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WORK PLANS

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RCRA FACILITY INVESTIGATION
TASK 1: DESCRIPTION OF CURRENT CONDITIONS

BLOOMFIELD REFINING COMPANY
50 COUNTRY ROAD 4990
BLOOMFIELD, NEW MEXICO

MARCH 1993

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RCRA FACILITY INVESTIGATION
TASK I: DESCRIPTION OF CURRENT CONDITIONS
BLOOMFIELD REFINING COMPANY
50 COUNTY ROAD 4990 (SULLIVAN ROAD)
BLOOMFIELD, NEW MEXICO

MARCH 1993

Submitted to:

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Region VI
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1.0 INTRODUCTION

This "Task I: Description of Current Conditions" report has been prepared pursuant to Part I.C of Attachment II - Corrective Action Plan of the Administrative Order on Consent (Docket No. VI-303-H) dated December 31, 1992 between the United States Environmental Protection Agency (USEPA) Region VI and Bloomfield Refining Company (BRC). The purpose of this report is to summarize the background of the BRC facility, provide information on the nature and extent of contamination and perform a preliminary evaluation of corrective measures technologies. This report provides the basis for the technical approach of the Draft RCRA Facility Investigation Work Plan (RFIWP) submitted concurrently. The RFIWP discusses the additional investigative work tasks proposed to complete the delineation of the nature and extent of contamination resulting from facility operations and to evaluate corrective measure technologies for application at the facility.

This report is organized as follows:

- Section 1.0 provides information on the facility background, previous investigations, and regulatory history;
- Section 2.0 describes the environmental setting of the facility, including geology, hydrology, land use and potential receptors;
- Section 3.0 discusses known and potential sources of releases to the environment and data previously collected in these areas;
- Section 4.0 describes groundwater conditions at the site;
- Section 5.0 describes surface water conditions at the site;
- Section 6.0 provides a pre-investigative evaluation of corrective measures;
- Section 7.0 is a summary of the Task I report; and
- Section 8.0 includes references used in compiling the report.

1.1 Facility Background

The BRC facility is located at 50 County Road 4990 (Sullivan Road), immediately south of Bloomfield, New Mexico in San Juan County (Figure 1). The site is located on a bluff approximately 100 feet above the south side of the San Juan River, a perennial river that flows to the west. On the bluff and between the river and the process area of the facility is the Hammond Ditch, a man-made channel

for irrigation water supply that borders all but the southern portion of the site. Bordering the facility is a combination of federal and private properties (Figure 2). The topography of the site is generally flat with low-lying areas to the east of the process area (Figure 3). The current facility layout is shown in Figure 4.

The BRC facility was originally constructed as a crude topping unit in the late 1950s by local entrepreneur Kimball Campbell. O. L. Garretson bought the facility in the early 1960s, renamed it Plateau, Inc., and sold it in 1964 to Suburban Propane of New Jersey. Suburban upgraded the facility in 1966, increasing the crude unit throughput to 4,100 barrels per day (bbl/day) and adding a 1,850 bbl/day reformer and naphtha hydrotreater. The crude unit was later expanded to 8,400 bbl/day in 1975.

In 1979, the crude unit was expanded again to 16,800 bbl/day capacity. A fluidized catalytic cracker (FCC) with a capacity of 6,000 bbl/day, an unsaturated gas plant, and a treater unit were also added at this time. The capacity of the reformer/hydrotreater was increased to 2,250 bbl/day. The FCC was upgraded in 1982 to conform with state and federal air quality standards.

In November 1980, Plateau applied for a Part A Permit as a generator, storer, treater, and disposer of hazardous waste as a protective filing. Plateau later petitioned for reclassification under a generator-only status (in 1982).

1.1.1 BRC Activities

Bloomfield Refining Company acquired the facility from Suburban Propane (Plateau) on October 31, 1984 and made several improvements in facility management and operations. These improvements are listed below and discussed in greater detail in the "Interim Measures Work Plan" dated February 11, 1993.

1986	Relocated spent caustic tank onto a concrete pad with concrete retaining walls
1987	Upgraded the reformer and increased capacity to 3,600 bbl/day, modified the laboratory and treater unit, and increased tank storage capacity
	Cleaned up north and south bone yards
	Decommissioned and dismantled old tanks 6 and 7
	Relocated API crude tanks 8 and 9 onto concrete pads with concrete retaining walls

	Established a systematic inspection/maintenance/repair program for tanks
1988	Added a 2,000 bbl/day catalytic polymerization unit
	Removed the facility's two underground storage tanks (USTs) and replaced them with aboveground storage tanks (ASTs)
	Completed cathodic protection system for tank farm and underground piping
	Rebuilt process area sewer system and added curbed, concrete paving to the unpaved process areas
	Installed hydrocarbon recovery wells
1989	Increased reformer throughput to 4,000 bbl/day
	Activated hydrocarbon recovery system
	Installed a concrete pad with curbing between tanks 3 and 4
	Constructed first double-lined evaporation pond as part of discharge plan improvements
1990	Constructed second double-lined evaporation pond as part of discharge plan improvements
	Constructed a drum storage shed and converted to bulk chemical usage to minimize use of drummed chemicals
1991	Revamped burner fuel rack with concrete paving and curbing
	Submitted permit application for underground disposal well
	Upgraded hydrocarbon recovery system
1992	Submitted "Air Quality Permit Application to New Mexico Department of the Environment (NMED)," proposing the installation of a hydrodesulfurization (HDS) unit and a sulfur recovery unit (SRU) to decrease air emissions
1993	Submitted "Interim Measures Work Plan" to USEPA, proposing additional hydrocarbon recovery wells, well survey and monitoring
	Replaced portions of the underground cooling water piping
Future	Implement "Interim Measures Work Plan" upon approval by USEPA
	Install and operate underground disposal well upon permit issuance
	Close clay-lined evaporation ponds once disposal well is on-line
	Double-line NOWP and SOWP by March 29, 1994

Improve pollution prevention measures with additional paving and drainage controls

Decrease emissions by installing the HDS and SRU upon air permit approval

1.2 Hazardous Waste Generation

A summary of substances generated or handled at the facility that have been identified as hazardous wastes, including the reason for listing and the approximate amounts generated, is provided as Table 1. These are wastes that have been generated at the facility in the past, or that continue to be generated as a part of normal operating procedures at the petroleum refinery. BRC currently lists heat exchanger bundle (HEB) cleaning sludge (K050), API separator sludge (K051), leaded tank bottoms (K052), primary oil/water/solids/separation sludges (F037), ignitable wastes (D001), and benzene toxic waste (D018) with generation potential. The D018 waste (refinery wastewater stream) is further identified by a Part A and a Part B application. BRC has also disposed of some spent caustic as a waste, but currently handles the material as a product.

1.3 Regulatory Background

Since 1980, the facility has undertaken a series of interactions with the USEPA, the New Mexico Oil Conservation Division (NMOCD), and the New Mexico Environment Department (NMED) (formerly the New Mexico Environmental Improvement Division (NMEID)) regarding permitting and characterization of the site. The following chronology is a summary of regulatory activities concerning the site:

- August 19, 1980 - Plateau (Suburban Propane) notified USEPA that the facility was a treater, storer, and disposer (TSD facility) of hazardous waste as a protective filing.
- November 19, 1980 - Plateau was issued a RCRA Part A Permit as a generator, treater, storer, and disposer of hazardous waste.
- April 16, 1982 - Plateau amended the Part A permit to reflect their status as a generator of hazardous waste, not a treater, storer, or disposer, and asked that interim status be withdrawn.
- July 1982 - NMOCD conducted site inspection.
- May 21, 1982 - Plateau applied for delisting of hazardous wastes K049, K050, and K051. BRC did not wish to continue the Plateau initiated petition because of deficiencies in the petitioning process.

- October 21, 1982 through November 30, 1982 - Cleaned and lined SOWP and NOWP. Landfilled some material from SOWP and NOWP onsite.
- May 11, 12, 27 and June 8, 1983 - USEPA and NMEID sampling events.
- February 1984 - Groundwater monitoring wells MW-1 through MW-6 were installed at the facility.
- March 9, 1984 - USEPA conducted a Compliance Evaluation Inspection (CEI) of the Plateau facility.
- March 19 through 24, 1984 - USEPA conducted a sampling investigation.
- October 31, 1984 - BRC purchased the facility.
- March 29, 1985 - USEPA issued a RCRA 3013 Administrative Order (as a result of March 9, 1984 CEI) identifying alleged violations and/or technical deficiencies and directing BRC to complete an investigation of geologic and hydrogeologic site conditions.
- April 1, 1985 - USEPA issued RCRA 3008(a) Compliance Order (Docket No. RCRA VI-501-H).
- April 26, 1985 - BRC submitted RCRA 3013 Workplan proposal.
- June 26, 1985 - NMOCD sampling conducted.
- July 5, 1985 - USEPA comments on 3013 Workplan.
- August 5, 1985 - BRC submitted final 3013 Workplan.
- September 25, 1985 - Consent Agreement and Final Order (CAFO) negotiated and signed, incorporated Compliance Order.
- November 26, 1985 - USEPA issued a RCRA 3008 Order to pay fine of $5,700.00 for failure to make timely ownership transfer notices. Required that a closure plan be developed for NOWP, SOWP, Landfill, and Landfill Pond.
- December 2, 1985 - USEPA issued approval of 3013 Workplan.
- January 1986 through July 1987 - BRC contracted Engineering-Science, Inc. (Austin, Texas) to implement the approved 3013 Workplan. The investigation included an electrical resistivity survey, installation of monitoring wells MW-7 through MW-10, four quarters of groundwater sampling from all wells (MW-6 was dry), performance of slug tests and surface water sampling of the Hammond Ditch and the San Juan River.
- March 4, 1986 - NMOCD requested offsite hydrocarbon study.
- June 2, 1986 - BRC submitted to NMOCD report on offsite hydrocarbon study("Report on Subsurface Hydrocarbon Data").

- June 30, 1986 - BRC submitted to NMOCD Remedial Action Plan, including the installation and operation of hydrocarbon recovery wells.
- August 20, 1986 - BRC submitted a "Final Closure Plan for the API Wastewater Ponds, Landfill, and Landfill Pond at the Bloomfield Refinery" (E-S, 1986) to USEPA and NMEID.
- February 6, 1987 - BRC submitted "A Final Report on Section 3013 Administrative Order Work Elements" (E-S, 1987) in accordance with RCRA 3013 Administrative Order.
- June 26, 1987 - USEPA conducted a CME inspection.
- August 1987 - BRC installed offsite groundwater monitoring wells MW-11 and MW-12.
- January 26, 1988 - USEPA and NMEID conducted a CEI inspection and recommended corrective action for the facility.
- March 8, 1988 - BRC submitted to USEPA, NMEID, and NMOCD "Site Investigation and Remedial Action Conceptual Design".
- May 13, 1988 - NMOCD notified BRC to define extent of subsurface hydrocarbons and to initiate recovery of fluids.
- July 31, 1988 - BRC conducted a soil vapor survey on BLM property per NMOCD request.
- August 1988 - BRC installed additional recovery wells and piezometers for subsurface hydrocarbon recovery and groundwater monitoring well MW-13.
- January 1989 - BRC began operation of the hydrocarbon recovery system (RW-1, RW-2 and RW-3).
- April 27, 1989 - NMOCD conducted sampling.
- August 1989 - BRC submitted "Final Report on Soil Vapor Survey, Well Installation and Hydrocarbon Recovery System" (GCL, 1989) to NMOCD.
- September 12-14, 1989 - USEPA conducted CME and CEI inspections, issued report and Notice of Violation for technical deficiencies and alleged violations noted during inspection.
- November 1989 - BRC submitted a report to NMOCD about an investigation of the property between the Hammond Ditch and Highway 44 (Avis Salmon property).
- December 1989 - BRC excavated the "landfill" area.
- April 9, 1990 - NMOCD conducted sampling.
- May 7, 1990 - BRC remediated an area of localized contamination on the property between the Hammond Ditch and Highway 44 (Avis Salmon property).

- August 1990 - BRC installed additional recovery wells to augment the subsurface hydrocarbon recovery efforts.

- September 1990 - BRC submitted a Part A Operating Permit Application for the SOWP and NOWP, and installed high-rate aeration system in these ponds.

- April 29, 1991 - BRC submitted a Delisting Petition (ERM, April 1991) to USEPA and NMEID for the "landfill" area.

- September 1991 - BRC installed groundwater monitoring wells MW-20 and MW-21 as part of the facility's RCRA groundwater monitoring program.

- September 25, 1991 - BRC submitted a Part B Operating Permit Application (ERM, Sept. 1991) for SOWP and NOWP to USEPA and NMEID.

- August 1992 - BRC submitted a Discharge Plan Approval (Tierra, 1992) application for an underground disposal well to NMOCD.

- December 18, 1992 - BRC submitted an Air Quality Permit Application (BRC, 1992).

- April through December 1992 - USEPA issued a draft Administrative Order on Consent to BRC and entered into negotiations with BRC on the Order. The final order was signed by USEPA on 31 December 1992.

- February 11, 1993 - BRC submitted the "Interim Measures Work Plan" (GTI, 1993) to USEPA for review as part of the Administrative Order requirements.

The BRC facility currently operates under the following permits:

- RCRA Part A Permit (Interim Status) Hazardous Waste Facility - A Part B Operating Permit Application was submitted to USEPA and NMOCD in September 1991. BRC conducts groundwater sampling of groundwater monitoring wells MW-9, MW-20, MW-21, RW-15 and RW-18 as part of the interim status compliance requirements.

- Discharge Plan Approval (GW-1) - This approval is for the facility's wastewater treatment system. BRC conducts semi-annual monitoring of wells MW-1 and MW-5 to comply with NMOCD requirements. A new discharge plan approval has been requested (August 1992) for the underground disposal well. Compliance and monitoring requirements will change.

- General Air Quality Permit - BRC operates under a General Air Quality Permit under the jurisdiction of the NMED Air Quality Bureau and submits reports for compliance as required. BRC submitted an Air Quality Permit Application and Notice of Intent in December 1992 to modify its existing permit to reduce emissions by adding a hydrodesulfurization unit (HDS), a sulfur recovery unit (SRU), and a cover for the API separator.

- Spill Prevention, Control and Countermeasure (SPCC) Plan - The facility has a SPCC plan describing preventative and emergency procedures to control releases of hydrocarbons to the environment. In addition, BRC recently (February 1993)

submitted an Emergency Response Plan to USEPA (Contingency Planning Section) to describe emergency procedures in the unlikely event of a release to the San Juan River.

- Stormwater Permit - BRC received a Stormwater General Permit Notice on December 31, 1992 (No. NMR00A013) from USEPA (National Pollutant Discharge Elimination System Program). A Stormwater Pollution Prevention Plan has been prepared. Implementation is proceeding to meet an October 1993 deadline.

1.4 Previous Investigations

A series of investigations has been conducted at BRC to characterize subsurface impacts at the site. Following is a discussion of the studies conducted at the site.

1.4.1 Installation of Wells

Between 1984 and 1991, 14 groundwater monitoring wells, nine recovery wells, and three piezometers were installed as part of the existing NMOCD discharge plan requirements, the RCRA 3013 Administrative Order investigation, or for voluntary recovery of separate-phase hydrocarbons (SPH). Well construction details are summarized in Table 2. Well locations are shown in Figure 5.

1.4.2 RCRA 3008 Order and Consent Agreement Investigation

After issuance of the April 1985 RCRA 3008 Order and Consent Agreement for alleged violations at the facility under previous ownership, BRC submitted a Closure Plan to USEPA and the NMEID to comply with requirements specified in the Order. This included the closure of the API wastewater ponds (SOWP and NOWP), the "landfill", and the landfill runoff pond. In October 1985, soil samples were collected from each of the oily water ponds for closure characterization, and the soil analytical results were consistent with clean closure for the units (E-S, 1986). The landfill runoff pond, created as a result of blockage of an arroyo during construction of the Hammond Ditch, was also sampled in 1985, and again, the results were consistent with clean closure for the unit. A summary of soil sample analytical results for the 1985 closure sampling event is provided in Table 3.

1.4.3 RCRA 3013 Administrative Order Investigation

Subsequent to the issuance by USEPA of the 3013 Order requiring an extensive groundwater study at the site (Docket No. RCRA 3013-00-185), a final report on groundwater conditions (E-S, 1987) was submitted to the USEPA on February 6, 1987. Included in this study were an electrical resistivity survey, installation of groundwater monitoring wells MW-7 through MW-10, monthly fluid-level measurements, quarterly groundwater sampling of wells MW-1 through MW-5 and MW-7 through MW-10 for a one-year period, and a series of slug tests. The results of surface water sampling of Hammond Ditch and the San Juan River (summarized in Table 4) were submitted to USEPA on September 14, 1987, so that samples could be collected during low-flow conditions. Tables 5 and 6 provide summaries of groundwater analytical data for organic and inorganic analyses, respectively.

1.4.4 Off-Site Investigation

In 1988, BRC conducted a soil vapor survey of land owned by the Bureau of Land Management (BLM) adjacent to the facility. A report of findings was submitted in August 1989 (GCL, 1989). During this time, three piezometers, two recovery wells and one monitoring well were installed, MW-10 was converted to a recovery well (RW-3), pneumatic skimmer pumps were installed in the recovery wells, and the system was started up on January 4, 1989.

A total of 25 soil gas survey locations (three on the BRC property and 22 on the BLM property) taken at five-foot depths were analyzed for benzene, toluene, ethylbenzene, total xylenes, tetrachloroethene, and trichloroethylene using a portable gas chromatograph. The highest concentrations of soil vapors detected were in the onsite survey locations, decreasing to the south across Sullivan Road. Vapor concentrations were detected southeast of the site near monitoring well MW-11 (survey location 14). A summary of soil vapor survey results is presented in Table 7. Soil gas survey locations are shown in Figure 6.

1.5 Documentation of Product Spills at Facility

The facility has been an active petroleum refinery since its construction in the late 1950s. The following is a chronology of the known major product spills at the facility since BRC's ownership. These incidents were reported to the appropriate authorities (NMOCD), and copies of the spill reports are included in Appendix A. A map showing the approximate locations of major spills is provided as Figure 7.

Date:	November 7, 1984
Incident:	880 barrels of naphtha spilled, 80 unrecovered.
Location:	Storage tank.
Action:	Contained in tank dike, cleaned up, and returned to system.

Date:	May 19, 1985
Incident:	140 barrels of diesel fuel spilled, 80 unrecovered.
Location:	Inside Tank 19 dike.
Action:	Within one hour of discovery, removed product from tank, water pumped into tank, small pit dug to contain leak and vacuum truck used to pump out pit. Modified piping to pump contents of tank into another tank. Maintained water level in tank until tank empty and all water recovered from pit.

Date:	April 8-9, 1986
Incident:	200 barrels diesel fuel spilled from leaking diesel rundown piping, 150 barrels unrecovered.
Location:	Lower piperack to the east of crude unit.
Action:	Diesel rundown routed to slop tank, flanges tightened, line inspected. Vacuum truck used to recover pooled diesel fuel, area sanded to prevent fire hazard.

Date:	February 24, 1987
Incident:	290 barrels regular gasoline spilled during blending, 5 barrels unrecovered.
Location:	Inside Tank dike.
Action:	Water added to float gasoline, cleaned up by vacuum truck. Added warning sign to check blends and instrumentation.

Date:	August 27, 1989
Incident:	100 barrels gasoline blend/intermediate water spilled, 1 barrel unrecovered.
Location:	Inside Tank 22 dike.
Action:	Vacuum truck used to recover product.

Date:	March 8, 1991
Incident:	180 barrels kerosene (Jet A) spilled during transfer, 60 unrecovered.
Location:	Inside Tank 26 dike (transferred from Tank 5).
Action:	Vacuum truck used to recover product.

In addition, indirect documentation of product releases as a result of discovering leaks in product storage tanks during inspections include:

Tank 17:	February, 1991 - Floor repaired with 120 mils of fiberglass.
Tank 18:	May, 1988 - Five holes patched in epoxy coated floor.
Tank 19:	July, 1985 - Repaired 28 holes in floor. June, 1990 - Repaired 60 pits/holes in floor. June, 1991 - Replaced old floor with new floor.
Tank 20:	November, 1990 - Repaired 5 holes in floor with fiberglass.
Tank 23:	June, 1992 - Repaired 1 hole in floor.
Tank 24:	May, 1986 - Installed 2 coats of epoxy to floor to repair leaks.

Tank 25:	March, 1986 - Installed 2 coats of epoxy to floor to repair leaks.
Tank 26:	February, 1989 - Fiberglass/epoxy coating of floor to repair leaks.
Tank 29:	January, 1990 - Replaced floor because of numerous holes.
Tank 30:	December, 1989 and March, 1992 - Repaired holes in floor.
Tank 31:	March, 1992 - Replaced part of floor on east side because of corrosion holes.

2.0 ENVIRONMENTAL SETTING

2.1 Geology/Hydrogeology

The BRC facility is located within the San Juan Basin, a subprovince of the Colorado Plateau physiographic province. The site is underlain by Quaternary Jackson Lake terrace deposits, consisting of 10 to 15 feet of coarse-grained fluvioglacial outwash and loess. A permeable cobble layer directly overlies the bedrock at the site, the Tertiary Nacimiento Formation. The Nacimiento Formation is an interbedded, black carbonaceous mudstone/claystone with white, medium to coarse-grained sandstones approximately 570 feet thick in this area. The bluff that crops out along the San Juan River near the site is similarly composed of these lithologies. Underlying the Nacimiento are the Ojo Alamo, Kirtland Shale, and Fruitland Formations (USEPA, 1987). A site cross-section is presented as Figure 8.

Details on ownership and construction of water wells within a one-mile radius of the site are summarized in Table 8, and the location of each is shown in Figure 9. A total of 22 wells were identified in a well search conducted by Tierra Environmental Company, Inc. (Tierra, 1992). The locations of 18 of these wells are shown on Figure 9, since the well records for three wells (#4, 11 and 12) were not reported and the location of well #21 was reported to be located in Township 29 N, Range 11W, Section 25, which is off the map. The locations of two wells (#15 and 22) are only approximate.

As shown in Figure 9, eight wells are within a one-mile radius of the center of the BRC site: #1, 3, 5, 6, 7, 13, 15 and 22. Well #1, located south of the site, is owned by C.W. Wooten. This well is double-cased and is screened between 266 and 306 feet. Well #6 is located west of the site on the opposite side of the Hammond Ditch. This well is owned by D.C. Looney and is reported to be screened between 22 and 32 feet below ground surface. Well #5 is located southwest of the site, is owned by E.H. Brown (Aztec, NM), and is reportedly cased to 20 feet. Wells #3, 7, 13, 15, and 22 are located across (north of) the San Juan River from the site. Due to their location and/or the depths of the screened intervals, none of these wells is at risk for impact from off-site migration of petroleum hydrocarbon constituents, although no testing has been performed.

Groundwater at the site occurs at depths ranging from 6 to 40 feet below ground surface, increasing in depth from west to east across the site. Groundwater flow direction is generally to the north-

northwest, toward the Hammond Ditch and San Juan River. BRC dikes the Hammond Ditch during the non-irrigation season (October 15 through April 15) to maintain a mounding effect of the ditch, thereby inhibiting northward groundwater flow. Groundwater in the perched aquifer migrates through the permeable sands, silts and cobble zone along the relatively impermeable Nacimiento Formation, which is reported to dip toward the north. Groundwater seeps along the bluff occur at the interface between the cobble zone and the Nacimiento. Two water table contour maps using data collected during November 1991 and February 1992 are presented as Figures 10 and 11.

In 1986, slug tests performed to estimate characteristics of the cobble zone indicated average hydraulic conductivity and transmissivity values of 2.08×10^{-4} feet/second and 171 square feet/day, respectively. The average saturated thickness was estimated at 9.6 feet. Using an estimated average gradient of 0.0025, the calculated flux over a 2,500 square foot area was 8,500 gallons per day or 6 gallons per minute (E-S, 1987).

2.2 Meteorology

A compilation of climatological data for the Bloomfield area is provided in Table 9 (EPA, 1987). The mean temperature extremes for the Bloomfield area occur in January and July. Temperatures are above freezing for the majority of the year (February through November). Mean annual precipitation for the area is 8.37 inches, with the greatest precipitation during the month of August (1.27 inches). Evaporation in the area varies from 68 inches to 45 inches, depending on measurement method. A gross lake surface evaporation rate is estimated at 52 inches (90 percent of a 58-inch floating pan evaporation rate). A net loss of 44 inches results.

2.3 Hydrology

Surface waters in the vicinity of the facility include the San Juan River (to the north) and the Hammond Ditch (Figures 1 and 4). The San Juan River is used for potable water for the town of Bloomfield and surrounding areas, and is controlled by the upstream Navajo Dam (ERM, 1991). The Hammond Ditch, an unlined man-made channel used for irrigation of agriculture and watering of livestock, is not intended for human consumption.

