50	• • • • •	• • • • •			

Well Installation Summary

Location See Plan	Project Name OCD Compliance Drilling		Date February 20, 2006	Well No. SW1-0206
	Drilling Co. Enviro-Drill, Albuquerque, NM		Driller M. Cain	
	Drill Rig CME 75		Logged By JCB	Page 1 of 1
	Drilling Method 3¾"/7" HSA to 60'; 6¼"/10" HSA to 40'; 5½" AR to 60'			
Elevation, feet msl	Depth, feet			
				
	+ 2.5 Ground Surface	Locking Steel Casing		
		Locking Cap		
		Portland Cement Concrete		
	2	Grout		
	14	Hydrated Bentonite Clay (¾-inch Hole Plug)		
	16	4-inch ID Threaded PVC Casing		
	21	4-inch ID Threaded PVC Screen, 0.020" Slot		
		10/20 Silica Sand		
	51½	4-inch ID Threaded PVC Cap		
	53	Hydrated Bentonite Clay (¾-inch Hole Plug)		
	58	Slough		
	60			

Log of SW1-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¼"/7" HSA to 60'; 6¼"/10" HSA to 40'; 5½" AR to 60'			Date February 20, 2006 Driller M. Cain Logged By JCB		Page 1 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
					Surface Condition: Fill Soil		
1						Sand Fill	fine to medium, trace coarse, little fine to coarse gravel, few clayey silt, brown, medium dense, dry
2							
3	S-1	---	---	0.0		Gravel Jackson Lake Terrace	fine to coarse, some fine to coarse sand, trace clayey silt, scattered cobbles, gray-brown, very dense, dry
4	Grab						
5							
6							
7							
8						Sand	fine to medium, trace coarse, few fine gravel, trace clayey silt, brown, dense, dry
9							
10	S-2	12	0	--			
11	SPT	17					
12		12					
13						Claystone Nacimiento Formation	Silty Clay; medium plasticity, brown, very hard, dry, faint laminated bedding, silt partings on approx. 1" to 2" spacing, oxidized reddish-brown ⅛" to ¼" nodules, lightly fractured, moderately cemented
14							
15	S-3	13	100	0.0			
16	SPT	26					
17		46					
18							
19							
20							

Log of SW1-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HSA to 60'; 6¼"/10" HSA to 40'; 5½" AR to 60'			Date February 20, 2006 Driller M. Cain Logged By JCB		Page 2 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
20	S-4	18	100	>10		Claystone	continued, laminated bedding, highly fractured
21	SPT	19					
		50					
22		5½"					
23							
24							laminated with gray-brown clayey silt
25	S-5	29	100	0.0			
26	SPT	50					
		4"					
27							
28							
29							
30	S-6	50	0	---			Silty Clay; medium plasticity, light gray, very hard, brown, very hard, dry, fissured bedding, moderately cemented
31	SPT	4"					
32							
33							Silty Clay; medium plasticity, dark gray, very hard, dry, highly fractured, slickensides on fractures, moderately cemented
34							
35	S-7	31	100	0.0			
36	SPT	49					
37							
38							
39							
40						Siltstone	Clayey Silt; trace fine sand, low plasticity, light gray, very hard, moist, laminated bedding, laminated with gray-brown clayey silt, moderately cemented

Log of SW1-0206

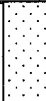
Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3 3/4"/7" HSA to 60'; 6 1/4"/10" HSA to 40'; 5 1/2" AR to 60'			Date February 20, 2006 Driller M. Cain Logged By JCB		Page 3 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
40	S-8	50	100	0.0		Siltstone	continued
41	SPT	5"					
42							
43						Sandstone	Sand; fine, few clayey silt, light gray, very dense, moist, faint laminated bedding, weakly cemented
44							
45	S-9	50	100	0.0			
46	SPT	5"					
47							
48							
49							
50	S-10	40	20	0.0			
51	SPT	50					no bedding observed
52		5"					
53							
54							little clayey silt, laminated bedding
55	S-11	35	100	0.0			
56	SPT	50					
57		5"					
58							
59							
60							

Log of SW1-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HSA to 60'; 6¼"/10" HSA to 40'; 5½" AR to 60'			Date February 20, 2006 Driller M. Cain Logged By JCB		Page 4 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
60	S-12	36	100	0.0		Sandstone continued, few clayey silt Bottom of boring at approximately 60¾ feet. Boring completed on February 20, 2006. No groundwater observed during drilling. No groundwater measured in well on March 2, 2006.	
61	SPT	50 4"					
62							
63							
64							
65							
66							
67							
68							
69							
70							
71							
72							
73							
74							
75							
76							
77							
78							
79							
80							



Log of SW2-0206

Location See Plan		Project Name		OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3 3/4" / 7" HAS to 35'		Date February 16, 2006 Driller M. Cain Logged By JCB		Page 1 of 2 Elevation		
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description					
					Surface Condition: Soil, Shoulder of Hammond Ditch Road					
1						Sand Fill	fine to coarse, little fine to coarse gravel, trace clayey silt, brown, medium dense, dry			
2										
3	S-1 Grab	---	---	1.3		Sand Jackson Lake Terrace	fine to coarse, little fine to coarse gravel, trace clayey silt, scattered cobbles, brown, dense, dry			
4										
5						Gravel	fine to coarse, some fine to coarse sand, trace clayey silt, scattered cobbles, gray-brown, dense, dry			
6										
7						Sand	fine to medium, trace coarse, trace clayey silt, gray-brown, medium dense, moist, dark gray/black petroleum staining			
8										
9	S-2 SPT	11 17 22	100	>10		Claystone Nacimiento Formation	Silty Clay; trace fine sand, medium plasticity, brown, very hard, moist, faint laminated bedding, silt partings on approx. 1" spacing, lightly fractured with occasional reddish-brown oxidization on fractures, moderately cemented, 10' to 10.1' dark gray/black petroleum staining			
10										
11										
12										
13										
14										
15	S-3 SPT	20 21 30	100	3.5						
16								laminated bedding		
17										
18										
19										
20										

Log of SW2-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HAS to 35'			Date February 16, 2006 Driller M. Cain Logged By JCB		Page 2 of 2 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
20	S-4	18	100	0.3		Claystone continued	
21	SPT	33					
		<u>50</u>					
22		3"					
23							
24							
25	S-5	30	100	0.6		Silty Clay; low plasticity, medium gray, laminated bedding, occasional laminations of clayey silt, moderately fractured, faint slickensides on fractures, moderately cemented	
26	SPT	<u>50</u>					
		4"					
27							
28							
29							
30	S-6	40	25	0.3		occasional silt partings	
31	SPT	<u>50</u>					
		5"					
32							
33							
34							
35	S-7	<u>50</u>	100	0.4		Bottom of boring at approximately 35½ feet. Boring completed on February 16, 2006. No groundwater observed during drilling. No groundwater measured in well on March 2, 2006.	
36	SPT	5½"					
37							
38							
39							
40							

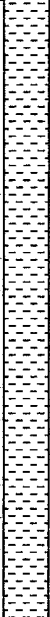
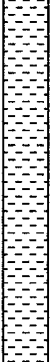
Well Installation Summary

Location See Plan	Project Name OCD Compliance Drilling		Date February 17, 2006	Well No. SW3-0206
	Drilling Co. Enviro-Drill, Albuquerque, NM		Driller M. Cain	
	Drill Rig CME 75		Logged By JCB	Page 1 of 1
	Drilling Method 3¾"/7" HSA to 60'; 6¼"/10" HSA to 58'			
Elevation, feet msl	Depth, feet			
	+ 2.1	Locking Steel Casing		
	Ground Surface	Locking Cap		
	3	Portland Cement Concrete		
	13	Grout		
	16	Hydrated Bentonite Clay (⅜-inch Hole Plug)		
	20	4-inch ID Threaded PVC Casing		
		4-inch ID Threaded PVC Screen, 0.020" Slot		
		10/20 Silica Sand		
	50½	4-inch ID Threaded PVC Cap		
	51½	Hydrated Bentonite Clay (⅜-inch Hole Plug)		
	55	Slough		
	60			

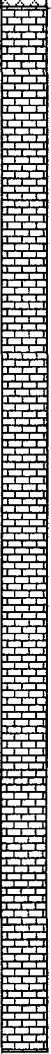
Log of SW3-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HSA to 60'; 6¼"/10" HSA to 58'			Date February 17, 2006 Driller M. Cain Logged By JCB		Page 1 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
Surface Condition: Soil, Shoulder of Hammond Ditch Road							
1					Sand Fill	fine to medium, trace coarse, few fine gravel, trace clayey silt, brown, medium dense, moist	
2							
3							
4							
5	S-1	---	---	0.1			
6	Grab						
7							
8					Claystone Naciminto Formation	Silty Clay; trace fine sand, medium plasticity, brown, hard, dry, laminated bedding, silt partings on approx. 1" to 2½" spacing, moderately cemented	
9	S-2	7	100	0.2			
	SPT	8					
10		10					
11							
12							
13							
14							
15	S-3	11	100	0.2		moderately fractured with reddish-brown oxidization on fractures	
16	SPT	12					
		11					
17							
18							
19							
20							

Log of SW3-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HSA to 60'; 6¼"/10" HSA to 58'			Date February 17, 2006 Driller M. Cain Logged By JCB		Page 2 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
20					 Claystone continued		
21							
22							
23							
24							
25							
26							
27							
28							
29							
30	S-4	38	100	0.2	 Silty Clay; medium plasticity, dark gray, laminated bedding, highly fractured, slickensided fractures, moderately cemented		
31	SPT	50 3"					
32							
33							
34					 Siltstone Clayey Silt; trace fine sand, low plasticity, light gray, very hard, dry, laminated bedding, laminated with medium gray clayey silt, moderately cemented		
35	S-5	13	100	0.2			
36	SPT	33 50 4"					
37							
38							
39							
40							

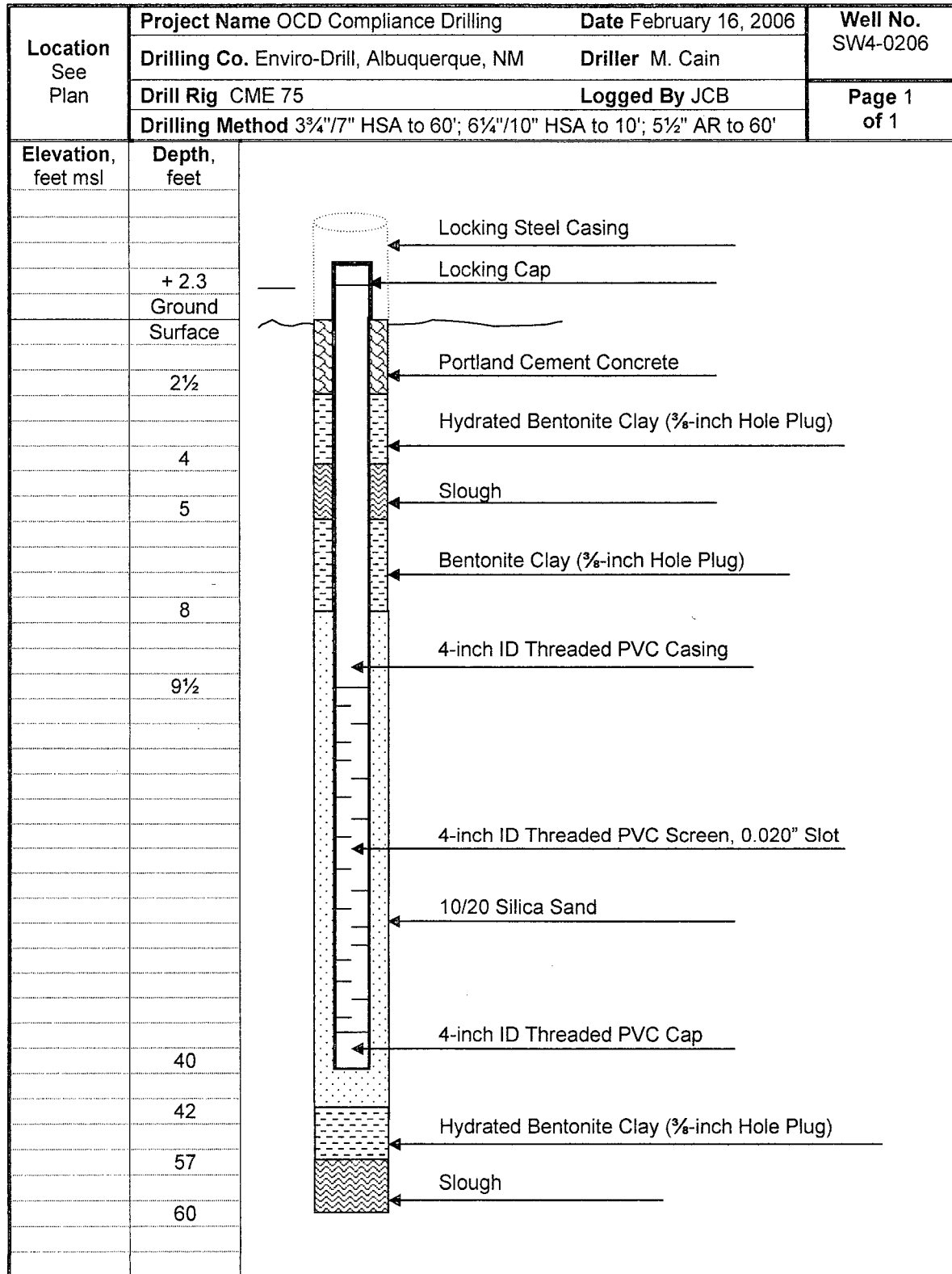
Log of SW3-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3 3/4"/7" HSA to 60'; 6 1/4"/10" HSA to 58'			Date February 17, 2006 Driller M. Cain Logged By JCB		Page 3 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
40	S-6	34	100	0.7		Siltstone	continued
41	SPT	50 4"					
42							
43							
44						Sandstone	Clayey Sand; fine, low plasticity, light gray, very dense, moist, faint laminated bedding, laminated with medium gray clayey silt, moderately cemented
45							
46							
47							
48							
49							
50	S-7	50	100	0.2			
51	SPT	5"					
52							
53							
54							
55							
56							
57							
58							
59							
60							

Log of SW3-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HSA to 60'; 6¼"/10" HSA to 58'			Date February 17, 2006 Driller M. Cain Logged By JCB		Page 4 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
60	S-8	50	100	0.2	 Sandstone continued		
61	SPT	3"			Bottom of boring at approximately 60¼ feet. Boring completed on February 17, 2006. No groundwater observed during drilling. No groundwater measured in well on March 2, 2006.		
62							
63							
64							
65							
66							
67							
68							
69							
70							
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79							
80							

Well Installation Summary



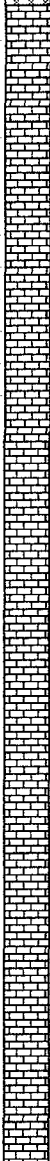
Log of SW4-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HSA to 60'; 6¼"/10" HSA to 10'; 5½" AR to 60'			Date February 16, 2006 Driller M. Cain Logged By JCB		Page 1 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
Surface Condition: Soil, Shoulder of Hammond Ditch Road							
1						Sand Fill fine to medium, trace coarse, few fine gravel, few clayey silt, brown, loose, moist	
2							
3							
4	S-1 Grab	---	---	0.1			
5							
6							
7							
8							
9							
10	S-2 SPT	3 4 4	50	3.6		medium dense scattered organics, old topsoil horizon, weeds in sample	
11							
12							
13							
14							
15	S-3 SPT	17 24 50 5"	100	0.4			
16							
17							
18							
19							
20							
						Claystone Nacimiento Formation Silty Clay; trace fine sand, medium plasticity, brown, soft, moist, faint laminated bedding, silt partings on approx. 1" to 2" spacing, moderately cemented	
						very hard	
						highly fractured, occasional reddish-brown oxidization on fractures, faint slickensides on fractures	

Log of SW4-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HSA to 60'; 6¼"/10" HSA to 10'; 5½" AR to 60'			Date February 16, 2006 Driller M. Cain Logged By JCB		Page 2 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
20	S-4	14	100	0.0		Claystone	continued
21		34					
		38					
22							
23							
24							
25	S-5	24	100	0.2			
26		<u>50</u> 4"					
27							
28							
29							
30	S-6	<u>50</u>	50	0.0			Silty Clay, medium plasticity, light gray, very hard, dry, laminated bedding, silt partings on approx. 1" spacing, moderately cemented
31	SPT	4"					
32							Silty Clay: medium plasticity, dark gray, very hard, dry, faint laminated bedding, highly fractured, slickensided fractures, moderately cemented
33							
34							
35	S-7	18	100	0.8			
36	SPT	38					
		<u>50</u>					
37		5½"					
38						Siltstone	Clayey Silt; low plasticity, light gray, very hard, dry, laminated bedding, silt partings on approx. ¾" to 1" spacing, moderately cemented
39							
40							

Log of SW4-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HSA to 60'; 6¼"/10" HSA to 10'; 5½" AR to 60'			Date February 16, 2006 Driller M. Cain Logged By JCB		Page 3 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
40	S-8 SPT	<u>50</u> 6"	100	0.2		Siltstone	continued
41							
42							
43						Sandstone	Clayey Sand; fine, low plasticity, light gray, very dense, moist, faint laminated bedding, laminated with medium gray clayey silt, moderately cemented
44							
45	S-9 SPT	46 <u>50</u>	80	0.0			
46		4"					
47							
48							
49							
50	S-10 SPT	<u>50</u> 5½"	100	0.0			
51							
52							
53							
54							
55	S-11 SPT	<u>50</u> 5½"	100	0.0			laminated bedding, little clayey silt
56							
57							
58							
59							
60							

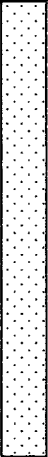
Log of SW4-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HSA to 60'; 6¼"/10" HSA to 10'; 5½" AR to 60'			Date February 16, 2006 Driller M. Cain Logged By JCB		Page 4 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
60	S-12 SPT	50 5"	100	0.0	Sandstone continued		
61					Bottom of boring at approximately 60½ feet. Boring completed on February 16, 2006. No groundwater observed during drilling. No groundwater measured in well on March 2, 2006.		
62							
63							
64							
65							
66							
67							
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79							
80							

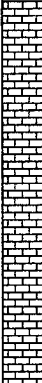
Well Installation Summary

Location See Plan		Project Name	OCD Compliance Drilling	Date	February 15, 2006	Well No.	SW5-0206
		Drilling Co.	Enviro-Drill, Albuquerque, NM	Driller	M. Cain		
		Drill Rig	CME 75	Logged By	JCB	Page 1 of 1	
		Drilling Method	6 1/4" / 10" HSA to 14'; 5 1/2" AR 14' to 60'				
Elevation, feet msl	Depth, feet	The diagram is a vertical cross-section of a well. It shows a central 4-inch ID threaded PVC casing. At the top is a locking steel casing with a locking cap. Below the cap is a layer of Portland cement concrete. Underneath the concrete is a slough. Further down is a layer of hydrated bentonite clay (3/8-inch hole plug). Below that is a section of 4-inch ID threaded PVC casing. This is followed by a 4-inch ID threaded PVC screen with 0.020-inch slots, surrounded by 10/20 silica sand. Below the sand is another 4-inch ID threaded PVC cap. At the bottom is another layer of hydrated bentonite clay (3/8-inch hole plug). The well is shown extending to a depth of 60 feet.					
	+ 2.3	Ground Surface					
	2 1/2						
	10						
	14						
	19						
	49 1/2						
	52						
	60						

Log of SW5-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 6¼"/10" HSA to 14'; 5½" AR 14' to 60'			Date February 15, 2006 Driller M. Cain Logged By JCB		Page 1 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
Surface Condition: Fill Soil							
1						Sand Fill	fine to coarse, little fine to coarse gravel, trace clayey silt, brown, loose, dry
2							
3							scattered cobbles
4							
5							medium dense
6							
7							
8						Gravel Jackson Lake Terrace	fine to coarse, some fine to coarse sand, trace clayey silt, scattered cobbles, gray-brown, medium dense, dry
9							
10	S-1 Grab	---	---	0.3		Sand	fine to coarse, some fine to coarse gravel, trace clayey silt, brown, dense, dry
11							
12						Gravel	some cobbles, few fine to coarse sand, trace clayey silt, dense, dry
13							
14							
15							
16							
17						Sand	fine to medium, trace coarse, few clayey silt, yellowish brown, very dense, dry, oxidized ¼" lenses
18	S-2 SPT	50 5"	100	0.3			
19							
20							

Log of SW5-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 6¼"/10" HSA to 14'; 5½" AR to 60'			Date February 15, 2006 Driller M. Cain Logged By JCB		Page 2 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
20	S-3	38	50	0.3		Sand	continued
21		<u>29</u> < 1"					
22							
23	S-4	27	100	0.2			
24		44 45					
25	S-5	15	100	0.1			laminated bedding
26		24 27					
27							
28							
29							
30	S-6	11	100	0.0		Sandstone <i>Nacimiento Formation</i>	stratified with 1" to 1½" thick light gray clayey fine sand
31	SPT	26 29					
32							
33							
34							
35	S-7	24	100	0.1		Claystone	Silty Clay; medium plasticity, medium gray, very hard, moist, laminated bedding, laminated with light brown and dark brown silty clay, lightly fractured, moderately cemented
36	SPT	<u>50</u> 5"					
37							
38							
39							
40							Silty Clay; trace fine sand, medium plasticity light gray, very hard, dry, faint laminated bedding, silt partings on approx. ¼" to ½" spacing, moderately cemented

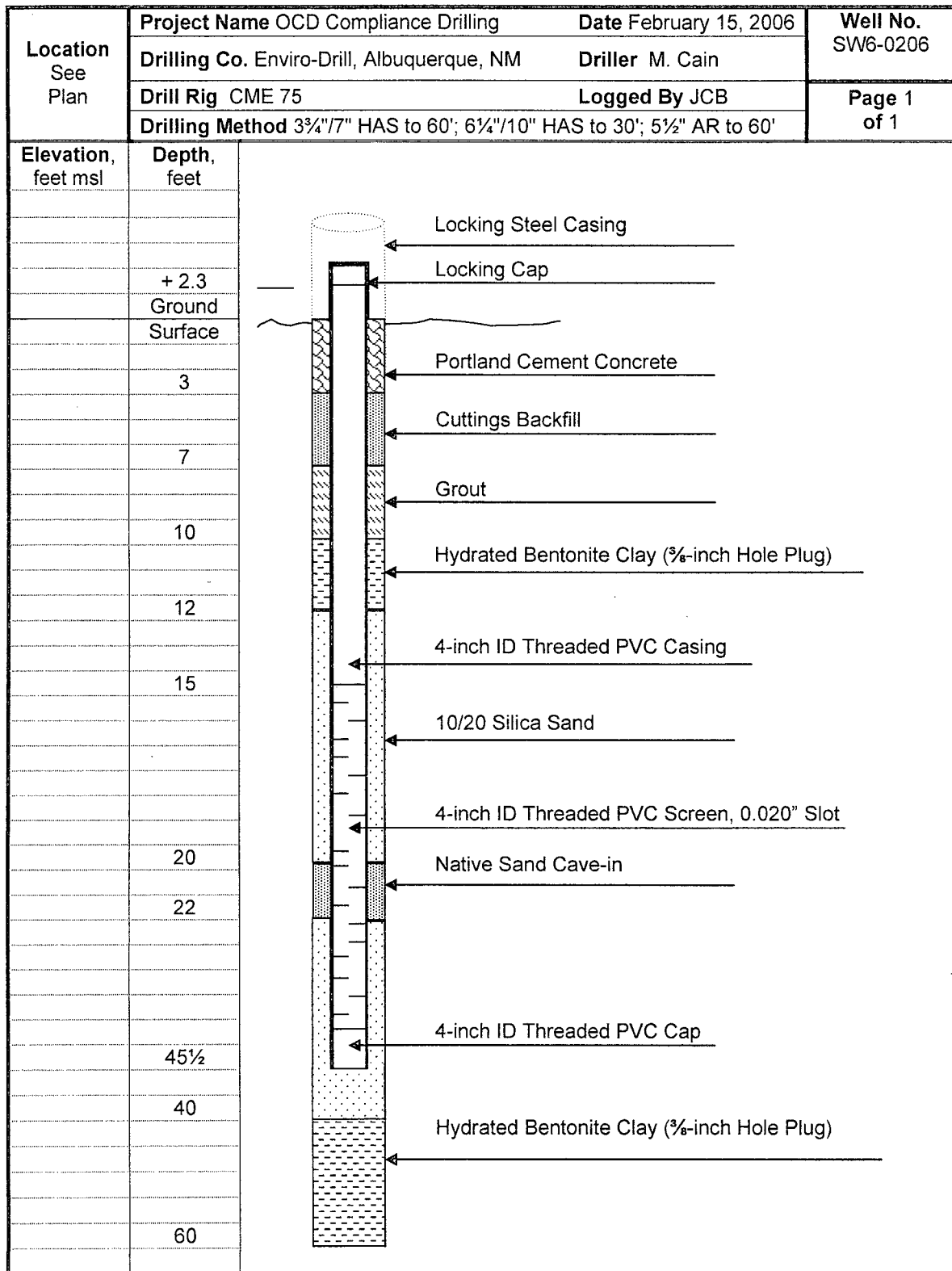
Log of SW5-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 6¼"/10" HSA to 14'; 5½" AR to 60'			Date February 15, 2006 Driller M. Cain Logged By JCB		Page 3 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
40	S-8	40	100	0.3		Claystone	continued
41	SPT	50 5"					
42							
43							
44							
45	S-9	21	80	0.3			Silty Clay; medium plasticity, dark gray, very hard, moist, laminated bedding, highly fractured, faint slickensides on fractures, moderately cemented
46	SPT	50 2"					
47							
48							
49							
50	S-10	50	100	0.2		Siltstone	Clayey Silt; trace fine sand, low plasticity, light gray, very hard, moist, laminated bedding, laminated with medium gray clayey silt, moderately cemented
51	SPT	5½"					
52							
53							
54							
55	S-11	50	100	0.3		Sandstone	Sand; fine, few clayey silt, light gray, very dense, moist, faint laminated bedding, laminated with medium gray clayey silt, weakly cemented
56	SPT	5"					
57							
58							
59							
60							