The Hammond Ditch and the surface impoundments that are part of refinery operations distributed across the site contribute to groundwater recharge at the site. Toward the southern portion of the site, as the elevation of the Nacimiento Formation increases, the perched water table dissipates

(MW-6 has been dry since its installation in 1984). The Hammond Ditch (unlined in the vicinity of BRC) is actively flowing during the irrigation season (April 15 through October 15) for agricultural purposes and is diked by BRC during the non-irrigation season. When full, the Hammond Ditch creates a mounding effect, inhibiting groundwater flow. Seepage from the ditch has not been quantified at this time but is known to be substantial based on numerous seeps along the San Juan River bluff. Seepage from the raw water ponds is estimated at 16,500 gallons per day. Seepage from the clay-lined evaporation ponds is estimated at 14,400 gallons per day. No seepage is expected from the HDPE single-lined oily water ponds (SOWP and NOWP) or the HDPE double-lined evaporation ponds.

Stormwater is collected in the curbed, concrete paved process areas that have sewers connected to the wastewater treatment system. Other sewers outside of the paved areas collect stormwater runoff and channel it to the facility's wastewater treatment system. Some areas (not served by sewers) collect process and stormwater in sumps which are emptied by vacuum truck to the wastewater treatment system. Tank berms and dikes are used to control other stormwater runoff.

2.4 Land Use

Public property managed by the Bureau of Land Management borders the facility to the south. Undeveloped public and private lands in addition to several gravel pits border the property to the east and private undeveloped land borders the property to the west. The town of Bloomfield is located immediately north of the refinery, across the San Juan River, and has a population of approximately 5,000. The majority of the undeveloped land in vicinity of the refinery is used extensively for oil and gas production and, in some instances, grazing. U.S. Highway 44 is located approximately one-half mile west of the facility. The adjacent property owners are illustrated in Figure 2.

2.5 Potential Pathways and Receptors

Surface Water

As indicated above, the San Juan River is a source of potable water for the surrounding communities. In addition, the San Juan River is used for recreational purposes (i.e., fishing). The Hammond Ditch provides a barrier to groundwater migration between the facility and the San Juan River. However, seeps from the bluff are a potential source of contamination to the San Juan River and, if impacted, will need to be controlled as part of the facility's interim and final corrective

measures. Overland migration of dissolved petroleum constituents to water bodies is limited by the site-wide stormwater runoff control system.

The Hammond Ditch, because it is used for irrigation of agriculture and livestock, may be a potential pathway for transmission of hazardous constituents to sources of food for human consumption. The United States Department of the Interior - Bureau of Reclamation (USDOI - BOR) has proposed a plan to line the Hammond Ditch with impermeable materials to reduce seepage and thereby reduce the salinity of the water downstream (USDOI-BOR, January 1993). This project will eliminate the potential for impacts to the Hammond Ditch from the BRC facility.

Groundwater

No evidence has been found to date indicating that water wells used for human consumption are completed in the shallow perched water-bearing zone that contains dissolved concentrations of petroleum hydrocarbon constituents at the refinery. The shallow wells depicted in Figure 9 and summarized in Table 8 are used for non-human consumption (irrigation, etc.) purposes.

The deeper aquifer, the Ojo Alamo, is used for potable water, therefore the potential exists for migration of petroleum hydrocarbon constituents to this aquifer. However, the presence of the relatively impermeable Nacimiento Formation (approximately 570 feet thick) between the Ojo Alamo and the shallow, perched zone acting as a confining layer eliminates the possibility of downward migration of dissolved petroleum constituents.

Petroleum hydrocarbons are lighter than water tending to remain in the upper portion of the perched water zone. The lighter-than-water, non-aqueous phase liquids (LNAPLs) provide the primary source for dissolved and adsorbed-phase hydrocarbon contamination at the site. Therefore, these contaminant zones are also expected to be limited to the unsaturated zone and zone of seasonal water table fluctuation for the adsorbed-phase contamination, and the upper, perched water zone for dissolved-phase contamination.

Soils

The process areas of the facility are secure from access by the public with fencing and 24-hour surveillance. High-traffic process areas have been paved. Only facility personnel and contractors will potentially contact contaminated soils during construction or remediation projects at the facility. These projects would be performed in accordance with OSHA requirements and the site-specific Health and Safety Plan.

Contaminated soils presenting potential sources for groundwater contamination will be addressed as part of the corrective measures for the facility, but with consideration to the ongoing industrial activity at the site.

Subsurface Vapors

Volatile petroleum hydrocarbons are present in soils and groundwater at the BRC facility. Vapor hazards have not been identified at the site. Onsite buildings do not have basements where vapors may accumulate. As necessary, subsurface vapors will be addressed as part of the corrective measures for soil contamination at the facility.

Air

The facility operates under a General Air Quality Permit issued by the NMED. Refinery emissions are reported as required in compliance with this permit. BRC has recently submitted a permit modification Notice of Intent to install units to reduce emissions. The soil and groundwater contamination and investigation activities will not contribute significantly to the overall facility emissions. Air monitoring will be performed during the facility investigation in accordance with the site specific Health and Safety Plan. Possible air emissions as part of corrective measures (e.g., emissions from soil vapor extraction activities) will be permitted and monitored as required.

3.0 NATURE AND EXTENT OF CONTAMINATION

The current facility layout identifying all major aboveground structures is depicted in Figure 4. The refinery offices are located on the western end of Sullivan Road along with warehouse space, maintenance and shop areas, a drum storage area, raw water ponds (for temporary storage of water from the San Juan River), and one cooling tower (#1). Process units are located just east of the offices and include: the crude unit, the fluidized catalytic cracking unit, the gas con unit, the treater unit, one cooling tower, reformer/hydrotreater, catalytic polymerization unit, and API separator and oily water treatment ponds.

Aboveground storage tanks (ASTs) occupy a large portion of the facility from north of the process units east along Sullivan Road. Two clay-lined evaporation ponds are located to the east of the tank farms for treated wastewater discharge, and the fire training and "landfill" areas are east of the evaporation ponds near Hammond Ditch. South of Sullivan Road are the terminals where product trucks are loaded and crude trucks are off-loaded. The spray irrigation area and double-lined evaporation ponds are located east of the terminals.

From previous investigations, a separate-phase hydrocarbon (SPH) plume has been partially delineated at the BRC site, extending from the western area of the site (near the offices) to the eastern portion of the AST farm (Figure 12). The sources of this plume are believed to be product releases which occurred from ASTs and associated piping over the many years of the facility's operation as a petroleum refinery. In order to prevent any new releases, BRC has made numerous improvements to the facility's storage and processing units and has established a systematic tank inspection and maintenance program. A cathodic protection system was installed to minimize the potential for future corrosion.

Because of the nature of the SPH plume, and associated adsorbed- and dissolved-phase contamination, the BRC site has been geographically divided into four (4) areas for the purposes of the following discussion regarding the nature and extent of contamination. Potential source(s) within these areas are discussed in this section. It should be noted, however, that BRC intends to consider the entire site as one Solid Waste Management Unit (SWMU) for investigation purposes and as one Corrective Action Management Unit (CAMU) for remediation purposes.

3.1 Geographic Areas

The facility has been divided into four geographic areas which are shown on Figure 7 and are discussed below. In June 1987, an USEPA-led investigation identified 13 areas as Solid Waste Management Units (SWMUs), five of which were further classified as RCRA-regulated SWMUs. These include the two oily water ponds (NOWP and SOWP), the clay-lined evaporation ponds (north and south), the landfill, and the landfill pond. Since that time, it has been determined that the clay-lined evaporation ponds are not RCRA-regulated SWMUs.

3.1.1 Area 1

Area 1 is located on the northeast corner of the site and includes the following units:

- The API Oil/Water Separator and the NOWP and SOWP;
- The Spent Caustic Tank;
- The Former Drum Storage Area(s) (warehouse yard);
- The Major Processing Units; and
- Tank Area for Tanks 3, 4, and 5 and Former Location of Tanks 6 and 7.

As mentioned previously, the NOWP and SOWP are considered RCRA-regulated SWMUs since DO18 (benzene-contaminated) wastes are treated in these units. The API separator is considered a process unit and the spent caustic tank is currently for product storage. The former drum storage area in the warehouse yard was not used for waste storage. The crude unit is the site of a documented spill that occurred in 1986 (see list of spills in Section 1.5). Other spills, although undocumented, undoubtedly occurred during the long history of the refinery and the process areas. The tank areas for tanks 3, 4, and 5 and the former location of tanks 6 and 7 are also considered probable source areas.

Several monitoring wells (MW-4, MW-7, MW-9 and MW-20), recovery wells (RW-1, RW-2, RW-3, RW-18, and RW-19), proposed recovery wells (RW-22 and RW-23) and piezometers (P-1, P-2 and P-3) are located in Area 1. Discernable thicknesses of SPH historically have been observed in many of these wells. Recovery wells RW-2, RW-18 and RW-19 are currently active in the facility's hydrocarbon recovery system. Because SPH has been measured in MW-4, RW-2, RW-19, and RW-18, the entire eastern portion of Area 1 is known to be impacted. The source(s) of this impact are assumed to be product releases (documented and undocumented) from storage and processing areas over the many years of the refinery operations. The sources of the subsurface contamination

in this area are not considered to be limited to the SWMUs discussed in this section. It is likely that a portion of the subsurface contamination migrated from other areas.

3.1.1.1 Wastewater Treatment System: API Separator, SOWP, and NOWP

BRC has an intake in the San Juan River to provide raw water for facility processes. A line diagram illustrating the routing of water through the facility is shown as Figure 13. Water (approximately 369,000 gallons per day) is pumped from the river to the east and west raw water ponds. Water from the raw water ponds is filtered and then either channeled through softeners to the boilers for steam generation or to the two cooling towers. The steam is used in the process units. The process wastewater is discharged to the API separator. Cooling tower blowdown is directly discharged to the API separator.

The wastewater treatment system, which includes the API separator, the south oily water pond (SOWP), and the north oily water pond (NOWP), treats approximately 72 gallons per minute (gpm) of water. The separator, considered a process unit, is a double-chambered steel-reinforced concrete tank that acts as a physical separator of water and oil. Oil is skimmed in the separator and returned to the refinery process, water underflows a weir to the SOWP, and sludges accumulate in the bottom.

The facility drainage system, consisting of a network of tank farm sumps which are emptied by vacuum truck and sewer lines within the process areas, leads directly to the API separator unit. Accumulated API sludge is normally cleaned out annually (never less frequently than every two years) and is shipped offsite to a permitted hazardous waste disposal facility. The API separator discharges water to HDPE-lined SOWP and NOWP, which are equipped with aerators and serve to biologically treat the wastewater. The facility plans to double-line these hazardous waste impoundments in early 1994.

The facility began using aerators in the SOWP and NOWP in 1990 which averaged 91 percent removal of benzene concentrations. Additional aerators were added in May 1991 and again in July 1992. Samples collected between August 1992 and February 1993 on a monthly basis indicate non-detectable benzene concentrations in the effluent from the NOWP in five of the seven sampling events. Benzene was detected during the December 1992 and February 1993 samplings at 0.022 mg/l and 0.040 mg/l, respectively.

After aeration and biological treatment, water is discharged to the evaporation ponds (either the clay-lined north and south evaporation ponds or the HDPE double-lined north and south evaporation ponds). The total daily discharge averages 100,800 gallons. BRC is in the process of permitting an underground disposal well as an alternative to total evaporation of the refinery discharge. When the disposal well is permitted and installed (expected by late 1993), the clay-lined evaporation ponds will be taken out of service and the double-lined evaporation ponds will serve as backup and retention ponds prior to underground injection of treated wastewater.

The oily water ponds were cleaned out in 1982 and lined with 100-mil HDPE liners. The two ponds are scheduled to be double-lined in late 1994. A french drain system, consisting of 4-inch diameter PVC perforated pipe draining to a nearby observation well, was installed beneath the ponds to detect leakage. Leakage was detected in the system soon after its installation, so the ponds were emptied and the liners repaired. Daily monitoring of the ponds is conducted to insure no overbanking of the ponds occurs.

Some of the sludges removed from the SOWP and NOWP in 1982 were disposed onsite into the "landfill", which has been identified by the USEPA as a RCRA-regulated SWMU because of the alleged presence of these sludges (see Area 4).

Soil beneath the ponds were sampled in 1985 (E-S, 1986) as part of a closure plan for the units (Table 3). A total of thirteen soil samples were collected from beneath the two ponds and analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX), phenolics, total chromium and total lead. Only one soil sample contained a detectable concentration of BTEX constituents, which consisted of 7.4 micrograms per kilogram (ug/kg) of total xylenes in sample 51469-17. Phenolics were non-detectable in all samples. Chromium and lead levels were well within the range of background concentrations of these metals in soils.

One soil sample (51469-23) was also analyzed for "Skinner List" parameters (a subset of Appendix VII parameters that are expected to be present at a petroleum refinery.) None of these parameters, which include volatile organic compounds and base/neutral acid extractable compounds, were detected.

Monitoring wells MW-9 and MW-20 and recovery well RW-18 are located downgradient of the wastewater treatment units. During the 1987 EPA inspection, it was noted that the good condition of the liners, the fact that overtopping of the ponds was not occurring, and the presence of the leak

detection system all serve to minimize the possibility of migration of hazardous substances from the ponds to the soil, surface water, or groundwater. No further investigation is proposed to specifically address the API separator, the NOWP or the SOWP, although non-SPH bearing wells will be included in the groundwater sampling to be performed as part of the facility investigation.

3.1.1.2 Spent Caustic Tank

The contents of the spent caustic tank that had been located near the API separator were sampled during a 1984 USEPA inspection and were found to have a pH of 12.8, thereby rendering the material hazardous based on its characteristic of corrosivity (EPA, 1987). The material also contained levels of reactive sulfides. Since the storage of this waste was not included in the facility's RCRA permit application, this finding was cited in the 3008 Compliance Order issued by USEPA. Ensuing discussions resolved that BRC would not store corrosive or reactive wastes for more than 90 days at the facility.

In 1986, the caustic tank was cleaned out and the material was shipped to a hazardous waste disposal facility. In early 1987, a new spent caustic tank was installed to the west of the SOWP and NOWP. The tank (12 feet in diameter, 20 feet in height) rests on a concrete pad and is surrounded by a concrete containment wall. A transfer pump to remove spent caustic from the tank is located within the containment area. Currently, spent caustic is a product shipped to a pulp paper plant.

During the 1987 USEPA inspection, it was noted that the tank appeared to be in good structural condition with no signs of leakage, and that it was unlikely that releases from the tank would occur. No further investigation is proposed to specifically address the spent caustic tank.

3.1.1.3 Drum Storage Areas

North Bone Yard

Several areas where drums were stored at the facility were noted during the 1984 inspection by the USEPA, including the north bone yard located north of the clay-lined evaporation ponds (Area 4). In July 1987, BRC removed the drums from this area to the area west of the refinery offices. Currently only empty drums are stored in the north bone yard. Monitoring well MW-1 is located in the north bone yard and is sampled on a semi-annual basis as part of the facility's discharge plan compliance requirements. Dissolved hydrocarbon concentrations in MW-1 historically have been low or non-detectable.

Warehouse Yard

During the 1987 inspection, drum storage for solvents and oils used in the refinery processes had been consolidated to the fenced area west of the refinery office (warehouse yard). In 1988, the facility again upgraded its drum storage area by constructing a metal frame storage shed with concrete flooring and curbing and a collection trench. This project was part of the facility's program to convert to bulk storage and minimize drummed chemicals. Drums containing primarily lube oils are currently stored on a rack in the shed. For the most part, chemicals used in the refinery processes are stored in the process areas in portafeed tanks or stainless-steel totes. Recovery well RW-1 and piezometer P-1 are located in the warehouse yard. Well RW-1 is connected to the hydrocarbon recovery system but is not currently active since SPH has not been detected in this well for several consecutive monitoring events and the recovery well underlies the office and warehouse leachfield. Groundwater sampling as part of the facility investigation will include RW-1, provided SPHs are not present in the well.

90-day Hazardous Waste Storage Area

Drums of hazardous wastes are stored in an indoor, 90-day storage room in the east end of an auxiliary warehouse building (Area 3). The room is fully enclosed and has a concrete floor in good structural condition. The only drums stored in this area are those containing wastes awaiting off-site shipment to a hazardous waste disposal area. During the 1987 inspection, it was noted that releases of waste from this drum storage area were unlikely to occur. No further investigation is proposed to specifically address the 90-day waste storage area.

3.1.1.4 Crude Unit and Other Process Units

As discussed in Section 1.5 above, a spill near the crude unit was reported in April 1986. A total of 200 barrels of diesel fuel were spilled, 150 of which were not recovered. The area has since been paved with concrete. This area is not easily accessible for investigation. The facility investigation activities will characterize this portion of the site and provide data for corrective measures evaluation. Other process areas are likely to have had undocumented releases of products over the long history of the facility.

3.1.1.5 Tanks 3, 4, 5, 6, and 7

Tanks 6 and 7 were removed from service in mid-1987 because of corrosion and generally poor structural condition. Tanks 3, 4, and 5 have capacities of 420,000 gallons each and currently contain JP4 Jet Fuel (tanks 3 and 4) and premium unleaded gasoline (tank 5). The two additional recovery wells to be installed in this area as proposed in the "Interim Measures Work Plan" will further define groundwater and soil conditions in this location and will serve to enhance the existing subsurface hydrocarbon recovery system.

3.1.2 Area 2

A second geographic area of the facility consists of the main AST farm. The documented product releases in Area 2 are:

- Inside the Tank 19 Berm;
- Inside the Berms for Tanks 21 and 22; and
- Inside the Tank 26 Berm;

Product releases (documented and undocumented) from the ASTs and associated piping are believed to be the primary source of subsurface impacts at the BRC facility. Spills occurred in several of the tank berms in the past as documented in the spill reports included in Appendix A and discussed in Section 1.5 above. Additional and more substantial product releases have been documented as likely because of tank floor leaks detected during routine inspections.

There are four recovery wells (RW-14 through RW-17) and one monitoring well (MW-21) in Area 2. Discernable thicknesses of SPH historically have been observed in the all of the recovery wells which are currently active in the facility's hydrocarbon recovery system. Monitoring well MW-21 is sampled as part of the RCRA groundwater monitoring compliance (Table 5). Dissolved concentrations during the past year have shown an increasing trend, with the highest benzene concentration of 3.010 mg/l during the October 1992 event. Since SPH is present in the four recovery wells located across the entire bulk storage area, Area 2 is known to be impacted. The source(s) of this impact are product releases from storage tanks and associated piping. Further investigation in this portion of the facility is proposed as part of the facility investigation because of the historical spills documented and the need to delineate both the SPH and dissolved plumes in this area.

3.1.3 Area 3

Area 3 is the portion of the site to the south of Sullivan Road and includes the following units:

- Transportation Terminal Sump;
- Heat Exchanger Bundle (HEB) Cleaning Area and RCRA 90-day Area;
- Crude Loading Area;
- Product Loading Rack; and
- Underground Piping.

The transportation terminal sump and HEB cleaning areas were identified in the 1987 EPA CME as potential SWMUs but were not considered RCRA-regulated units. The crude loading area was the site of a spill, and the product loading rack and underground piping are considered additional potential sources because of the nature of the activities conducted at these sites. Further investigation in the vicinity of the transportation terminal sump and crude loading rack is proposed as part of the facility investigation.

There are two monitoring wells (MW-13 and MW-6) in Area 3. Monitoring well MW-6 has been dry since its installation in 1984. Monitoring well MW-13 was sampled in 1988 for BTEX, 1,2-dichloroethane, trans 1,2-dichloroethane, nitrate as N, phenol, sulfate and total dissolved solids (TDS). Low levels of BTEX, 1,2-dichloroethane and phenols were detected. This well will be included in the groundwater sampling to be performed during the facility investigation.

3.1.3.1 Transportation Terminal Sump

An earthen sump was located to the south of the liquid propane gas (LPG) bullets in the southern portion of the refinery (south of Sullivan Road) and was used as a truck cleaning area at one time. The area was backfilled with soil in 1986 and is no longer used. It was noted during the 1987 inspection that although the terminal area was located outside the floodplain, the potential for leaching and migration of hazardous constituents was possible since no liners or containment features were documented for the area. Further investigation of this area is proposed as part of the facility investigation.

3.1.3.2 Heat Exchanger Bundle (HEB) Cleaning Area

The HEB cleaning area is located to the south of Sullivan Road in a room on the east end of the auxiliary warehouse. The room is fully enclosed with sheet metal walls and a concrete floor. A concrete sump in the floor of the cleaning area collects sludges generated during cleaning of the bundles. The sludges are then transported to a hazardous waste facility offsite. Monitoring well MW-13 is located downgradient (to the west) of this area. It was deemed unlikely during the USEPA-led 1987 inspection that the HEB cleaning area would be a source area for transmittal of hazardous constituents to soil, surface water, or groundwater because of the good structural condition of the unit. The downgradient monitoring well MW-13 will be included in the groundwater sampling to be performed as part of the facility investigation.

3.1.4 Area 4

The fourth geographic area includes the following units:

- Evaporation Ponds (north and south);
- Landfill;
- Landfill Pond;
- Fire Training Area; and
- Spray Irrigation Area.

The clay-lined evaporation ponds were considered by USEPA to be RCRA-regulated units during the 1987 USEPA inspection, but it has since been determined that they are non-regulated units. The landfill and landfill runoff pond were identified in the 1987 EPA CME report as RCRA-regulated SWMUs, although BRC has not agreed to this opinion. The fire training and spray irrigation areas were identified as non RCRA-regulated SWMUs by USEPA.

There are four monitoring wells (MW-1, MW-3, MW-5 and MW-8) in Area 4. None of these wells has ever contained discernable thicknesses of SPH. Wells MW-1 and MW-5 are sampled semi-annually as part of the facility's discharge plan compliance requirements for the following parameters:

- water level,
- pH,
- total dissolved solids (TDS),
- BTEX
- chlorinated purgeable volatile hydrocarbons,

- phenol,
- cyanide,
- iron, manganese, sulfate, nitrate/nitrite as N, ammonia, total Kjeldahl N,
- arsenic, barium, boron, cadmium, chromium, and lead.

Monitoring wells MW-3 and MW-8 were sampled quarterly in 1986 during the 3013 investigation. Samples from MW-3 were analyzed for BTEX, phenols, total organic carbon (TOC), cyanide, TDS, chloride and sulfate and metals. Samples from MW-8 were analyzed for these same parameters and volatile organic compounds and semivolatile organic compounds. Tables 5 and 6 summarize this data. Dissolved concentrations of volatile organic compounds, semivolatile organic compounds and phenols have been low or non-detectable. The units comprising Area 4 are not considered to be major contributors to subsurface contamination at the BRC facility. The groundwater monitoring wells in this area will be included in the groundwater sampling to be performed during the facility investigation.

3.1.4.1 Evaporation Ponds

As shown in the line diagram (Figure 13), treated wastewater from the NOWP is transferred first to the south evaporation pond, then into the north evaporation pond, both of which are located to the east of the AST area. The earthen dikes and bottoms of the ponds are lined with 4 to 6 inches of bentonite. The units are inspected daily to assure no overtopping of the ponds occurs. Water is removed from the ponds through evaporation or is transferred to the spray irrigation area to the southeast of the refinery. The two ponds are scheduled to be decommissioned in 1994 upon permitting and operation of the proposed underground disposal well.

Studies using neutron logging, thermonics, and radioactive tracers to determine seepage patterns indicated that water seeps from the ponds at a rate of approximately 10 to 20 gpm.

It was noted during the 1987 inspection that the ponds lie outside of the floodplain, they were observed to be in good condition, and daily inspections of freeboard are conducted by the facility. The USEPA inspection concluded that it was unlikely that hazardous constituents would be transferred to surface waters by overbanking of the ponds. However, because of the seepage of water from the ponds, the units were identified as potential sources of soil or groundwater contamination.

Monitoring well MW-1 is located north (downgradient) of these ponds and is sampled on a semi-annual basis according to the facility's discharge plan approval requirements noted above. Concentrations of hydrocarbon contamination historically have been low to non-detectable. Soil and groundwater quality on the west side (also downgradient) of the ponds will be investigated during the facility investigation.

3.1.4.2 Landfill and Landfill Pond

The "landfill" is the low-lying area to the east of the process area into which sludges and contaminated soils from the SOWP and NOWP were placed in 1982.

Soils in the landfill and landfill pond areas were sampled in 1985 (E-S, 1986) as part of a closure plan for the units (Table 3). Eight samples in the landfill area and seven samples in the landfill pond area were collected and analyzed for BTEX, phenolics, total chromium and total lead. Only one soil sample contained a detectable concentration of BTEX constituents, which consisted on 1.3 ug/kg of benzene in sample 51469-13 taken from the landfill pond. Phenolics were non-detectable in all samples. Chromium and lead levels were well within the range of background concentrations of these metals in soils.

One soil sample (51469-23) from the landfill pond was also analyzed for "Skinner List" parameters (a subset of Appendix VII parameters that are expected to be present at a petroleum refinery.) None of these parameters, which include volatile organic compounds and base/neutral acid extractable compounds, were detected.