Log of SW5-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 6¼"/10" HSA to 14'; 5½" AR to 60'			Date February 15, 2006 Driller M. Cain Logged By JCB		Page 4 of 4 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
60	S-12 SPT	50 4"	100	0.3	 Sandstone continued		
61					Bottom of boring at approximately 60¼ feet. Boring completed on February 15, 2006. No groundwater observed during drilling. Perched groundwater measured in well at approximately 33¼ feet on March 2, 2006.		
62							
63							
64							
65							
66							
67							
68							
69							
70							
71							
72							
73							
74							
75							
76							
77							
78							
79							
80							

Well Installation Summary



Log of SW6-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HAS to 60'; 6¼"/10" HAS to 30'; 5½" AR to 60'			Date February 13 & 14, 2006 Driller M. Cain Logged By JCB		Page 1 of 3 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Graphic	Description	
						Surface Condition: Fill Soil, Weeds	
1						Sand <i>Fill</i>	fine to coarse, little fine to coarse gravel, trace clayey silt, gray-brown, loose, dry
2							
3							
4							
5							
6							
7						Silt <i>Loess</i>	little fine sand, brown, loose, dry
8							
9							
10						Sand <i>Jackson Lake Terrace</i>	fine to coarse, some fine to coarse gravel, trace clayey silt, scattered cobbles, gray-brown, medium dense, dry, stratified with 2" to 12" thick fine to coarse sand, few clayey silt, trace fine to coarse gravel
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

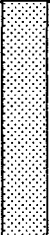
Log of SW6-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HAS to 60'; 6¼"/10" HAS to 30'; 5½" AR to 60'			Date February 13 & 14, 2006 Driller M. Cain Logged By JCB		Page 2 of 3 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Graphic	Description	
20						Sand	continued
21							
22							
23	S-1 MC	39 50 4"	100	0.8			Sand; fine, few clayey silt, yellowish brown, very dense, moist, stratified with ¼" to ½" thick clayey fine sand
24							
25							
26							
27							dark gray/black petroleum staining, petroleum odor
28	S-2 MC	21 50 4"	100	>10 5.2			PID reading of >10 on slough
29							
30						Sandstone Nacimiento Formation	
31							
32							
33	S-3 MC	50 4"	0	---			Clayey Sand; fine, low plasticity, light gray, very dense, moist, moderately cemented
34							
35							
36							
37							
38	S-4 SPT	26 51	100	4.7			laminated bedding PID reading of 4.7 on slough
39							
40							

Log of SW6-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HAS to 60'; 6¼"/10" HAS to 30'; 5½" AR to 60'			Date February 13 & 14, 2006 Driller M. Cain Logged By JCB		Page 3 of 3 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Graphic	Description	
40						Sandstone	continued
41							
42							
43	S-5 SPT	31 <u>50</u> 4"	100	0.8			Sand; fine, few clayey silt, light gray, very dense, moist, laminated with medium gray clayey silt, moderately cemented
44						Claystone	
45							
46							Silty Clay; trace fine sand, medium plasticity, light gray, very hard, moist, faint laminated bedding, laminated with medium gray clayey silt, moderately cemented
47							
48	S-6 SPT	40 <u>50</u> 2"	100	0.9			
49							
50						Siltstone	
51							
52							Silt; few fine sand, light gray, very dense, moist, laminated bedding, laminated with medium gray clayey silt, weakly cemented
53	S-7 SPT	<u>50</u> 5"	100	0.7			
54						Sandstone	
55							
56							Clayey Sand; fine, low plasticity, light gray, very dense, moist, laminated bedding, laminated with medium gray clayey silt, moderately cemented
57							
58	S-8 SPT	20 <u>50</u> 5"	100	4.4			PID reading of 4.4 on slough
59							Bottom of boring at approximately 58½ feet. Boring completed on February 14, 2006.
60							No groundwater observed during drilling. No groundwater measured in well on March 2, 2006.

Log of SW7-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3 3/4" / 7" HSA			Date February 22, 2006 Driller M. Cain Logged By JCB		Page 1 of 2 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Graphic	Description	
Surface Condition: Soil, Shoulder of Hammond Ditch Road							
1						Sand Fill fine to medium, few clayey silt, brown, loose, moist	
2							
3	S-1 Grab	--	--	5.1			
4						Gravel Jackson Lake Terrace fine to coarse, little fine to coarse sand, trace clayey silt, scattered cobbles, gray-brown, very dense, dry	
5							
6							
7							
8							
9	S-2 Grab	--	--	>10			
10	S-3 SPT	27 50	80	>10		Sandstone Nacimiento Formation Sand; fine to medium, little clayey silt, light gray, very dense, moist, laminated with medium gray clayey silt, dark gray petroleum stained layers approx. 1/2" to 1 1/2" thick, weakly cemented	10' to 11' dark gray petroleum staining, petroleum odor
11		5 1/2"					
12							
13							
14							
15	S-4 SPT	18 50	100	>10			
16		5"					
17							
18							
19							
20							

Log of SW7-0206

Location See Plan		Project Name OCD Compliance Drilling Drilling Co. Enviro-Drill, Albuquerque, NM Drill Rig CME 75 Drilling Method 3¾"/7" HSA			Date February 22, 2006 Driller M. Cain Logged By JCB		Page 2 of 2 Elevation
Depth, feet	Sample No./Type	Blow Counts	Recovery, %	PID, ppm	Description		
20	S-5	45	25	>10		Sandstone	continued
21	SPT	<u>50</u> 5½"					
22							
23							
24							
25	S-6	29	90	>10		Sandstone	Clayey Sand; fine, low plasticity, light gray, very dense, moist, laminated bedding, laminated with medium gray silty clay, moderately cemented
26	SPT	<u>50</u> 5"					
27							
28							
29							
30	S-7	<u>50</u>	90	>10		Sandstone	Clay; high plasticity, medium gray, very hard, moist, moderately cemented
31	SPT	<u>5"</u>					
32							
33							
34							
35	S-8	<u>35</u>	90	>10		Sandstone	Bottom of boring at approximately 35½ feet. Boring completed on February 22, 2006. Perched groundwater observed at approximately 15 feet during drilling. Perched groundwater measured in well at approximately 15¼ feet on March 2, 2006.
36	SPT	<u>25</u> 1"					
37							
38							
39							
40							



505 523-1674

Temporary Piezometer Installation - Typical See Logs for Depth Details

Elevation Reference
(Top of Pipe)

Ground Surface

Casing Cap

Screen:

5.0 ft.

Top of Screen

Bottom of Screen

Piezometer Tip

Bottom of Boring

Boring Diameter: $8\frac{5}{8}"$

Soil Type: Native Backfill

Ballards, Type/Size: None

Grout: None

Screen Type/Size: 2" PVC Sch. 40, 0.060" Band
Slotted @ 3" Intervals

Grout/Grout: None

Riser Type/Size: 2" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? No
(Slip Cap)

Site No. (In Log): _____

Other: N/A

Bottom Cap Used? Yes

Site Elevation: _____

Giant Refining Co.

Project #: 03-122

Project Name: Bloomfield Wells

Elevation: _____

Sheet: 1 of 1

Bore Point: See plan

Water Elevation: 6.3' below ground surf.

Boring No.: TP2-1004

P.O. Box 422

Las Cruces, NM 88004

505-523-7674

File #: 03-122

Site: Bloomfield

Giant Refining

Elevation: unsurveyed

Date: 10/27/2004

Log of Test Borings

[illegible]

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

LOGGED BY: KM

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File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: unsurveyed
Date: 10/28/2004

C:\bill\Projects\2004\hammond ditch correspondence\ditchlogsasof11105\TF

Sheet: 1 of 1

Water Elevation: 5.4' below ground surf.

Precision Engineering, Inc.

Las Cruces, NM 88004

File #: 03-122

Site: Bloomfield

Giant Refining

Elevation: unsurveyed

Date: 10/28/2004

[illegible]

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LOGGED BY: KM

Sheet: 1 of 1
Bore Point: See plan
Water Elevation: 5.4' below ground surf.
Boring No.: TP5-1004

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: unsurveyed
Date: 10/28/2004

Log of Test Borings

[illegible]

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LOGGED BY: KM

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: unsurveyed
Date: 10/28/2004

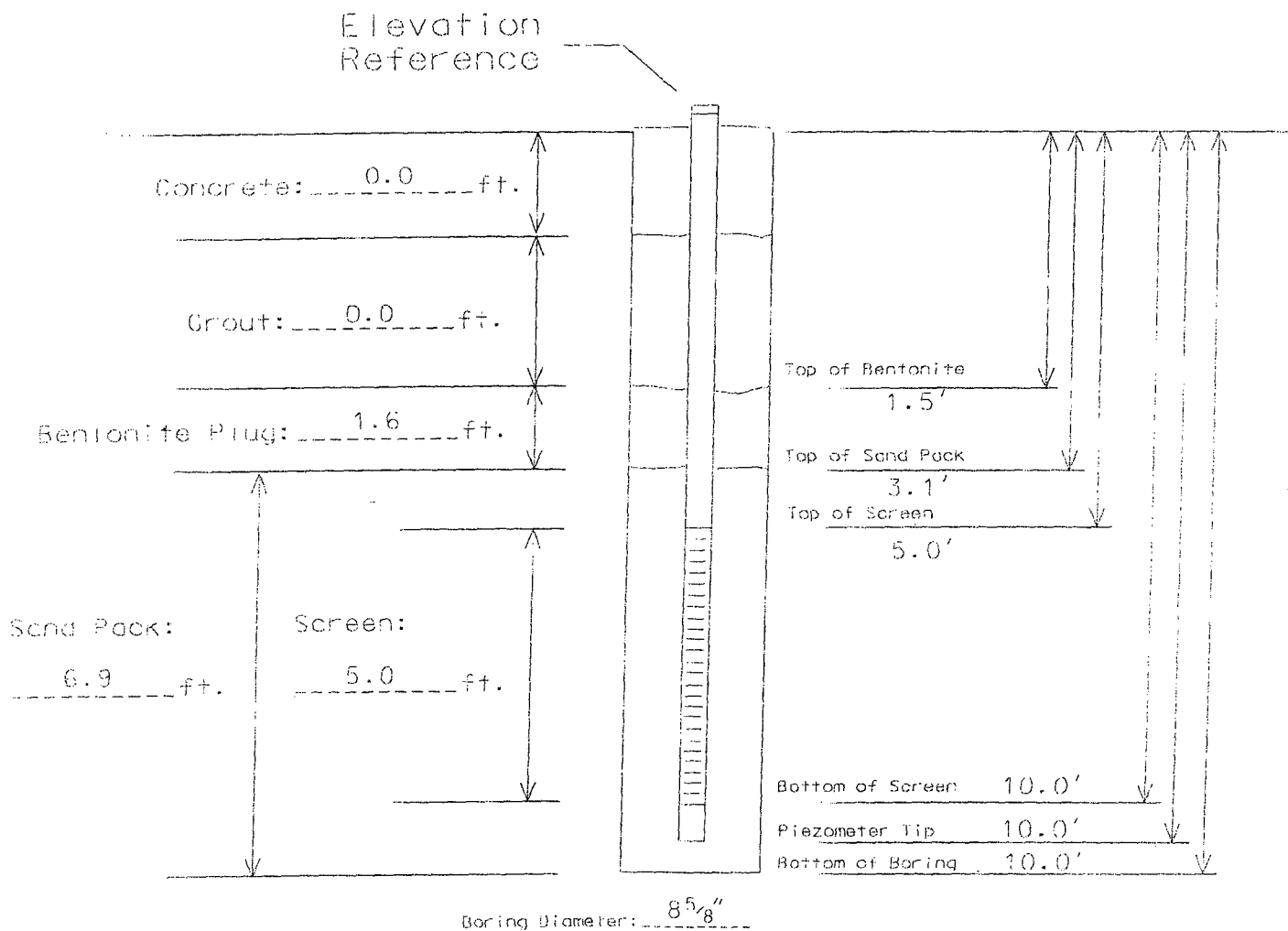
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505-523-7674

Installation Diagram

Monitoring Well No. IP 9



Sand Type: 10-20 Silica

Ballards, 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 North Arrow: BS

Bottom Cap Used? Yes

Site Fencing: BS

Other: _____

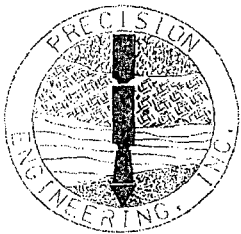
Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: BS

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 4/5/2005

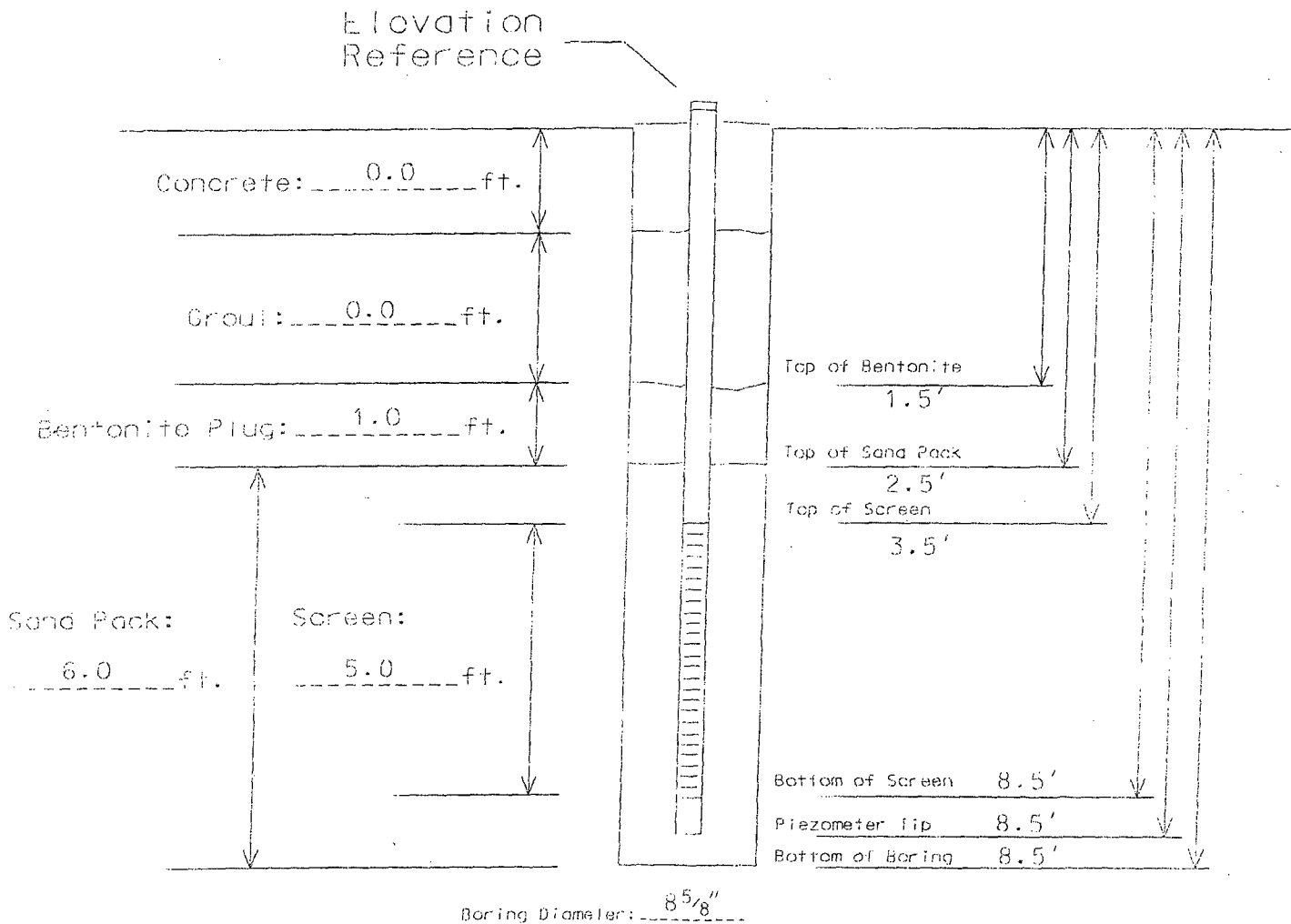
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505-523-7674

Installation Diagram

Monitoring Well No. TP 10



Sand Type: 10-20 Silica

Ballards, 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 Notations: TBS

Bottom Cap Used? Yes

Site Labeling: TBS

Other: _____

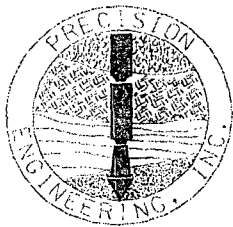
Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 4/5/2005

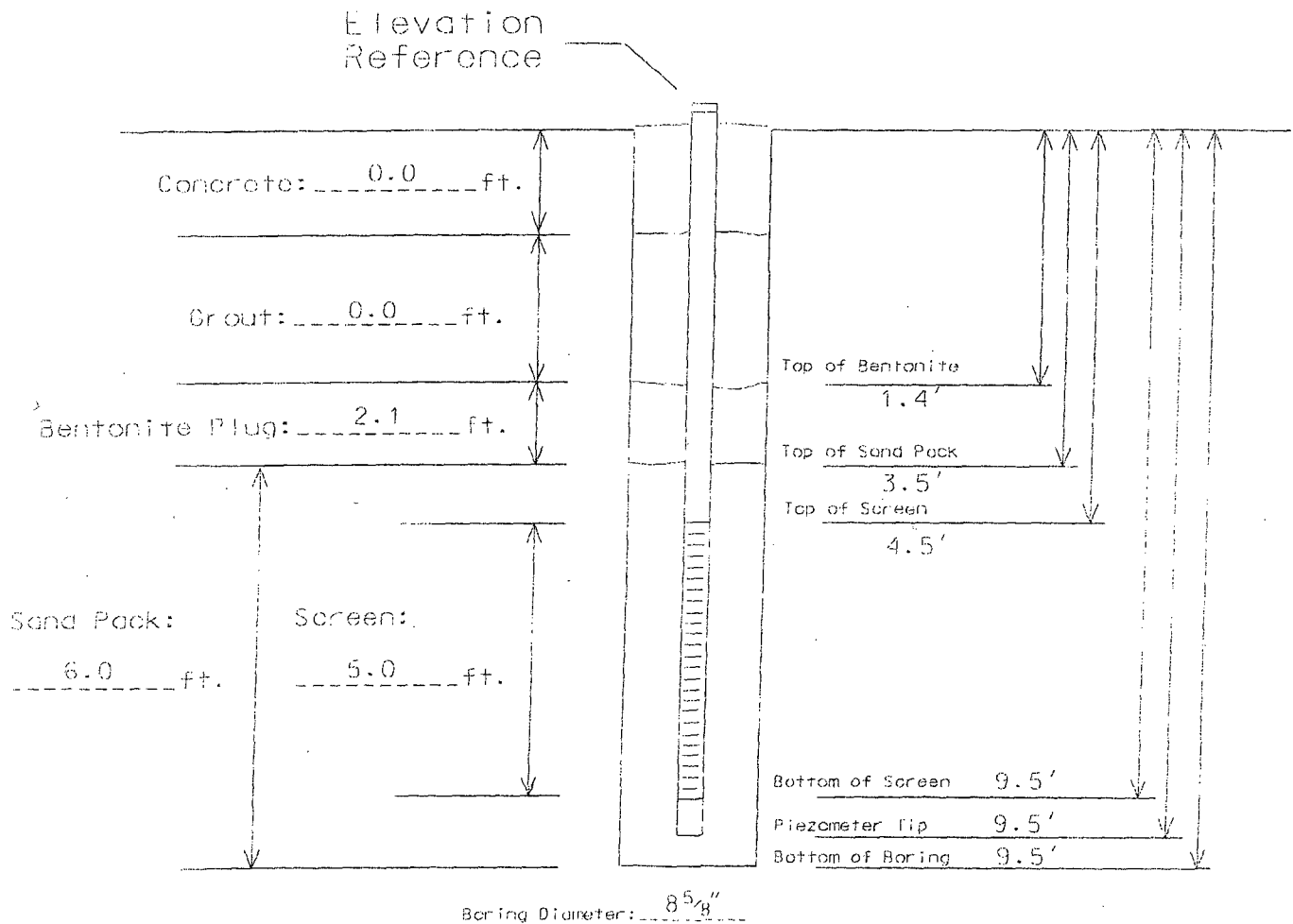
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305-523-7674

Installation Diagram

Monitoring Well No. TP 11



Sand Type: 10-20 Silica

Boulders, 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 Northings: 185

Other:

Bottom Cap Used? Yes Site Eastings: 185

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: 185

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 4/5/2005

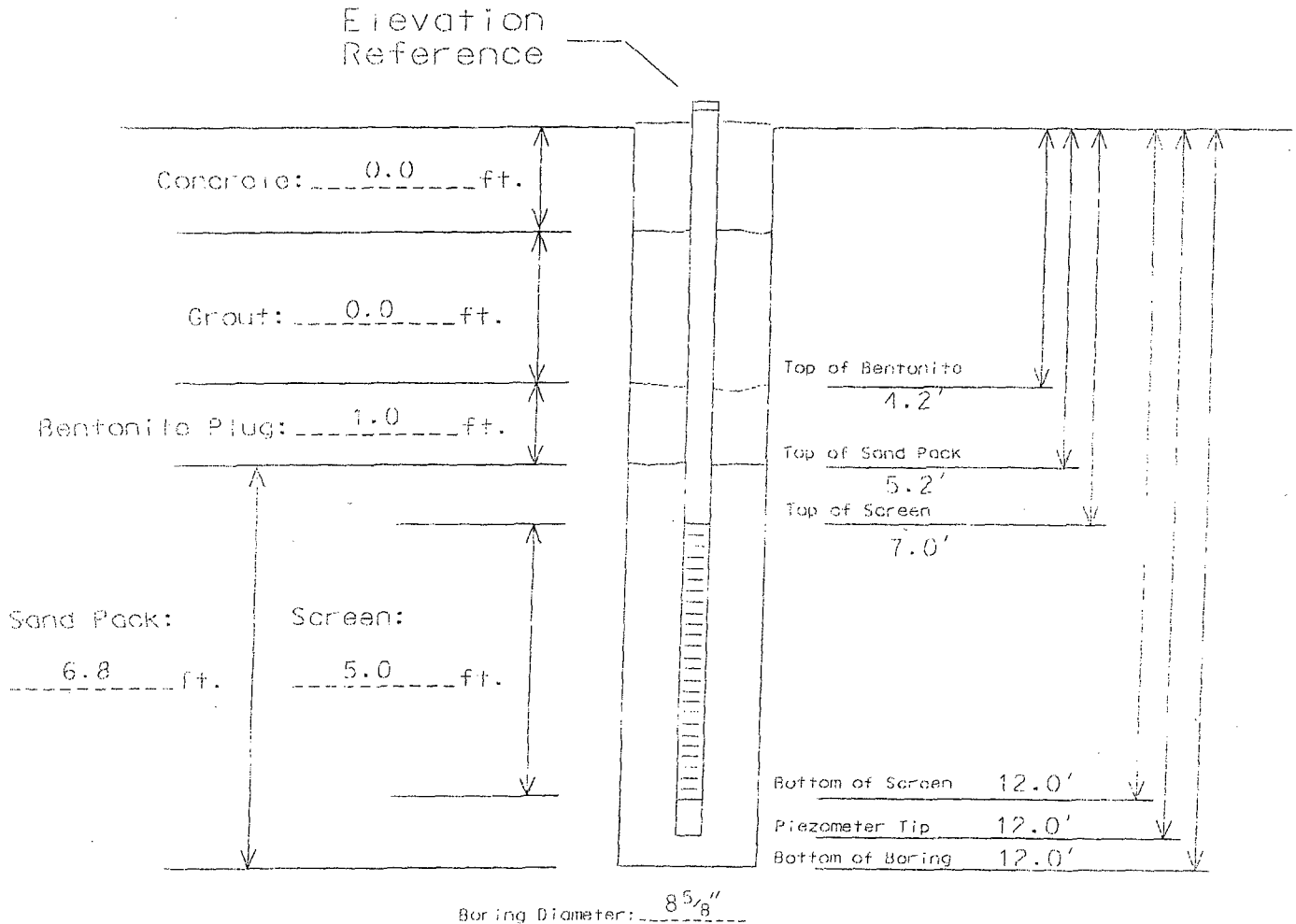
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505-523-7674

Installation Diagram

Monitoring Well No. TP 12



Sand Type: 10-20 Silica

Ballards, Type/Size: NA

Bentonite: 3/8" Chips

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

Concrete/Grout: NA

Riser Type/Size: 2" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? Yes

Site Northings: 185

Bottom Cap Used? Yes

Site Eastings: 185

Other:

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: 185

Sheet: 4 OF 5
 Bore Point: RiverTerrace
 Water Elevation: 7.5'
 Boring No.: TP-12

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

File #: 05-038
 Site: Bloomfield
 Giant Refining
 Elevation: EXISTING
 Date: 4/5/2005

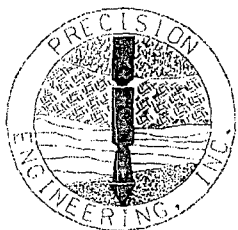
Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS.
	0.0-3.0		***_*** ***_*** ***_*** ***_*** ***_***	2.5	<u>Sand</u> , Very Fine to Fine, Slightly Silty, Brown, Gravel, Cobbles, Moist				
	3.0-4.5		////**// ////**// ////**//		<u>Clay</u> , Sandy, Very Fine, Brown, Some Gravel/ Cobbles, Moist				
	4.5-9.0		***//*** ***//*** ***//*** ***//*** ***//*** ***//*** ***//***	5.0 7.5	<u>Sand</u> , Very Fine to Fine, Clayey, Brown, Moist, Some Gravel				
	9.0-13.0		***** ***** ***** ***** ***** ***** ***** ***** ***** *****	10.0	Water <u>Sand</u> , Fine to Coarse, Tan, Water Bearing				
	13.0			15.0 20.0	TD Set 2" Well @ 12.0' 5' of Screen, 8' of Riser Top of Sand 5'2" Top of Bentonite 4'2"				

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

LOGGED BY: KMM

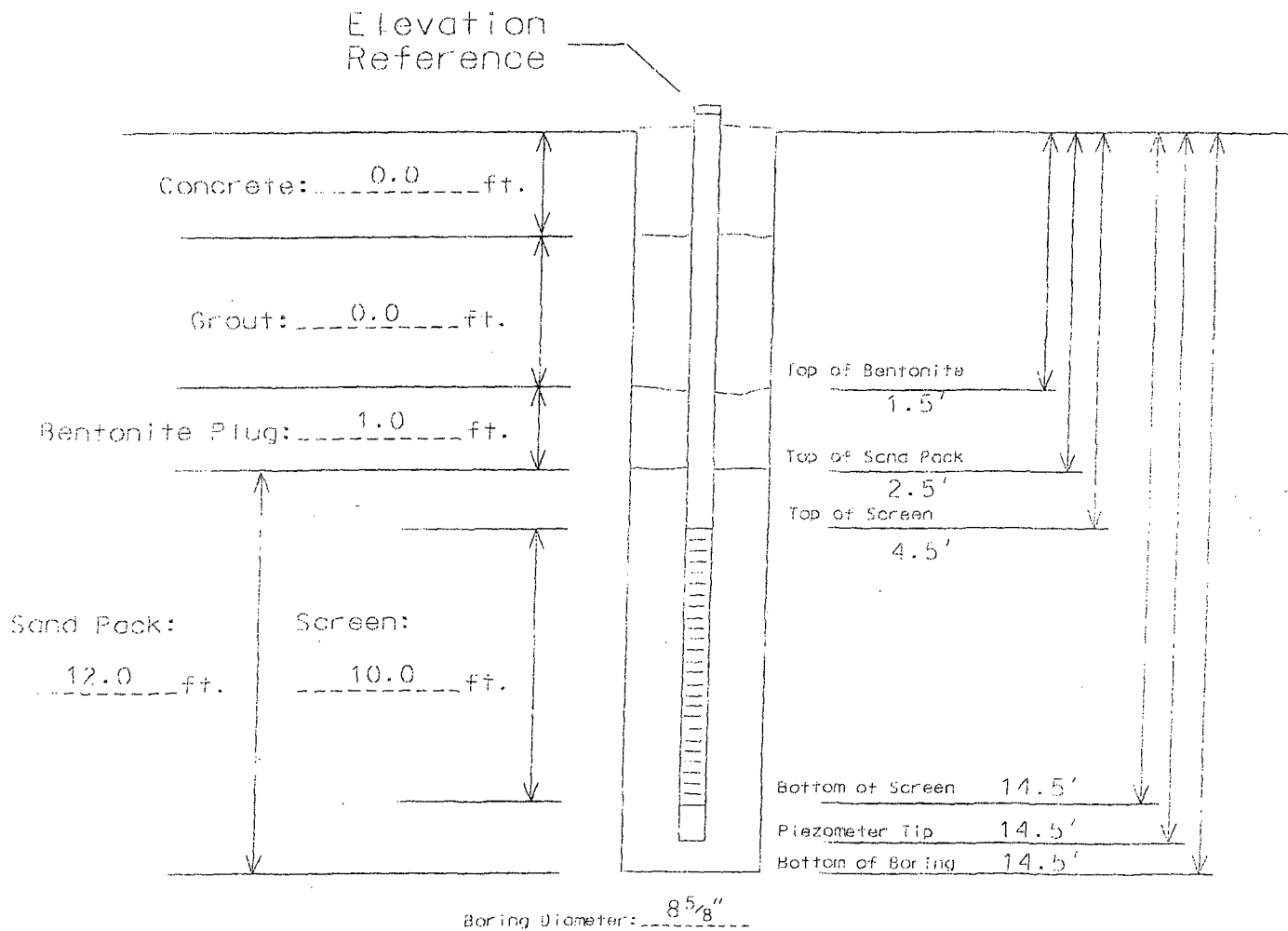
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505-523-7674

Installation Diagram

Monitoring Well No. TP 13



Sand Type: 10-20 Silica

Ballards, 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 Marking: TBS

Bottom Cap Used? Yes

Site Easting: TBS

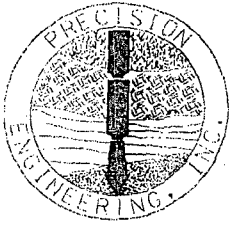
Other: _____

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS

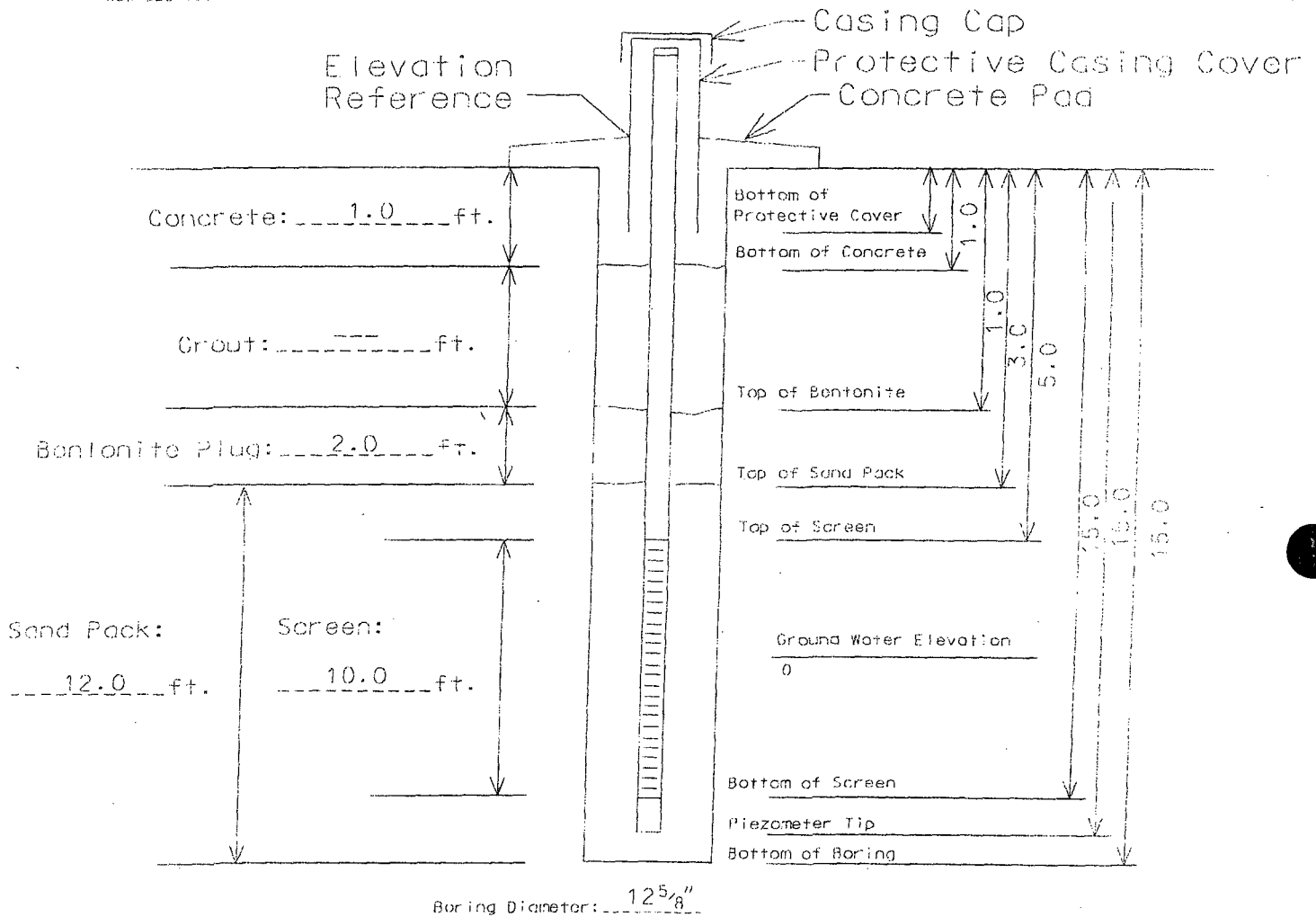
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505-523-7674

Installation Diagram

Monitoring Well No. MW-48



Sand Type: 8-12 Silica

Bollards, Type/Size: Steel, 3"

Bentonite: 3/8" Chips

Screen Type/Size: 4" PVC Sch. 40, 0.020" Slotted

Cement/Grout: ---

Riser Type/Size: 4" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? Yes

Site Northing: 6204.63

Other: N/A

Bottom Cap Used? Yes

Site Easting: 2700.70

Project #: 03-122

Project Name: Giant Refining Co. Bloomfield Wells

Elevation: not surveyed

Sheet: 1 of 1
 Bore Point: See plan
 Water Elevation: 7.70
 Boring No.: MW-48

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

File #: 03-122
 Site: Bloomfield
 Giant Refining
 Elevation: Not Surveyed
 Date: 10/28/2004

Log of Test Borings

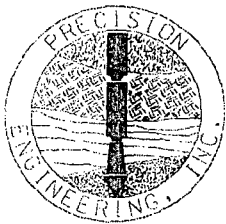
LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS.
	0-1		*** *O*		<u>Silt</u> , sand, very fine to fine, brown, damp, a few cobbles				
	1-15.0		*O*		<u>Sand</u> , silty, very fine to fine, brown, damp, gravelly				
	2.0		*O*	<u>2.5</u>	Black with hydrocarbon odor				
			O						
			O						
			O						
			O						
			*****		medium to coarse sand				
			*****	<u>5.0</u>					

			*****	<u>7.5</u>					
			*****		water bearing				

			O	<u>10.0</u>	some gravel				
			O						
			O						
			O						
			O						
			O						
			O						
			O						
			O	<u>15.0</u>					
					T.D. 15.0				
					Bottom of well 15'				
					Placed 4" PVC, 10' factory slotted .020" screen				
					Sanded with 8-12 Silica Sand to 3' bgs				
					Bentonite Plug to 1' bgs				
				<u>20.0</u>					

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

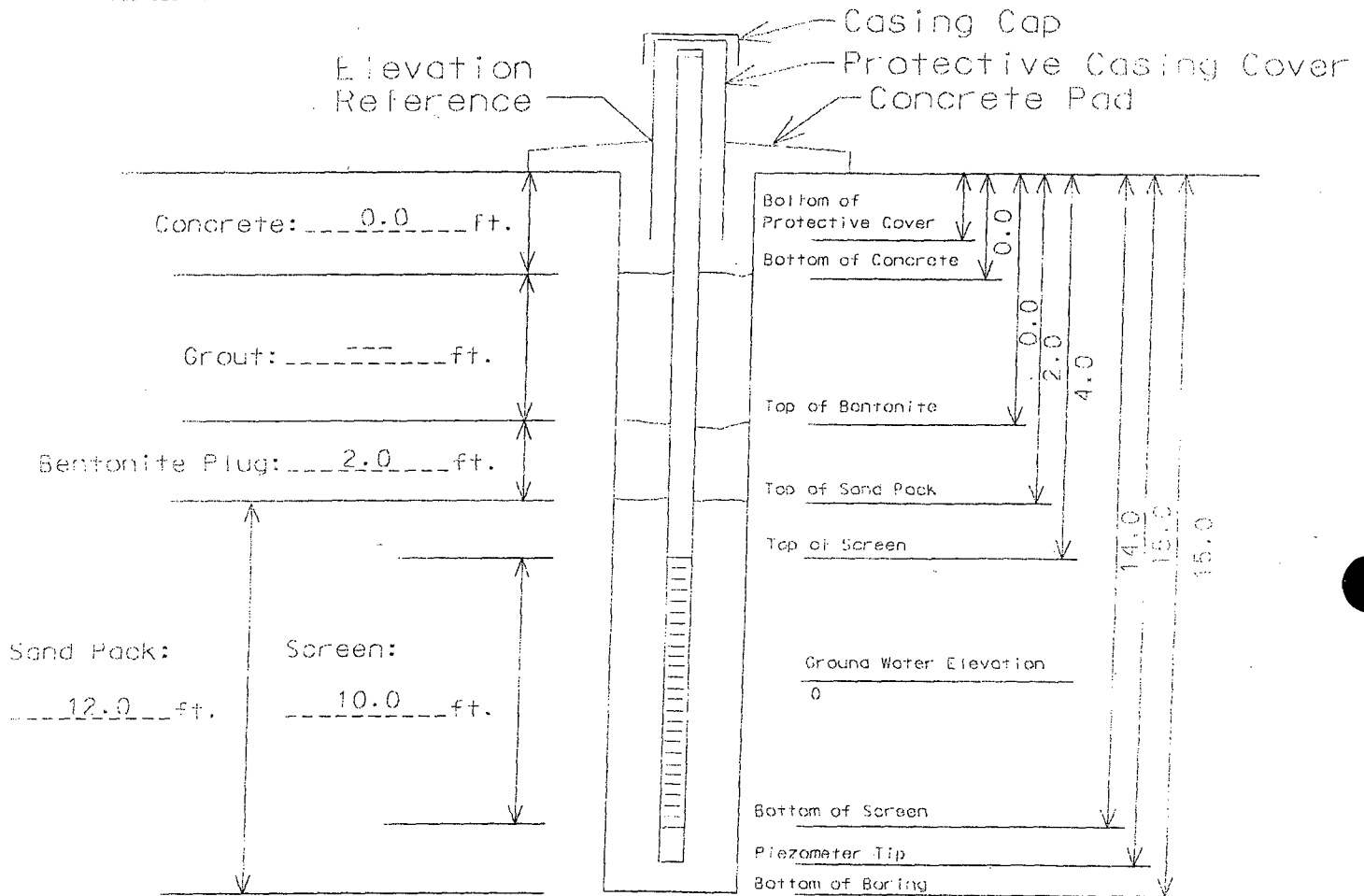
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505-523-7674

Installation Diagram

Monitoring Well No. MW-49



Boring Diameter: 12⁵/₈"

Sand Type: 8-12 Silica

Boulders, Type/Size: Steel, 3"

Bentonite: 3/8" Chips

Screen Type/Size: 4" PVC Sch. 40, 0.020" Slotted

Cement/Grout: ---

Riser Type/Size: 4" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? Yes

Site Northing: 6196.16

Owner: N/A

Bottom Cap used? Yes

Site Easting: 2653.14

Project #: 03-122 Project Name: Giant Refining Co. Bloomfield Wells

Elevation: Not Surveyed

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: Not Surveyed
Date: 10/28/2004

LOGGED BY: KM

**MALCOLM
PIRNIE****GIANT**
INDUSTRIES, INC.**Boring Log and Construction for Dewatering Well DW-1**

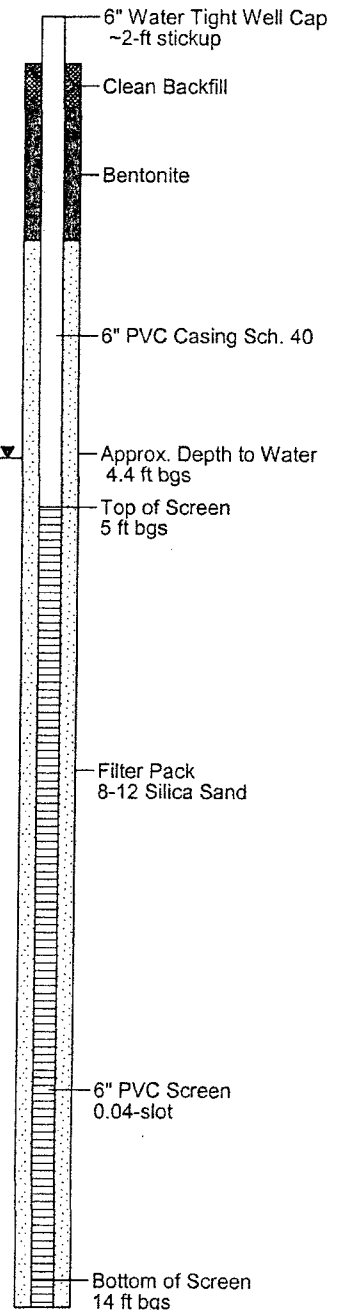
(Page 1 of 1)

Giant Refining Company
Bloomfield Refinery
Well Installation
Bloomfield, New Mexico

Project No. 5127-003

Start Date : Aug. 16, 2005
Finish Date : Aug. 16, 2005
Location : Bloomfield Refinery
Logged By : Brian Sperrazza
Drilling Subcontractor : EnvirotechDrill Rig : Hollow Stem Auger
Driller, Helpers : Kelly, Kimo
Sampling Method : Split-Spoon
Northing : NA
Easting : NA

Depth in Feet	USCS	Graphic	Lithologic Description of Soil	Size Distribution of Soils			Blows per 6"	Recovery (in.)
				% Gravel	% Sand	% Fines		
0			NOTE: Lithologic Description from Boring #2.					
1								
2			Poorly Graded Sandy SILT, brown, fine sand, non-plastic fines, trace of fine gravel, moist/damp.	T	30	70	1	12
3	ML							
4								
5								
6			Black staining starts.					
7			Poorly Graded SILTY SAND, gray/black, fine sand, non-plastic fines, trace of fine gravel.	T	70	30	3 1 1	12
8	SM							
9								
10								
11								
12			Clayey SILT, gray, low plasticity fines, fine to coarse sand, fine gravel.	5	20	75	1	9
13	ML							
14								

Well Name: DW-1
Borehole Diameter: 12 inch

**MALCOLM
PIRNIE****GIANT**
INDUSTRIES, INC.**Boring Log and Construction for Dewatering Well DW-2**

(Page 1 of 1)

Giant Refining Company
Bloomfield Refinery
Well Installation
Bloomfield, New MexicoStart Date : Aug. 18, 2005
Finish Date : Aug. 18, 2005
Location : Bloomfield Refinery
Logged By : Brian Sperrazza
Drilling Subcontractor : EnvirotechDrill Rig : Hollow Stem Auger
Driller, Helpers : Kelly, Kimo
Sampling Method : Split-Spoon
Northing : NA
Easting : NA

Project No. 5127-003

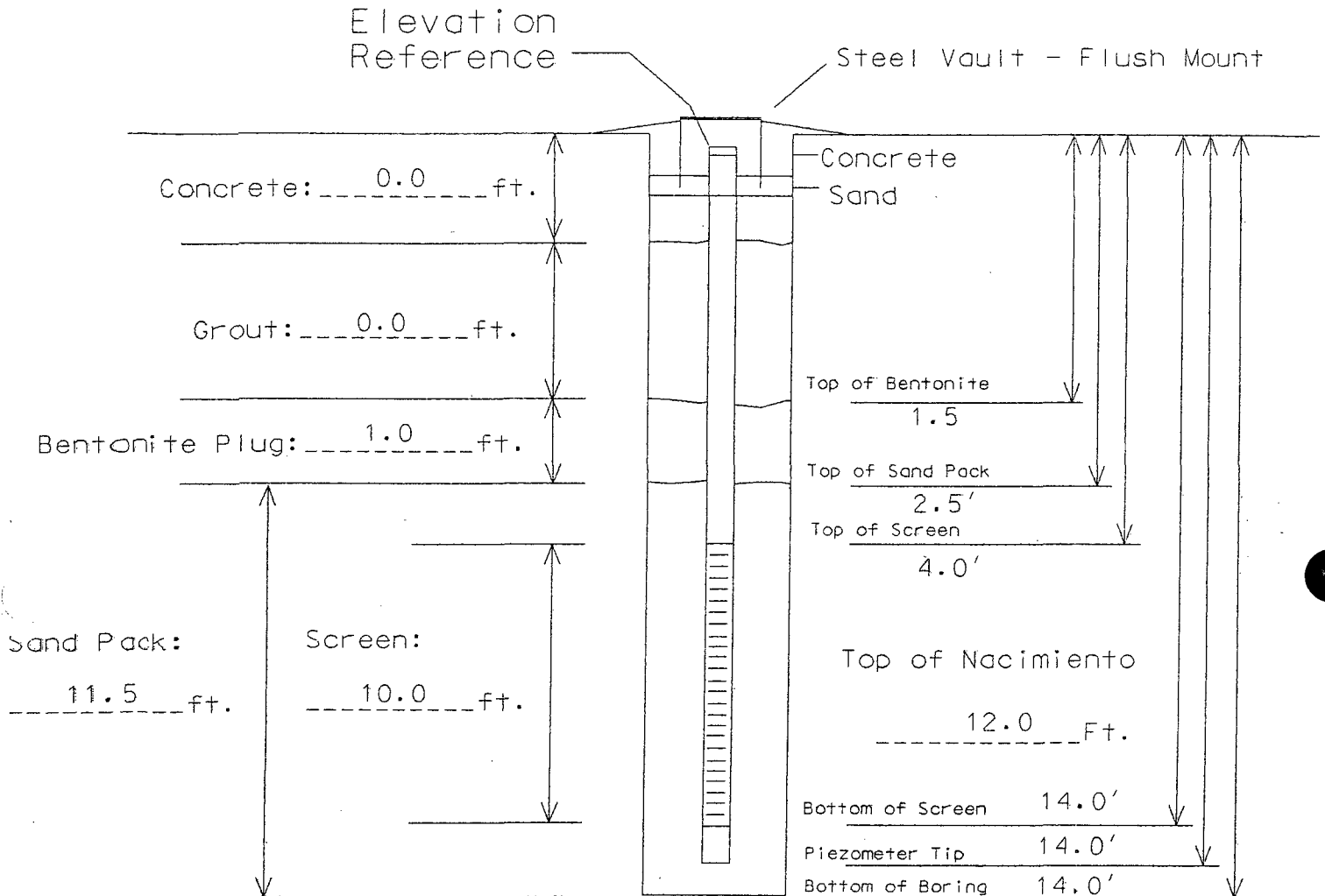
Depth in Feet	USCS	Graphic	Lithologic Description of Soil	Size Distribution of Soils			Blows per 6"	Recovery (in.)	Well Name: DW-2 Borehole Diameter: 12 inch
				% Gravel	% Sand	% Fines			
0									4" Water Tight Well Cap 1-ft stickup
1									Clean Backfill
2									Bentonite
3	ML		SILT, brown, non-plastic fines, fine sand, fine gravel. Clay 2" thick.	5	35	60	1 2 2	10	4" PVC Casing Sch. 40
4									Top of Screen 4 ft bgs
5									Approx. Depth to Water 5.3 ft bgs
6									
7	SM		Poorly Graded SILTY SAND, black, med. sand, non-plastic fines. Clay 3" thick.	5	70	25	1 2 5	12	Filter Pack 8-12 Silica Sand
8									
9									
10									
11	SP-SM		POORLY GRADED SAND WITH SILT, coarse sand, fine gravel, non-plastic fines.	10	75	15			4" PVC Screen 0.04-slot
12									
13									
14	SW		WELL GRADED Gravelly SAND, black, fine to med. gravel, fine to coarse sand, non-plastic fines.	25	70	5	10 17 23	24	Bottom of Screen 14 ft bgs
15									
16									