During the 1987 inspection, it was noted that runoff from the landfill was unlikely to reach surface waters since it is a low-lying area relative to the rest of the surrounding property. However, based on soil and water sampling conducted by USEPA in 1984, this area was noted as a potential source for soil and groundwater. Since 1987, the landfill has undergone the rigors of a delisting petition filed in 1991 (ERM, 1991). Composite soil samples were collected and analyzed for the following parameters:

- ignitability
- corrosivity
- reactivity (cyanide/sulfide)
- total metals
- metals in Toxicity Characteristics Leachate Procedure (TCLP) leachate (TCLP metals)
- EP Toxicity metals

- total pesticides
- total herbicides
- TCLP organics
- total organic carbon (TOC)
- oil and grease
- cyanide
- Appendix VIII constituents

USEPA has recently requested additional sampling in support of the petition which will be conducted by BRC. This SWMU has been subjected to extensive investigation and is being further characterized as part of the delisting process. In addition, as stated above, monitoring well MW-8 will be included in the groundwater sampling to be performed as part of the facility investigation.

3.1.4.2 Fire Training Area

The fire-training area is located to the east of the north evaporation pond in the northeast corner of the site. It is used to practice extinguishing fires similar to those that might occur at the facility. The area includes a fuel tank on the south end of the training area, and diesel fuel, gasoline, and other fuels are used to set the fires for training. The area is covered with gravel, and tanks and vessels in which the fires are set are distributed across the area. During the 1987 CME inspection, black oily stains were noted on the ground around several of the vessels. The area is outside the floodplain, but because of limited containment features, runoff from this area may be transported to surface waters, including Hammond Ditch. It was further noted during the 1987 CME that it is possible that organic compounds used during training exercises may leach to soil and groundwater. Because of the lack of soil data in this vicinity, further investigation of the fire training area is proposed as part of the facility investigation.

3.1.4.3 Spray Irrigation Area

The spray irrigation area is located to the southeast of the refinery and consists of a 10-acre parcel of land onto which water from the north evaporation pond is sprayed through stationary sprinkler heads (mainly from March through October). The area is diked to prevent runoff. It was noted during the 1987 inspection that contamination of surface waters by flooding or runoff from the spray irrigation field was not likely.

Monitoring well MW-5, which is sampled on a semi-annual basis as part of the facility's discharge plan, is located downgradient from this area (Tables 5 and 6). BTEX concentrations in this well have been non-detectable and phenols detected at very low (<0.15 mg/l) concentrations. This well will be sampled during the groundwater sampling to be performed as part of the facility investigation.

4.0 GROUNDWATER CONDITIONS

A site map illustrating the locations of monitoring and recovery wells is shown as Figure 5. In accordance with the NMED's request for monitoring of groundwater quality, under interim status BRC has conducted groundwater monitoring at the facility since November 1991. The wells chosen as compliance monitoring wells are: MW-9, MW-20, MW-21, RW-15, and RW-18. The wells have been sampled for the following analytes:

- BTEX (USEPA method 8020)
- Chlorinated herbicides (USEPA method 8150)
- Organochlorine pesticides and PCBs (USEPA method 8080)
- Total organic halides (TOX, USEPA method 9020)
- Priority pollutant metals (USEPA method 200.7/200 series)
- Total organic carbon (TOC)
- Phenols
- Fecal coliform
- Radiation: Gross alpha/beta, Radium 226/228
- Fluoride, nitrate as N, chloride, sulfate, sodium

As part of the NMOCD's requirements for the facility's discharge plan, wells MW-1 and MW-5 are sampled on a semi-annual basis for the following constituents:

- Total dissolved solids (TDS)
- BTEX
- Chlorinated purgeable volatile hydrocarbons
- Phenol
- Cyanide
- Iron, manganese, sulfate, nitrate as N, total Kjeldahl N
- Metals: Arsenic, barium, boron, cadmium, chromium, lead

In addition to the above groundwater sampling plans, a sampling plan for the proposed injection well will provide for analysis of the following parameters:

- Aromatic and halogenated volatile hydrocarbons (USEPA methods 8010/8020 or 8240)
- General water chemistry: Calcium, potassium, magnesium, sodium, bicarbonate, carbonate, chloride, sulfate, TDS, pH, and conductivity
- Heavy metals (USEPA method 6010)
- Arsenic and mercury (USEPA methods 7060 and 7470, respectively)

A summary of all available organic and inorganic groundwater data collected in the course of the numerous investigations conducted at the facility is provided in Tables 5 and 6, respectively, and a

map depicting the most recent (October 1992) distribution of dissolved hydrocarbons (BTEX) is shown as Figure 14. The tables show only compounds that were detected.

During the four quarters of monitoring of wells MW-1 through MW-10 (except MW-6 which was dry), samples from MW-4, MW-7, MW-8, MW-9, and MW-10 were also analyzed for full VOCs and BNAs. With the exception of a single occurrence of 1,2-dichloroethane (at 2 ug/l in MW-1 in December), no VOCs other than BTEX were detected. Based on these results, BTEX (by USEPA Method 602) would be an appropriate analysis for future groundwater sampling events.

Four quarters of data (November 1991 through October 1992) show that no significant changes in groundwater quality have occurred over the past year. It should be noted that wells RW-15 and RW-18 typically contain SPH which is decanted prior to analysis of the samples. Dissolved concentrations of BTEX in these wells are consistently elevated, which is expected. The dissolved concentrations in wells MW-9 and MW-20 have remained relatively constant over the four quarters monitored, while increasing during the last two quarters in well MW-21.

Similarly, concentrations of metals dissolved in groundwater have remained unchanged through four quarters of monitoring and are considered to be within the range of background concentrations. No concentrations of herbicides or pesticides have been detected, although they are routinely analyzed for in groundwater samples.

Groundwater contamination associated with the SPH plume is limited by the Hammond Ditch which surrounds the facility on all but the southern side. Beyond the ditch to the north, groundwater occurs as seeps in the bluff above the San Juan River. Dissolved contamination extends to the northern (downgradient) end of the facility in the process area of the site, as monitored by wells MW-9 and MW-20. Additional delineation is proposed in the northwestern portion of the site in the area between the fire house and the transformer station. Dissolved contamination in the western portion of the facility may be monitored using RW-1, which previously contained SPH that has since dissipated over time.

The eastern side of the site (upgradient) is monitored frequently and results indicate that the dissolved plume has been delineated in this area. Additional groundwater delineation is proposed in the southeastern, southern, and northeastern portions of the site.

Vertical distribution of soil and groundwater impacts is effectively limited by the physical characteristics of the underlying Nacimiento Formation. The Nacimiento Formation has an extremely low permeability and has exhibited an upward vector of groundwater movement.

5.0 SURFACE WATER CONDITIONS

As described in Section 1.4.3, surface water investigations were conducted in 1986-1987 and included sampling of the San Juan River and Hammond Ditch. Results of the sampling are summarized in Table 4. Four samples were collected from each of the water bodies during low-flow (worst case) conditions. As shown, concentrations of volatile and semivolatile organic compounds were not detected in any of the samples from the San Juan River. Low levels of benzene (6 ug/l) and toluene (3 ug/l) were detected in one of the four surface water samples from the Hammond Ditch (near Sullivan Road). Six targeted semivolatile compounds were also detected at low concentrations in the same sample. Fluoranthene was the only semivolatile compound detected in one of the other three surface water samples collected from the Hammond Ditch (1 ug/l). Phenols were detected in seven of the eight surface water samples at concentrations ranging from 2 ug/l to 18 ug/l.

Additional sampling of surface water and sediment in the vicinity of the site is proposed for both the Hammond Ditch and the San Juan River to obtain more current data.

6.0 PRE-INVESTIGATIVE EVALUATION OF CORRECTIVE MEASURES

Any corrective measure or remedial action for the BRC site needs to account for the contaminant type, volume, media which is contaminated, risk that the contaminant presents, cost for clean-up, and practicality of construction. The initial response in the proposed corrective measure is to mitigate potential seepage into the Hammond Ditch and/or the San Juan River. Other remedial objectives will be to eliminate/mitigate separate-phase hydrocarbons (SPH), remediate soil from which the SPH are still produced, and finally, reduce the concentration of dissolved hydrocarbons in groundwater beneath the site.

Because four remedial objectives are sought, no single technology is applicable across the site. In order to assess technologies, a screening matrix for each remedial objective has been prepared (Appendix B). This section lists the alternatives considered and provides recommendations for acceptable technologies, also identifying pilot studies which may be necessary to further assess the technologies. Risk assessment may be applicable if there are no offsite receptors. Remedial objectives will consider risk or the potential for exposure to chemicals of concern prior to selection of the final remedy.

6.1 Screening Matrix For Seepage (see also Appendix B)

The following corrective measures address mitigation of groundwater seepage into the Hammond Ditch and/or San Juan River:

- Dewater entire area by pumping water
- Construct a grout curtain
- Implement an air curtain
- Build an interceptor trench
- Reverse gradient with pumping
- Implement a water curtain (clean water)

As shown in Appendix B, three alternatives were retained for further consideration: a grout curtain, an interceptor trench and dewatering near the seeps. Dewatering near seeps has been proposed in

the Interim Measures Work Plan (GTI, 1993), although a grout curtain may be needed if the facility's injection well permitting is significantly delayed.

These measures may be temporary if BRC can decrease the use of evaporation ponds which contribute to the recharge of perched groundwater beneath the site. As described previously, a discharge plan approval application for an underground injection well has been submitted, and construction is planned for late 1993.

6.2 Screening Matrix for SPH (Appendix B)

The following corrective measures address mitigation of SPH (free floating hydrocarbons) from the water table:

- Install skimming pumps
- Construct dual pump system (groundwater and SPH)
- Remove SPH by vapor extraction
- Utilize high vacuum (Hi Vac) fluid removal
- Perform sparging/vapor extraction
- Perform total fluid pumping

As shown in Appendix B, three alternatives were retained for further consideration from the preliminary screening: skimming pumps, vapor extraction and Hi VAC total fluid extraction. Skimming pumps are already in use in seven recovery wells onsite. Vapor extraction will be evaluated as part of the facility investigation (pilot test).

6.3 Screening Matrix for Soil (Appendix B)

The following measures were considered as soil remediation alternatives:

- Risk assessment (determine exposure levels)
- *In situ* vapor extraction
- *In situ* bioventing

- Excavation and disposal/treatment of contaminated soil
- *In situ* soil washing
- Perform chemical fixation
- Stabilization of mobile contaminants
- Vitrification
- Steam-stripping of contaminants

As shown in Appendix B, two alternatives were retained for further consideration from the preliminary screening: risk assessment and *in situ* vapor extraction. Vapor extraction will be evaluated further during the facility investigation (pilot test). A risk assessment may be useful in determining site-specific remedial objectives.

6.4 Screening Matrix for Dissolved Groundwater (Appendix B)

The following measures were screened for groundwater remediation:

- Risk Assessment (eliminate exposures)
- Altered water management practices for facility

-- i.e., Gradually reduce the amount of perched groundwater, by decreasing the leakage from the evaporation ponds and raw water ponds

- Pump, treat, re-inject of groundwater
- Pump, treat, re-infiltrate of groundwater
- Perform sparging (VOC stripping, oxygen addition)
- *In situ* biotreatment (nutrient addition)
- Natural biological degradation combined with source elimination (eventually dissolved contaminants will decrease)

  -- Only 1% of hydrocarbon mass is dissolved in groundwater

  -- The object is to eliminate residual sources and contain dissolved hydrocarbon on site

As shown in Appendix B, four alternatives were retained for further consideration during the preliminary screening: risk assessment; pump, treat, reinject; sparging/vapor extraction; and source reduction.

A risk assessment may assist in determining site-specific remedial objectives. If BRC can limit production water recharged into the perched aquifer directly beneath the site, groundwater should decrease in volume over time. The aquifer test to be performed during the facility investigation will assist in evaluating the feasibility of the pump, treat and reinject alternative. The air sparge/vapor extraction pilot study will provide information on the applicability of these technologies. Source reduction (removal of SPH) will be required regardless of the other measures selected.

6.5 Pilot Tests

Prior to investigating any of the preferred technologies identified in Appendix B, pilot tests and a more rigorous cost evaluation will be performed as part of the facility investigation and Task IV - Investigation Analysis.

6.5.1 Pilot Test to Mitigate Seepage

A pump test is necessary to define aquifer parameters for proper spacing of wells and rates of groundwater recovery for the dewatering alternative to mitigate seepage. Slug tests performed in 1986 provided values for aquifer characteristics, although it is preferable to have active pumping data upon which to base a remedial system design. Water pumped during the pump test will be directed to the facility's wastewater treatment plant. If a grout curtain is the selected measure, the type of curtain trench or mix will need to be evaluated. Cobbles and soil stability and excavation into the Nacimiento Formation will also have to be considered. An interceptor trench will require major excavation in order to capture water before it seeps from the bluff. The capital and operation and maintenance costs for this technology will be compared with barrier wells.

6.5.2 Pilot Test for SPH Recovery

Removal of SPH will eliminate the major source of dissolved hydrocarbons at the BRC site. Experience from hundreds of product removal projects has shown that soil vapor extraction (SVE) can be the most effective *in situ* method for accomplishing this objective. This method is applicable for volatile and semi-volatile organic constituents, which comprise the SPH at the BRC site. A pilot

test utilizing current monitor wells and specially constructed vapor extraction wells will be performed. This data will aid in extraction well spacing, determining removal rates and evaluating the effect of SVE on soils containing volatile and semi-volatile constituents.

Pilot testing for a high vacuum SVE may be considered but will not be tested at this time. This technology is still emerging, but offers great potential for simultaneous remediation of SPH, water and soil. By moving great amounts of air under a high vacuum, liquids (water and SPH) are brought to the surface. At the same time, volatile and semi-volatile compounds are evaporated from the soil column and biological degradation is enhanced because of the addition of oxygen. Off-gas treatment systems would have to be designed to accommodate the capacity of the subsurface yield.

6.5.3 Pilot Test for Soil Remediation

Vapor extraction and bioventing technologies will require a vapor extraction pilot test to ascertain site-specific removal rates and design criteria such as the effective radius of influence. Monitoring of CO_2 levels is necessary to determine the amount of biological activity occurring during venting. Before employing bioventing for remediation of semi-volatiles, samples to evaluate soil parameters such as moisture, phosphates, nitrates and organic carbon should be obtained during the installation of vapor extraction wells.

6.5.4 Pilot Test for Dissolved Hydrocarbons

Air sparging is one of the most promising technologies available for *in situ* remediation of groundwater with organic contaminants. Sparging will physically strip volatile and semi-volatile constituents from the water column while providing an oxygen source for enhancing biological decay of organic material. The depth, spacing, number and effectiveness can be estimated by pilot testing specially built sparge wells.

In situ bioremediation, with injection/infiltration of water containing greater than normal concentrations of oxygen and nutrients, may be considered if reinfiltration of treated water from dewatering or product recovery activities is possible. The dissolved solids content of the groundwater at the facility is relatively high and may limit the application of this technology. A tracer study for identifying preferential pathways may be necessary. *In situ* bioremediation should not be performed until SPH is removed.

6.6 Recommendations for Remedial Actions

Source elimination or reduction is the recommended course of action for remedial activities at the BRC site. Seepage of groundwater can be reduced by improved wastewater management practices by BRC (i.e. use of future injection well for process water). The Interim Measures Work Plan (GTI, 1993) proposed additional recovery wells to inhibit the migration of hydrocarbons to surface water. An aquifer test will be performed as part of the facility investigation to indicate optimum pumping rates and location of additional recovery wells needed (if any) to control migration of SPH and dissolved contamination.

Since treated groundwater is presently discharged to the evaporation ponds which contribute to groundwater recharge, this mode of disposal of treated groundwater for the long-term corrective measure is not preferred. Instead, the use of the underground injection well for treated water will limit groundwater recharge at the site and make source control more manageable. If permitting of the injection well is significantly delayed, a grout curtain to control seepage to surface water may be considered.

A risk assessment should be performed to determine remedial objectives for soil and groundwater. Remedial technologies being considered for soil and groundwater include vapor extraction and sparging. Sparging cannot be used without vapor extraction because without vapor extraction there is no way to remove contaminants from the subsurface. Elimination of SPH will significantly reduce dissolved hydrocarbons in groundwater. Vapor extraction is a strong candidate for SPH removal. This technology may also be utilized for soil remediation. A pilot study will be performed as part of the facility investigation to determine design parameters for a soil vapor extraction (and possibly, air sparging) system.

7.0 SUMMARY

Surface water, groundwater, and soil have all exhibited varying degrees of impact by petroleum hydrocarbons. The RFI work plan (Task II) is designed to address those areas in which additional investigation is necessary in order to design and implement an effective corrective measure strategy.

The investigation includes characterizing specific SWMUs identified by USEPA during the 1987 inspection as well as completing the delineation of the SPH and dissolved plumes at the site. The approximate horizontal dimensions of the separate-phase hydrocarbon plume are depicted in Figure 12. However, additional information is needed along the southern and northeastern edges to further delineate the extent of subsurface contamination. Pilot studies to evaluate various corrective measure alternatives will also be part of the facility investigation.

In general, further investigation of all phases of hydrocarbon impact (surface water, groundwater, and soil) will be necessary to the south of the facility, along Sullivan Road, and to the northeast of the AST farm. The additional data from the facility investigation will be used to design and implement a comprehensive, effective remediation program for the BRC site.

8.0 REFERENCES

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United States Department of the Interior - Bureau of Reclamation, "San Juan River Unit - Hammond Project Portion, New Mexico (Colorado River Water Quality Improvement Program)", Preliminary Draft - Planning Report/Environmental Assessment (PR/EA), January 1993.

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Geoscience Consultants, Ltd., "Final Report on Soil Vapor Survey, Well Installation and Hydrocarbon Recovery System - Bloomfield Refining Company", August 3, 1989.

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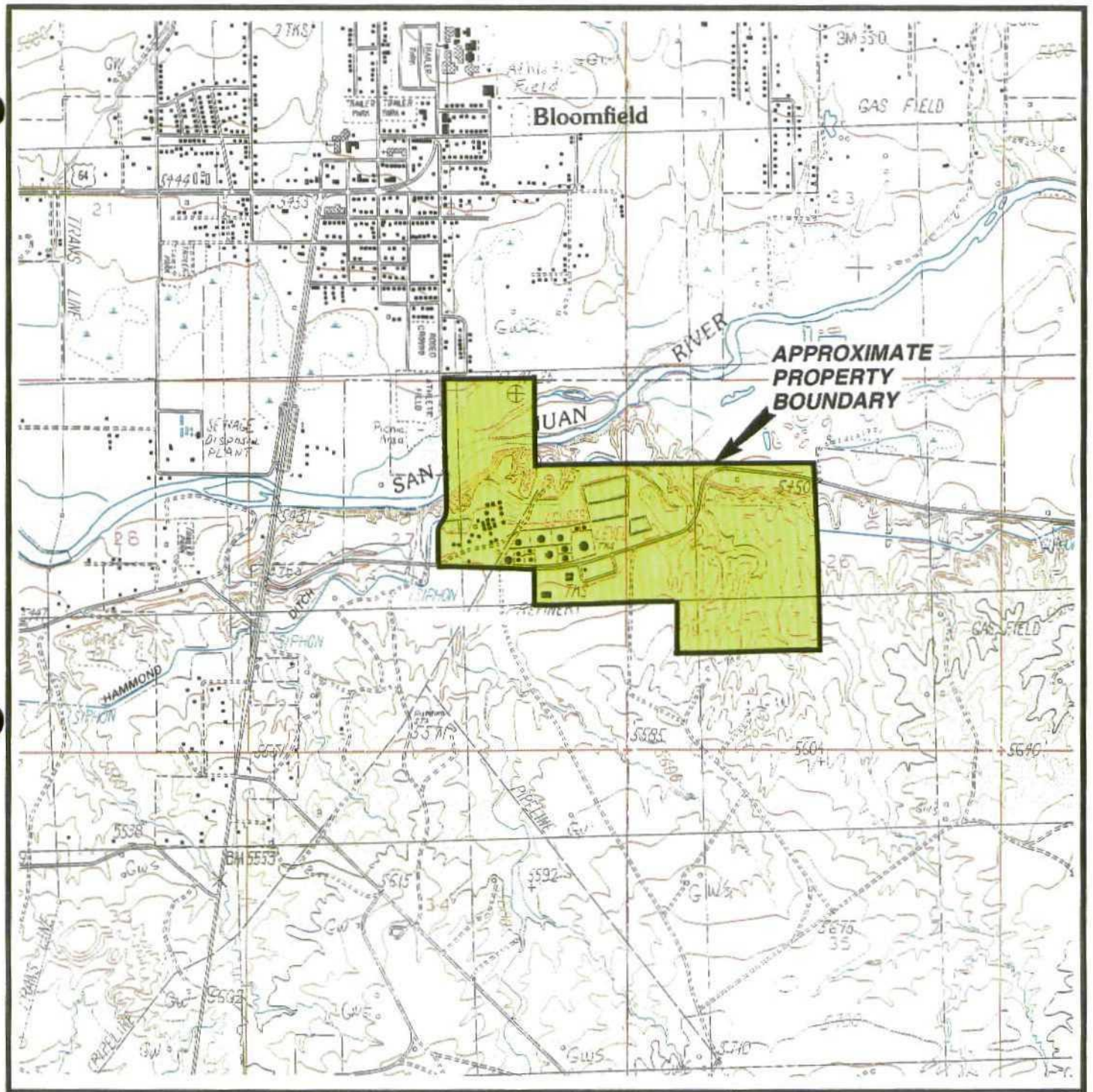


LEGEND

SITE BOUNDARY

NEW MEXICO

QUADRANGLE LOCATION

N

1000 0 2000

SCALE IN FEET

BLOOMFIELD, N. MEX.QUADRANGLE
PROVISIONAL EDITION
1985
36107-F8-TF-024

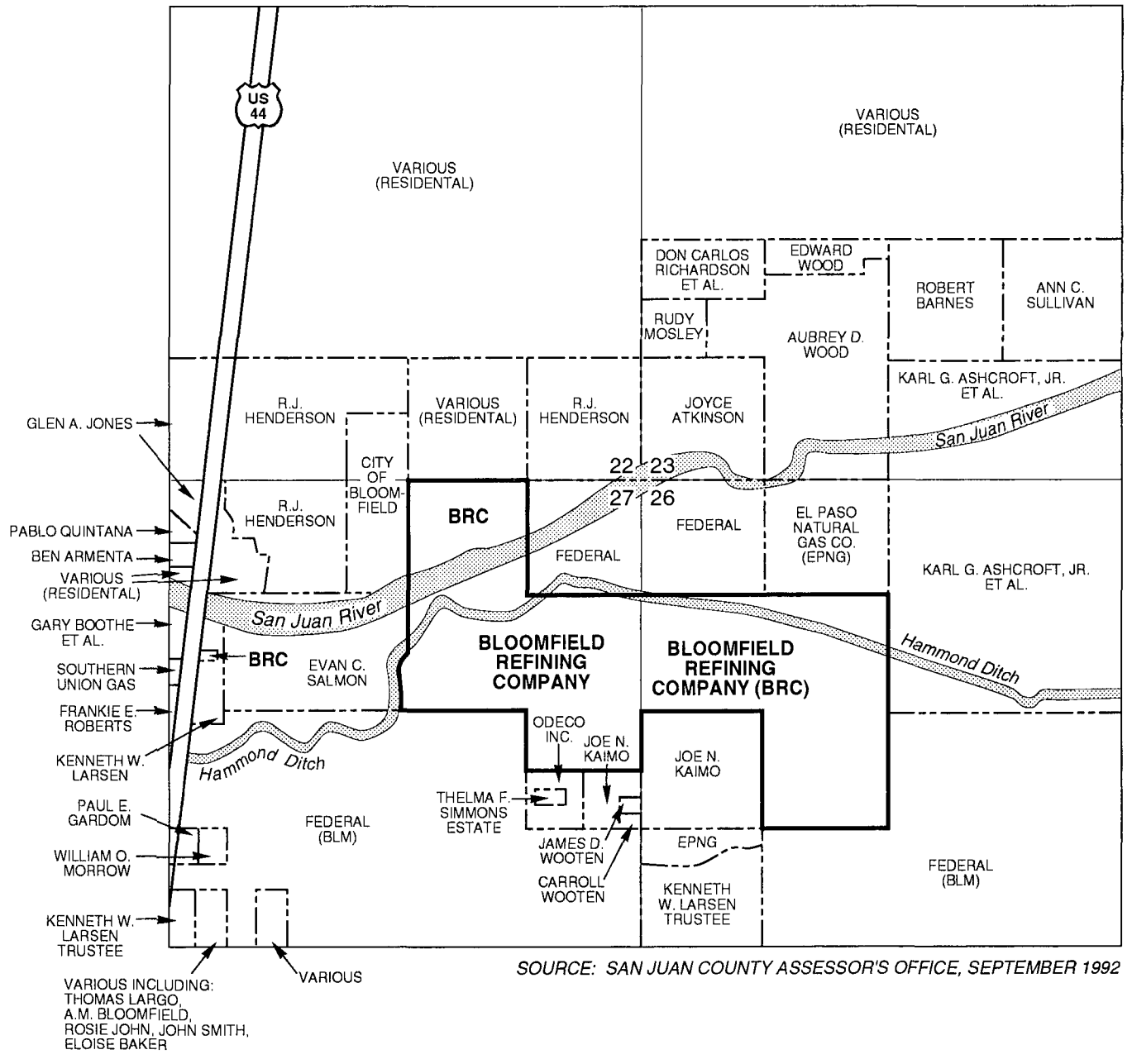
Bloomfield Refining Company
A Gary Energy Corporation Subsidiary
#50 COUNTY ROAD 4990
BLOOMFIELD, NEW MEXICO

GROUNDWATER TECHNOLOGY
2501 YALE BLVD. SE, SUITE 204
ALBUQUERQUE, N.M. 87106 (505) 242-3113

SITE LOCATION

DESIGNED BY: CD	DETAILED BY: EF	CHECKED BY:
DATE: 2/2/93		FILE: BL-SITELOC
PROJECT NO.: 023353014		CONTRACT:
DRAWING: FIGURE 1		REVISION: -

T29N R11W, SEC. 22, 23, 26 & 27



SOURCE: SAN JUAN COUNTY ASSESSOR'S OFFICE, SEPTEMBER 1992

LEGEND

PROPERTY BOUNDARY LINE

SECTION LINE

0 1/4 1/2 MILE

SCALE

N

NOTE:
LOCATIONS OF PROPERTY BOUNDARIES, IMPROVEMENTS, AND NATURAL FEATURES ARE APPROXIMATE.