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

Other: -----

Bottom Cap Used? Yes

Site Easting: TBS

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS



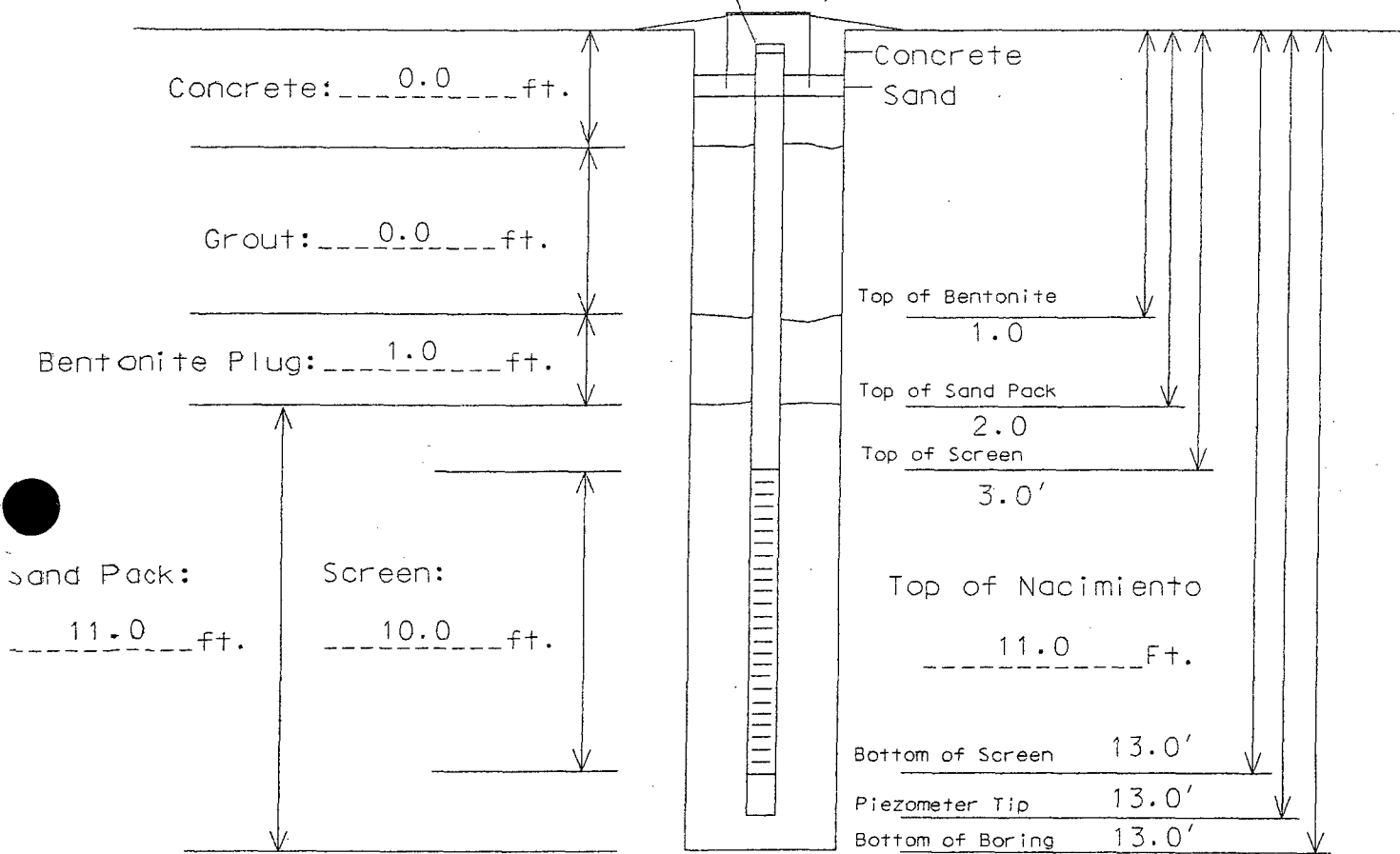
505-523-7674

Installation Diagram

Monitoring Well No. CW 1+50

Elevation
Reference

Steel Vault - Flush Mount



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

Other: _____

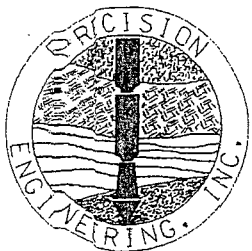
Bottom Cap Used? Yes

Site Easting: TBS

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS



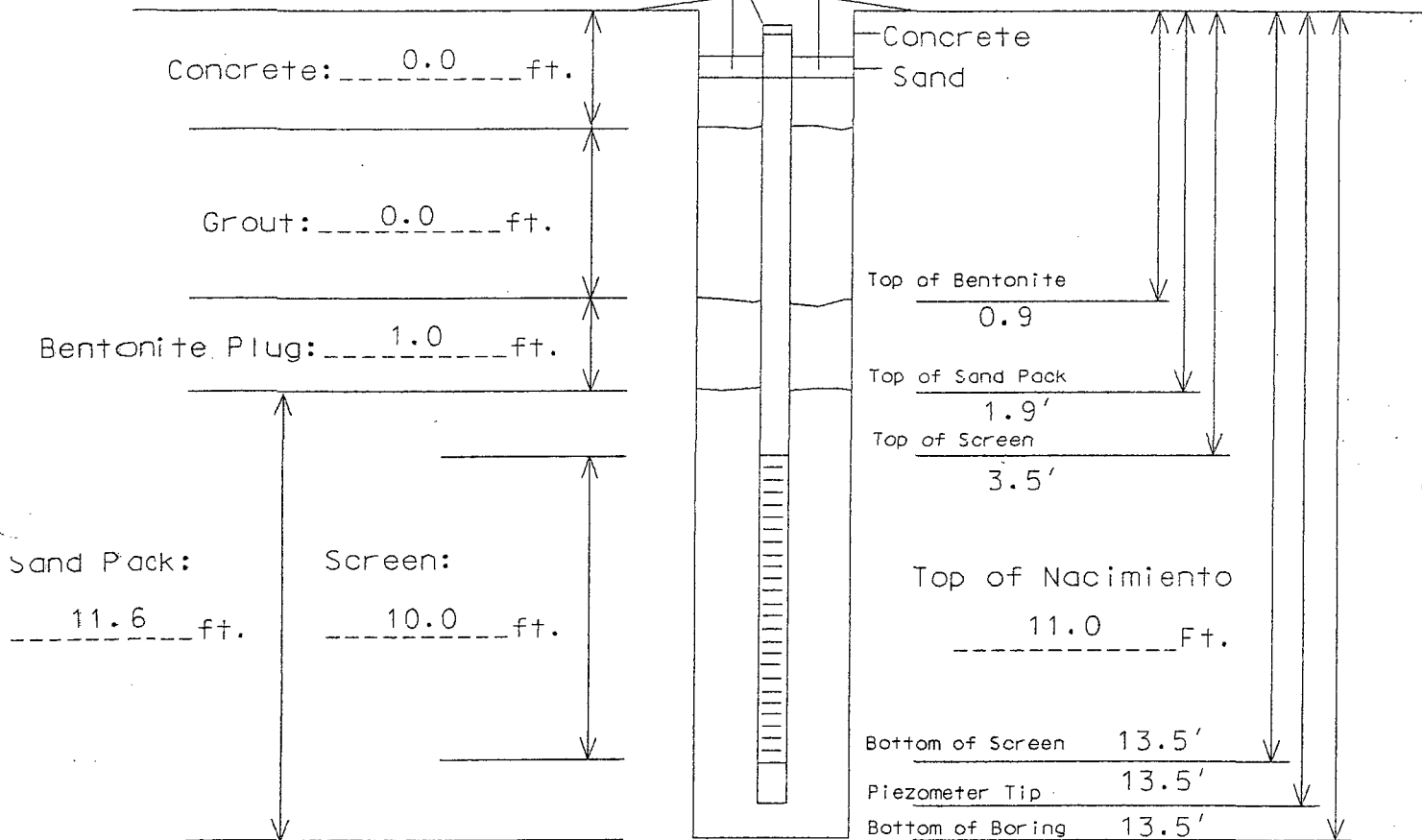
505523-7674

Installation Diagram

Monitoring Well No. CW 3+85

Elevation
Reference

Steel Vault - Flush Mount



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

Other: -----

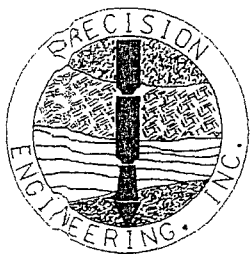
Bottom Cap Used? Yes

Site Easting: TBS

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS



505-523-7674

Installation Diagram

Monitoring Well No. CW 5+50

Elevation
Reference

Steel Vault - Flush Mount

Concrete: 0.0 ft.

Grout: 0.0 ft.

Bentonite Plug: 1.0 ft.

Sand Pack:
10.7 ft.

Screen:
9.0 ft.

Concrete
Sand

Top of Bentonite
0.9

Top of Sand Pack
2.1'

Top of Screen
3.0'

Top of Nacimientos
10.0 Ft.

Bottom of Screen 12.5'

Piezometer Tip 12.5'

Bottom of Boring 12.5'

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

Other: _____

Bottom Cap Used? Yes

Site Easting: TBS

Project #: 05-038

Project Name: Bloomfield Refinery

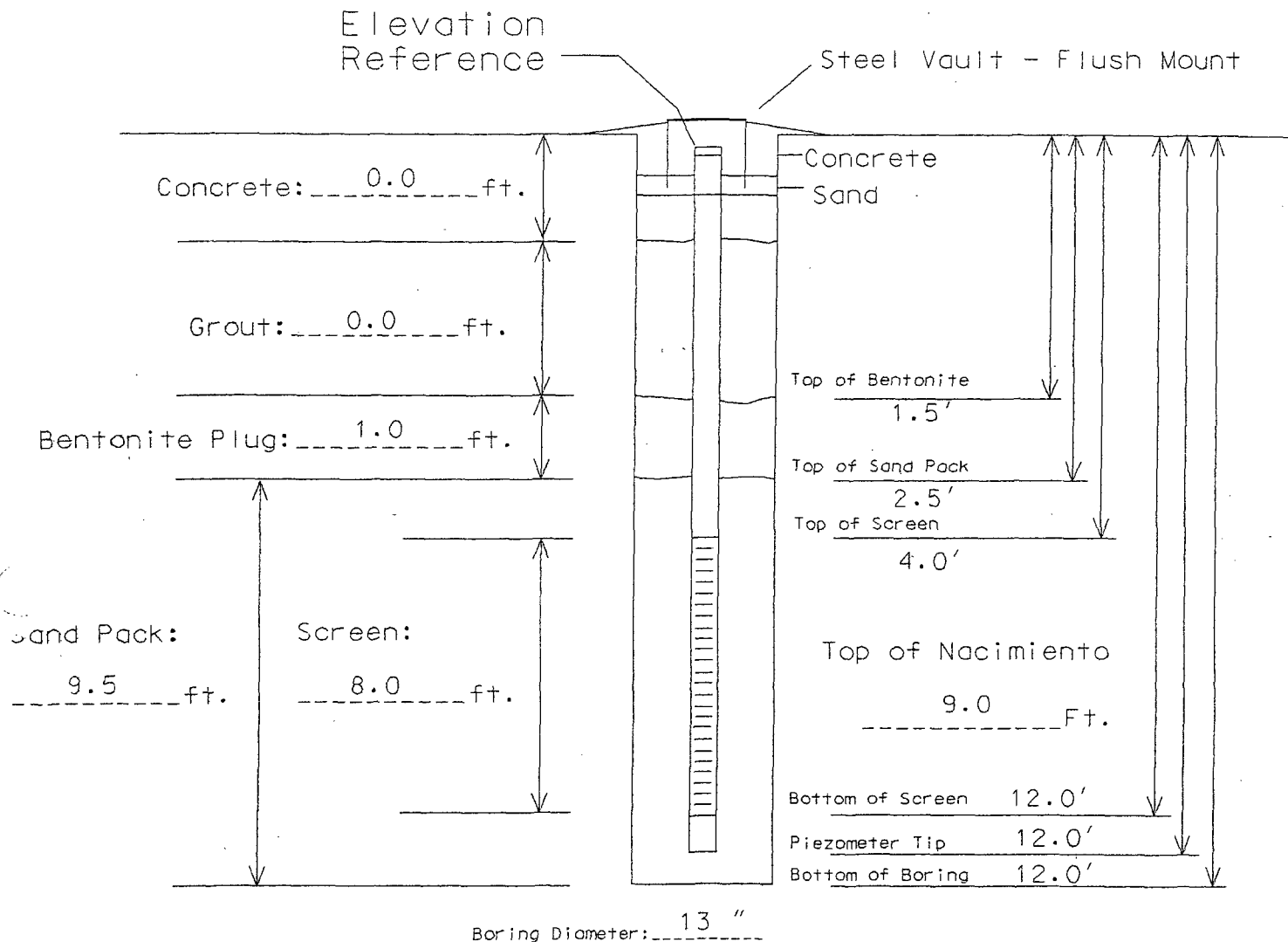
Elevation: TBS



505-523-7674

Installation Diagram

Monitoring Well No. CW 6+70



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

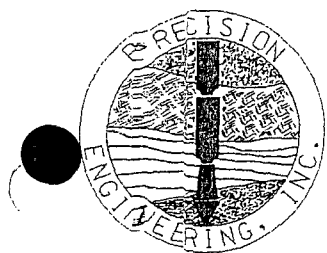
Site Easting: TBS

Other: _____

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS



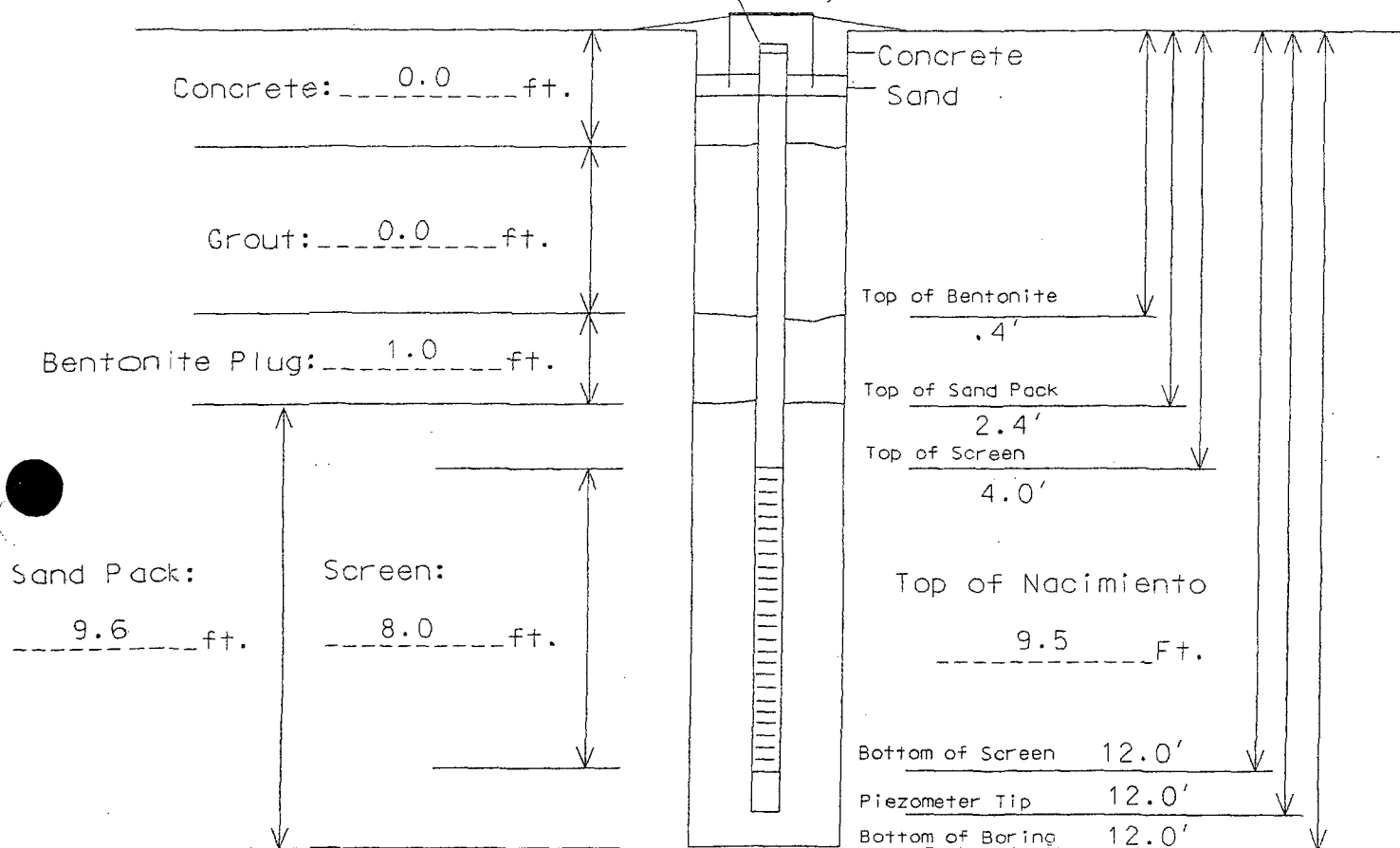
505-23-7674

Installation Diagram.

Monitoring Well No. CW 8+10

Elevation
Reference

Steel Vault - Flush Mount



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

Other: _____

Bottom Cap Used? Yes

Site Easting: TBS

Project #: 05-038

Project Name: Bloomfield Refinery

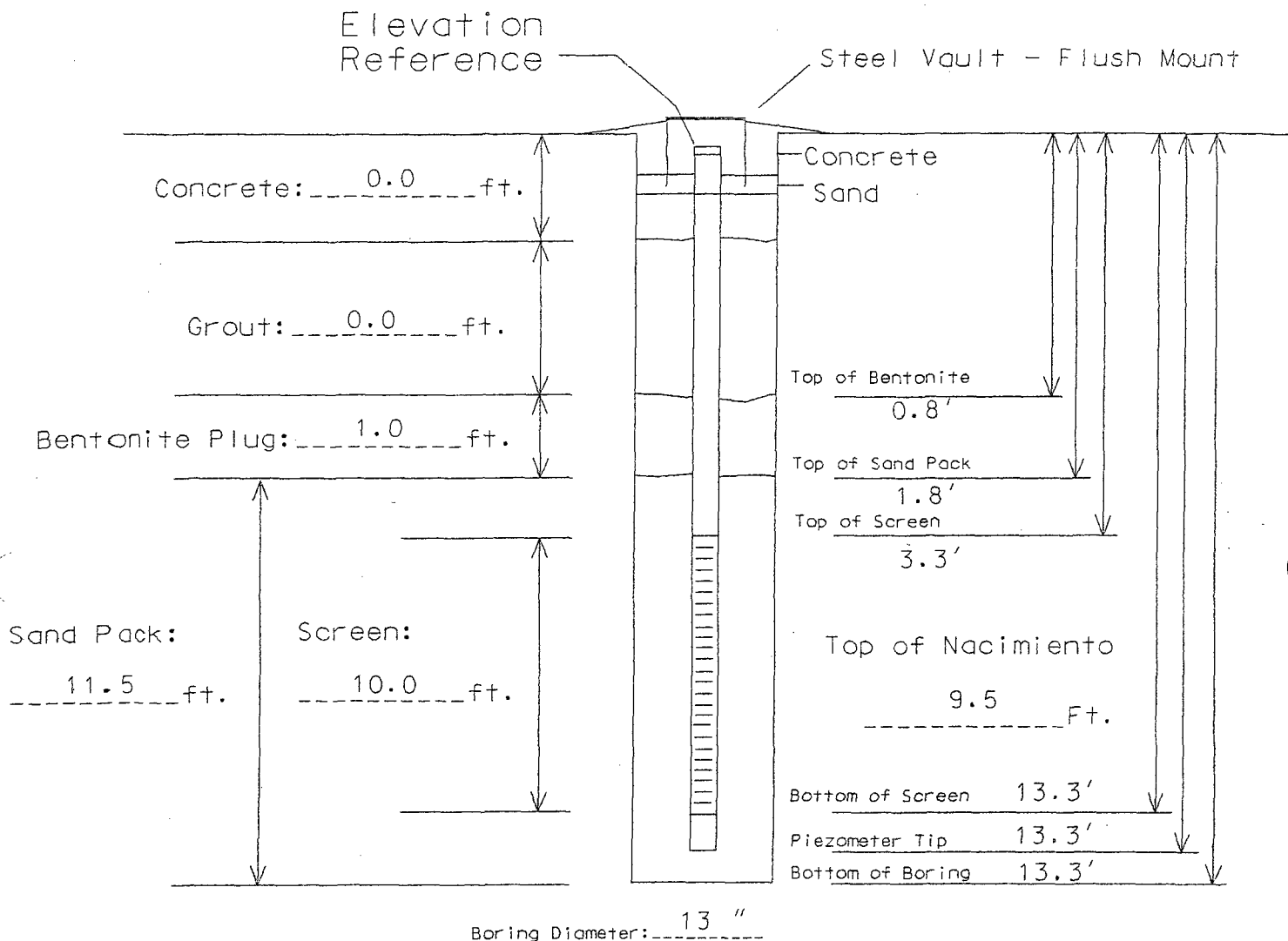
Elevation: TBS



505-523-7674

Installation Diagram

Monitoring Well No. CW 8+45



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

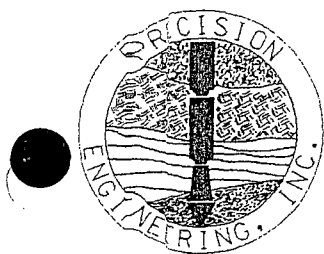
Site Easting: TBS

Other: _____

Project #: 05-038

Project Name: Bloomfield Refinery

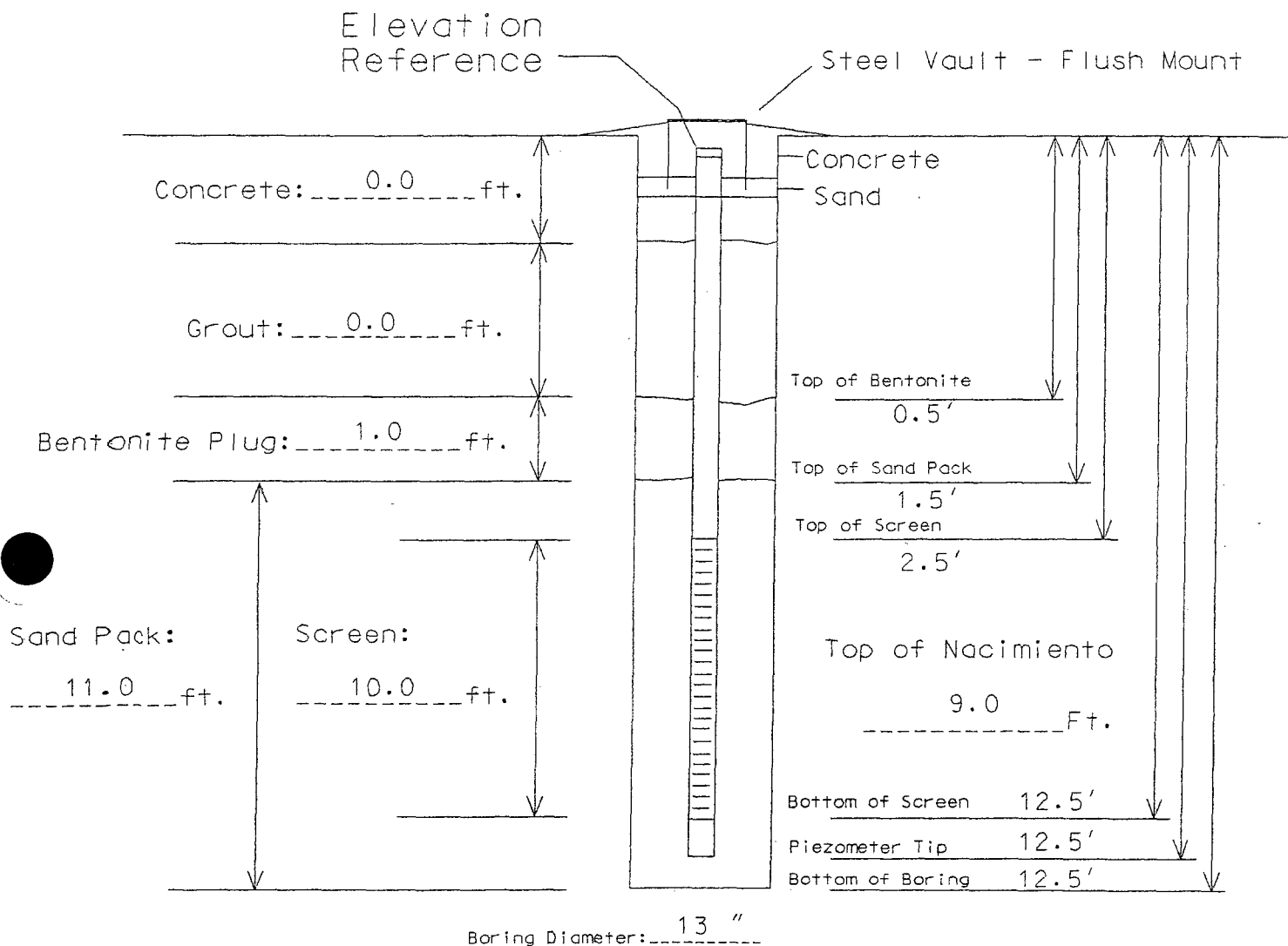
Elevation: TBS



505-523-7674

Installation Diagram

Monitoring Well No. CW 11+15



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

Other: _____

Bottom Cap Used? Yes

Site Easting: TBS

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS



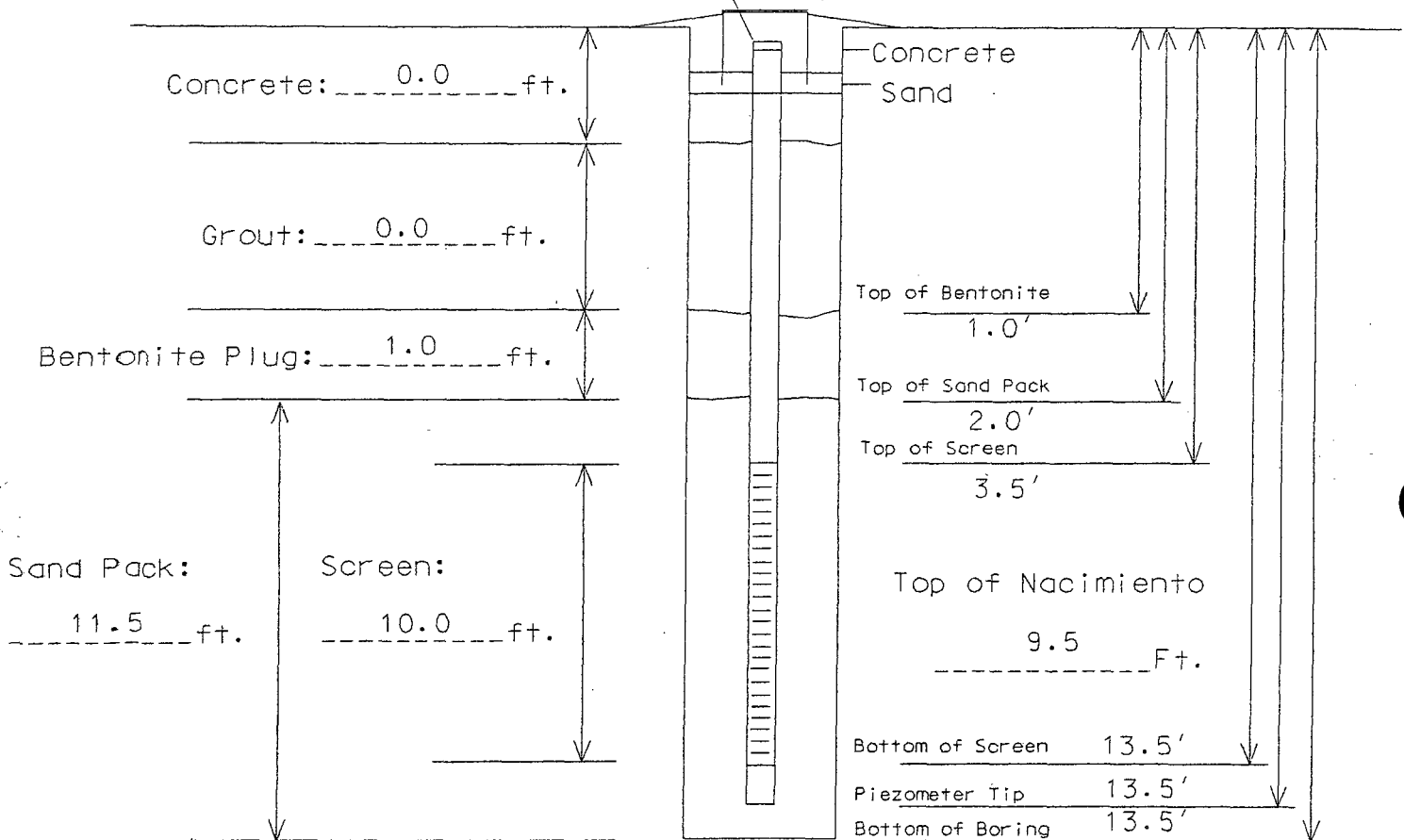
501-523-7674

Installation Diagram

Monitoring Well No. CW 14+10

Elevation
Reference

Steel Vault - Flush Mount



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

Other: _____

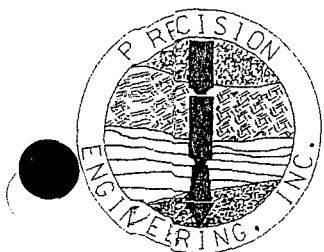
Bottom Cap Used? Yes

Site Easting: TBS

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS



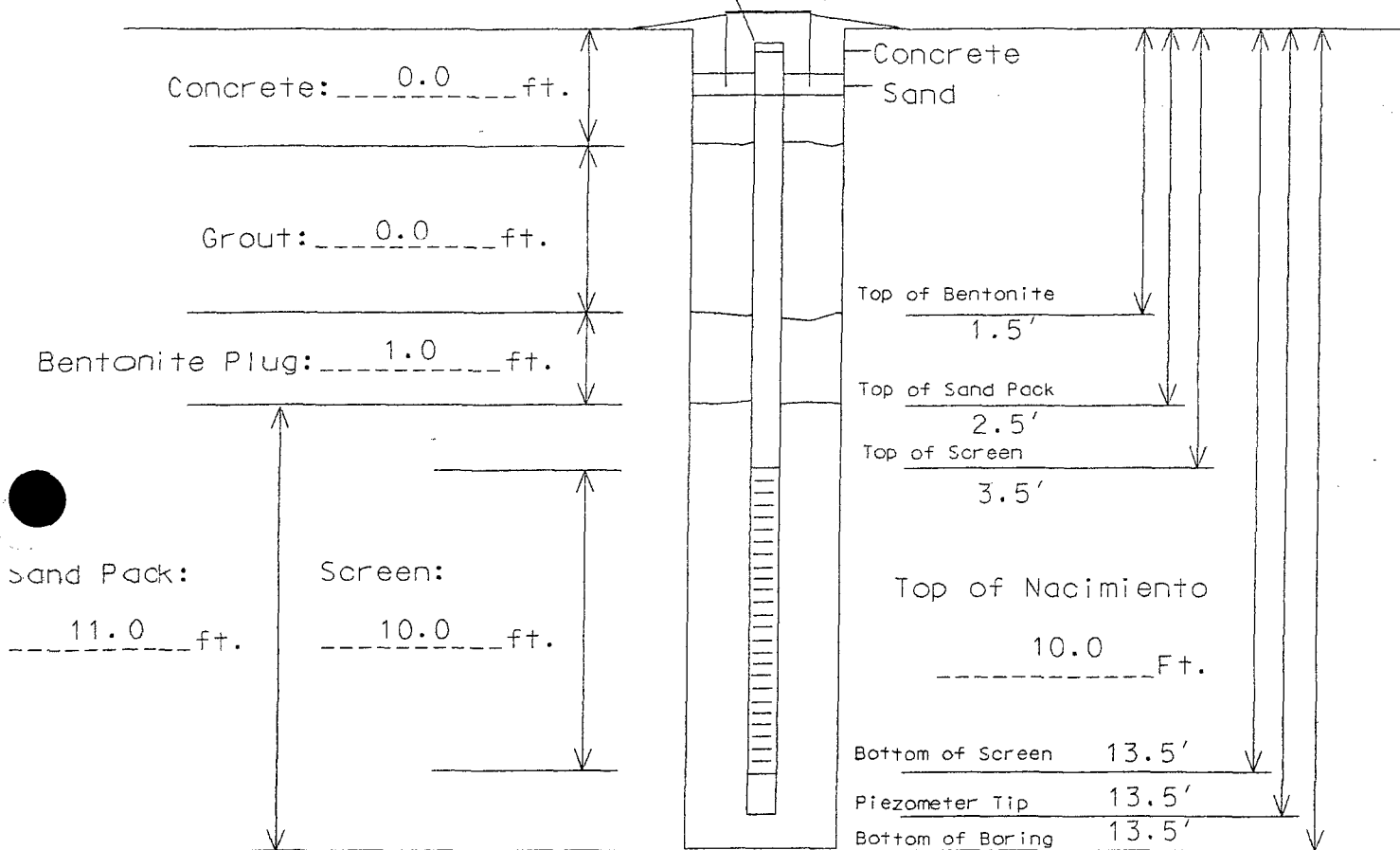
5 Q5-523-7674

Installation Diagram

Monitoring Well No. CW 16+60

Elevation
Reference

Steel Vault - Flush Mount



Boring Diameter: 13 "