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BLOOMFIELD, NEW MEXICO

GROUNDWATER TECHNOLOGY
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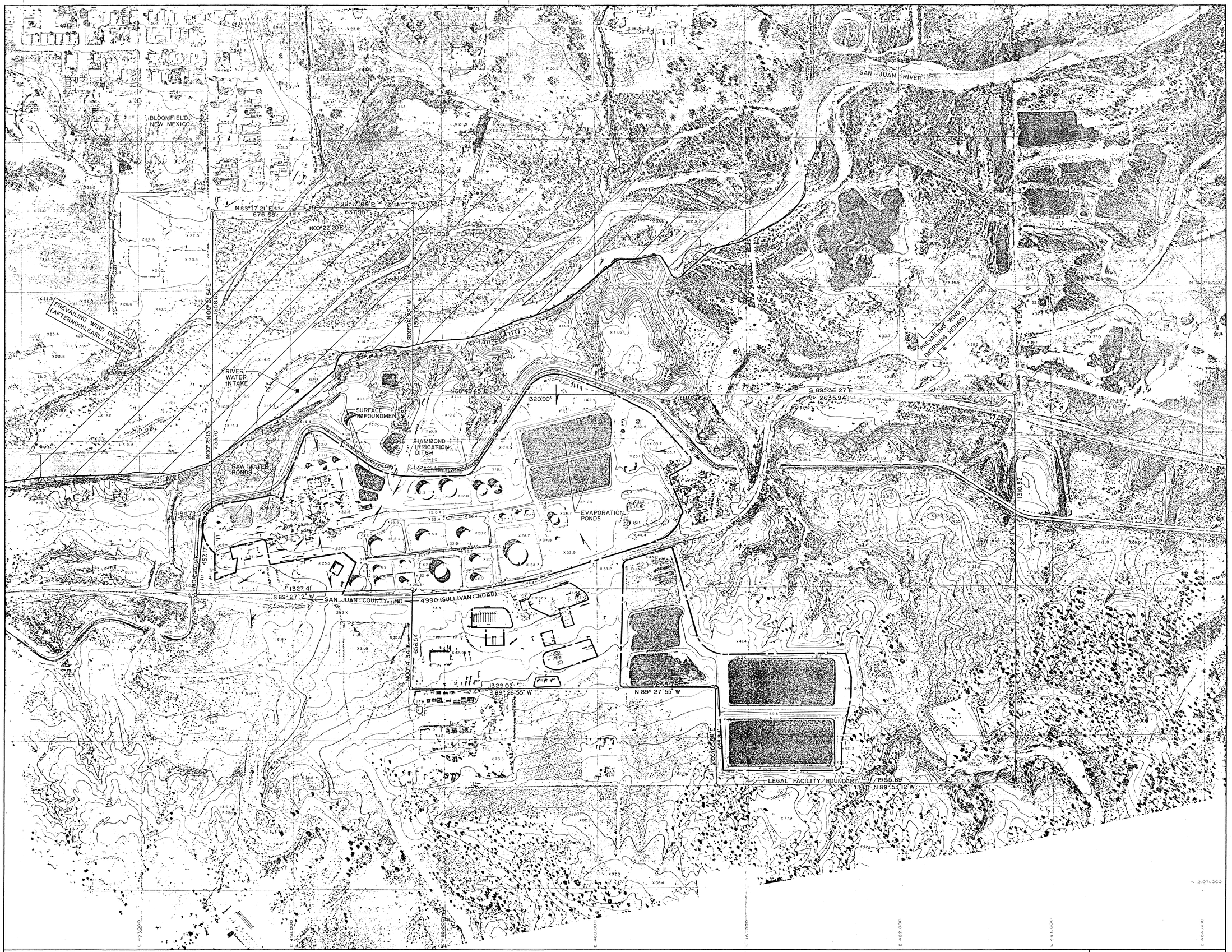
BLOOMFIELD REFINING COMPANY AND SURROUNDING PROPERTIES

DESIGNED BY: PS	DETAILED BY: EF	CHECKED BY:
DATE: 2/9/93	FILE: BL-PropOwner	
PROJECT NO.: 023353014	CONTRACT:	
DRAWING: FIGURE 2	REVISION: –	



NOTES:

1) This Map Complies with National Map Accuracy Standards.
2) Field Surveys Performed by Surveying Control, Inc. of Albuquerque, New Mexico Using GPS Methods.
3) Aerial Photography Exposed on April 9, 1991 by New Mexico Aerial Surveys, Inc. of Albuquerque, New Mexico Utilizing a Zeiss RMK A 15/23 Precision Aerial Mapping Camera with a Calibrated Focal Length of 153.506 mm.
4) Topographic/Orthophoto Composite Produced by Thomas R. Mann & Associates, Inc. of Albuquerque, New Mexico.
5) 1000' Grid Based on the New Mexico State Plane Coordinate System, West Zone, North American Datum of 1927, with the Data Adjusted to NGS Station Dune and USBR Station N-4.

TRM

LEGEND:

RUN-OFF CONTROL BERMS AND DIKES

SURFACE WATER RUN-OFF

N

NORTH

200' 100' 0' 200' 400' 600'

SCALE: 1"=200' (1:2400)
CONTOUR INTERVAL: 5'

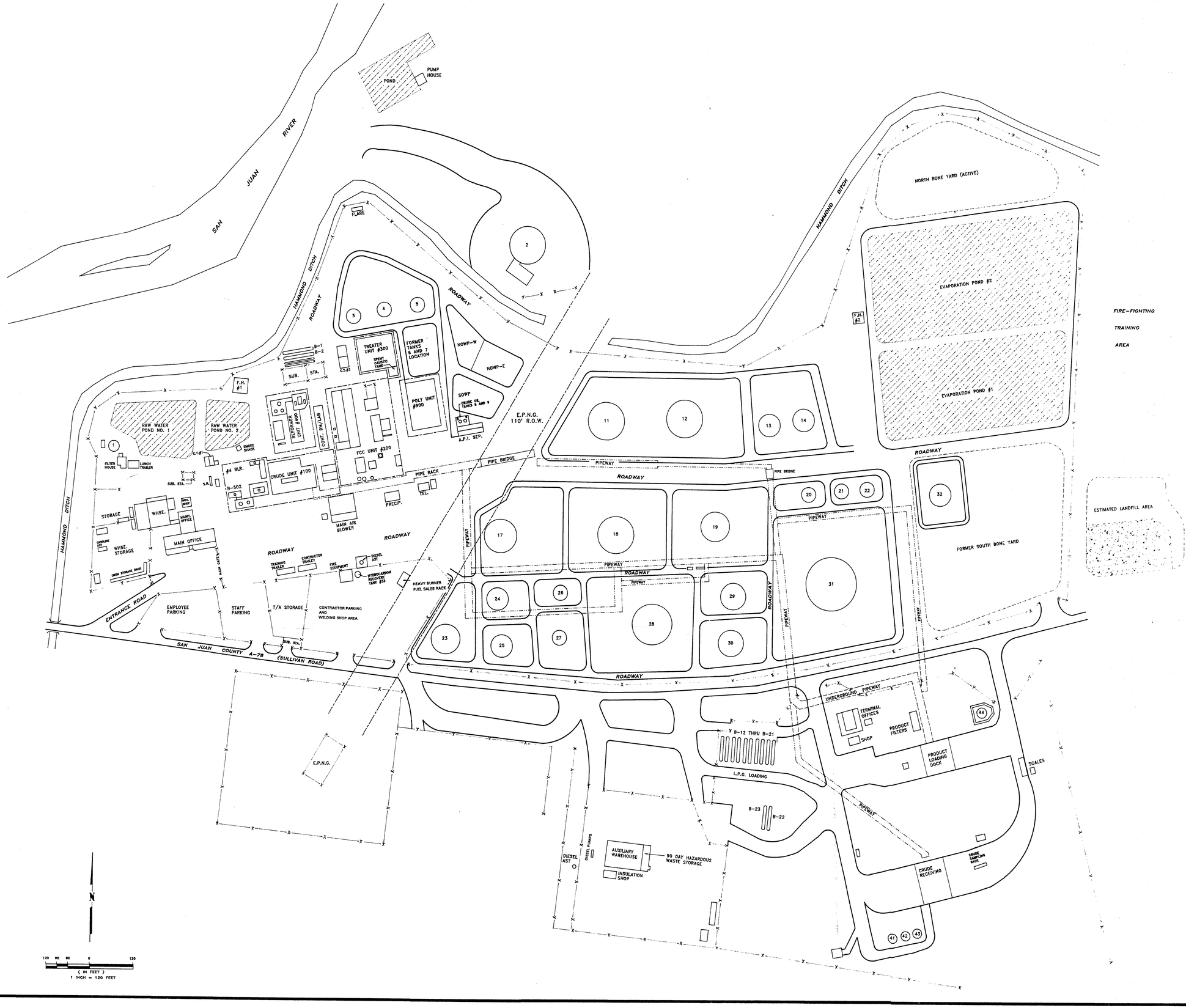
Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

SITE PLAN
AND
ORTHOPHOTO/TOPOGRAPHIC COMPOSITE

SAN JUAN ENGINEERS
2101 San Juan Boulevard
FARMINGTON, NEW MEXICO 87401

DRAWN BY: KAS	DATE: 09/24/91	SCALE: GRAPHIC	APPROVED:
CHECKED BY:			
DRAWING NUMBER: R-000-900-017			REV:

DATE	REVISION RECORD	BY	CK



NO.	DATE	BY	REVISION

LEGEND

- PIPEWAY
- UNDERGROUND PIPEWAY
- FENCE

ATTENTION

THIS DRAWING AND ANY ATTACHMENTS ("DRAWINGS"), HAVE BEEN PRODUCED FOR THE SOLE USE OF THE RECIPIENT AND MUST NOT BE USED, REUSED, REPRODUCED, MODIFIED OR COPIED ("USE") IN ANY MANNER WITHOUT PRIOR WRITTEN APPROVAL OF GROUNDWATER TECHNOLOGY, INC. THIS DRAWING MAY CONTAIN CONFIDENTIAL AND PROPRIETARY INFORMATION OF GROUNDWATER TECHNOLOGY, INC. ANY UNAUTHORIZED USE OF THIS DRAWING IS STRICTLY PROHIBITED.

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PROJECT MGR:	
CLIENT:	

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#50 COUNTY ROAD 4990 BLOOMFIELD, NEW MEXICO

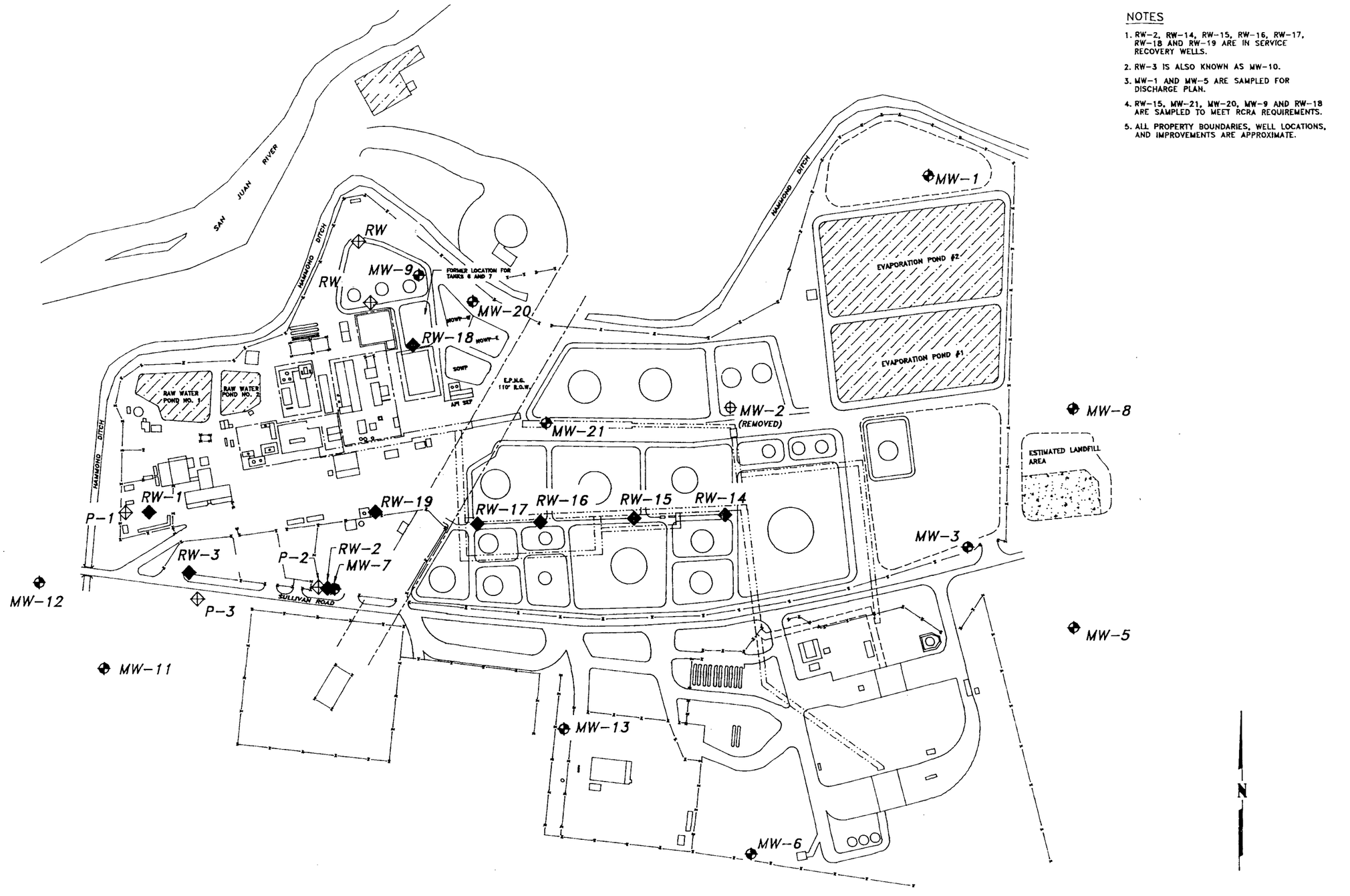
GROUNDWATER TECHNOLOGY
2501 YALE BLVD. SE, SUITE 204
ALBUQUERQUE, NEW MEXICO 87106
(505) 242-3113

SITE PLAN

DESIGNED BY:	DRAFTED BY:	CHECKED BY:
	J. ML	

DATE:	FILE:
FEBRUARY-1993	SITEPLAN.DWG
PROJECT NO.: 023353014	CONTRACT:
DRAWING:	REVISION:

FIGURE 4



NOTES

1. RW-2, RW-14, RW-15, RW-16, RW-17, RW-18 AND RW-19 ARE IN SERVICE RECOVERY WELLS.
2. RW-3 IS ALSO KNOWN AS MW-10.
3. MW-1 AND MW-5 ARE SAMPLED FOR DISCHARGE PLAN.
4. RW-15, MW-21, MW-20, MW-9 AND RW-18 ARE SAMPLED TO MEET RCRA REQUIREMENTS.
5. ALL PROPERTY BOUNDARIES, WELL LOCATIONS, AND IMPROVEMENTS ARE APPROXIMATE.

NO.	DATE	BY	REVISION

LEGEND

- PIPEWAY
- UNDERGROUND PIPEWAY
- x FENCE
- MW-1 EXISTING MONITORING WELL
- RW-1 EXISTING RECOVERY WELL
- P-1 PROPOSED RECOVERY WELL
- MW-2 FORMER MONITORING WELL

SIGNATURE	DATE
PROJECT GEO:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

Bloomfield Refining Company
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BLOOMFIELD, NEW MEXICO

GROUNDWATER TECHNOLOGY
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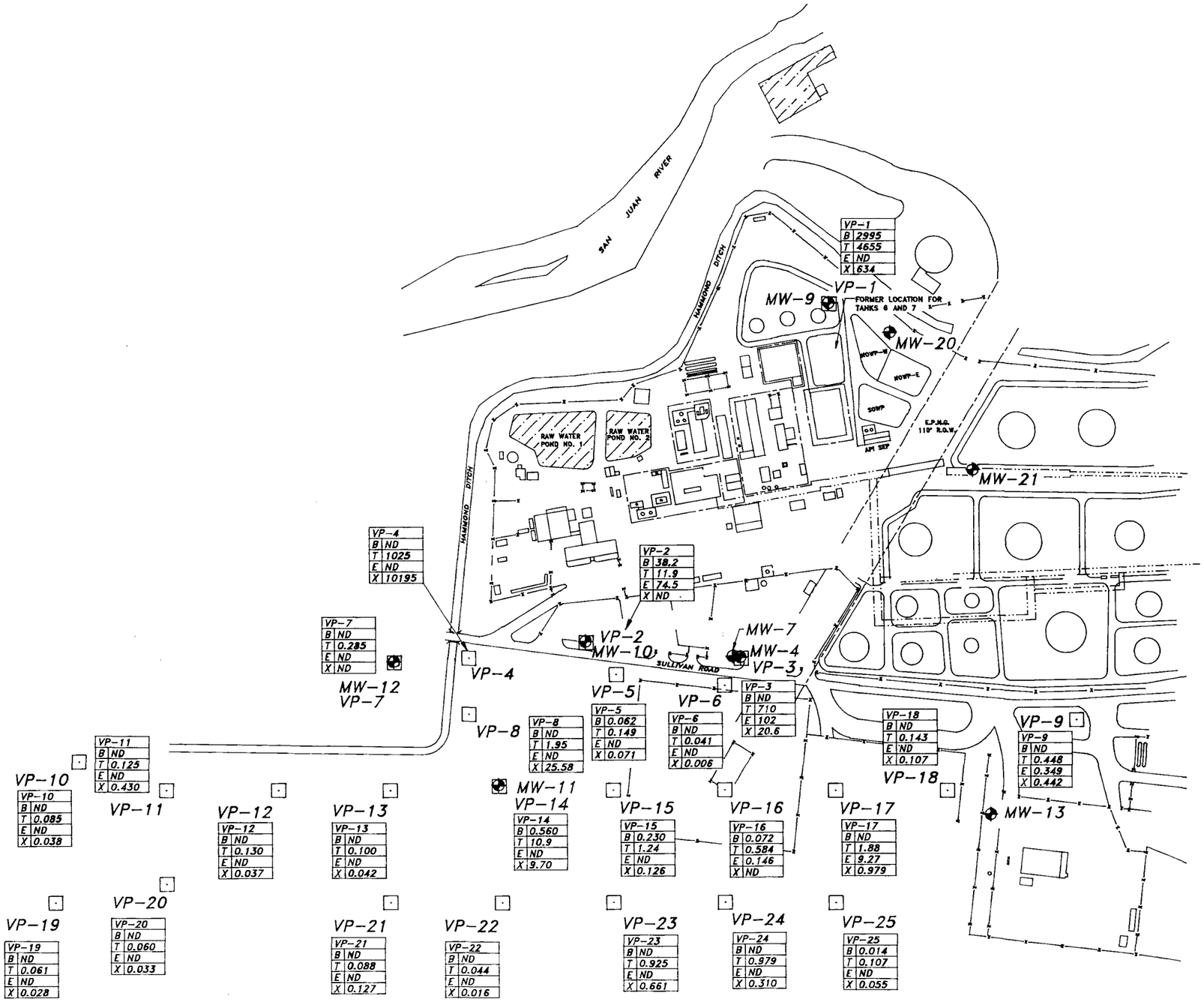
ALBUQUERQUE, NEW MEXICO 87106
(505) 242-3113

WELL LOCATIONS
(EXISTING AND PROPOSED)

DESIGNED BY:	DRAFTED BY:	CHECKED BY:
	J. ML	

DATE:	FILE:
MARCH - 1993	WELLS-B4.DWG
PROJECT NO.: 023353014	CONTRACT:
DRAWING:	REVISION:

FIGURE 5



NOTES

1. RW-2, RW-14, RW-15, RW-16, RW-17, RW-18 AND RW-19 ARE IN SERVICE *RECOVERY WELLS*.
2. RW-3 IS ALSO KNOWN AS MW-10.
3. MW-1 AND MW-5 ARE SAMPLED FOR DISCHARGE PLAN.
4. RW-15, MW-21, MW-20, MW-9 AND RW-18 ARE SAMPLED TO MEET RCRA REQUIREMENTS.
5. ALL PROPERTY BOUNDARIES, WELL LOCATIONS, AND IMPROVEMENTS ARE APPROXIMATE.

NO.	DATE	BY	REVISION

LEGEND

- PIPEWAY
- UNDERGROUND PIPEWAY
- FENCE
- MW-1 EXISTING MONITORING WELL
- RW-1 EXISTING RECOVERY WELL
- P-1 PROPOSED RECOVERY WELL
- MW-2 FORMER MONITORING WELL
- VP-1 SOIL VAPOR SAMPLING POINT

B = BENZENE
T = TOLUENE
E = ETHYLBENZENE
X = TOTAL XYLENES
ND = NOT DETECTED

CONCENTRATIONS IN ppm

SIGNATURE	DATE
PROJECT GEO:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

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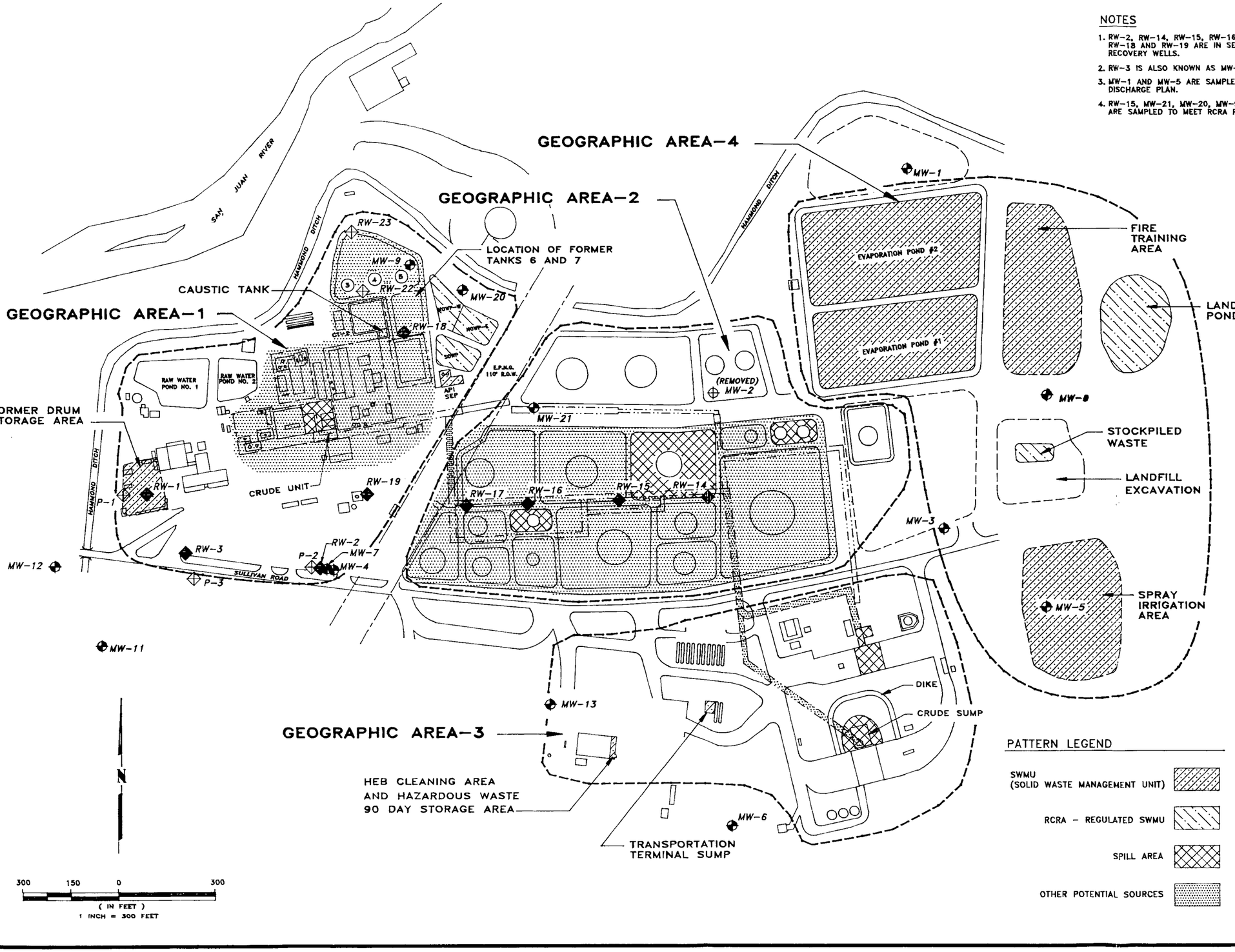
ALBUQUERQUE, NEW MEXICO 87106
(505) 242-3113

BTEX CONCENTRATIONS (ppm)
SOIL VAPOR SURVEY
JULY 1988

DESIGNED BY:	DRAFTED BY:	CHECKED BY:
	J. ML	

DATE:	FILE:
MARCH 9, 1993	BTEX0788.DWG
PROJECT NO.: 023353014	CONTRACT:
DRAWING:	REVISION:

FIGURE 6



NO.	DATE	BY	REVISION

LEGEND

- PIPEWAY
- UNDERGROUND PIPEWAY
- AREA OF CONCERN
- MW-1 EXISTING MONITORING WELL
- RW-1 EXISTING RECOVERY WELL
- P-1 PROPOSED RECOVERY WELL
- MW-2 FORMER MONITORING WELL

ATTENTION

SIGNATURE	DATE
PROJECT GEO:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

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BLOOMFIELD, NEW MEXICO

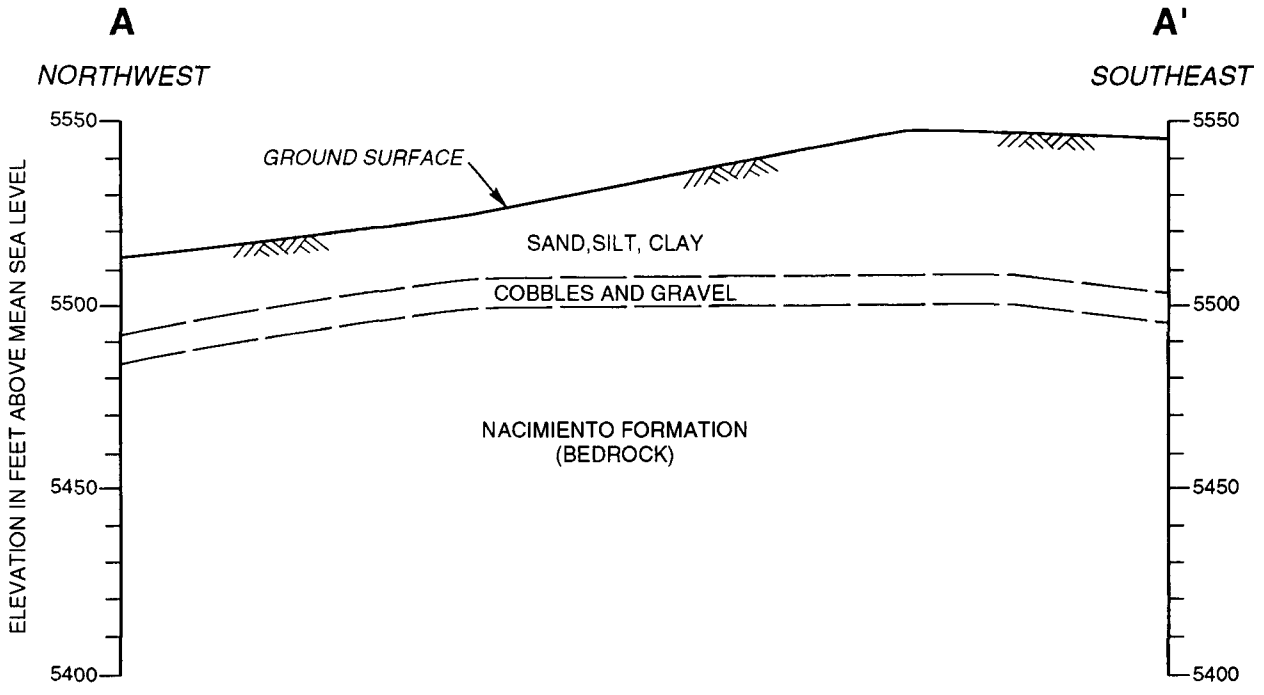
GROUNDWATER TECHNOLOGY
2501 YALE BLVD. SE, SUITE 204
ALBUQUERQUE, NEW MEXICO 87106
(505) 242-3113

SOLID WASTE MANAGEMENT UNITS AND POTENTIAL SOURCE AREAS

DESIGNED BY:	DRAFTED BY:	CHECKED BY:
	J. ML	

DATE:	FILE:
MARCH - 1993	SWMU.DWG
PROJECT NO.: 023353014	CONTRACT:
DRAWING:	REVISION:

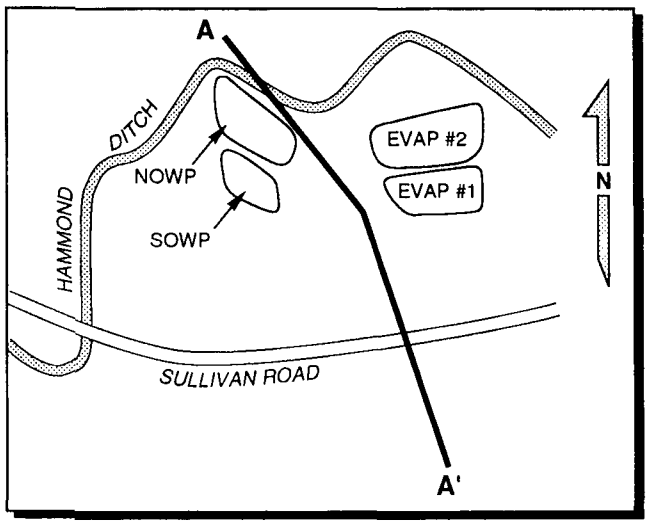
FIGURE 7



NOTE: MODIFIED FROM ERM (SEPT. 1991)

0 200 400 FT
HORIZONTAL SCALE

0 20 40 FT
VERTICAL SCALE



SITE CROSS-SECTION LOCATION MAP

Bloomfield Refining Company
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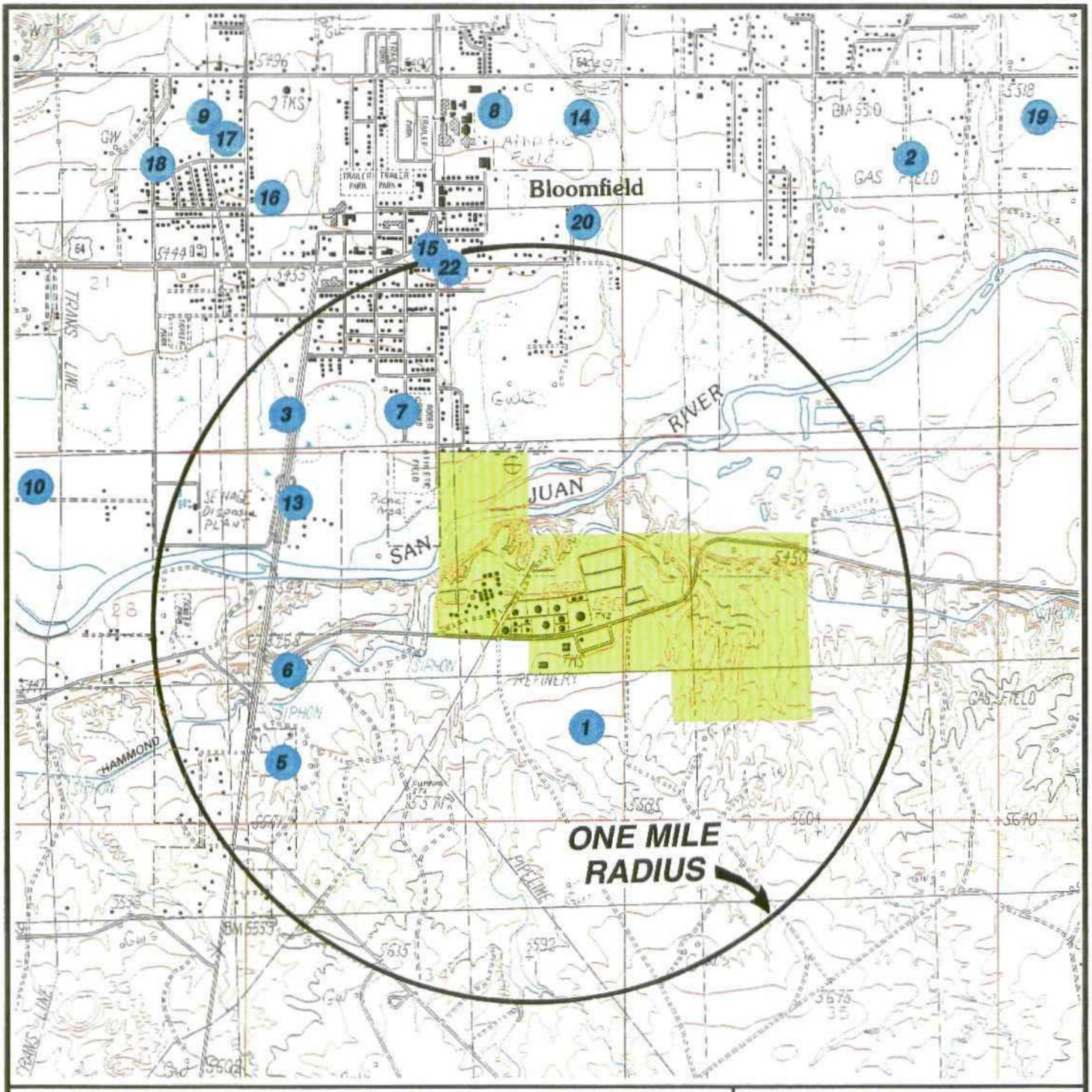
#50 COUNTY ROAD 4990
BLOOMFIELD, NEW MEXICO

GROUNDWATER TECHNOLOGY
2501 YALE BLVD. SE, SUITE 204
ALBUQUERQUE, N.M. 87106 (505) 242-3113

SITE CROSS-SECTION A-A'

DESIGNED BY: PS	DETAILED BY: EF	CHECKED BY:
DATE: 2/9/93	FILE: BL-XSect	
PROJECT NO.: 023353014	CONTRACT:	
DRAWING: FIGURE 8	REVISION: –	



LEGEND

SITE

WATER WELL LOCATION (SEE TABLE 1 FOR OWNER INFORMATION)

NOTES:

1) WELL NOS. 4, 11, & 12 NOT SHOWN SINCE LOCATIONS WERE NOT REPORTED ON WELL RECORDS. WELL NO. 21 IS NOT SHOWN, AS IT IS NOT IN THE VICINITY OF THE SITE.

2) WELLS NO. 15 AND 22 ARE APPROXIMATELY LOCATED.

BLOOMFIELD, N. MEX. QUADRANGLE
PROVISIONAL EDITION
1985
36107-F8-TF-024

NEW MEXICO
QUADRANGLE LOCATION

N

1000 0 2000
SCALE IN FEET

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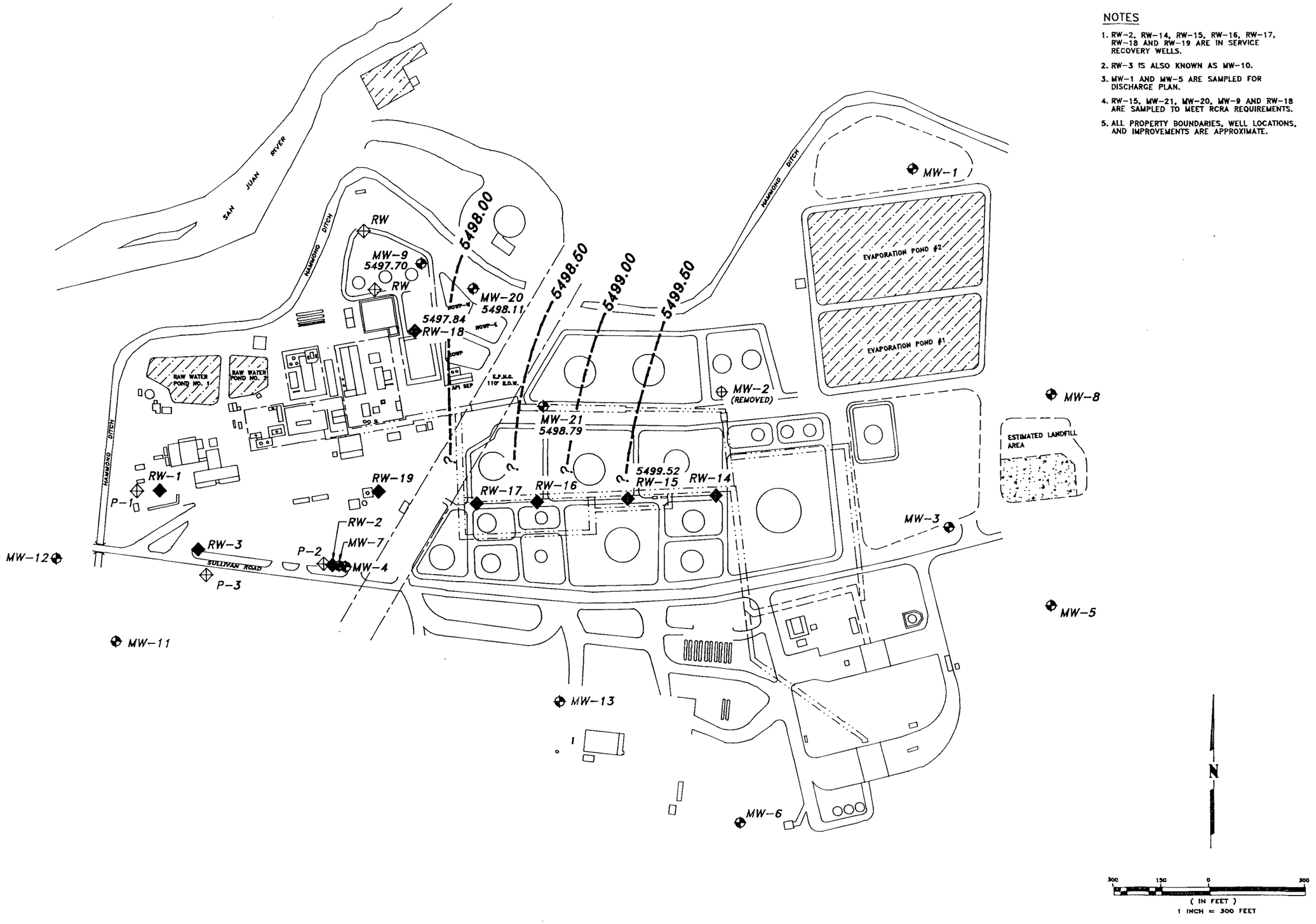
#50 COUNTY ROAD 4990
BLOOMFIELD, NEW MEXICO

GROUNDWATER TECHNOLOGY
2501 YALE BLVD. SE, SUITE 204
ALBUQUERQUE, N.M. 87106 (505) 242-3113

WATER WELLS WITHIN ONE MILE OF THE FACILITY

DESIGNED BY: CD	DETAILED BY: EF	CHECKED BY:
DATE: 2/2/93		FILE: BL-WELL LOC
PROJECT NO.: 023353014		CONTRACT:
DRAWING: FIGURE 9		REVISION: —



NOTES

1. RW-2, RW-14, RW-15, RW-16, RW-17, RW-18 AND RW-19 ARE IN SERVICE RECOVERY WELLS.
2. RW-3 IS ALSO KNOWN AS MW-10.
3. MW-1 AND MW-5 ARE SAMPLED FOR DISCHARGE PLAN.
4. RW-15, MW-21, MW-20, MW-9 AND RW-18 ARE SAMPLED TO MEET RCRA REQUIREMENTS.
5. ALL PROPERTY BOUNDARIES, WELL LOCATIONS, AND IMPROVEMENTS ARE APPROXIMATE.

NO.	DATE	BY	REVISION

LEGEND

- PIPEWAY
- UNDERGROUND PIPEWAY
- MW-1 EXISTING MONITORING WELL
- RW-1 EXISTING RECOVERY WELL
- P-1 PROPOSED RECOVERY WELL
- MW-2 FORMER MONITORING WELL
- 5498.11 GROUNDWATER ELEVATION (IN FEET - AMSL)
- 5498.00 GROUNDWATER ELEVATION CONTOUR (IN FEET - AMSL)

CONTOUR INTERVAL = 0.5 FOOT

ATTENTION

SIGNATURE	DATE
PROJECT GEO:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary
#50 COUNTY ROAD 4990
BLOOMFIELD, NEW MEXICO

GROUNDWATER TECHNOLOGY
2501 YALE BLVD. SE, SUITE 204
ALBUQUERQUE, NEW MEXICO 87106
(505) 242-3113

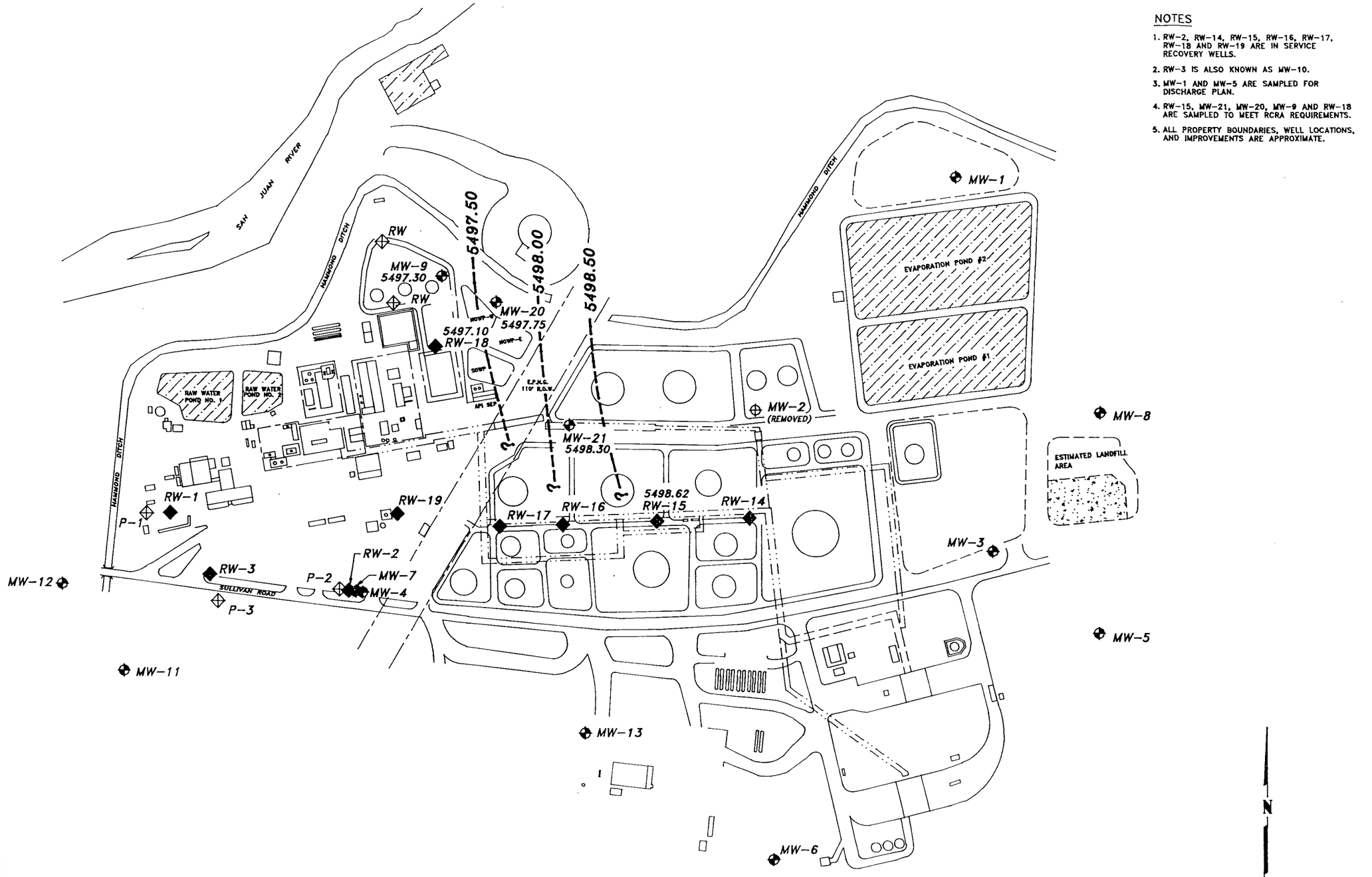
WATER TABLE CONTOUR MAP

NOVEMBER - 1991

DESIGNED BY:	DRAFTED BY:	CHECKED BY:
	J. ML	

DATE:	FILE:
FEBRUARY-1993	WTCM1191.DWG
PROJECT NO.: 023353014	CONTRACT:
DRAWING:	REVISION:

FIGURE 10



NOTES

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5. ALL PROPERTY BOUNDARIES, WELL LOCATIONS, AND IMPROVEMENTS ARE APPROXIMATE.

NO.	DATE	BY	REVISION

LEGEND

- PIPEWAY
- UNDERGROUND PIPEWAY
- MW-1 EXISTING MONITORING WELL
- RW-1 EXISTING RECOVERY WELL
- P-1 PROPOSED RECOVERY WELL
- MW-2 FORMER MONITORING WELL
- 5497.75 GROUNDWATER ELEVATION (IN FEET - AMSL)
- 5498.00 GROUNDWATER ELEVATION CONTOUR (IN FEET - AMSL) CONTOUR INTERVAL = 0.5 FOOT

ATTENTION

SIGNATURE	DATE
PROJECT GEO:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary
#50 COUNTY ROAD 4990
BLOOMFIELD, NEW MEXICO

GROUNDWATER TECHNOLOGY
2501 YALE BLVD. SE, SUITE 204
ALBUQUERQUE, NEW MEXICO 87106
(505) 242-3113

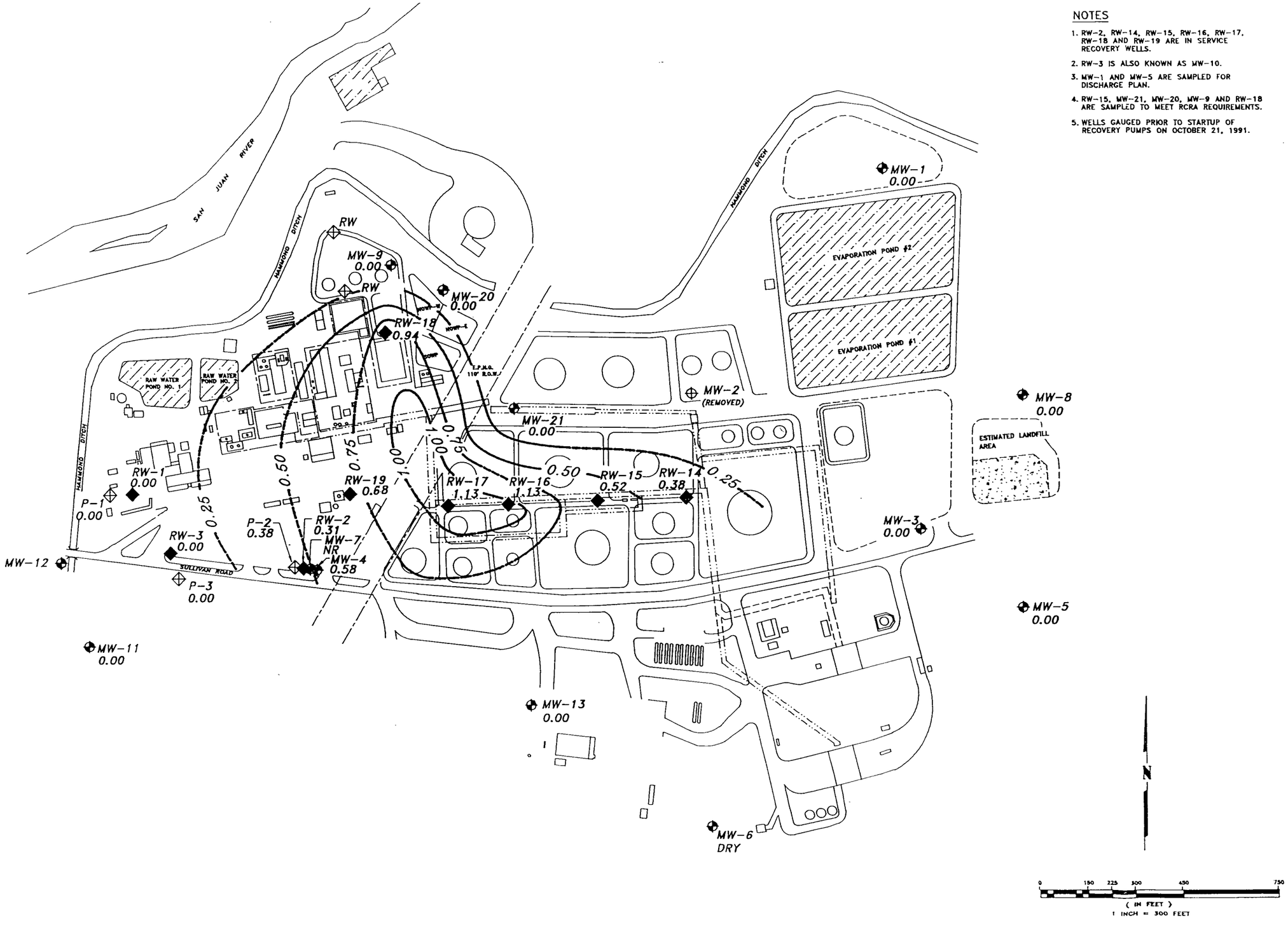
WATER TABLE CONTOUR MAP

FEBRUARY - 1992

DESIGNED BY:	DRAFTED BY:	CHECKED BY:
	J. ML	

DATE:	FILE:
FEBRUARY-1993	WTCM0292.DWG
PROJECT NO.: 023353014	CONTRACT:
DRAWING:	REVISION:

FIGURE 11



NOTES

1. RW-2, RW-14, RW-15, RW-16, RW-17, RW-18 AND RW-19 ARE IN SERVICE RECOVERY WELLS.
2. RW-3 IS ALSO KNOWN AS MW-10.
3. MW-1 AND MW-5 ARE SAMPLED FOR DISCHARGE PLAN.
4. RW-15, MW-21, MW-20, MW-9 AND RW-18 ARE SAMPLED TO MEET RCRA REQUIREMENTS.
5. WELLS GAUGED PRIOR TO STARTUP OF RECOVERY PUMPS ON OCTOBER 21, 1991.