Sand Type: 10-20 Silica

Boillards, Type/Size: NA

Bentonite: 3/8" Chips

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

Cement/Grout: NA

Riser Type/Size: 6" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? Yes

Site Northing: TBS

Other: _____

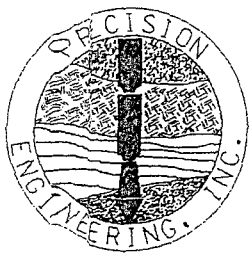
Bottom Cap Used? Yes

Site Easting: TBS

Project #: 05-038

Project Name: Bloomfield Refinery

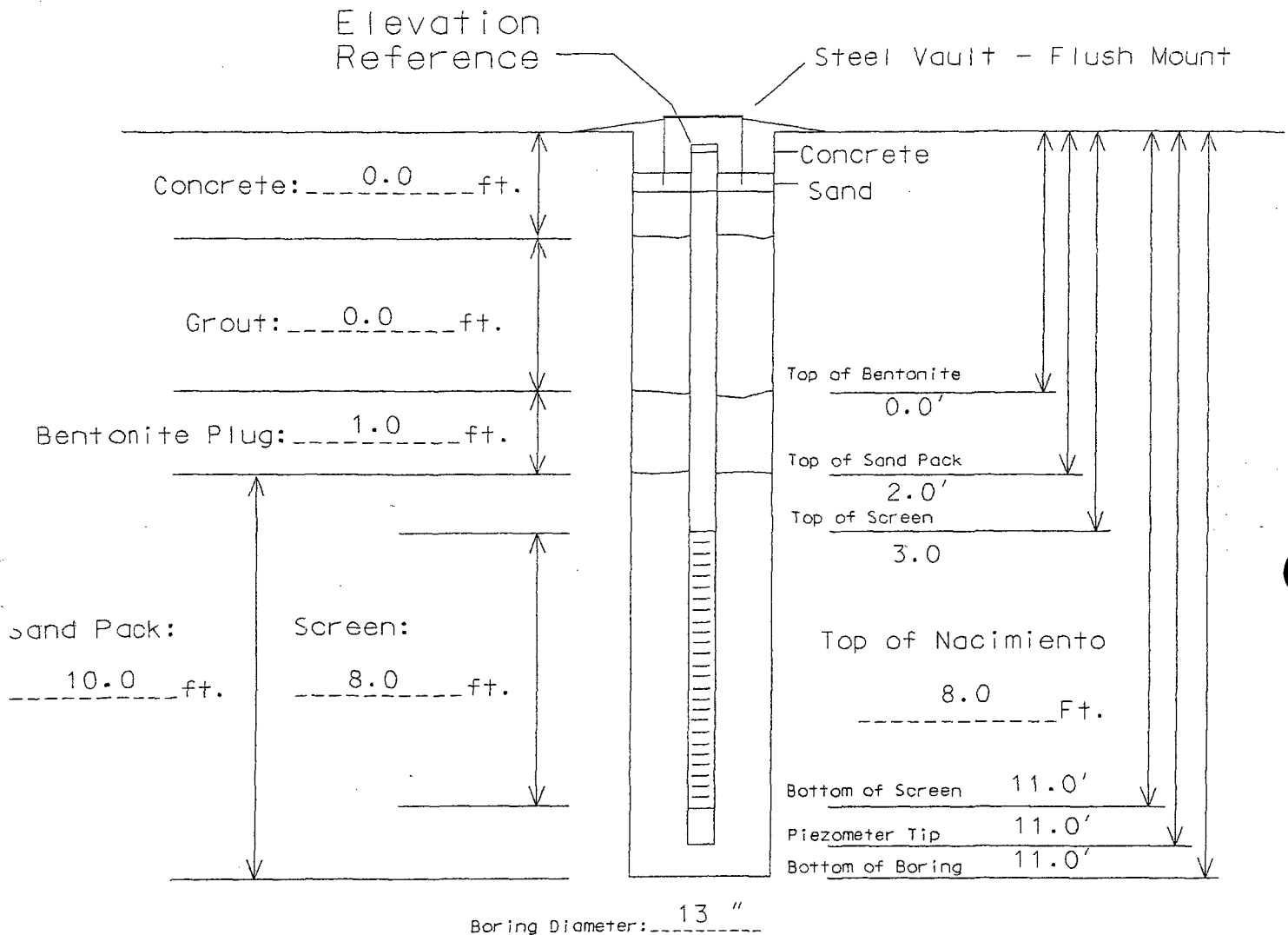
Elevation: TBS



50-523-7674

Installation Diagram

Monitoring Well No. CW 19+50



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

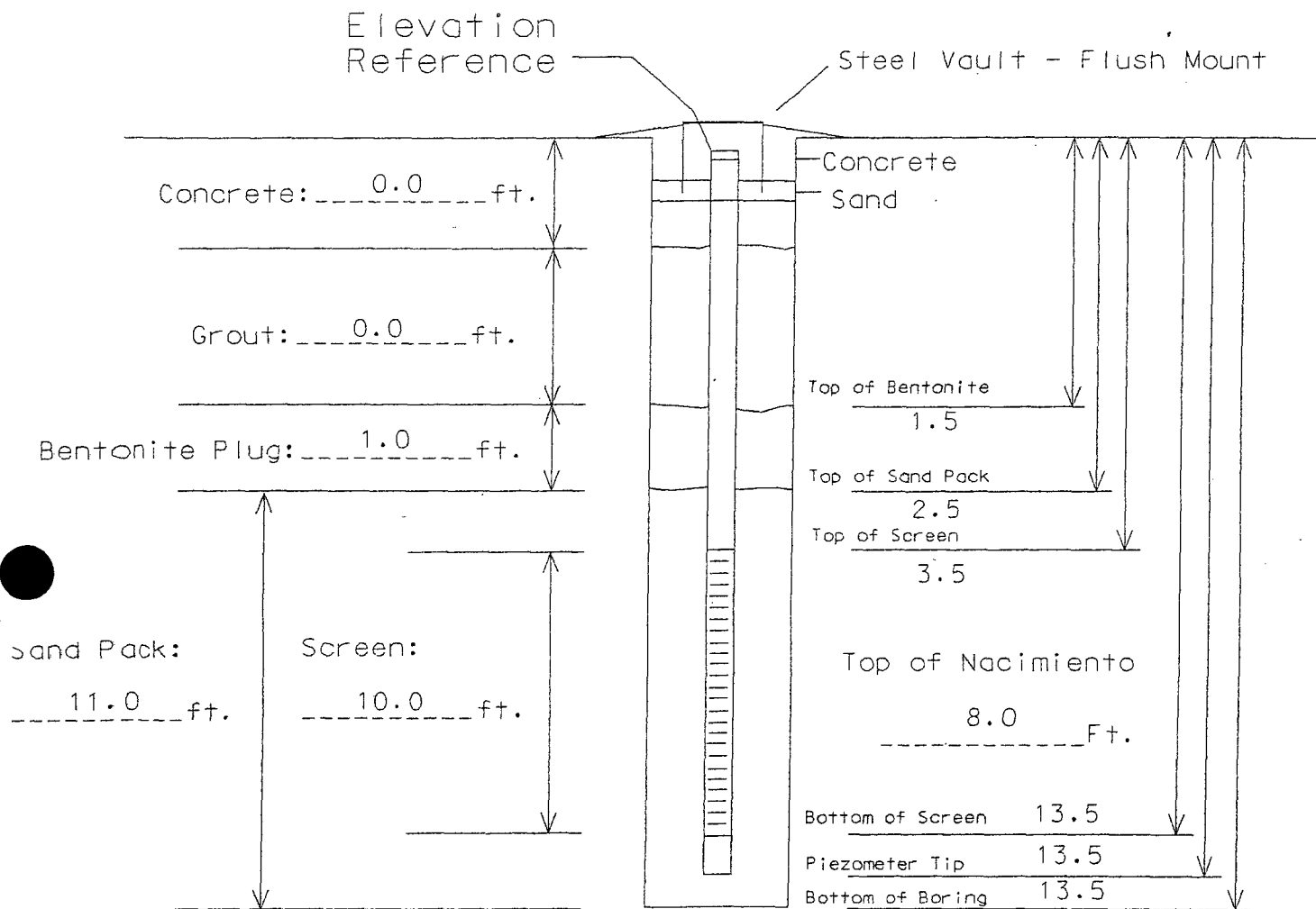
Elevation: TBS



505-523-7674

Installation Diagram

Monitoring Well No. CW 22+00



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



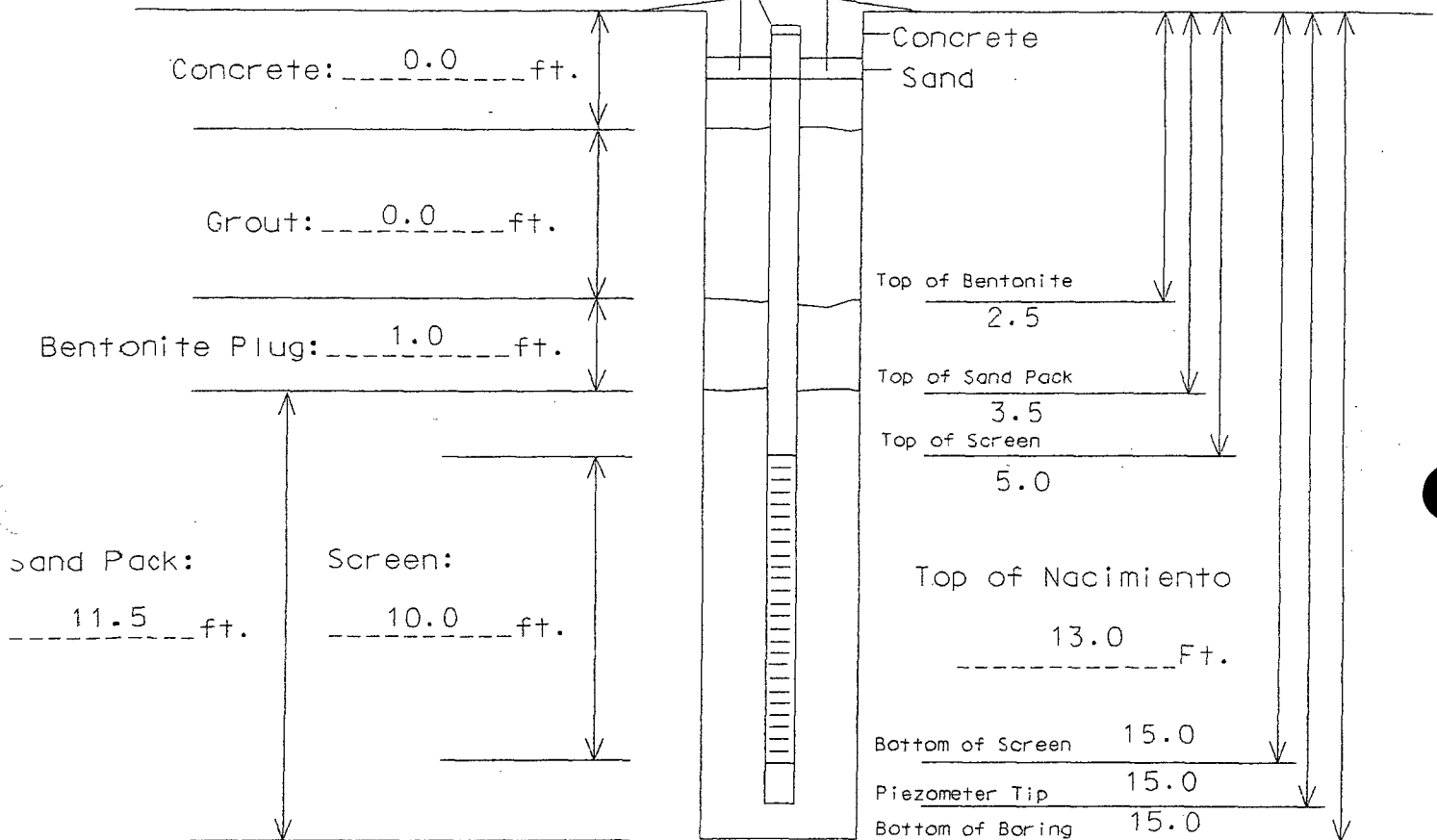
S05523-7674

Installation Diagram

Monitoring Well No. CW 23+10

Elevation
Reference

Steel Vault - Flush Mount



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

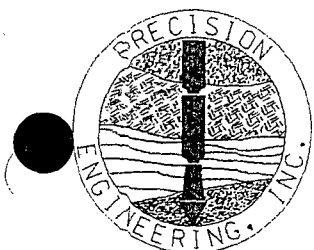
Site Easting: TBS

Other: _____

Project #: 05-038

Project Name: Bloomfield Refinery

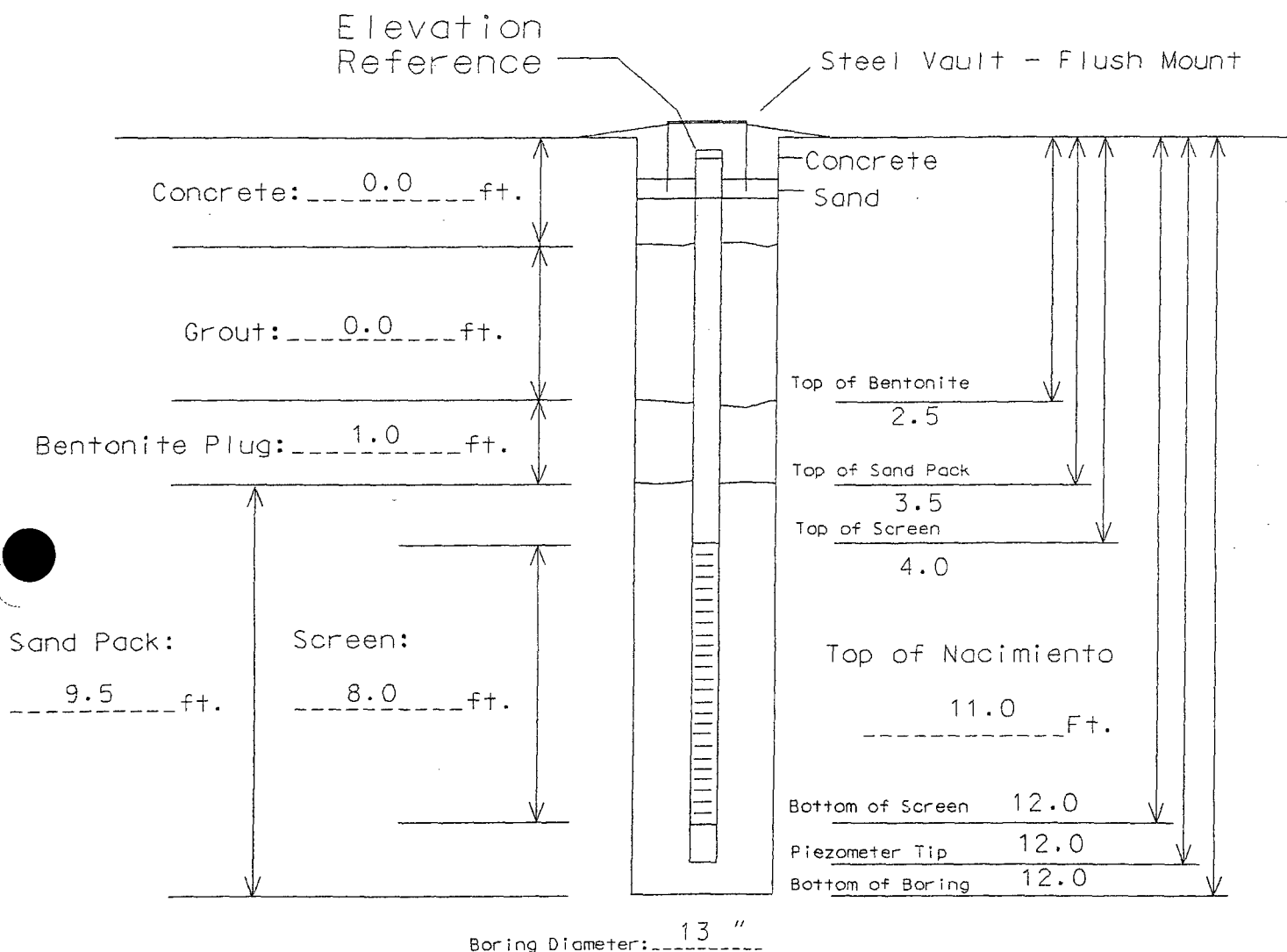
Elevation: TBS



505-523-7674

Installation Diagram

Monitoring Well No. CW 23+90



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

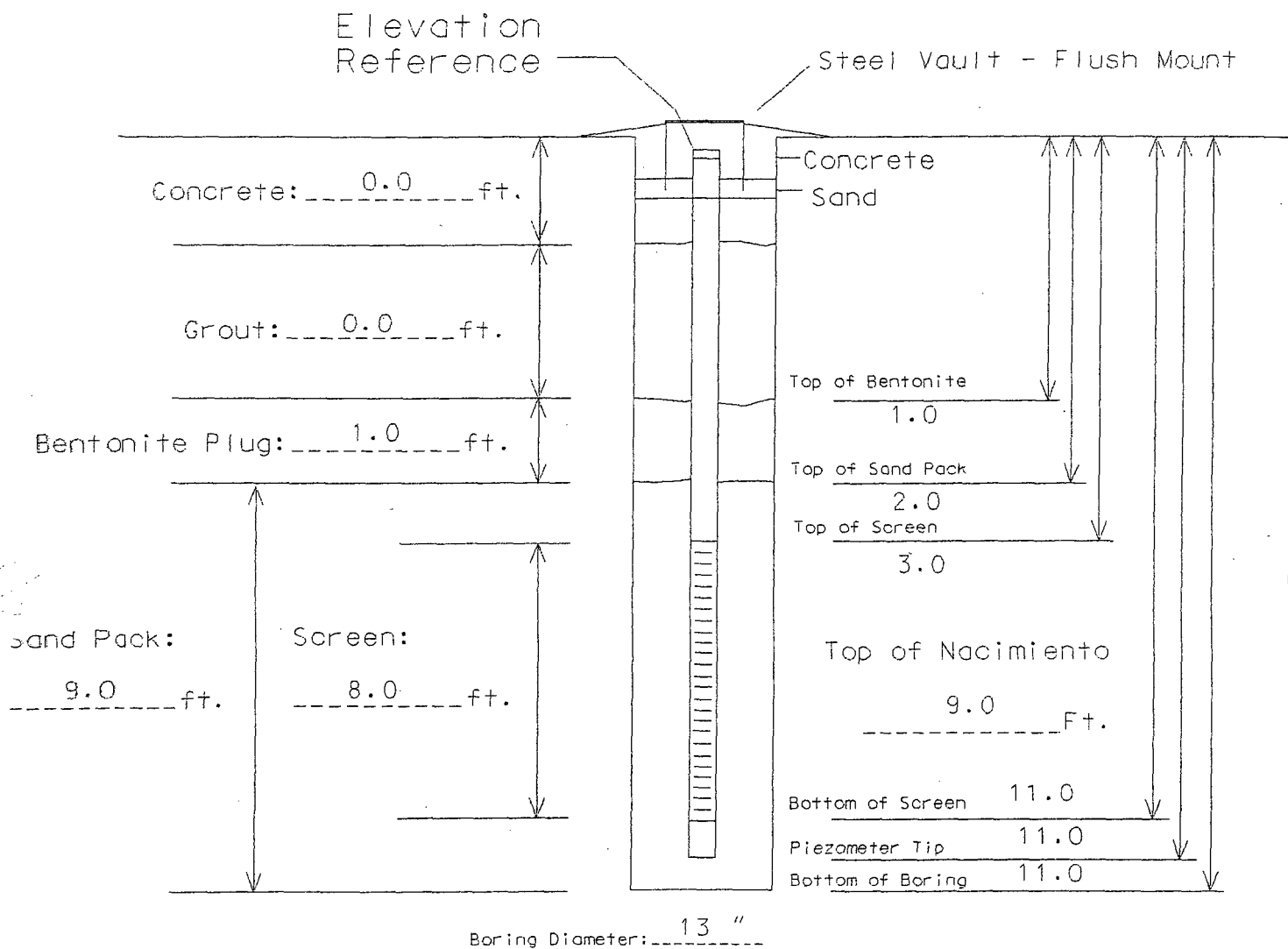
Elevation: TBS



545-523-7674

Installation Diagram

Monitoring Well No. CW 25+95



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

Other: _____

Bottom Cap Used? Yes

Site Easting: TBS

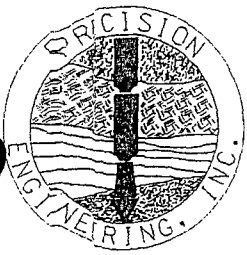
Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS

Installation Diagram

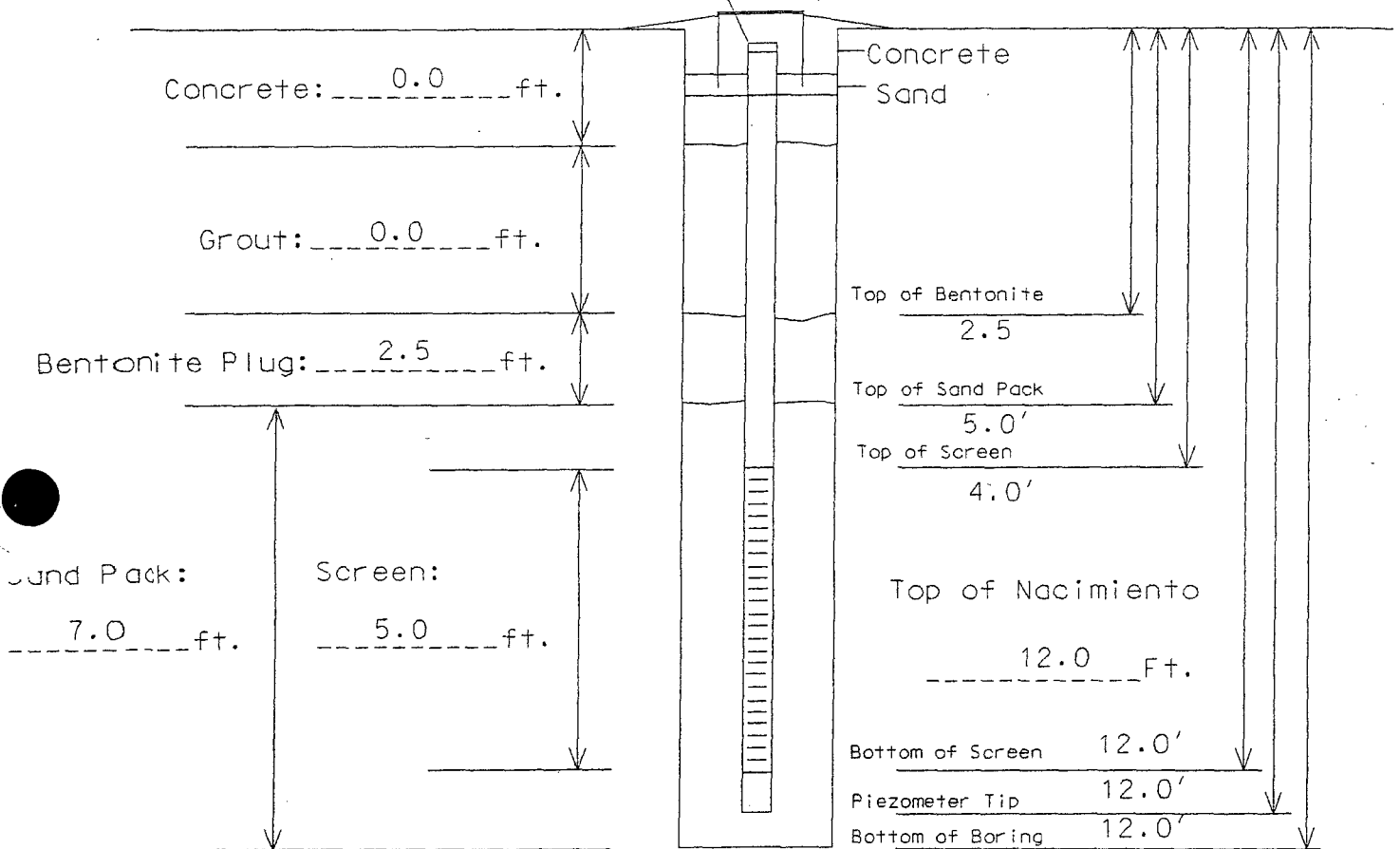
Monitoring Well No. OW 0+60



505523-7674

Elevation
Reference

Steel Vault - Flush Mount



Boring Diameter: 8⁵/₈"

Sand Type: 10-20 Silica

Bollards. Type/Size: NA

Bentonite: 3/8" Chips

Screen Type/Size: 2" PVC Sch. 40, 0.40" 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

Sheet: 1 OF 15
 Boring Point: See Plan
 Water Elevation: 10.7'
 Boring No.: OW 0+60

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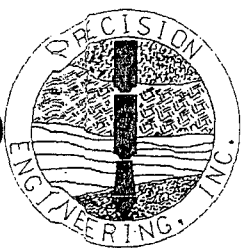
File #: 05-038
 Site: Bloomfield
 Giant Refining
 Elevation: EXISTING
 Date: 4/20/2005

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS.
	0-2.0		***//*** ***//*** ***//***		<u>Sand</u> , very fine to fine, brown, moist				
	20-3.5		***oo*** ***oo*** ***oo*** ***oo***	<u>2.5</u>	<u>Gravel</u> , cobbles, to boulder size, grey, moist very dense,				
	35-8.0		***** ***** ***** ***** ***** ***** ***** *****	<u>5.0</u> <u>7.5</u>	<u>Sand</u> , silty, clayey, yellow-brown, damp, moderately dense				
	80-11.5		***** ***** ***** ***** ***** ***** *****	<u>10.0</u>	<u>Sand</u> , silty, grey-black, hydrocarbon odor, dense, moist, Water Level 10.7'				
	12.0		*****						
	12.5		===== ===== =====		<u>Nacimiento Formation</u> Friable Sandstone, silty, yellow-brown, dense, damp, no odor				
	14.0			<u>15.0</u>	TD				
				<u>20.0</u>	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

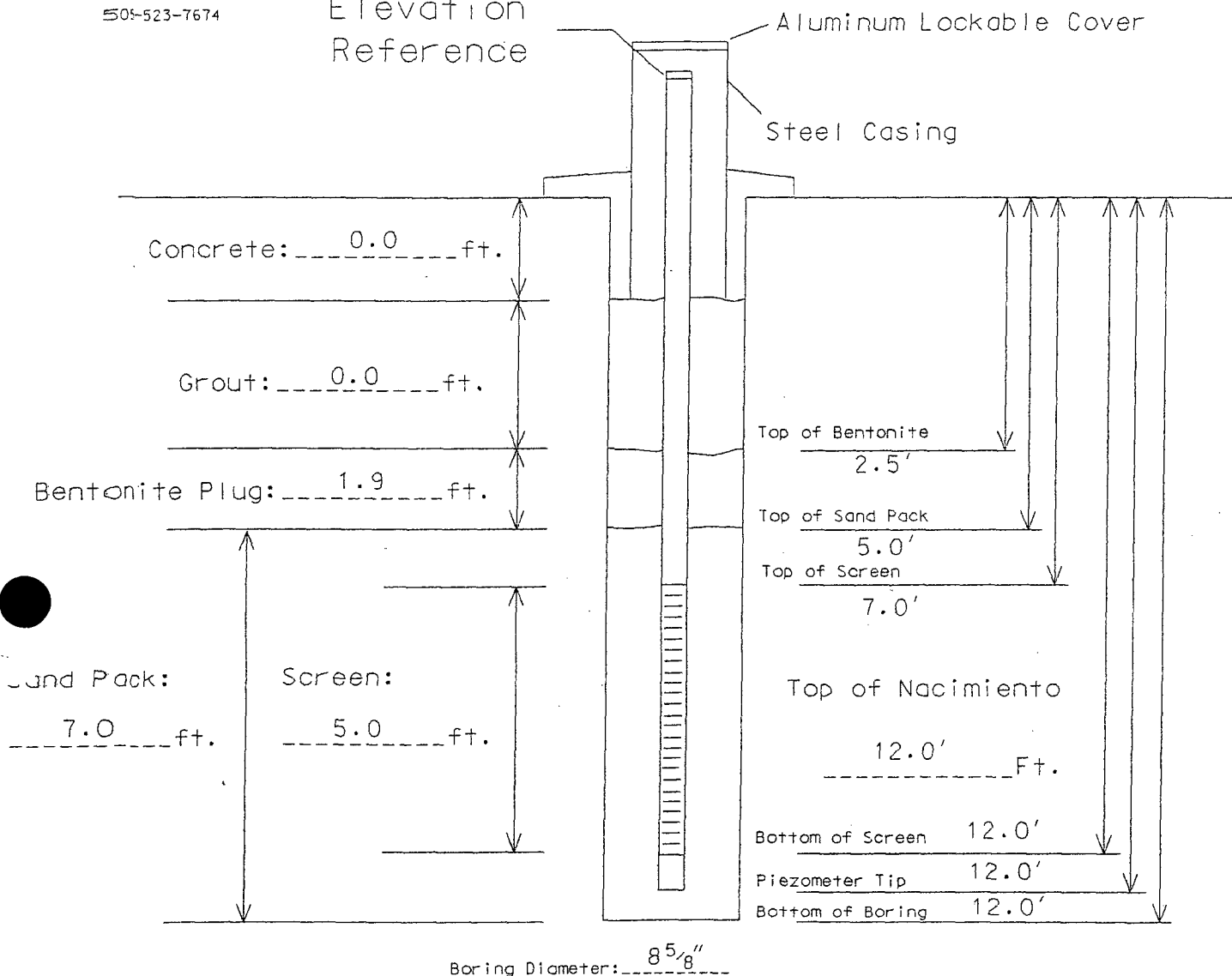


505-523-7674

Installation Diagram

Monitoring Well No. OW 1+50

Elevation
Reference



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: 2 OF 15
 Bore Point: See Plan
 Water Elevation:
 Boring No.: OW 1+50

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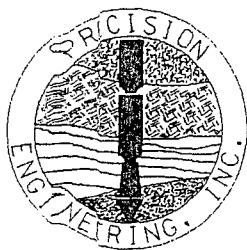
File #: 05-038
 Site: Bloomfield
 Giant Refining
 Elevation: EXISTING
 Date: 4/20/2005

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 OoO*Oo	<u>2.5</u> <u>5.0</u> <u>7.5</u>	<u>Gravel</u> , cobbles, to boulder size, brown to grey rock, slightly sandy, very dense				
	8.0-11.5		***** ***** ***** ***** ***** ***** *****	<u>10.0</u>	<u>Sand</u> , medium, silty, grey/black, wet dense, moist, moderately dense Slighty water bearing				
	12.0		***** == == == == == ==		<u>Nacimiento Formation</u> Sandstone, degraded, weathered, very dense yellow-brown to light brown, damp				
	13.5			<u>15.0</u> <u>20.0</u>	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

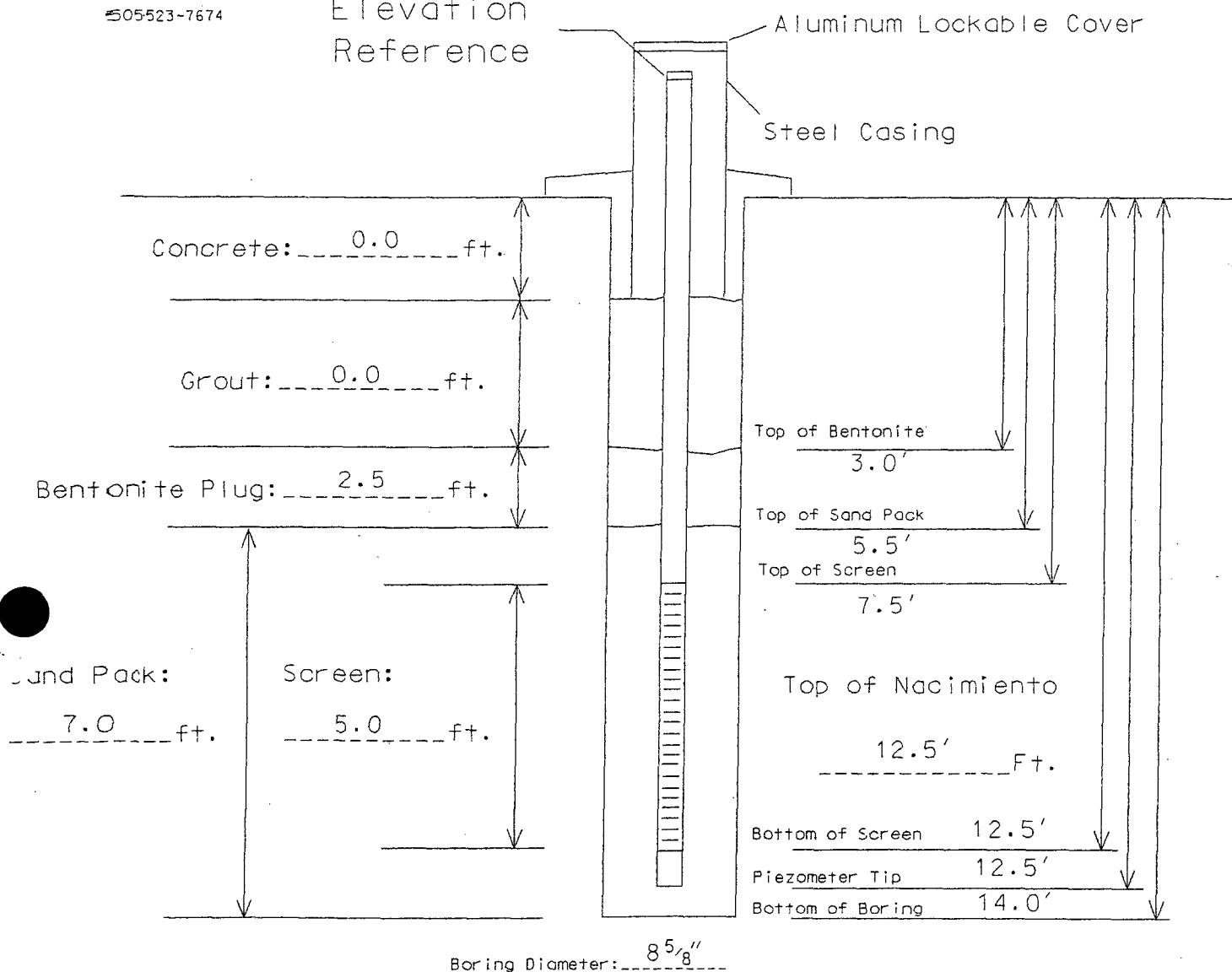


505523-7674

Installation Diagram

Monitoring Well No. OW 3+85

Elevation
Reference



Sand Type: 10-20 Silica

Bollards, Type/Size: NA

Bentonite: 3/8" Chips

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

Cement/Grout: NA

Riser Type/Size: 2" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? Yes

Site Northing: TBS

Other: _____

Bottom Cap Used? Yes

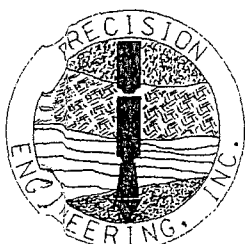
Site Easting: TBS

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 4/20/2005

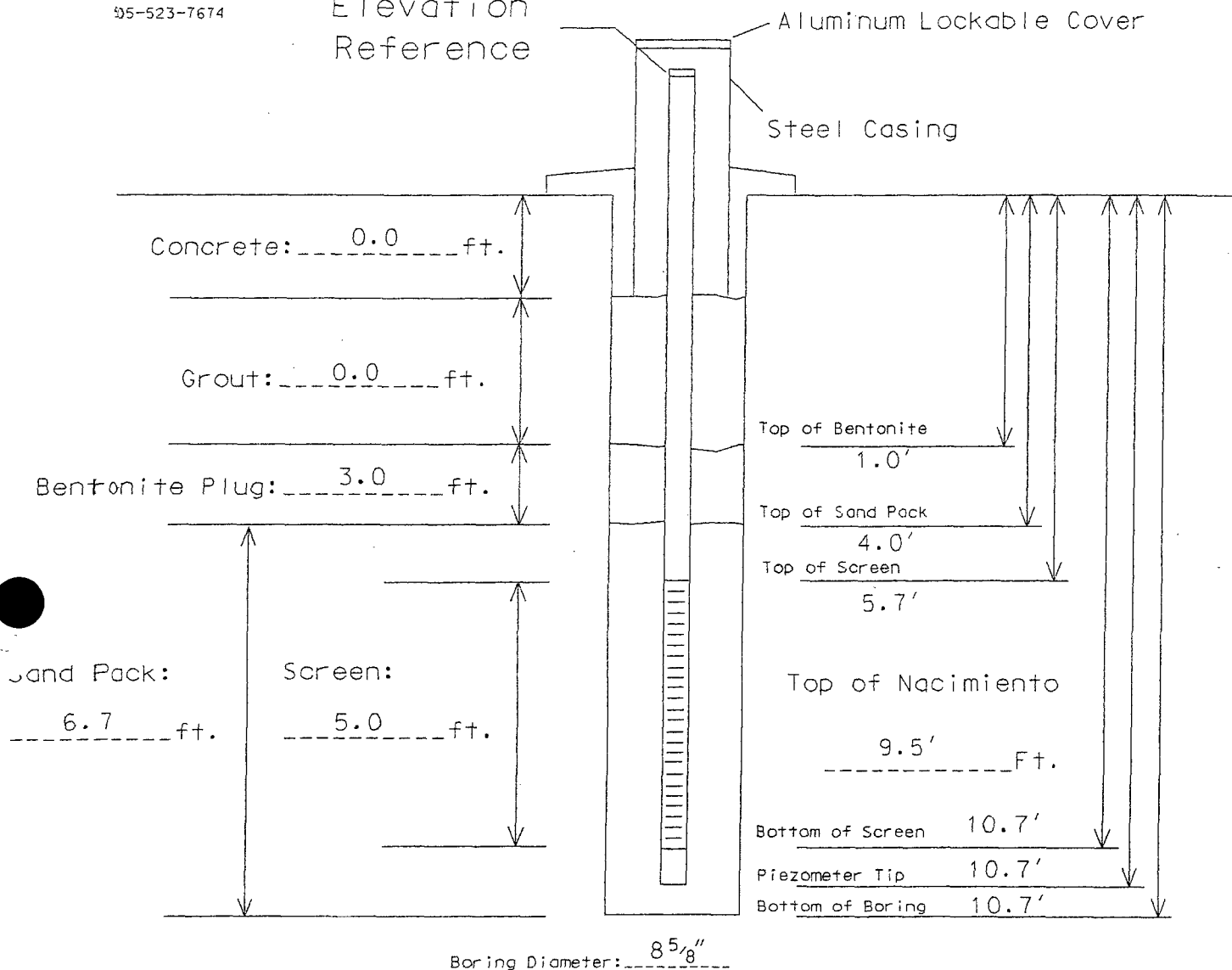


505-523-7674

Installation Diagram

Monitoring Well No. OW 5+50

Elevation
Reference



Sand Type: 10-20 Silica

Bollards. Type/Size: NA

Bentonite: 3/8" Chips

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

Cement/Grout: NA

Riser Type/Size: 2" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? Yes

Site Northing: TBS

Other: _____

Bottom Cap Used? Yes

Site Easting: TBS

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 5/1/2005

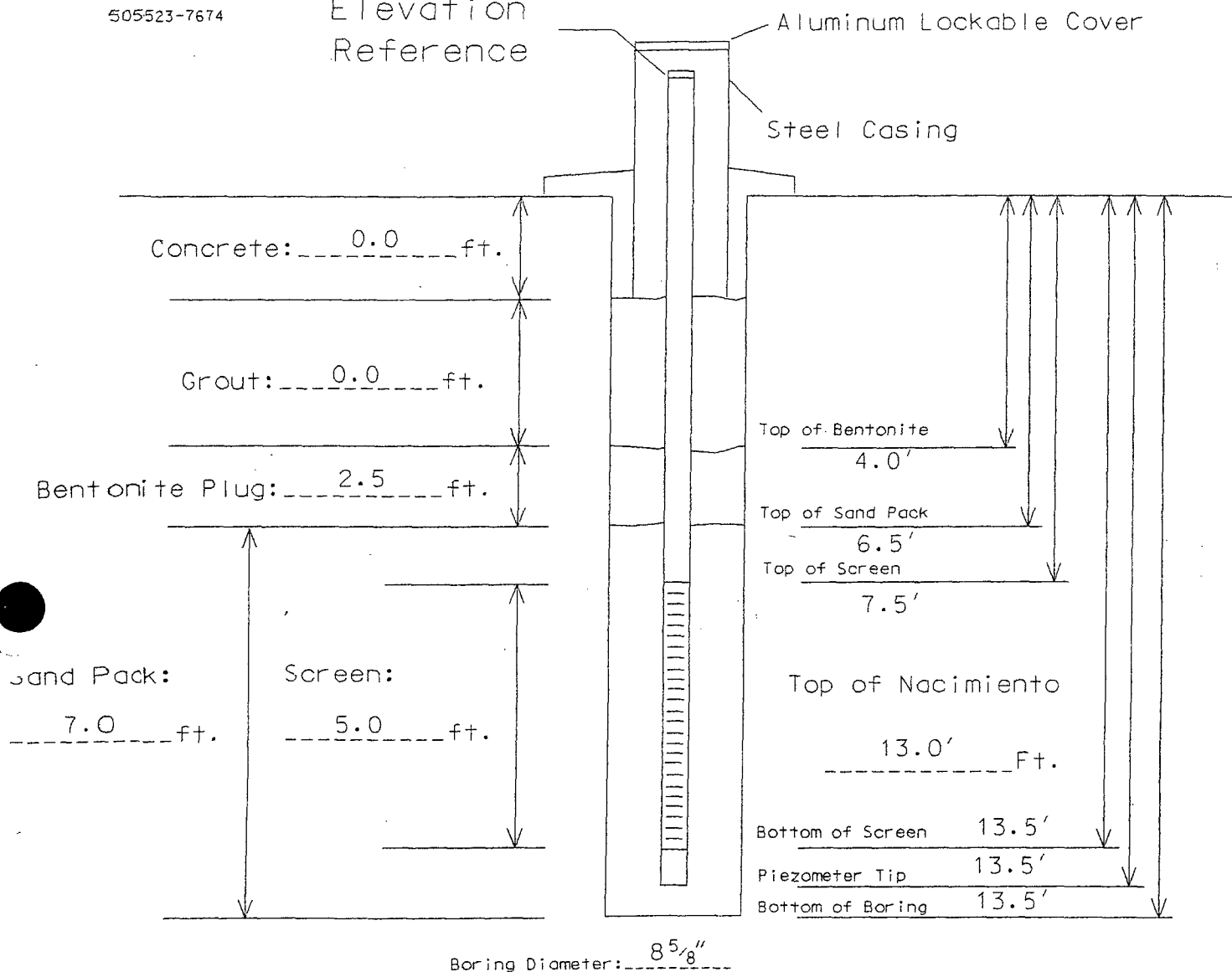


505523-7674

Installation Diagram

Monitoring Well No. OW 6+70

Elevation
Reference



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: 5 OF 15
 Bore Point: See Plan
 Water Elevation: Not Encountered
 Boring No.: OW6+70