NO.	DATE	BY	REVISION

LEGEND

- PIPEWAY
- UNDERGROUND PIPEWAY
- MW-1 EXISTING MONITORING WELL
- RW-1 EXISTING RECOVERY WELL
- P-1 PROPOSED RECOVERY WELL
- MW-2 FORMER MONITORING WELL
- 0.00 HYDROCARBON THICKNESS (IN FEET)
- 0.25 HYDROCARBON THICKNESS CONTOUR (IN FEET)

CONTOUR INTERVAL = .25 FEET

ATTENTION

SIGNATURE	DATE
PROJECT GEO:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary
#50 COUNTY ROAD 4990
BLOOMFIELD, NEW MEXICO

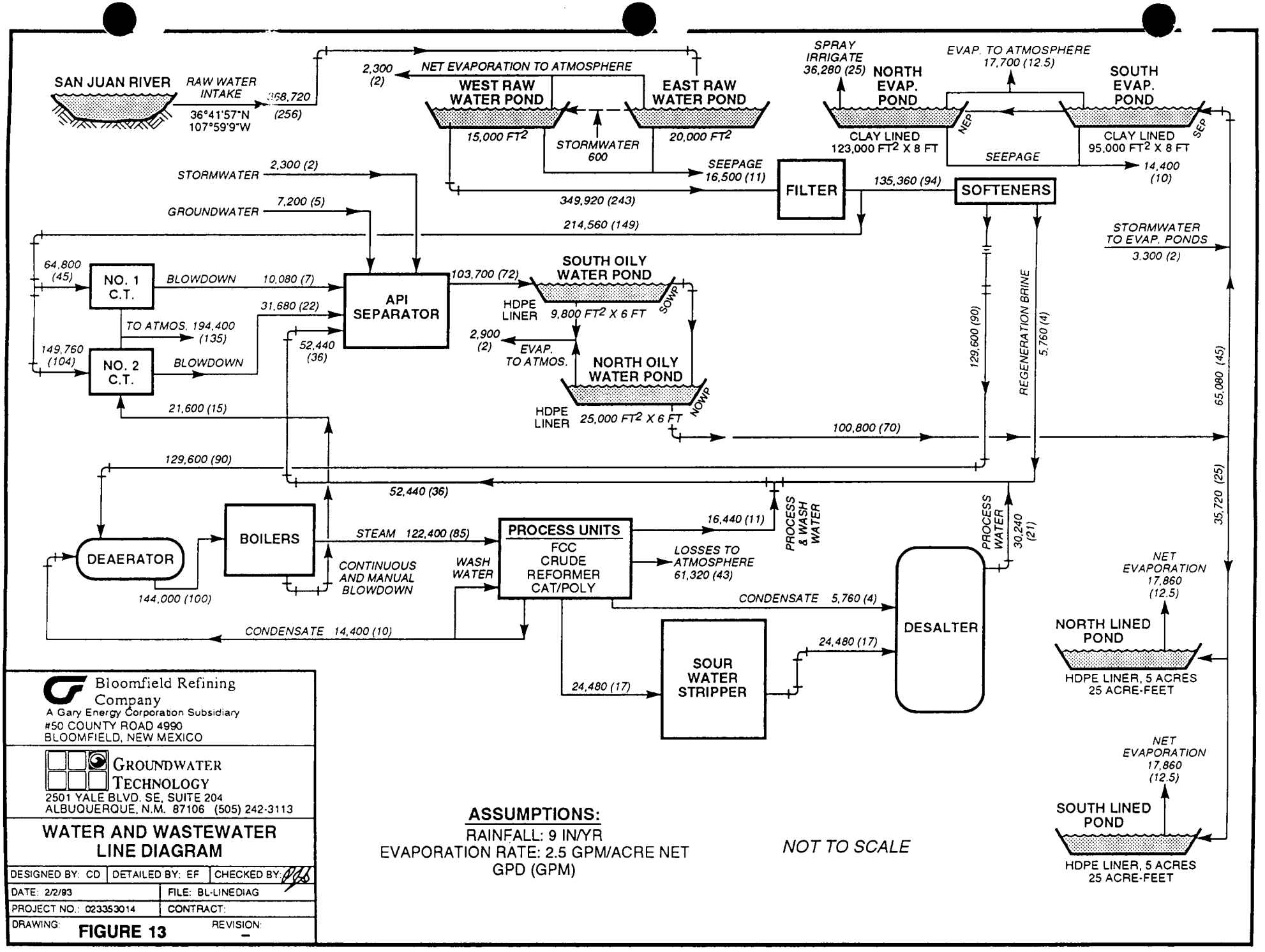
GROUNDWATER TECHNOLOGY
2501 YALE BLVD. SE, SUITE 204
ALBUQUERQUE, NEW MEXICO 87106
(505) 242-3113

SEPARATE PHASE HYDROCARBON ISOPLETH

DESIGNED BY:	DRAFTED BY:	CHECKED BY:
	J. ML	

DATE:	FILE:
FEBRUARY-1993	SPHC-B5.DWG
PROJECT NO.: 023353014	CONTRACT:
DRAWING:	REVISION:

FIGURE 12



Bloomfield Refining Company
A Gary Energy Corporation Subsidiary
#50 COUNTY ROAD 4990
BLOOMFIELD, NEW MEXICO

GROUNDWATER TECHNOLOGY
2501 YALE BLVD. SE, SUITE 204
ALBUQUERQUE, N.M. 87106 (505) 242-3113

WATER AND WASTEWATER LINE DIAGRAM

DESIGNED BY: CD	DETAILED BY: EF	CHECKED BY:
DATE: 2/2/93	FILE: BL-LINEDIAG	
PROJECT NO.: 023353014	CONTRACT:	
DRAWING: FIGURE 13	REVISION: –	

ASSUMPTIONS:
RAINFALL: 9 IN/YR
EVAPORATION RATE: 2.5 GPM/ACRE NET
GPD (GPM)

NOT TO SCALE

TABLE 1

SUMMARY OF HAZARDOUS WASTES GENERATED AT BLOOMFIELD REFINING COMPANY, BLOOMFIELD, NEW MEXICO

HAZARDOUS WASTE	USEPA REASON FOR LISTING	AMOUNT GENERATED
Heat exchanger bundle (HEB) cleaning sludge (K050)	Hexavalent chromium	5,000 lb/3 yrs
API separator sludge (K051)	Hexavalent chromium & lead	250,000 lb/2 yrs
Leaded tank bottoms (K052)	Lead	8,000 lb/tank/5 yrs
1,1,1-Trichloroethane and methanol in naphtha (D001, F002)	Ignitable, spent halogenated solvent	None Recent - Potential Waste
Process Waste Water Containing Benzene (D018)	Benzene	108,800 gal/day
Spent Solvent (D001)	Ignitable	2,000 lb/yr

SOURCE:

"Part B Operating Permit Application for Surface Impoundments," ERM, September 25, 1991.

"Preliminary Review Report/Visual Site Inspection," EPA Contract No. 68-01-7251, August 25, 1987.

TABLE 2

MONITORING WELL SPECIFICATIONS
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO

WELL ID	INSTALL DATE	GRADE ELEV (FT)	TOC ELEV (FT)	TOP SCRN ELEV (FT)	BOT SCRN ELEV (FT)	TOTAL DEPTH (FT)
MW-1	8-Feb-84	5514.07	5515.77	5511.12	5491.12	24.65
MW-2	8-Feb-84	5517.95	5519.45	5512.55	5492.55	26.90
MW-3	9-Feb-84	5534.85	5535.85	5516.50	5496.50	39.35
MW-4	9-Feb-84	5522.90	5524.30	5511.80	5491.80	32.50
MW-5	6-Feb-84	5544.10	5545.10	5513.49	5493.49	51.61
MW-6	7-Feb-86	5549.63	5551.23	5521.60	5501.60	49.63
MW-7	25-Feb-86	5522.99	5524.09	5473.98	5463.98	62.11
MW-8	28-Feb-86	5530.12	5531.12	5518.18	5498.18	34.94
MW-9	3-Mar-86	5518.00	5519.70	5507.71	5487.71	33.99
RW-1	31-Aug-88	5524.52	5525.92	5507.12	5491.52	40.98
P-1	30-Aug-88	5523.82	5524.62	5503.32	5487.32	42.45
RW-2	29-Aug-88	5522.98	5523.48	5506.98	5491.28	38.03
P-2	29-Aug-88	5522.93	5523.73	5506.33	5491.03	38.33
RW-3	4-Mar-86	5515.46	5516.86	5504.93	5484.93	33.93
P-3	1-Sep-88	5506.40	5507.20	5500.85	5490.40	22.80
MW-11	31-Jul-87	5503.23	5506.83	5498.23	5488.23	24.73
MW-12	1-Aug-87	5495.86	5498.36	5491.86	5481.86	14.22
MW-13	3-Sep-88	5535.12	5538.42	5509.59	5493.82	53.00
RW-14	6-Aug-90	5532.07	5533.97	5510.97	5492.97	43.00
RW-15	7-Aug-90	5531.62	5533.32	5509.92	5491.92	43.40
RW-16	7-Aug-90	5530.19	5531.99	5508.89	5490.89	43.10
RW-17	7-Aug-90	5528.83	5530.43	5508.88	5490.88	41.55
RW-18	8-Aug-90	5523.45	5527.05	5506.10	5488.10	40.95
RW-19	8-Aug-90	5525.58	5527.08	5510.38	5492.38	36.70
MW-20	13-Sep-91	5514.64	5516.44	5506.26	5491.26	27.18
MW-21	16-Sep-91	5517.04	5518.64	5504.71	5489.71	30.93

SOURCE: Bloomfield Refining Company Groundwater Sampling and Analysis Plan, NMD 089-416-416, 1991

TABLE 3 (Page 1 of 3)

SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS
FINAL CLOSURE PLAN FOR THE API WASTEWATER PONDS,
LANDFILL, AND LANDFILL PONDS
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO

SAMPLE NO.	SAMPLE LOCATION	DATE SAMPLED	PHENOLICS	Cr	Pb	BENZENE	ETHYLBENZENE	TOLUENE	TOTAL XYLENES	MEK
51469-01	L1 & L2, 0-6" Quadrant # 1 - Landfill	10/16/85	ND	11	10	ND	ND	ND	ND	NT
51469-02	L3 & L4, 6-12" Quadrant # 1 - Landfill	10/16/85	ND	8.9	9.8	ND	ND	ND	ND	NT
51469-03	L5 & L6, 0-6" Quadrant # 2 - Landfill	10/16/85	ND	9.9	9.0	ND	ND	ND	ND	NT
51469-04	L7 & L8, 6-12" Quadrant # 2 - Landfill	10/16/85	ND	7.6	6.7	ND	ND	ND	ND	NT
51469-05	L9 & L10, 0-6" Quadrant # 3 - Landfill	10/16/85	ND	7.8	7.6	ND	ND	ND	ND	NT
51469-06	L11 & L12, 6-12" Quadrant # 3 - Landfill	10/16/85	ND	7.4	7.0	ND	ND	ND	ND	NT
51469-07	L13 & L14, 0-6" Quadrant # 4 - Landfill	10/16/85	ND	9.1	8.2	ND	ND	ND	ND	NT
51469-08	L15 & L16, 6-12" Quadrant # 4 - Landfill	10/16/85	ND	7.0	7.7	ND	ND	ND	ND	NT
51469-09	LP1 & LP2, 0-6" Points 1&2 @ Landfill Pond	10/16/85	ND	6.2	9.0	ND	ND	ND	ND	NT
51469-10	LP3 & LP4, 6-12" Points 1&2 @ Landfill Pond	10/16/85	ND	8.1	8.5	ND	ND	ND	ND	NT
51469-11	LP5 & LP6, 0-6" Points 3&4 @ Landfill Pond	10/16/85	ND	7.8	8.9	ND	ND	ND	ND	NT

TABLE 3 (Page 2 of 3)

SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS
FINAL CLOSURE PLAN FOR THE API WASTEWATER PONDS,
LANDFILL, AND LANDFILL PONDS
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO

SAMPLE NO.	SAMPLE LOCATION	DATE SAMPLED	PHENOLICS	Cr	Pb	BENZENE	ETHYLBENZENE	TOLUENE	TOTAL XYLENES	MEK
51469-12	LP7 & LP8, 6-12" Points 3&4 @ Landfill Pond	10/16/85	ND	10	12	ND	ND	ND	ND	NT
51469-13	LP9 & LP10, 0-6" Points 5&6 @ Landfill Pond	10/16/85	ND	8.0	12	0.0013	ND	ND	ND	NT
51469-14	LP11 & LP12, 6-12" Points 5&6 @ Landfill Pond	10/16/85	ND	7.8	13	ND	ND	ND	ND	NT
51469-15	LP13 & LP14, 0-6" S. Evaporation Pond Landfill Pond	10/16/85	ND	2.3	4	ND	ND	ND	ND	ND
51469-16	MS1 & MS2, Mystery Sample	10/16/85	ND	2.4	4	ND	ND	ND	ND	0.053
51469-17	APS1 & APS2, 0-6" NE & SE of SOWP	10/15/85	ND	4.4	5	ND	ND	ND	0.0074	NT
51469-18	APS3 & APS4, 6-12" NE & SE of SOWP	10/15/85	ND	5.3	5	ND	ND	ND	ND	NT
51469-19	APS5 & APS6, 0-6" N & S of SOWP	10/15/85	ND	5.5	5	ND	ND	ND	ND	NT
51469-20	APS7 & APS8, 6-12" N & S of SOWP	10/15/85	ND	14	4	ND	ND	ND	ND	NT
51469-21	APS9 & APS10, 0-6" NW & SW of SOWP	10/15/85	ND	6.8	5.1	ND	ND	ND	ND	NT
51469-22	APS11 & APS12, 6-12" NW & SW of SOWP	10/15/85	ND	27	5.9	ND	ND	ND	ND	NT

TABLE 3 (Page 3 of 3)

SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS
FINAL CLOSURE PLAN FOR THE API WASTEWATER PONDS,
LANDFILL, AND LANDFILL PONDS
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO

SAMPLE NO.	SAMPLE LOCATION	DATE SAMPLED	PHENOLICS	Cr	Pb	BENZENE	ETHYLBENZENE	TOLUENE	TOTAL XYLENES	MEK
51469-23	APS13, 0-6" SE near influent SOWP	10/15/85	ND	4.9	6.0	ND	ND	ND	ND	ND
51469-24	APN1 & APN2, 0-6" NE & SE of NOWP	10/15/85	ND	7.8	4	ND	ND	ND	ND	NT
51469-25	APN3 & APN4, 6-12" NE & SE of NOWP	10/15/85	ND	3.2	3	ND	ND	ND	ND	NT
51469-26	APN5 & APN6, 0-6" NE & SE of NOWP	10/15/85	ND	3.6	5	ND	ND	ND	ND	NT
51469-27	APN7 & APN8, 6-12" N & S of NOWP	10/15/85	ND	2.3	3	ND	ND	ND	ND	NT
51469-28	APN9 & APN10, 0-6" NW & SW of NOWP	10/15/85	ND	2.9	3	ND	ND	ND	ND	NT
51469-29	APN11 & APN12, 6-12" NW & SW of NOWP	10/15/85	ND	12	4	ND	ND	ND	ND	NT

ND= not detected
NT= not tested

Samples 51469-15, 51469-16 and 51469-23 also analyzed for VOCs (USEPA method 8240) and BNAs (USEPA method 8270).
Only compounds detected are reported.
Analyses performed by Rocky Mountain Analytical Laboratory.

SOURCE: "Final Closure Plan for API Wastewater Ponds, Landfill and Landfill Pond at the Bloomfield Refinery," Engineering-Science, Inc., July 1986.

TABLE 4 (Page 1 of 2)

SUMMARY OF SURFACE WATER
SAMPLE ANALYTICAL RESULTS
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO
APRIL 1986 - JULY 1987

SAMPLE LOCATION	Hammond Ditch	Hammond Ditch	Hammond Ditch	Hammond Ditch	San Juan River	San Juan River	San Juan River	San Juan River
SAMPLE ID	Near Sullivan Rd. (HSRD5)	Near API Ponds (HAPI)	Near API Waste Ponds (U6A)	Near Sullivan Road (D64)	Hwy 44 Bridge Near Side	Hwy 44 Bridge Middle	Hwy 44 Bridge Farside	Upstream
SAMPLE DATE	22. April 1986	22. April 1986	28. April 1986	28. April 1986	24. July 1987	24. July 1987	24. July 1987	24. July 1987
ANALYTES								
VOLATILE ORGANIC COMPOUNDS								
Benzene	0.006	ND	ND	ND	ND	ND	ND	ND
Toluene	0.003	ND	ND	ND	ND	ND	ND	ND
SEMIVOLATILE ORGANIC COMPOUNDS								
Anthracene	0.006	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	0.003	ND	ND	ND	ND	ND	ND	ND
Chrysene	0.005	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	0.001	ND	ND	ND	ND	ND	ND
Naphthalene	0.013	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	0.007	ND	ND	ND	ND	ND	ND	ND
Pyrene	0.008	ND	ND	ND	ND	ND	ND	ND
PHENOLS	0.002	0.002	0.003	0.002	0.018	ND	0.013	0.018

GROUNDWATER TECHNOLOGY

TABLE 4 (Page 2 of 2)

SUMMARY OF SURFACE WATER
SAMPLE ANALYTICAL RESULTS
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO
APRIL 1986 - JULY 1987

SAMPLE LOCATION	Hammond Ditch	Hammond Ditch	Hammond Ditch	Hammond Ditch	San Juan River	San Juan River	San Juan River	San Juan River
SAMPLE ID	Near Sullivan Rd. (HSRD5)	Near API Ponds (HAPI)	Near API Waste Ponds (U6A)	Near Sullivan Road (D64)	Hwy 44 Bridge Near Side	Hwy 44 Bridge Middle	Hwy 44 Bridge Farside	Upstream
SAMPLE DATE	22. April 1986	22. April 1986	28. April 1986	28. April 1986	24. July 1987	24. July 1987	24. July 1987	24. July 1987
ANALYTES								
METALS								
Lead	ND	ND	NT	NT	0.061	0.054	ND	ND
CN	ND	ND	NT	NT	0.066	0.038	0.053	0.044
TDS	NT	NT	NT	NT	238	228	248	232
Cl	NT	NT	NT	NT	4.96	4.96	4.96	4.46
SO4	NT	NT	NT	NT	64.5	75.0	64.9	62.4
TOC	NT	NT	NT	NT	5	5	6	5

Units= mg/l (approximately equivalent to parts per million (ppm)).
ND= not detected
NT= not tested

CN = Cyanide
TDS = Total Dissolved Solids
Cl = Chloride
SO4 = Sulfate
TOC = Total Organic Carbon

Samples analyzed by Assaigai Analytical Laboratories (Albuquerque, NM) by SW-846 test methods.
Only compounds detected are reported.

SOURCE:
"A Final Report on Section 3013 Administrative Order Work Elements", Engineering-Sciences, Inc., February 8, 1987.
Correspondence from Richard Traylor of BRC to William Taylor, Jr. of USEPA dated September 14, 1987.

TABLE 5 (Page 1 of 4)

SUMMARY OF ORGANIC GROUNDWATER ANALYTICAL DATA
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO

WELL ID	SAMPLE DATE	TOC	TOX	B	T	E	X	TOTAL PHEN	EDC	2,4 DCP	2,4 DMP	4,6 DNC	2,4 DNP	2-NP	4-NP	BENZ ANTH	PHEN	CHRY-SENE	FLUO-RENE	NAPH	PYR	2 CHLR PHEN	PCMC	BENZ FLR	A-NAPH	ANTH	FLUORANTH
MW-1	26-Mar-86	18.0	NT	ND	ND	ND	ND	0.009	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	23-Jun-86	24.0	ND	ND	ND	ND	ND	0.017	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Sep-86	24.0	NT	ND	ND	ND	ND	0.19	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Dec-86	18.0	0.002	ND	ND	ND	ND	0.012	0.002	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	28-May-87	NT	NT	ND	ND	NT	NT	0.123	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	17-Nov-87	NT	NT	ND	ND	NT	NT	0.02	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	3-Jun-88	NT	NT	ND	ND	NT	NT	0.021	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Nov-88	NT	NT	0.00075	0.00268	NT	NT	0.05	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	25-May-89	NT	NT	ND	ND	ND	ND	0.214	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1-Dec-89	NT	NT	ND	0.00375	ND	ND	0.151	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	19-Jun-90	11.30	NT	ND	ND	ND	ND	0.231	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	14-Nov-90	12.8	NT	ND	ND	ND	0.0011	0.50	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Jun-91	NT	NT	ND	ND	ND	ND	0.022	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	7-Nov-91	NT	NT	ND	ND	ND	ND	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	9-Jun-92	NT	NT	ND	ND	0.0014	ND	0.04	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	11-Dec-92	NT	NT	ND	ND	ND	ND	0.01	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-2	26-Mar-86	18.0	NT	ND	ND	ND	ND	0.063	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	23-Jun-86	27.0	NT	ND	ND	ND	ND	0.023	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Sep-86	23.0	NT	ND	ND	ND	ND	0.17	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Dec-86	15.0	NT	ND	ND	ND	ND	0.110	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-3	26-Mar-86	29.0	NT	ND	ND	ND	ND	0.006	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	23-Jun-86	17.0	NT	ND	0.003	ND	0.030	0.006	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Sep-86	16.0	NT	ND	ND	ND	ND	0.082	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Dec-86	12.0	NT	ND	ND	ND	ND	0.012	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-4	26-Mar-86	110.0	NT	11.8	7.5	0.107	NT	0.633	ND	0.200	ND	0.100	0.050	ND	0.090	ND	0.202	ND	0.150	0.036	0.166	ND	ND	ND	0.044	ND	ND
	23-Jun-86	130.0	NT	3.1	0.290	0.070	NT	0.430	ND	ND	0.058	ND	ND	0.108	0.302	0.016	ND	0.023	ND	0.019	ND	ND	ND	ND	ND	ND	ND
	18-Sep-86	63.0	NT	6.65	0.407	0.140	NT	0.085	ND	ND	ND	ND	ND	0.026	0.331	0.010	ND	ND	ND	0.015	0.005	0.001	0.045	ND	ND	ND	ND
	16-Dec-86	170.0	NT	1.91	1.78	4.48	NT	0.096	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.023	0.036	ND	ND	ND	ND	0.049	ND	ND
	28-May-87	NT	NT	10.7	0.71	NT	NT	0.278	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	17-Nov-87	NT	NT	8.5	0.023	NT	NT	0.73	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	3-Jun-88	NT	NT	8.9	0.93	NT	NT	0.069	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Nov-88	NT	NT	11.130	8.916	NT	NT	0.101	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	25-May-89	NT	NT	9.200	9.800	1.100	10.700	0.250	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

GROUNDWATER TECHNOLOGY

TABLE 5 (Page 2 of 4)

SUMMARY OF ORGANIC GROUNDWATER ANALYTICAL DATA
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO

WELL ID	SAMPLE DATE	TOC	TOX	B	T	E	X	TOTAL PHEN	EDC	2,4 DCP	2,4 DMP	4,6-DNC	2,4 DNP	2-NP	4-NP	BENZ ANTH	PHEN	CHRY-SENE	FLUO-RENE	NAPH	PYR	2 CHLR PHEN	PCMC	BENZ FLR	A-NAPH	ANTH	FLUORANTH
MW-5	26-Mar-86	14.0	NT	ND	ND	ND	ND	0.006	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	23-Jun-86	21.0	ND	ND	ND	ND	ND	0.007	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Sep-86	20.0	NT	ND	ND	ND	ND	0.034	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Dec-86	9.0	ND	ND	ND	ND	ND	0.021	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	28-May-87	NT	NT	ND	ND	NT	NT	0.334	0.72	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	17-Nov-87	NT	NT	ND	ND	NT	NT	ND	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	3-Jun-88	NT	NT	ND	ND	NT	NT	0.064	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Nov-88	NT	NT	ND	0.00186	NT	NT	0.16	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	25-May-89	NT	NT	ND	ND	ND	ND	0.362	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1-Dec-89	NT	NT	0.0108	0.092	0.0098	0.0223	0.006	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	19-Jun-90	7.40	NT	ND	ND	ND	ND	0.102	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	14-Nov-90	8.60	NT	ND	ND	ND	ND	0.03	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Jun-91	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	7-Nov-91	NT	NT	ND	ND	ND	ND	0.002	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	9-Jun-92	NT	NT	ND	ND	ND	0.0012	0.02	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	11-Dec-92	NT	NT	ND	ND	ND	ND	0.04	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-7	26-Mar-86	11.0	NT	0.015	0.053	0.007	NT	ND	ND	ND	ND	0.013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	23-Jun-86	4.0	NT	ND	ND	ND	NT	0.006	ND	ND	ND	ND	ND	ND	ND	0.001	ND	0.002	ND	ND	ND	ND	ND	ND	ND	ND	ND
	18-Sep-86	4.0	NT	0.058	0.006	0.004	NT	0.036	ND	ND	ND	ND	ND	ND	0.007	ND	ND	ND	ND	ND	ND	ND	0.001	ND	ND	ND	ND
	16-Dec-86	2.0	NT	0.009	ND	ND	ND	0.025	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.002	ND	ND	ND	ND	ND	0.001	ND	ND	ND
MW-8	26-Mar-86	5.0	ND	ND	ND	0.107	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	23-Jun-86	13.0	ND	ND	ND	ND	NT	0.005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	18-Sep-86	8.0	ND	ND	ND	ND	NT	0.097	ND	ND	ND	ND	ND	ND	0.008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	16-Dec-86	8.0	ND	ND	ND	ND	ND	0.042	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-9	26-Mar-86	143	NT	7.4	6.3	3.2	ND	0.304	ND	0.160	ND	ND	ND	ND	ND	ND	0.149	ND	0.012	ND	ND	ND	ND	ND	ND	ND	ND
	23-Jun-86	180	NT	4	1.7	0.71	NT	0.372	ND	0.150	ND	ND	ND	ND	ND	ND	0.170	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	18-Sep-86	240	NT	17.7	10.6	0.015	NT	0.17	ND	ND	ND	ND	ND	ND	1.10	0.007	0.013	ND	ND	ND	0.010	ND	ND	ND	0.028	ND	ND
	16-Dec-86	275	NT	1.49	0.754	0.504	ND	0.160	ND	ND	ND	ND	ND	ND	ND	ND	0.133	ND	ND	0.029	ND	ND	ND	ND	ND	ND	ND
	8-Nov-91	63.3	0.041	16.200	0.309	8.700	10.820	0.115	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	7-Feb-92	109	0.054	2.740	1.570	0.610	2.940	0.11	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	10-Jun-92	97.7	0.049	15.600	1.100	4.800	6.800	0.330	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Oct-92	48.9	0.036	17.500	0.700	2.200	7.300	0.180	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-10	26-Mar-86	34	NT	0.093	ND	ND	ND	0.147	ND	ND	0.025	0.020	ND	ND	ND	ND	0.090	ND	0.033	ND	0.030	ND	ND	ND	ND	0.039	0.034
	23-Jun-86	76	NT	ND	ND	ND	NT	0.186	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	18-Sep-86	125	NT	0.041	0.054	ND	NT	0.065	ND	ND	ND	ND	ND	0.002	0.016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	16-Dec-86	114	NT	14.1	7.4	0.03	ND	0.055	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.004	ND	ND	ND	ND	ND	ND	ND

GROUNDWATER TECHNOLOGY

SUMMARY OF ORGANIC GROUNDWATER ANALYTICAL DATA
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO

WELL ID	SAMPLE DATE	TOC	TOX	B	T	E	X	TOTAL PHEN	EDC	2,4 DCP	2,4 DMP	4,6-DNC	2,4 DNP	2-NP	4-NP	BENZ ANTH	PHEN	CHRY-SENE	FLUO-RENE	NAPH	PYR	2 CHLR PHEN	PCMC	BENZ FLR	A-NAPH	ANTH	FLUORANTH
MW-11	3-Jun-88	NT	NT	3.0	0.46	NT	NT	NT	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	9-Sep-88	NT	NT	44.400	0.840	0.063	3.406	0.06	0.0022	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-12	3-Jun-88	NT	NT	ND	ND	NT	NT	NT	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-13	9-Sep-88	NT	NT	0.00023	0.00024	0.00029	0.00156	0.03	0.0156	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-20	8-Nov-91	19.7	0.037	0.002	ND	ND	0.004	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	7-Feb-92	21.4	0.041	0.201	0.035	0.011	0.051	0.020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	10-Jun-92	19.2	0.038	0.017	0.008	0.003	0.012	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Oct-92	15.2	0.030	0.022	0.005	ND	0.002	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-21	8-Nov-91	12.2	0.065	0.001	0.011	ND	0.001	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	7-Feb-92	12.9	0.051	0.010	0.020	0.005	0.026	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	10-Jun-92	14.6	0.042	1.940	0.450	ND	0.630	0.010	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Oct-92	14.9	0.048	3.010	0.420	ND	0.090	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
RW-1	9-Sep-88	NT	NT	6.400	0.070	0.540	14.800	0.34	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
P-1	9-Sep-88	NT	NT	102.200	0.034	0.00143	0.866	NT	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
RW-2	9-Sep-88	NT	NT	11.0	10.200	2.9	28.800	0.13	0.0016	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
P-2	9-Sep-88	NT	NT	4.80	1.430	0.900	7.530	NT	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
RW-3	9-Sep-88	NT	NT	12.000	0.062	0.00286	5.403	0.05	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
P-3	9-Sep-88	NT	NT	19.400	0.00435	ND	35.100	NT	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
RW-15	8-Nov-91	27.2	0.204	16.100	1.780	23.700	18.760	0.059	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	7-Feb-92	40.8	0.045	4.430	3.850	1.540	4.410	0.140	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	10-Jun-92	29.9	0.115	21.700	3.800	27.300	20.900	0.140	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Oct-92	26.3	0.180	17.600	2.500	25.200	15.200	0.260	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
RW-18	8-Nov-91	48.9	0.040	3.830	ND	ND	ND	0.044	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	7-Feb-92	63.6	0.045	1.990	0.150	0.361	1.401	0.070	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	10-Jun-92	88.0	0.075	4.500	1.800	ND	3.200	0.140	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Oct-92	46.9	0.068	4.410	0.440	ND	0.370	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

TABLE 5 (Page 4 of 4)

SUMMARY OF ORGANIC GROUNDWATER ANALYTICAL DATA
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO

NT=Not Tested
ND= Not Detected
Units=mg/l (approximately equivalent to parts per million (ppm)).

KEY

B=Benzene
T=Toluene
E=Ethylbenzene
X=total Xylenes
Total Phen=Total Phenols
EDC=1, 2-Dichloroethane
2, 4-DCP=2, 4-Dichlorophenol
2, 4-DMP=2, 4-Dimethylphenol
4, 6-DNC=4, 6-Dinitro-o-cresol
2, 4-DNP=2, 4-Dinitro-phenol
2-NP=2-Nitrophenol
4-NP=4-Nitrophenol
BENZANTH=Benzo(a)anthracene
PHENE=Phenol
CHRY=Chrysene
P-C-M-C=P-chloro-m-cresol
BENZFLUOR=Benzo(K)fluoranthene
FLUOR=Fluorene
A-NAPH=Acenaphthene
PYR=Pyrene
NAPH=Yaphthalene
2-CHLRPHEN=2-Chloro-phenol
FLUORANTH=Fluoranthene
TOC=Total Organic Carbon
TOX=Total Organic Halogens

GROUNDWATER TECHNOLOGY

SUMMARY OF INORGANIC GROUNDWATER AND WATER QUALITY DATA
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO

WELL ID	SAMPLE DATE	Cn	TDS	Cl	SO4	Sb	As	Be	Cd	Cr	Pb	Hg	Ni	Se	Ag	Zn	Al	Ba	B	Fe	Mo	Mn	Na	N	F	Coli	Ra 226	Ra 228
MW-1	26-Mar-86	ND	2936	750	7.5	ND	ND	ND	0.050	ND	0.085	ND	0.08	ND	ND	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	23-Jun-86	0.1	2960	994.7	630	ND	0.077	ND	ND	ND	0.065	ND	ND	0.035	ND	0.20	2.07	ND	ND	ND	ND	0.25	NT	0.540	0.100	NT	NT	NT
	18-Sep-86	0.07	2866	814	673	ND	0.050	ND	ND	ND	0.15	ND	0.07	0.033	ND	0.04	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Dec-86	ND	2498	774	579	0.25	ND	0.02	ND	ND	ND	ND	0.06	0.030	ND	0.012	4.54	0.055	0.27	ND	0.17	1.11	NT	2.900	0.960	NT	NT	NT
	28-May-87	0.0056	3272	794	827.6	NT	ND	NT	0.023	ND	0.20	ND	0.12	0.10	ND	0.024	ND	ND	0.70	0.14	0.79	1.51	NT	12.9	0.0353	NT	NT	NT
	17-Nov-87	ND	3050	910	655	NT	ND	NT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.32	ND	ND	1.45	NT	5.66	0.76	NT	NT	NT
	3-Jun-88	0.022	3500	1040	851	NT	ND	NT	ND	ND	ND	ND	0.03	ND	ND	0.03	ND	ND	0.25	ND	0.21	0.85	NT	3.22	0.60	NT	NT	NT
	18-Nov-88	ND	3430	1140	665	NT	ND	NT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.32	ND	ND	2.11	NT	4.03	0.92	NT	NT	NT
	25-May-89	ND	3308	NT	653.46	NT	ND	NT	ND	ND	0.05	NT	NT	NT	NT	NT	NT	ND	0.03	ND	NT	ND	NT	0.561	NT	NT	NT	NT
	1-Dec-89	ND	3120	1142.85	515.61	NT	0.0005	NT	0.0073	ND	ND	NT	NT	0.0011	NT	NT	NT	ND	0.28	0.68	NT	1.17	NT	2.04	NT	NT	NT	NT
	19-Jun-90	ND	2952	1269.1	491.3	NT	0.0092	NT	ND	ND	0.007	NT	NT	NT	NT	NT	NT	ND	0.31	ND	NT	0.59	NT	6.47	NT	NT	NT	NT
	14-Nov-90	ND	3440	1170	539	NT	0.0008	NT	ND	ND	ND	NT	NT	NT	NT	NT	NT	ND	ND	14.38	NT	2.30	NT	17	NT	NT	NT	NT
	18-Jun-91	ND	3200	1060	1070	NT	ND	NT	ND	ND	ND	NT	NT	NT	NT	NT	NT	ND	0.32	ND	NT	ND	NT	2.54	NT	NT	NT	NT
	7-Nov-91	ND	3540	1190	684	NT	ND	NT	ND	0.02	ND	NT	NT	NT	NT	NT	NT	ND	0.35	ND	NT	2.79	NT	20.6	NT	NT	NT	NT
	9-Jul-92	ND	3730	1220	882	NT	ND	NT	ND	ND	ND	NT	NT	NT	NT	NT	NT	ND	0.39	ND	NT	0.27	900	11.6	0.80	NT	NT	NT
	11-Dec-92	ND	4920	1760	747	NT	ND	NT	ND	ND	ND	NT	NT	NT	NT	NT	NT	ND	0.55	0.14	NT	3.29	NT	20.2	NT	NT	NT	NT
MW-2	26-Mar-86	ND	2796	200	11.0	ND	ND	ND	0.060	ND	0.12	0.003	0.07	ND	ND	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	23-Jun-86	0.1	3650	1204.6	1750	ND	0.094	ND	ND	ND	ND	ND	ND	0.070	ND	0.020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Sep-86	0.18	3598	993	1104	ND	0.080	ND	0.030	ND	0.08	ND	0.12	0.104	ND	0.02	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Dec-86	ND	3664	1012	1372	0.480	ND	ND	ND	ND	ND	ND	0.08	0.04	ND	0.009	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-3	26-Mar-86	ND	4836	1500	29.5	ND	ND	ND	0.12	ND	0.14	0.004	0.08	ND	ND	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	23-Jun-86	0.25	5362	1584	1950	ND	0.15	ND	0.015	ND	0.070	ND	0.08	0.010	ND	0.018	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Sep-86	0.17	5514	1290	2056	ND	0.21	ND	ND	ND	0.18	ND	0.14	0.100	ND	0.020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Dec-86	0.07	4860	1290	2204	0.67	ND	ND	0.11	ND	ND	ND	0.10	0.05	ND	0.01	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-4	26-Mar-86	ND	1868	500	0.3	ND	ND	ND	0.060	ND	0.074	0.002	0.08	ND	ND	0.012	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	23-Jun-86	0.5	2266	989.7	12.5	ND	0.070	ND	ND	ND	0.066	ND	ND	0.080	ND	0.019	1.93	3.54	ND	12.0	ND	3.5	NT	ND	0.21	NT	NT	NT
	18-Sep-86	ND	2308	754	ND	ND	0.08	ND	ND	ND	ND	ND	0.12	0.063	ND	0.008	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Dec-86	ND	2128	675	ND	0.40	ND	ND	ND	ND	ND	ND	ND	0.03	ND	0.04	3.8	2.3	0.7	18.6	ND	5.7	NT	ND	0.41	NT	NT	NT
	28-May-87	ND	2038	635	4.8	NT	ND	NT	0.018	ND	0.14	ND	0.12	0.08	ND	0.022	ND	9.88	0.97	0.17	0.13	5.29	NT	0.035	ND	NT	NT	NT
	17-Nov-87	0.005	2050	588	ND	NT	ND	NT	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8	0.59	4.59	0.03	4.77	NT	0.03	0.019	NT	NT	NT
	3-Jun-88	ND	1820	401	3	NT	ND	NT	ND	ND	ND	ND	0.02	ND	ND	0.001	ND	1.4	0.47	6.44	ND	3.51	NT	0.14	0.28	NT	NT	NT
	18-Nov-88	ND	1830	490	ND	NT	ND	NT	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8	0.57	5.95	ND	3.73	NT	0.09	0.30	NT	NT	NT
	25-May-89	ND	1454	NT	7.41	NT	ND	NT	ND	ND	0.03	NT	NT	NT	NT	NT	NT	1.4	0.50	0.92	NT	3.59	NT	ND	NT	NT	NT	NT

GROUNDWATER TECHNOLOGY

SUMMARY OF INORGANIC GROUNDWATER AND WATER QUALITY DATA
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO

WELL ID	SAMPLE DATE	Cn	TDS	Cl	SO4	Sb	As	Be	Cd	Cr	Pb	Hg	Ni	Se	Ag	Zn	Al	Ba	B	Fe	Mo	Mn	Na	N	F	Coli	Ra 226	Ra 228
MW-5	26-Mar-86	ND	3840	1100	14	ND	ND	ND	0.100	ND	0.160	ND	0.10	ND	ND	0.012	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	23-Jun-86	0.2	3778	1340	1800	ND	0.087	ND	ND	ND	0.055	ND	ND	0.071	ND	0.02	2.75	ND	ND	0.050	ND	0.025	NT	12.500	0.300	NT	NT	NT
	18-Sep-86	0.24	3184	1151	1237	ND	0.07	ND	ND	ND	ND	ND	0.09	0.030	ND	0.02	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Dec-86	ND	3788	1118	1132	0.5	ND	ND	0.010	ND	ND	ND	0.07	0.030	ND	0.016	4.34	0.010	0.24	ND	0.08	ND	NT	36.000	0.580	NT	NT	NT
	28-May-87	ND	3902	1112	772.4	NT	ND	NT	0.026	ND	0.20	ND	0.25	0.14	ND	0.024	ND	ND	0.24	0.14	ND	0.09	NT	27.01	0.0156	NT	NT	NT
	17-Nov-87	0.016	4300	1310	1060	NT	ND	NT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.54	ND	ND	ND	NT	36.4	0.24	NT	NT	NT
	3-Jun-88	0.030	4200	1300	1000	NT	ND	NT	ND	ND	ND	ND	0.04	ND	ND	ND	ND	ND	0.48	ND	ND	1.45	NT	32.9	0.22	NT	NT	NT
	18-Nov-88	ND	4080	1480	777	NT	ND	NT	ND	ND	0.07	ND	ND	ND	ND	ND	ND	ND	0.45	ND	ND	ND	NT	27.8	0.35	NT	NT	NT
	25-May-89	ND	4196	NT	781.03	NT	ND	NT	ND	ND	0.06	NT	NT	NT	NT	NT	NT	ND	0.41	ND	NT	ND	NT	21.04	NT	NT	NT	NT
	1-Dec-89	ND	4594	1715.62	946.45	NT	0.0006	NT	0.0039	ND	0.044	NT	NT	0.0003	NT	NT	NT	ND	0.58	ND	NT	ND	NT	24.85	NT	NT	NT	NT
	19-Jun-90	ND	4918	1751.4	1131.6	NT	0.0126	NT	ND	ND	0.005	NT	NT	NT	NT	NT	NT	ND	0.06	ND	NT	ND	NT	16.75	NT	NT	NT	NT
	14-Nov-90	0.01	4930	1640	1110	NT	ND	NT	ND	ND	ND	NT	NT	NT	NT	NT	NT	ND	ND	ND	NT	ND	NT	23.1	NT	NT	NT	NT
	18-Jun-91	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	7-Nov-91	ND	5390	1770	1370	NT	ND	NT	ND	0.03	ND	NT	NT	NT	NT	NT	NT	ND	0.48	ND	NT	0.12	NT	24.1	NT	NT	NT	NT
	9-Jul-92	ND	7634	3070	1190	NT	ND	NT	ND	ND	0.11	NT	NT	NT	NT	NT	NT	ND	0.63	ND	NT	9.11	1280	9.11	0.25	NT	NT	NT
	11-Dec-92	ND	6960	2820	754	NT	0.010	NT	ND	0.02	ND	NT	NT	NT	NT	NT	NT	ND	0.76	3.72	NT	0.60	NT	6.57	NT	NT	NT	NT
MW-7	26-Mar-86	ND	6076	30	5.5	ND	ND	ND	0.050	ND	ND	ND	0.08	ND	ND	0.018	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	23-Jun-86	0.25	6406	80	2400	ND	0.36	ND	0.030	0.052	0.24	ND	0.07	0.65	0.060	0.016	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Sep-86	0.10	6348	20	5802	ND	0.22	ND	ND	ND	0.05	ND	0.08	0.36	ND	0.02	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Dec-86	ND	6940	29	3630	0.83	ND	ND	0.02	0.08	0.26	ND	0.07	0.09	ND	0.017	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-8	26-Mar-86	ND	806	160	4.0	ND	ND	ND	0.010	ND	ND	ND	ND	ND	ND	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	23-Jun-86	ND	2910	840	1500	ND	0.072	ND	ND	ND	0.055	ND	0.86	0.210	ND	0.020	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Sep-86	ND	2284	576	586	ND	0.030	ND	ND	ND	ND	ND	0.21	ND	ND	0.02	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Dec-86	0.1	3450	913	1270	0.67	ND	ND	ND	ND	ND	ND	0.43	0.040	ND	0.016	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-9	26-Mar-86	ND	2360	149	13.0	ND	ND	ND	0.010	ND	ND	ND	0.30	ND	ND	0.012	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	23-Jun-86	0.4	1718	1010	114	ND	ND	ND	ND	ND	0.059	ND	0.25	0.040	ND	0.015	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Sep-86	ND	1428	89	ND	ND	0.02	ND	ND	ND	ND	ND	0.13	ND	ND	0.05	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Dec-86	ND	1684	109	20	0.4	ND	ND	ND	ND	ND	ND	0.16	0.03	ND	0.011	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	1-Nov-91	NT	NT	123	12	NT	0.013	NT	ND	ND	ND	ND	NT	ND	ND	NT	NT	1.600	NT	5.380	NT	3.220	471	ND	0.330	ND	ND	ND
	7-Feb-92	NT	NT	114	117	NT	0.010	NT	ND	0.030	ND	ND	NT	ND	ND	NT	NT	1.100	NT	0.150	NT	1.970	454	ND	0.300	ND	.7+/-.4	ND
	1-Jun-92	NT	NT	117	53	NT	0.009	NT	ND	ND	0.030	ND	NT	ND	ND	NT	NT	1.770	NT	6.630	NT	3.050	40	ND	0.340	20	ND	ND
	16-Oct-92	NT	NT	38	12	NT	0.008	NT	ND	ND	0.020	ND	NT	ND	ND	NT	NT	1.100	NT	3.230	NT	2.190	239	ND	0.430	ND	ND	ND
MW-10	26-Mar-86	ND	1546	245	5.3	ND	ND	ND	0.02	ND	ND	ND	0.08	ND	ND	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	23-Jun-86	ND	2820	570	165	ND	0.053	ND	ND	ND	0.059	ND	ND	0.04	ND	0.015	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	18-Sep-86	0.050	2408	587	ND	ND	0.05	ND	ND	ND	0.05	ND	0.18	0.071	ND	0.16	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
	16-Dec-86	ND	3272	457	10	0.56	ND	0.04	ND	ND	ND	ND	ND	0.03	ND	0.01	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
MW-11	9-Sep-88	NT	1900	NT	30	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	0.06	NT	NT	NT	NT

GROUNDWATER TECHNOLOGY

SUMMARY OF INORGANIC GROUNDWATER AND WATER QUALITY DATA
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO

WELL ID	SAMPLE DATE	Cn	TDS	Cl	SO4	Sb	As	Be	Cd	Cr	Pb	Hg	Ni	Se	Ag	Zn	Al	Ba	B	Fe	Mo	Mn	Na	N	F	Coli	Ra 226	Ra 228
MW-13	9-Sep-88	NT	3200	NT	728	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	13.1	NT	NT	NT	NT
MW-20	1-Nov-91	NT	NT	193	20	NT	0.005	NT	ND	0.020	ND	ND	NT	ND	ND	NT	NT	ND	NT	0.590	NT	3.860	398	ND	0.270	ND	ND	ND
	7-Feb-92	NT	NT	739	37	NT	0.007	NT	0.003	0.060	ND	ND	NT	ND	ND	NT	NT	0.700	NT	2.520	NT	7.900	501	ND	0.190	ND	.6+/-.3	2+/-1
	1-Jun-92	NT	NT	554	117	NT	ND	NT	ND	ND	ND	ND	NT	ND	ND	NT	NT	0.700	NT	1.730	NT	5.680	446	2.430	0.250	50	ND	ND
	16-Oct-92	NT	NT	361	215	NT	0.005	NT	ND	ND	ND	ND	NT	ND	ND	NT	NT	ND	NT	0.810	NT	5.200	445	0.020	0.260	ND	ND	ND
MW-21	1-Nov-91	NT	NT	481	416	NT	ND	NT	ND	ND	ND	ND	NT	ND	0.010	NT	NT	ND	NT	0.810	NT	6.230	604	ND	0.480	ND	ND	ND
	7-Feb-92	NT	NT	420	443	NT	0.011	NT	ND	ND	ND	ND	NT	ND	ND	NT	NT	ND	NT	1.000	NT	5.550	552	ND	0.430	ND	ND	ND
	1-Jun-92	NT	NT	626	165	NT	ND	NT	ND	ND	ND	ND	NT	ND	ND	NT	NT	ND	NT	1.710	NT	5.690	631	0.170	0.460	8	ND	ND
	16-Oct-92	NT	NT	797	210	NT	0.005	NT	ND	ND	ND	ND	NT	ND	ND	NT	NT	ND	NT	2.490	NT	6.800	607	ND	0.270	ND	ND	ND
RW-1	9-Sep-88	NT	3130	NT	4.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT
P-1	9-Sep-88	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
RW-2	9-Sep-88	NT	1983	NT	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT
P-2	9-Sep-88	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
RW-3	9-Sep-88	NT	3250	NT	9.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	ND	NT	NT	NT	NT
P-3	9-Sep-88	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
RW-15	1-Nov-91	NT	NT	730	2	NT	ND	NT	ND	ND	ND	ND	NT	ND	ND	NT	NT	0.800	NT	2.610	NT	4.590	750	ND	0.290	ND	ND	ND
	7-Feb-92	NT	NT	558	4	NT	0.007	NT	ND	0.060	ND	ND	NT	ND	ND	NT	NT	0.600	NT	10.100	NT	3.050	676	ND	0.270	ND	.9+/-.4	ND
	1-Jun-92	NT	NT	818	5	NT	ND	NT	ND	ND	ND	ND	NT	ND	ND	NT	NT	0.600	NT	ND	NT	1.130	709	ND	0.300	1	ND	ND
	16-Oct-92	NT	NT	758	3	NT	ND	NT	ND	ND	0.001	ND	NT	ND	ND	NT	NT	0.700	NT	1.940	NT	4.720	744	ND	0.170	ND	ND	ND
RW-18	1-Nov-91	NT	NT	228	24	NT	ND	NT	ND	ND	ND	ND	NT	ND	ND	NT	NT	1.100	NT	0.060	NT	4.690	492	ND	0.330	ND	ND	ND
	7-Feb-92	NT	NT	200	34	NT	0.006	NT	ND	0.030	ND	ND	NT	ND	ND	NT	NT	1.200	NT	10.400	NT	4.240	470	ND	0.310	ND	1.1+/-.4	2+/-1
	1-Jun-92	NT	NT	239	3	NT	ND	NT	ND	ND	0.020	ND	NT	ND	ND	NT	NT	1.150	NT	4.390	NT	4.480	383	ND	0.320	460	ND	ND
	16-Oct-92	NT	NT	240	59100	NT	ND	NT	ND	ND	0.002	ND	NT	ND	ND	NT	NT	1.000	NT	0.450	NT	4.370	426	ND	0.260	ND	ND	ND