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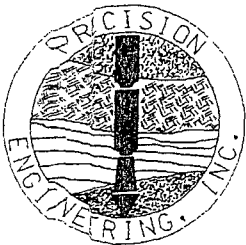
File #: 05-038
 Site: Bloomfield
 Giant Refining
 Elevation: EXISTING
 Date: 4/6/2005

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR, ETC.)	%M	LL	PI	CLASS.
	0.0-5.5		***_*** ***_*** ***_*** ***_*** ***_*** ***_*** ***_*** ***_*** ***_*** ***_***	2.5 5.0	<u>Sand</u> , Very Fine to Fine, Silty, Brown, Moist, Gravel, Cobbles				
	5.5-13.0		*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*	7.5 10.0	<u>Sand</u> , Fine, Silty, Light Brown, Damp, Some Small Gravel, (Cobbles @ 12.0')				
	13.0'		=== === === ===	15.0	<u>Nacimiento Formation</u>				
	15.0			20.0	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'				

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

LOGGED BY: KMM

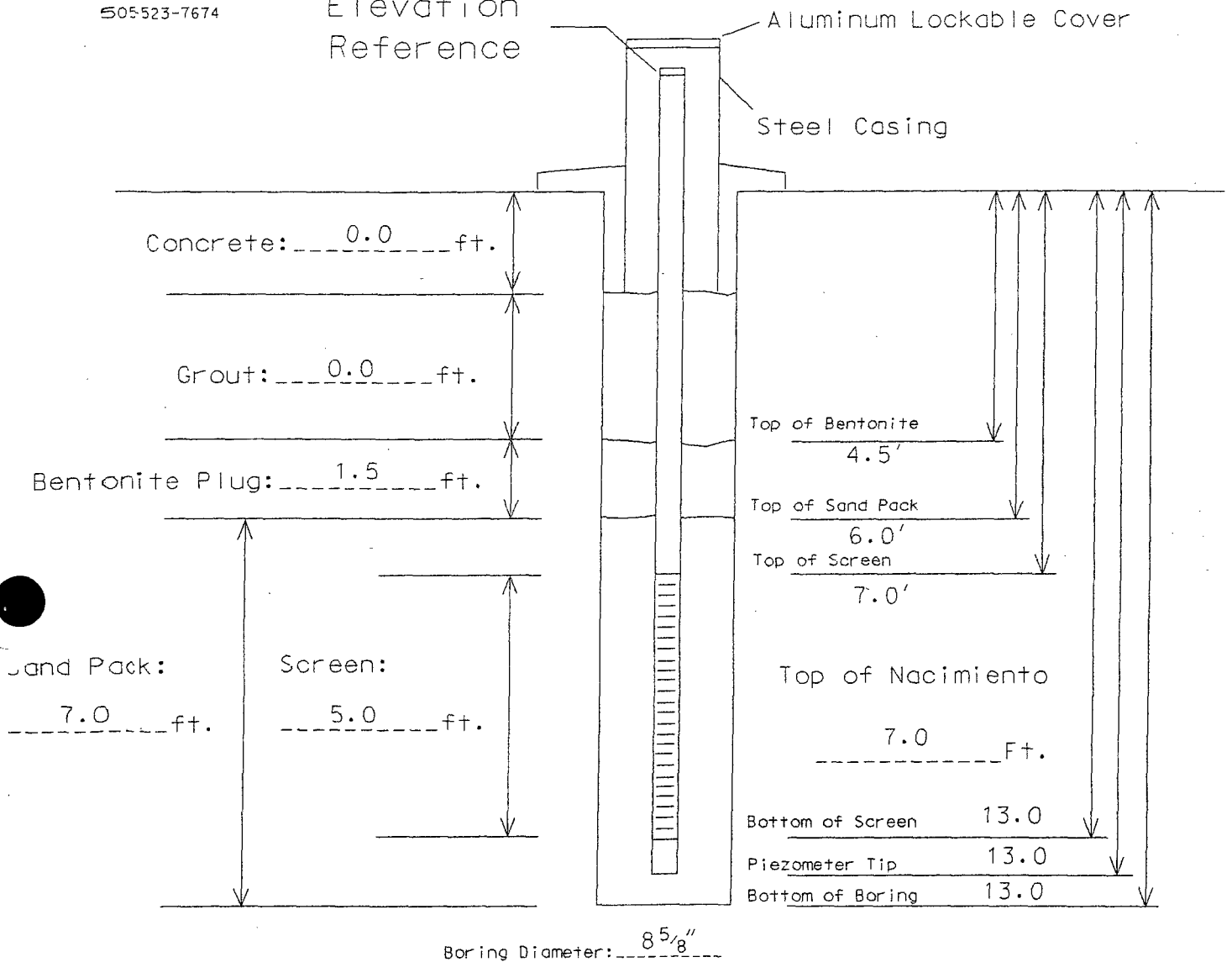


505523-7674

Installation Diagram

Monitoring Well No. DW 8+10

Elevation
Reference



Sand Type: 10-20 Silica

Bollards, Type/Size: NA

Bentonite: 3/8" Chips

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

Cement/Grout: NA

Riser Type/Size: 2" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? Yes Site Northing: TBS

Other: _____

Bottom Cap Used? Yes

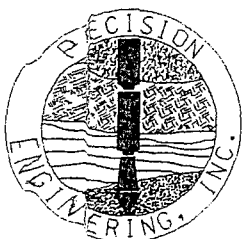
Site Easting: TBS

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 4/6/2005



50-523-7674

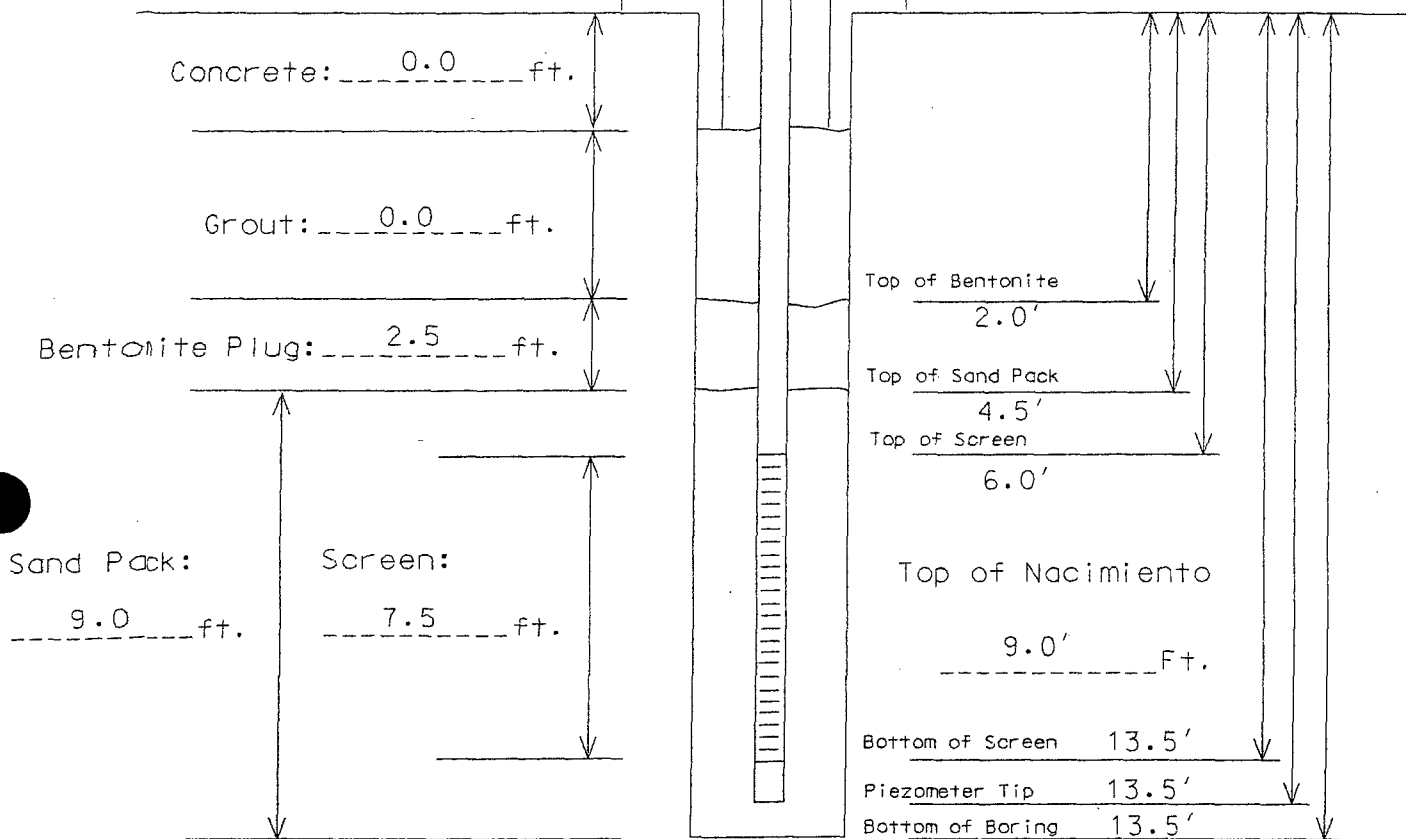
Installation Diagram

Monitoring Well No. DW 11+15

Elevation
Reference

Aluminum Lockable Cover

Steel Casing



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

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 4/7/2005

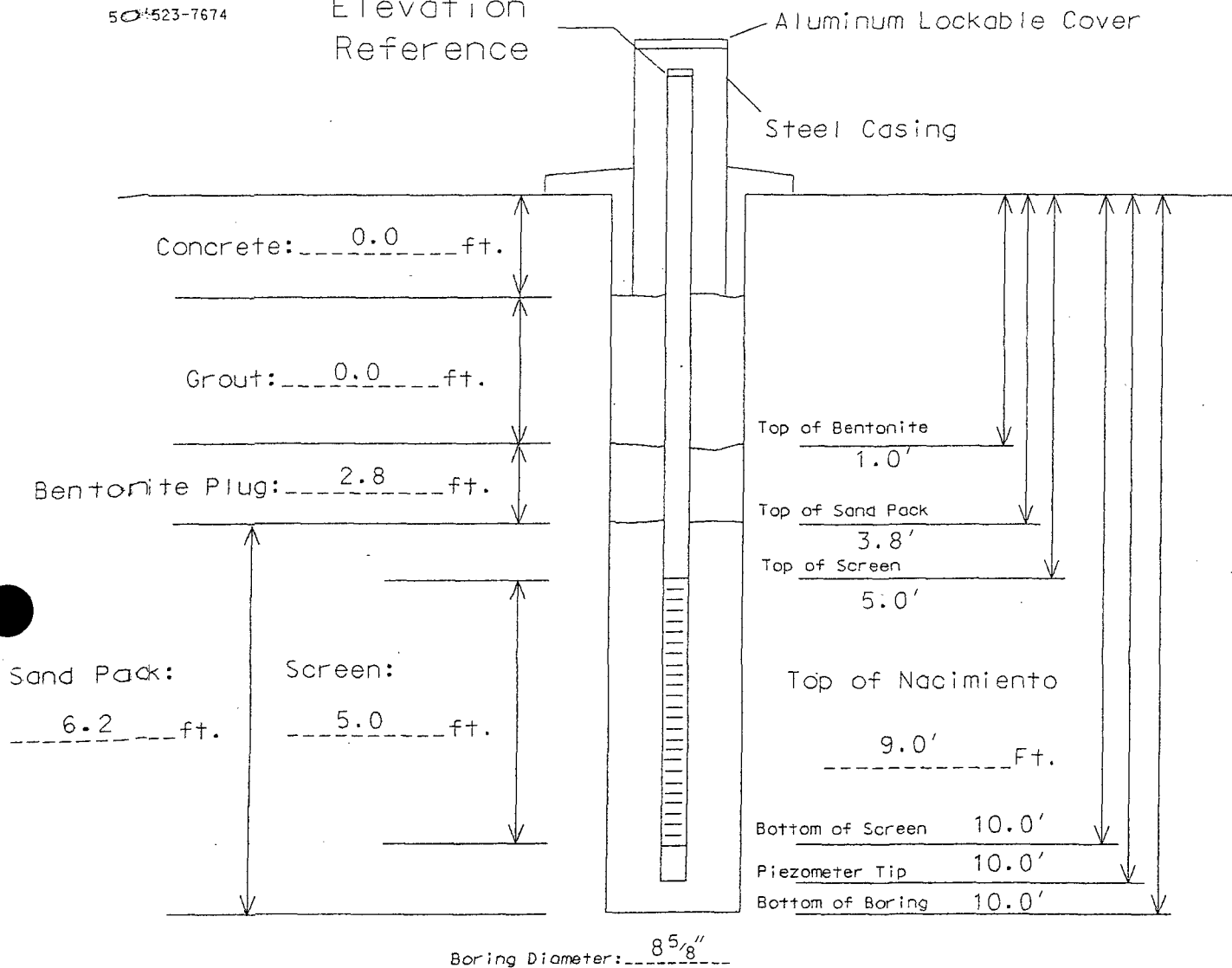


504523-7674

Installation Diagram

Monitoring Well No. OW 14+10

Elevation
Reference



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

Water Elevation:

Las Cruces, NM 88004

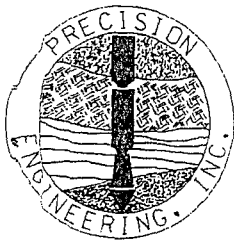
Elevation: EXISTING

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 <u>2.5</u> OoO*Oo OoO*Oo OoO*Oo OoO*Oo <u>5.0</u> OoO*Oo OoO*Oo OoO*Oo <u>7.5</u> OoO*Oo OoO*Oo		<u>Gravel</u> , cobbles, to boulder size, sand fine to coarse, damp dense				
	8.5		***** *****		<u>Sand</u> , fine to coarse, some gravel, grey, moist				
	9.0		=====		<u>Nacimiento Formation</u>				
	10.0				TD				
				<u>15.0</u>					
				<u>20.0</u>	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

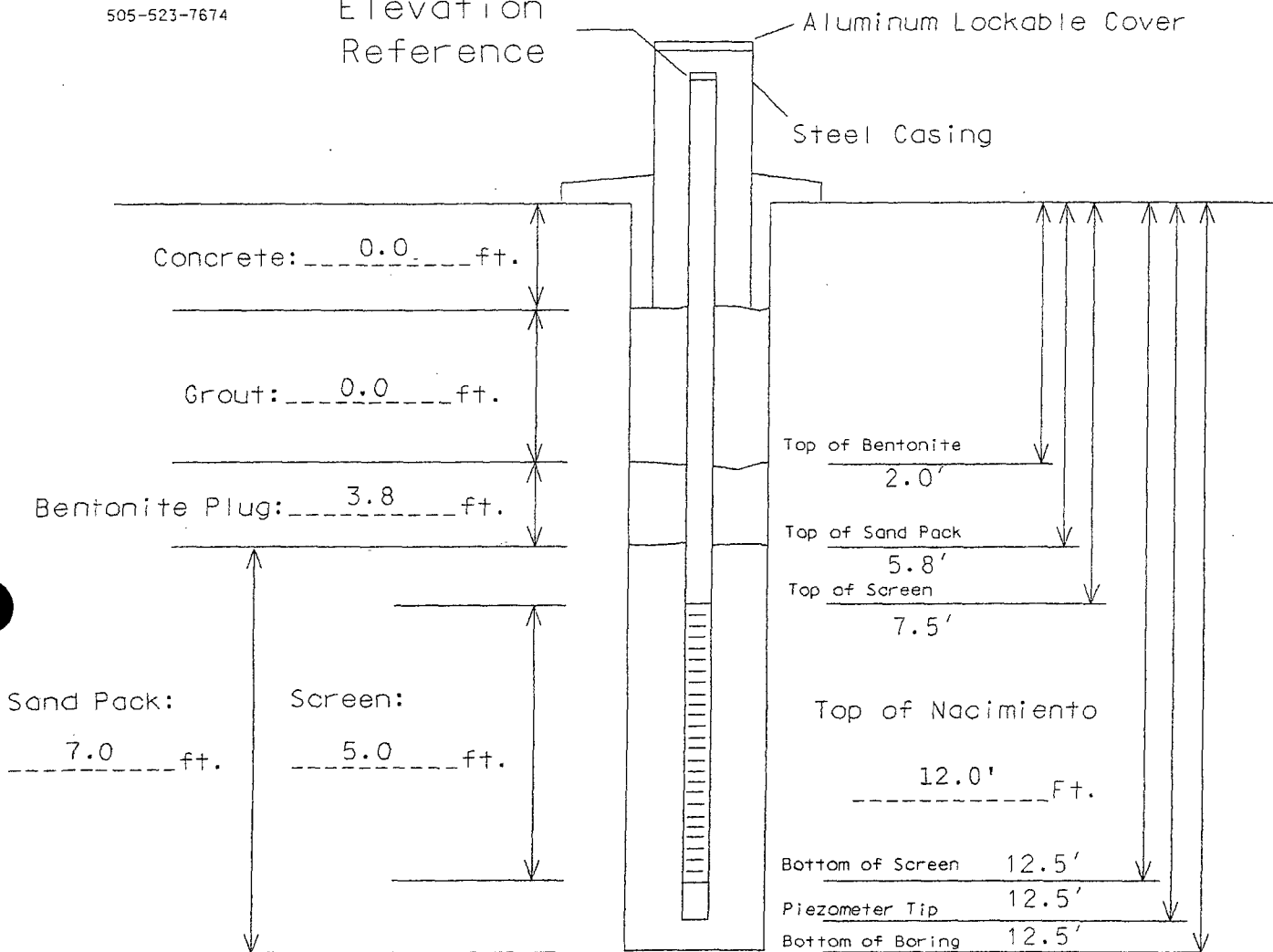


505-523-7674

Installation Diagram

Monitoring Well No. OW 16+60

Elevation
Reference



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

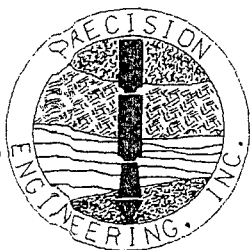
Other: _____

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 4/7/2005

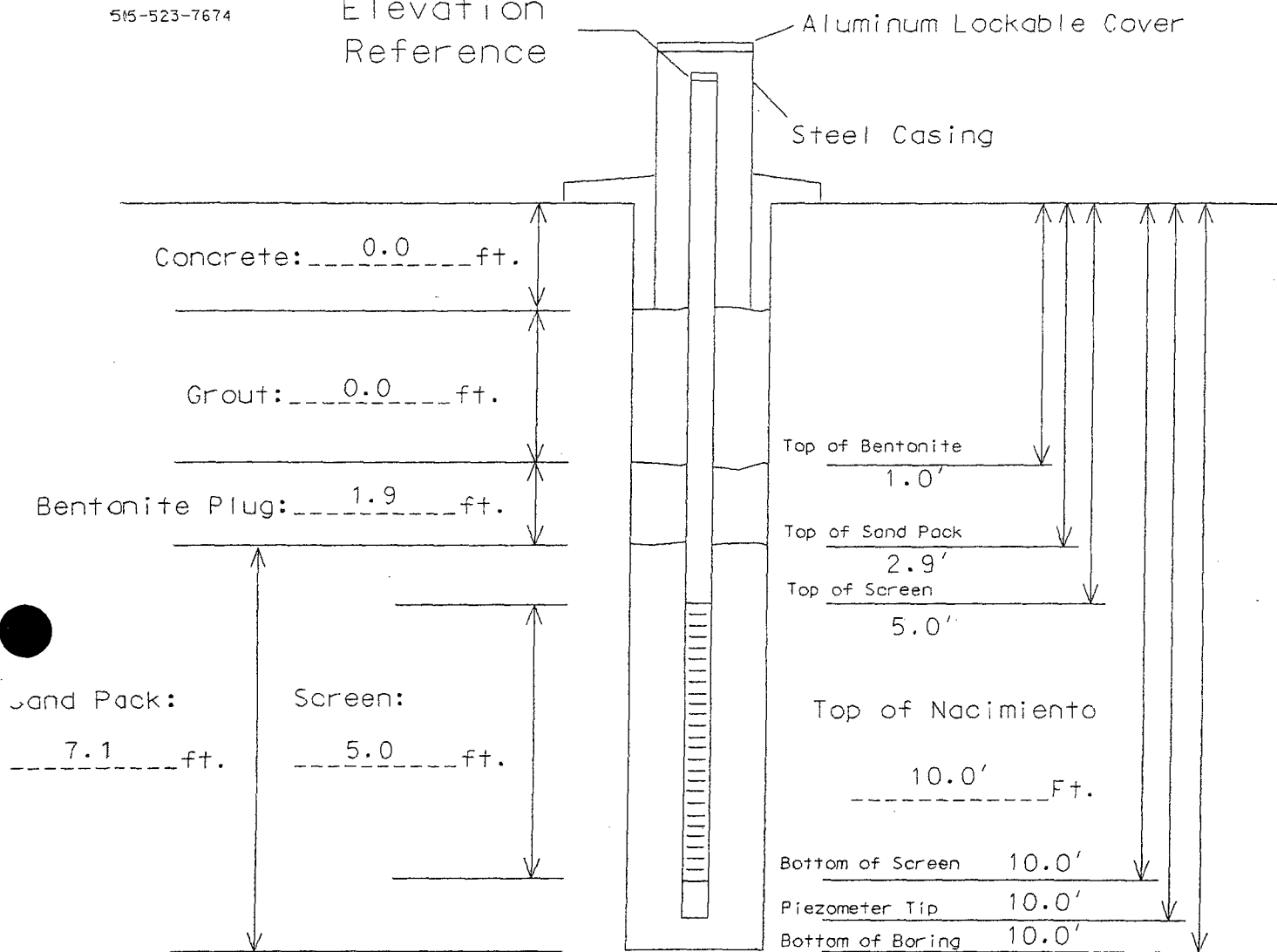


515-523-7674

Installation Diagram

Monitoring Well No. OW 19+50

Elevation
Reference



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

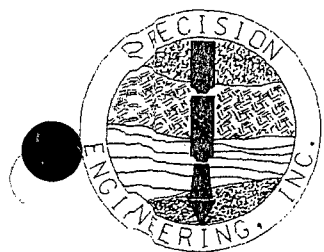
Elevation: TBS

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 5/7/2005

Log of Test Borings

[illegible]

LOGGED BY: KMM



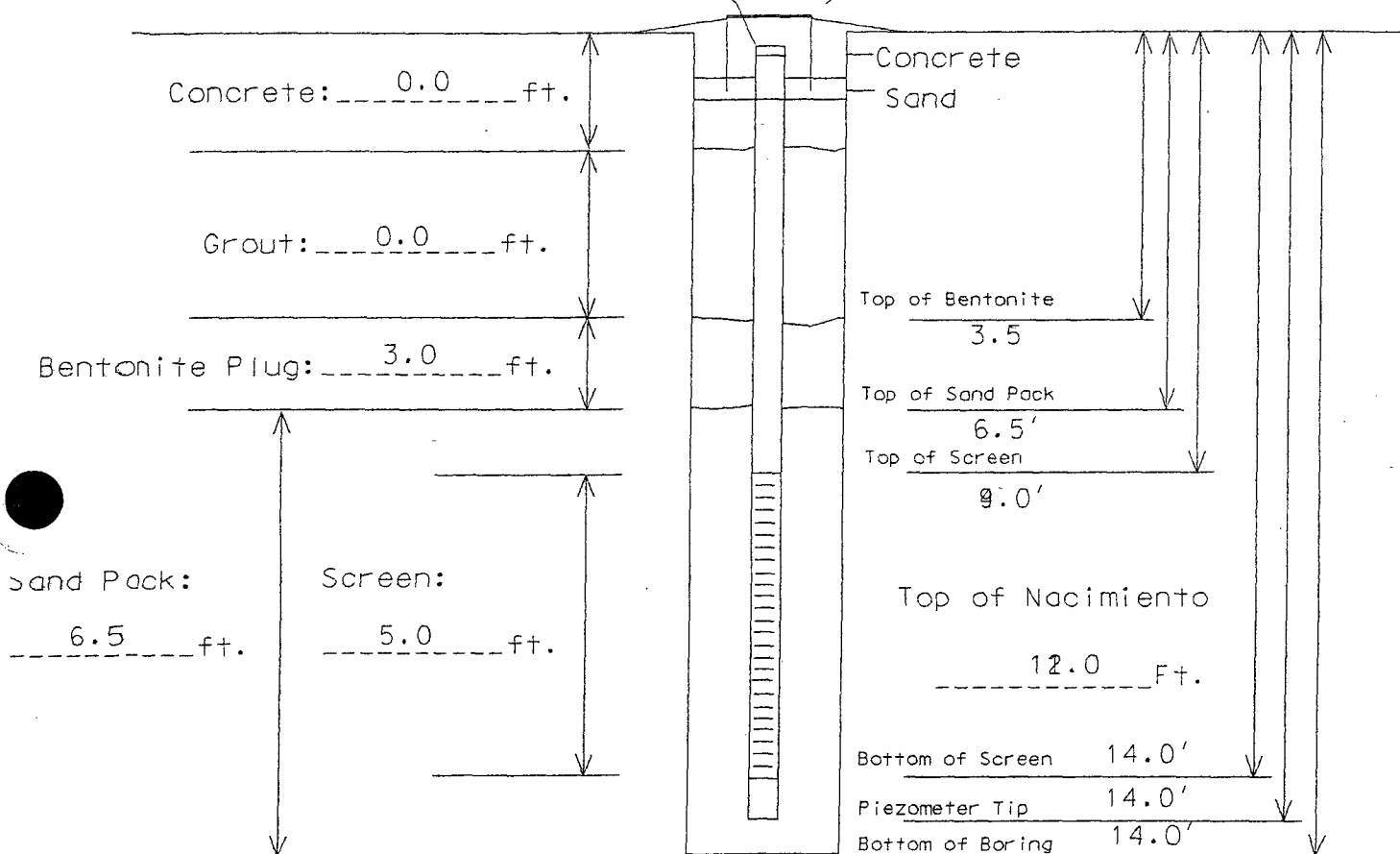
505-523-7674

Installation Diagram

Monitoring Well No. DW 22+00

Elevation
Reference

Steel Vault - Flush Mount



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

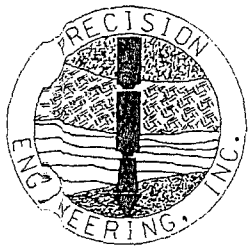
Other: _____

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 5/6/2005

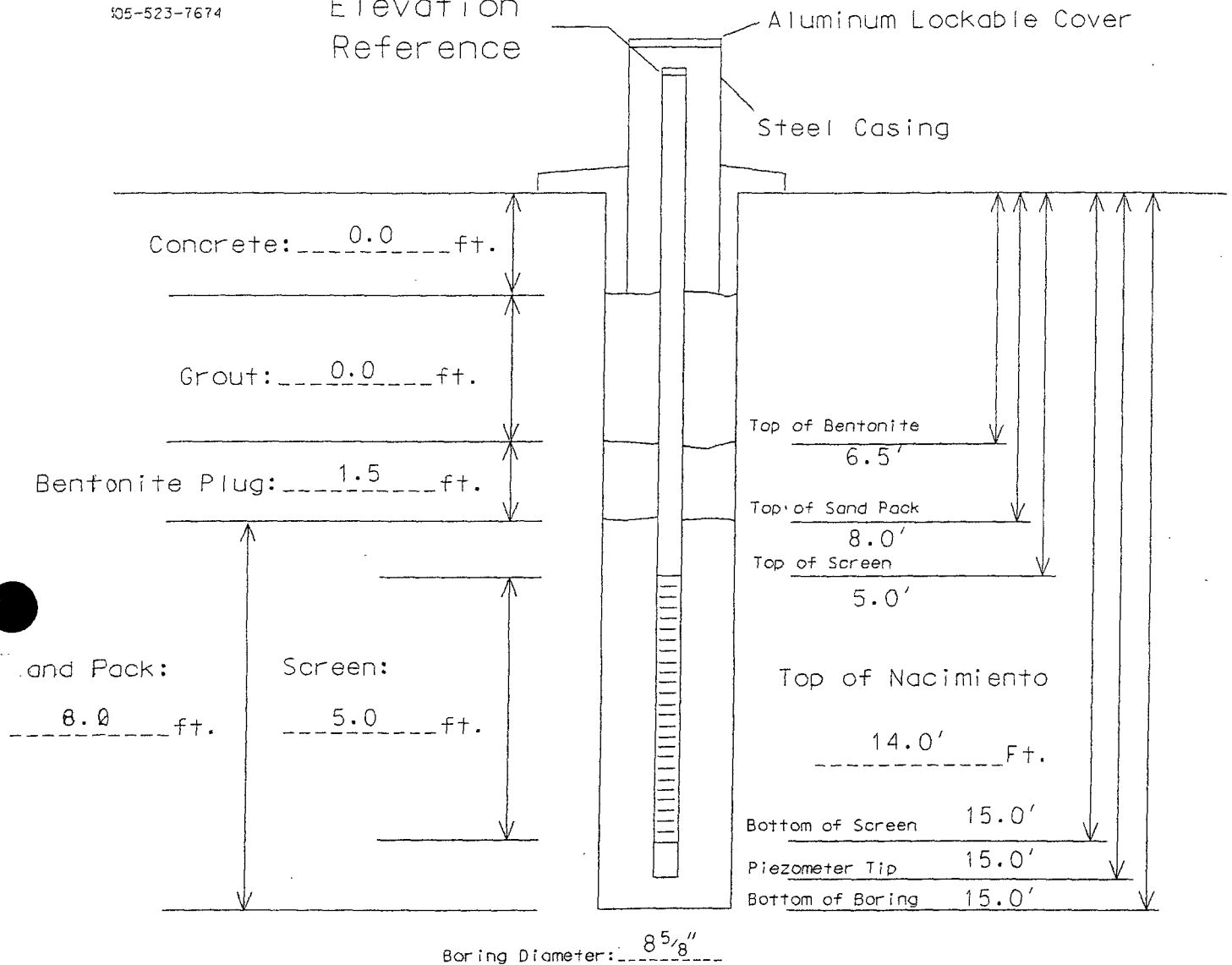


05-523-7674

Installation Diagram

Monitoring Well No. DW 23+10

Elevation
Reference



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

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 5/6/2005

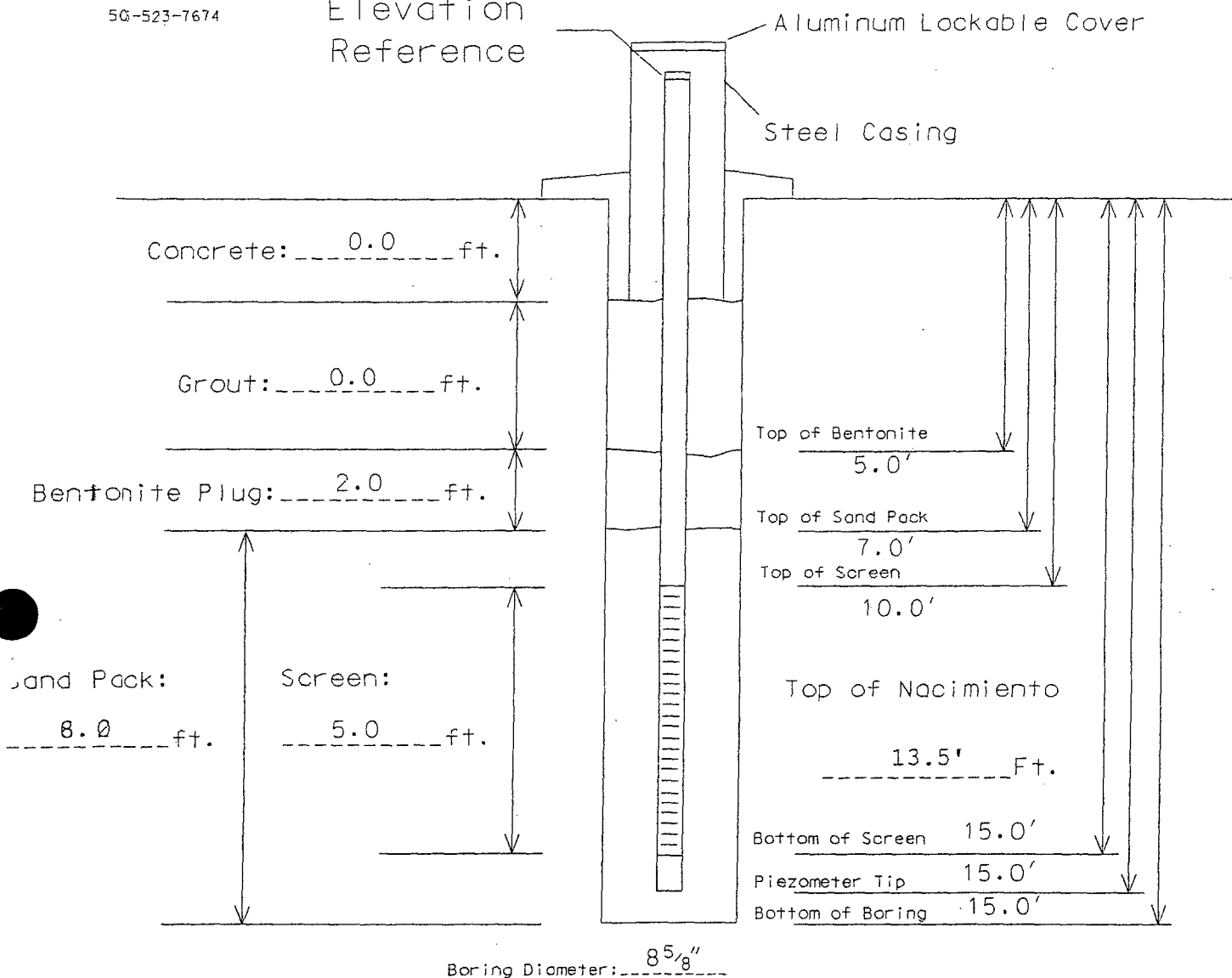


5G-523-7674

Installation Diagram

Monitoring Well No. OW 23+90

Elevation
Reference



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

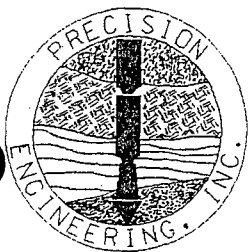
Other: _____

Project #: 05-038

Project Name: Bloomfield Refinery

Elevation: TBS

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 5/6/2005

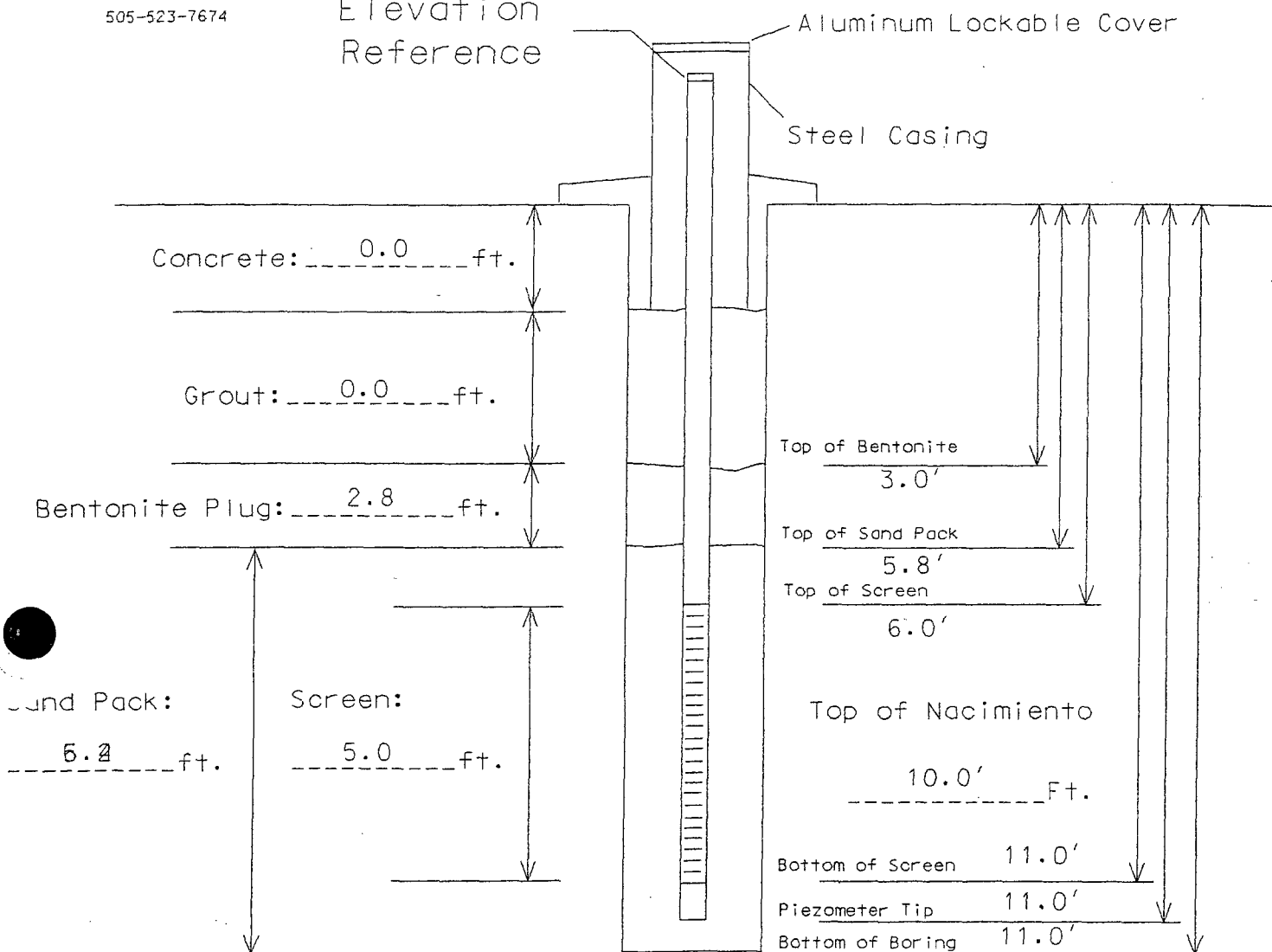


505-523-7674

Installation Diagram

Monitoring Well No. OW 25+70

Elevation
Reference



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

File #: 05-038
Site: Bloomfield
Giant Refining
Elevation: EXISTING
Date: 4/6/2005

Assessment, Remediation and Contingency Plan
Area North of the Barrier Wall (Underground Slurry Wall)
February 3, 2006

Bloomfield Refinery, P.O. Box 159, Bloomfield, NM 87413 (the "Facility")
Owner: San Juan Refining Company; Operator: Giant Industries Arizona, Inc.
d/b/a Giant Refining Company (collectively, "Giant")

This plan presents a proposed data evaluation and action plan in response to the Oil Conservation Division's (OCD's) recent request regarding the area between the North Boundary Underground Slurry Wall (the "Barrier") and the San Juan River. As part of this plan, Giant will assess whether there is a threat to the San Juan River from residual phase separated hydrocarbons or dissolved phase hydrocarbons (collectively, "PSH") in the shallow soils and in the shallow water table perched on the Nacimiento Formation north of the Barrier and, based on the results of this assessment, take appropriate remediation action. This plan is intended as a supplement to, but does not replace, the requirements of existing regulations applicable to the Facility, including the following:

- EPA Spill Prevention, Control & Countermeasures Plan (40 CFR Part 112.7)
- EPA Facility Response Plan (40 CFR parts 112.20 and 112.21)
- EPA Risk Management Program (40 CFR Part 68)
- EPA Contingency Planning Requirements (40 CFR Parts 264, 265, and 279.52)
- USCG Facility Response Plan (33 CFR Part 154)
- DOT/PHMSA Pipeline Response Plan (49 CFR Part 194)
- DOT Emergency Response Plans (49 CFR Parts 130 and 172)
- OSHA Emergency Action Plan (29 CFR 1919.38)
- NMED/OCD Emergency Response Requirements
- Stormwater Pollution Prevention Plan (40 CFR Part 126)

The purpose of this plan is as follows:

- Evaluate the performance of the Barrier.
- Thoroughly review the on-going fluid removal, collection, and monitoring program installed in connection with the Barrier (the "Collection System").
- Based on this evaluation, recommend modifications to the Collection System as necessary, and an action plan for remediation of any PSH remaining between the Barrier and the bluffs adjacent to the San Juan River.
- Have a contingency plan in place in the event of a free-flowing liquid event.

I. Evaluate Barrier Performance and Review the Fluid Removal, Collection, and Monitoring Program

Compile all the fluid monitoring, fluid removal, water levels, fluid thickness, and water sampling results from the collection wells, observation wells, and monitoring wells. The location of PSH in all wells will be assessed and trends in detection, absence, PSH thickness, and fluid build up on both sides of the Barrier will be assessed.

The review of this data will provide a means of evaluating the performance of the Barrier and of providing data for modification of the groundwater collection, removal, and monitoring system in order to maximize the efficiency of the system.

Compilation and review of this data has begun and is ongoing.

II. Recommend Modifications of the Collection System, and Recommend an Action Plan for Remediation of PSH Remaining

A field investigation will be conducted to determine the presence of PSH fluids in the shallow soils and shallow water table north of the Barrier and to identify current seeps and soil stained along the bluff. The investigation will determine options for fluid capture and removal.

Giant has begun initial investigations and has determined that remediation efforts should include strategically placed vertical wells. These wells will serve multiple purposes. They will provide:

- A means for the collection of groundwater perched on the Nacimient Formation, if present in sufficient quantity to allow recovery.
- Groundwater data for evaluation of the effectiveness of the Barrier.
- Information on the residual fluids for use in estimating the length of time before any remaining seepage ceases.
- Control contaminate hydrogeology by removing or lowering the water table perched on the Nacimient Formation.

Giant will utilize sump recovery well design and construction for the new wells. Well installation will be done using hollow-stem auger methods, which allow the collection of samples, observation of material types, an indication of joint and fracture frequency in the rock, and the depth where groundwater is encountered. Giant will submit a North Barrier Wall Work Plan by February 15, 2006.

Pumping rates and the need for additional wells will be based on the local hydrogeology observed during the investigation and well installation.

Schedule

Giant has been proactive and has already started these investigation activities. A six-month evaluation of the Barrier was compiled and was sent to OCD on January 5, 2006. Giant continues to scrutinize the Barrier with examination and field measurements of the collection and observation wells take semi-monthly. Giant will summarize these activities semi-annually as previously required by NMED.

III. Contingency Plan for Free-Flowing Liquids

This plan is being implemented north of the Barrier to actively remediate groundwater contamination, prevent its uncontrolled migration to the bluff area, and eliminate the potential for overland flow from seeps along the bluff area to discharge into the San Juan River.

Bluff Inspections

Giant will perform weekly visual inspections and semi-weekly inspections during precipitation events along the San Juan River bluff to identify fluid seeps that may emerge. The treatment systems will be inspected and maintained weekly. If a flowing seep is identified during an inspection, Giant personnel will record the following information:

- Time and date the seep was identified.
- Location of the discharge relative to the San Juan River.
- Approximate flow rate of the seep (e.g., gallons per hour).
- Approximate size of the area impacted.
- Ambient conditions (temperature, rain, etc).
- Conditions that may affect response.

If the seep is within close proximity to, or may have already impacted the San Juan River, Giant will take the following emergency actions:

- Implement Giant's emergency response plan.
- Request outside assistance from emergency responders, if required (Giant has contracted with H₂O Inc., a certified OSRO responder, for this purpose);
- Contact local authorities to limit access to the river by local residents until the hydrocarbon-impacted fluids have been contained and recovered;
- Contact New Mexico Environment Department (NMED) and OCD within 24 hours of discovery to report seep and proposed mitigation actions.

Mitigation Actions and Emergency Response

Actions taken by Giant to control seeps and recover hydrocarbon fluids along the bluff will depend on whether the fluids can be contained prior to reaching the San Juan River, or have reached the river. Giant will make every practicable effort to prevent hydrocarbon fluids from reaching the river.

If hydrocarbon fluids **have not reached** the San Juan River:

- Giant will maintain an appropriate number of absorbent booms and/or pillows that will be placed immediately down-slope from the location of the fluids' expression to prevent a discharge into the river.
- If the location and access allows, temporary catchments, such as earthen or sand-bag berms lined with plastic sheet liners, will be constructed to capture and

contain the fluids. The exact type of containment implemented will depend upon access to the area of the seep expression along the bluff.

- Absorbent booms or pillows will be placed along the riverbank (above the flow channel) down-slope of the seep expression as a secondary barrier to mitigate fluids from reaching the river.
- Captured fluids will be routinely removed (e.g., by pumping) from the temporary catchments. Recovered fluids will be pumped or placed in drums or other suitable containers and transported to the refinery for recycling or disposal.
- Expended absorbent devices will be replaced when necessary. Waste absorbents will be drummed and transported to the refinery for proper disposal.
- Impacted soil will be removed, and the natural appearance of the area restored to the extent possible. Depending on access to the area of concern, the impacted soil may be removed manually (e.g., hand shovels), by using equipment from the top of the bluff (e.g., drag line), or a combination thereof. Impacted soil will be placed in drums or other suitable containers for removal from the area of concern and transport to the refinery to be characterized for proper treatment and/or disposal.

If hydrocarbon fluids **have reached** the waters of the San Juan River:

- If hydrocarbon fluids have reached the waters of the San Juan River, all applicable mitigation actions detailed above for fluids that have not reached the river will continue to be taken as well as mitigation actions detailed below.
- Floating absorbent booms will be deployed at the point of entry of the fluids to the river as soon as possible after discovery of the incident. The objective will be to mitigate further discharge of fluids to the river.
- A second floating boom will be placed across the river downstream of the point of entry and downstream of the visible floating hydrocarbon plume, if such exists. The objective will be to contain any fluids already discharged to the river.
- Any free-phase hydrocarbons that collect behind the floating booms will be removed using a skimming device (e.g., skimming pump) or other suitable means. Recovered fluids will be pumped or placed in drums or other suitable containers and transported to the refinery for recycling or disposal.
- Impacted soil along the river bank will be addressed as stated above.
- Expended absorbent devices will be replaced when necessary. Waste absorbents will be drummed and transported to the refinery for proper disposal.
- River water samples will be collected in accordance with OCD and NMED's monitoring requirements.