GROUNDWATER TECHNOLOGY

SUMMARY OF INORGANIC GROUNDWATER AND WATER QUALITY DATA
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO

NT = Not Tested
ND = Not Detected
Units = mg/l (approximately equivalent to parts per million [ppm])

KEY:

Cn = Cyanide	Zn = Zinc
TDS = Total Dissolved Solids	Al = Aluminum
Cl = Chloride	Ba = Barium
SO4 = Sulfate	B = Boron
Sb = Antimony	Fe = Iron
As = Arsenic	Mo = Molybdenum
Be = Beryllium	Mn = Manganese
Cd = Cadmium	Na = Sodium
Cr = Chromium	N = Nitrogen
Pb = Lead	F = Fluoride
Hg = Mercury	Coli = Coliform
Ni = Nickel	Ra 226 = Radium 226
Se = Selenium	Ra 228 = Radium 228
Ag = Silver	

TABLE 7

SOIL VAPOR SURVEY RESULTS
BLOOMFIELD REFINING SOMPANY
BLOOMFIELD, NEW MEXICO
JULY 1988

POINT OR SAMPLE	X(FT)(a)	Y(FT)(b)	CONCENTRATION (ppm)					
			BENZENE	TOLUENE	ETHYLBENZENE	TOTAL XYLENES	PCE	TCE
1(MW-9)	600	1070	2995	4655	ND	634	110	ND
2(MW-10)	150	350	38.2	11.9	74.5	ND	ND	ND
3(MW-4)	570	350	ND	710	102	20.6	78	ND
4	0	300	ND	1025	ND	10195	ND	ND
5	300	300	0.062	0.149	ND	0.071	0.011	ND
6	600	300	ND	0.041	ND	0.006	ND	0.086
7(MW-12)	-610	150	ND	0.285	ND	ND	ND	ND
8	0	150	ND	1.95	ND	25.58	ND	6.49
9	1200	150	ND	0.448	0.349	0.442	0.513	0.38
10	-1200	0	ND	0.085	ND	0.038	ND	0.034
11	-900	0	ND	0.125	ND	0.43	ND	2.14
12	-600	0	ND	0.13	ND	0.037	ND	ND
13	-300	0	ND	0.1	ND	0.042	ND	0.037
14(MW-11)	0	0	0.56	10.9	ND	9.7	ND	ND
15	300	0	0.23	1.24	ND	0.126	ND	ND
16	600	0	0.072	0.584	0.146	ND	ND	ND
17	900	0	ND	1.88	9.27	0.979	ND	23.8
18	1200	0	ND	0.143	ND	0.107	0.003	0.082
19	-1200	-300	ND	0.061	ND	0.028	0.002	0.003
20	-900	-200	ND	0.06	ND	0.033	0.004	0.072
21	-300	-300	ND	0.088	ND	0.127	ND	0.033
22	0	-300	ND	0.044	ND	0.016	ND	ND
23	300	-300	ND	0.925	ND	0.661	ND	ND
24	600	-300	ND	0.979	ND	0.31	ND	ND
25	900	-300	0.014	0.107	ND	0.055	0.006	0.067

ND = not detected

(a) approximate distance east from well MW-11

(b) approximate distance north from well MW-11

SOURCE: "Final Report on Soil Vapor Survey, Well Installation and Hydrocarbon Recovery System", Geoscience Consultants, Ltd. August 1989.

TABLE 8
WATER WELLS WITHIN ONE MILE RADIUS
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO

	PERMIT NUMBER	WELL OWNER	ADDRESS	LOCATION	DATE	TOTAL DEPTH	CASING	SCREEN
1.	SJ-2148	C.W. Wooten	P.O. Box 1841 Bloomfield, NM 87413	S 1/2, NE 1/4, SE 1/2 Section 27 Twp 29 N Range 11-W	Nov. 1987	305'	7" steel to 39.5' 4" PVC to 266'	266'-306'
2.	SJ-1870	D.E. Walters	P.O. Box 2131 Bloomfield, NM 87413 Tract 2	NE 1/4 Section 23 Twp 29 N Range 11-W	Aug. 1984	58'	6" steel to 58'	None
3.	SJ-2026	S. Hinsen	P.O. Box 2562 Bloomfield, NM 87413	SW 1/2, SW 1/4, Section 22 Twp 29 N Range 11-W	Jan. 1986	27'	6 5/8" steel to 21'	21' to 26'
4.	SJ-2121	H. Chatto	Lot 10, Huntington Circle, Bloomfield, NM 87413	Not Reported	July 1987	30'	7" steel to 21'	21' to 26'
5.	SJ-700	E.H. Brown	Rt #1, Box 248, Aztec, NM 87410	SW 1/4, SW 1/4, NW 1/4 Section 27 Twp 29 N Range 11-W	July 1978	20'	7" steel to 20'	None
6.	SJ-2210	D.C. Looney	P.O. Box 2462 Bloomfield, NM 87413	S 1/2, NW 1/4, NW 1/4 Section 27 Twp 29 N Range 11-W	Dec. 1988	32'	6" PVC to 22'	22'-32'

TABLE 8
WATER WELLS WITHIN ONE MILE RADIUS
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO
(Continued)

	PERMIT NUMBER	WELL OWNER	ADDRESS	LOCATION	DATE	TOTAL DEPTH	CASING	SCREEN
7.	SJ-695	W.N. Wampler	P.O. Box 2386 Bloomfield, NM 87413, Lot 14, Block 2 of the Bloomfield Southside Add	SW 1/4, SE 1/4 Section 22 Twp 29 N Range 11-W	July 1978	34'	6" to 24'	24'to 34'
8.	SJ-796	T.P. Johnson	Tract A, Loma Addition, Bloomfield, NM 87413	NE 1/4, NW 1/4 Section 22 Twp 29 N Range 11-W	Mar. 1979	50'	5.5" to 40'	40' to 48'
9.	SJ-701	G.T. Rodriguez	P.O. Box 1071 Bloomfield, NM 87413, Lot 16, Green Valley Estates	NE 1/4, NE 1/4 Section 21 Twp 29 N Range 11-E	July 1978	70'	6 5/8" to 70'	None
10.	SJ-2330	R.H. Phelps	P.O. Box 2548 CR 5005 #65 A, Bloomfield, NM 87413	NW 1/4, NE 1/4 Section 28 Twp 29 N Range 11-W	Sept. 1991	128'	5" PVC to 107'	107' to 127'
11.	SJ-2195	M. Aronson	Bloomfield, NM 87413	Not Reported	Nov. 1988	70'	6" to 65'	65' to70'
12.	SJ-2182	M. Faverino	116 Road 5010 Bloomfield, NM 87413	Not Reported	July 1988	27'	7" to 22'	22' to 26'

TABLE 8
WATER WELLS WITHIN ONE MILE RADIUS
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO
(Continued)

	PERMIT NUMBER	WELL OWNER	ADDRESS	LOCATION	DATE	TOTAL DEPTH	CASING	SCREEN
13.	SJ-2227	Y. Chavez	P.O. Box 1412 Bloomfield, NM 87413 Huntington Circle	NW 1/4, NW 1/4 Section 27 Twp 29 Range 11-W	July 1989	27'	7" to 20'	20' to 24'
14.	SJ-704	C.W. Jaramillo	P.O. Box 594 Bloomfield, NM 87413 Lot 2&3, Blk 4 - Loma Vista	NE 1/4, NE 1/4 Section 22 Twp 29 N Range 11-W	July 1978	55'	6" Plastic to 35'	35' to 55'
15.	SJ-484	G.A. Chacon	P.O. Box 634 Bloomfield, NM 87413	Section 22 Twp 29 Range 11	Oct. 1977	37'	6 3/8" to 28'	28' to 34'
16.	SJ-320	M. Wileman	P.O. Box 503 Bloomfield, NM 87413	NW 1/4, SW 1/4, NW 1/4 Section 22 Twp 29 Range 11	Sept. 1977	38'	6 3/8" steel to 25'	25' to 36'
17.	SJ-1888	G.P. McKeown	P.O. Box 641 Bloomfield, NM 87106 Hwy 64, West- Broadway	NE 1/4, NE 1/4, SE 1/4 Section 21 Twp 29 Range 11	Sept. 1984	47'	7" steel to 38'	38' to 40'

TABLE 8
WATER WELLS WITHIN ONE MILE RADIUS
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO
(Continued)

	PERMIT NUMBER	WELL OWNER	ADDRESS	LOCATION	DATE	TOTAL DEPTH	CASING	SCREEN
18.	HC-124885	S.C. Byland	303 Chestnut, P.O. Box 11 Bloomfield, NM 87413, Lot 9, Blk 4, Wade Grand View Subdivision	NE 1/2 Section 21 Twp 29 Range 11-W	May 1985	65'	7" steel to 50'	50' to 55'
19.	SJ-1962	J.Cadvain	P.O. Box 649 Bloomfield, NM 87413	NW 1/4, NW 1/4 Section 24 Twp 24 Range 11-W	Aprl. 1985	45'	7" steel to 36'	36' to 39'
20.	SJ-2138	M. Gilbert	309 S.Johnson Bloomfield, NM 87413, Lot 6, Blk 5, Turner No.2	NE 1/4, SE 1/4 Section 22 Twp 29 N Range 11-W	June 1987	40'	7" steel to 35'	35' to 39'
21.	SJ-804	C.J. Dunson	Star Route 3 Box 142-B Bloomfield, NM 87413	W 1/4 Section 25 Twp 29 N Range 11-W	Oct. 1978	37'	6" to 37'	
22.	SJ-1974	A.R. Carpenter	700 South Turner Box 16 Bloomfield, NM 87413, Lot 2, Blk 4, Southside Add	Section 22 Twp 29 N Range 11-W	June 1985	47'	6" steel to 27' 5" PVC	27' to 31' 30' to 47'

TABLE 9

CLIMATOLOGICAL DATA SUMMARY
BLOOMFIELD REFINING COMPANY
BLOOMFIELD, NEW MEXICO
1951-1980

	TEMPERATURE (°F) MEANS			PRECIPITATION (INCHES)	
	DAILY MAX.	DAILY MIN.	MONTHLY	MEAN	SNOW-MEAN
JANUARY	40.7	17.8	29.3	0.59	4.3
FEBRUARY	48.1	23.0	35.6	0.44	2.1
MARCH	56.3	28.4	42.4	0.66	1.7
APRIL	66.6	35.5	51.1	0.55	0.5
MAY	77.0	44.5	60.8	0.41	0
JUNE	88.5	53.5	71.0	0.28	0
JULY	92.7	60.1	76.4	0.93	0
AUGUST	89.3	58.3	73.8	1.27	0
SEPTEMBER	82.3	50.6	66.5	0.83	0
OCTOBER	70.0	39.3	54.6	1.16	0
NOVEMBER	53.8	27.5	40.7	0.64	1.0
DECEMBER	42.7	18.8	30.8	0.61	4.6
YEAR	67.3	38.1	52.8	8.37	14.2

Reference: National Climatological Data Center (NCDC, 1984)

SOURCE: "Preliminary Review Report/Visual Site Inspection" EPA Contract No. 68-01-7251, August 25, 1987.

APPENDIX A

SPILL REPORTS

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

March 18, 1991

Mr. Charles Gholson
Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410

Mr. David Boyer
Land Office Building
P. O. Box 2088
Santa Fe, New Mexico 87501

Gentlemen:

Attached is a subsequent notification of a spill that occurred at Bloomfield Refining Company on March 8, 1991. Approximately 180 barrles of Jet A (kerosene) were spilled inside a tank dike. The spilled material was immediately recovered by vacuum truck.

Please call me if you need additional information.

Sincerely,

Chris Hawley
Environmental Engineer

CH/jm

Enclosure

cc: Richard Traylor
Gerald Collins
Chad King
Joe Warr
John Goodrich

P.O. Box 159 • Bloomfield, New Mexico 87413 • 505/632-8013

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR Blomfield Refining Company					ADDRESS P. O. Box 159, Bloomfield, N.M. 87413	
REPORT FOR	FIRE	BREAK	SPILL X	LEAK	BLOWOUT	OTHER*
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY X	OTHER*
NAME OF FACILITY Bloomfield Refining Company						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)					SEC. 27	TWP. T29N	RGE. R11W	COUNTY San Juan
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK 2 miles south of center of Bloomfield, N.M.						
DATE AND HOUR OF OCCURENCE 3/8/91 at 10:30 p.m.					DATE AND HOUR OF DISCOVERY 3/8/91 at 10:30 p.m.	
WAS IMMEDIATE NOTICE GIVEN?	YES X	NO	NOT REQUIRED		IF YES, TO WHOM Bill Gholson	
BY WHOM Chris Hawley					DATE AND HOUR 3/11/91 at 10:41 a.m.	
TYPE OF FLUID LOST Jet A (Kerosene)					QUANTITY OF SPILL 180 BBL	QUANTITY RECOVERED 120 BBL	LOSS 60 BBL
DID ANY FLUIDS REACH WATERCOURSE?	YES	NO X	QUANTITY			

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

While transferring Jet A (kerosene) from tank 5 to tank 26, tank 26 was overfilled. The problem was caused by failure of the operator to properly monitor the transfer. The operator was given disciplinary action and counseling in accordance with company policy.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

The spill occurred at tank 26 and was inside the tank dike. A vacuum truck was immediately called to vacuum up the spill. The acutal loss is probably overstated based on the soil condition after spill removal. The actual loss was estimated from tank gauges.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* Industrial			
SURFACE CONDITIONS	SANDY	SANDY LOAM X	CLAY	ROCKY	WET X	DRY	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

The weather was clear, windy, and about 35°F. There was no precipitation that day, but the soil inside the tank dike was still wet from previous rainfall.

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED [signature] TITLE Environmental Engineer DATE March 20, 199

CERTIFY

**ATTACH ADDITIONAL SHEETS IF NECESSARY

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

August 28, 1989

Mr. Charles Gholson
Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410

Mr. David Boyer
Land Office Building
P. O. Box 2088
Santa Fe, New Mexico 87501

Gentlemen:

Attached is a subsequent notification of a spill that occurred at Bloomfield Refining Company on August 27, 1989. Approximately 100 barrels of gasoline blend intermediate and water were spilled inside a tank dike. The spilled material was immediately recovered by vacuum truck.

Please call me if you need additional information.

Sincerely,

Chris Hawley
Environmental Engineer

Tank 22 will be taken out of service & slop gasoline from Terminals will be routed to API.

CH/jm

Enclosure

cc: Richard Traylor
Mike Macy
Chad King
Joe Warr

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	Bloomfield Refining Company				ADDRESS	P. O. Box 159, Bloomfield, New Mexico 87413	
TYPE OF REPORT	FIRE	BREAK	SPILL X	LEAK	BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY X	OTHER*
NAME OF FACILITY	Bloomfield Refining Company						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)					SEC. 27	TWP. T29N	RGE. R11W	COUNTY San Juan
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	2 miles south of center of Bloomfield, N.M.						
DATE AND HOUR OF OCCURENCE	3:30 p.m. to 5:00 p.m., 8/27/89				DATE AND HOUR OF DISCOVERY	5:00 p.m., 8/27/89	
WAS IMMEDIATE NOTICE GIVEN?	YES X	NO	NOT REQUIRED		IF YES, TO WHOM	Charles Gholson	
BY WHOM	Chris Hawley				DATE AND HOUR	10:35 a.m., 8/28/89	
TYPE OF FLUID LOST	Gasoline Blend Intermediate/Water				QUANTITY OF SPILL	100 bbls	QUANTITY RECOVERED	99+ bbls	LOSS	Small amt.to evap.
DID ANY FLUIDS REACH WATERCOURSE?	YES	NO X	QUANTITY				

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

Water draw to sump was opened and left unattended. The sump pump block valve was closed (operator should have opened it) causing the sump to overflow. The cause was operator error. The operator will be counseled.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

Maintenance was called out to vacuum up the spill. The spill occurred at tank 22 and was inside the tank dike.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* Industrial			
SURFACE CONDITIONS	SANDY	SANDY LOAM X	CLAY	ROCKY	WET	DRY X	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

Warm and dry, about 80°F.

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED Chris Hawley TITLE ENVIRONMENTAL ENGINEER DATE 8-30-89

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

July 25, 1989

Mr. Charles Gholson
Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410

Mr. David Boyer
Land Office Building
P. O. Box 2088
Santa Fe, New Mexico 87501

Gentlemen:

Attached is a subsequent notification of a minor spill and fire that occurred at Bloomfield Refining Company on July 24, 1989 at 8:30 p.m. The spill and fire resulted when the flare discharged liquids that caught on fire. The fire was put out with dry chemicals which minimized dispersion of hydrocarbons. The only losses were from burning. Liquids were collected in the flare sump.

Please call me if you need additional information.

Sincerely yours,

Chris Hawley
Environmental Engineer

CH/jm

cc: Richard Traylor
Mike Macy
Chad King
Joe Warr

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	Bloomfield Refining Company				ADDRESS	P. O. Box 159, Bloomfield, New Mexico 87413
TYPE OF	FIRE X	BREAK	SPILL X	LEAK	BLOWOUT	OTHER*
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY X	OTHER*
NAME OF FACILITY	Bloomfield Refining Company					
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)					SEC. 27	TWP. T29N	RGE. R11W	COUNTY San Juan
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	2 miles south of center of Bloomfield, N.M.							
DATE AND HOUR OF OCCURENCE	July 24, 1989 at 8:30 p.m.				DATE AND HOUR OF DISCOVERY	Same		
WAS IMMEDIATE NOTICE GIVEN?	YES X	NO	NOT REQUIRED X		IF YES, TO WHOM	Charles Gholson NM OCD		
BY WHOM	Chris Hawley				DATE AND HOUR	July 25, 1989 11:30 AM		
TYPE OF FLUID LOST	Light hydrocarbons				QUANTITY OF LOSS	5 bbls.	VOLUME RECOVERED	All
DID ANY FLUIDS REACH WATERCOURSE?	YES	NO X	QUANTITY					

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

Power failure and start-up causing excess hydrocarbons to flare drum. Fire caused when liquids discharged from flare stack. Fire put out with dry chemicals. Liquids collected (see below)

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

In flare sump and vacuumed to API separator. Some consumed in fire. Some surface staining to south of flare. Reviewing causes of excess hydrocarbons to flare drum to prevent future occurrence.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* Industrial			
SURFACE CONDITIONS	SANDY	SANDY LOAM X	CLAY	ROCKY	WET	DRY X	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

Wind blowing to south which kept hydrocarbons on refinery property. Recently rained, about 75°F.

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED [signature] TITLE ENVIRONMENTAL ENGINEER DATE 7-25-89

SPECIFY

**ATTACH ADDITIONAL SHEETS IF NECESSARY

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

September 18, 1987

Mr. Frank Chavez
Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410

Mr. David Boyer
Land Office Building
P. O. Box 2088
Santa Fe, New Mexico 87501

Gentlemen:

Attached is a subsequent notification of a minor spill of 10 barrels of slop oil that occurred at Bloomfield Refining Company on September 12, 1987. The spill was contained inside a diked area and immediately cleaned up, resulting in little or no loss.

Please call me if you need additional information.

Sincerely,

Chris Hawley
Environmental Engineer

CH/jm

Attachment

cc: Richard Traylor
Chad King
Mike Macy

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	Bloomfield Refining Company				ADDRESS	P. O. Box 159, Bloomfield, N.M. 87413
TYPE OF	FIRE	BREAK	SPILL	LEAK	BLOWOUT	OTHER*
			X			

TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY X	OTHER*

NAME OF FACILITY	Bloomfield Refining Company			
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)	SEC. 27	TWP. T29N	RGE. R11W	COUNTY San Juan
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	2 miles south of Bloomfield, New Mexico			

DATE AND HOUR OF OCCURENCE	September 12, 1987 at 8:30 p.m.	DATE AND HOUR OF DISCOVERY	September 12, 1987 at 8:30 p.m.

WAS IMMEDIATE NOTICE GIVEN?	YES	NO	NOT REQUIRED X	IF YES, TO WHOM	
BY WHOM				DATE AND HOUR	
TYPE OF FLUID LOST	Slop Oil			QUANTITY OF LOSS 0	VOLUME RECOVERED 10 barrels

DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO X	QUANTITY

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

Failure to closely monitor Tank #9 (API slop tank) for level resulting in overflow. Operator talked to about the incident. Solutions to give Operators better warning or piping overflow to API being considered.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

Diked area near API separator affected. Oil cleaned up and returned to separator.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* Industrial			
SURFACE CONDITIONS	SANDY X	SANDY LOAM	CLAY	ROCKY	WET	DRY X	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

Dry, temperate day.

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED [signature] TITLE Environmental Engineer DATE September 18, 1987

SPECIFY

**ATTACH ADDITIONAL SHEETS IF NECESSARY

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

March 2, 1987

Mr. Frank Chavez
Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410

Mr. David Boyer
Land Office Building
P. O. Box 2088
Santa Fe, New Mexico 87501

Gentlemen:

Attached is a notification of a spill of 290 barrels of regular gasoline that occurred at Bloomfield Refining Company on February 24, 1987. The spill occurred inside a tank dike.

Please call me if you need additional information.

Sincerely,

Chris Hawley
Environmental Engineer

CH/jm

Enclosure

cc: Richard Traylor
Mike Macy
Chad King

P.O. Box 159 • Bloomfield, New Mexico 87413 • 505/632-8013

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

E OF R	Bloomfield Refining Company				ADDRESS P.O. Box 159, Bloomfield, New Mexico 87413	
	FIRE	BREAK	SPILL X	LEAK	BLOWOUT	OTHER*
E OF ILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY X	OTHER*
E OF ILITY	Bloomfield Refining Company					
ATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)			SEC. 27	TWP. T29N	RGE. R11W	COUNTY San Juan
TANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	2 miles south of Bloomfield, New Mexico					
E AND HOUR OCCURENCE	February 24, 1987 at 4:00 a.m. to 5:00 a.m.				DATE AND HOUR OF DISCOVERY	February 24, 1987 at 5:00 a.m.
IMMEDIATE ICE GIVEN?	YES X	NO	NOT REQUIRED		IF YES, TO WHOM	Official at Aztec office for Chavez
OM	Chris Hawley				DATE AND HOUR	March 2, 1987 at 11:00 a.m.
E OF JID LOST	Regular Gasoline				QUANTITY OF LOSS	5 bbl	VOLUME RECOVERED	285 bbl
ANY FLUIDS REACH WATERCOURSE?	YES	NO X	QUANTITY			

YES, DESCRIBE FULLY**

SCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

Problem was caused by operator error in making a blend of regular gasoline. The blend component, base gas, was dialed into the blend meter at 5075 instead of 3075 and subsequent indirect information about the blend problems was not investigated. The operator was

SCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN** counseled by supervision. A warning sign will be posted to remind pumpers to check blends thoroughly and instrumentation is being reviewed for changes. The gasoline was contained in the tank dike. Water was added to float the gasoline, subsequently picked up by vacuum truck.

SCRIPTION AREA	FARMING	GRAZING	URBAN	OTHER* Industrial			
RFACE NDITIONS	SANDY X	SANDY LOAM	CLAY	ROCKY	WET X	DRY	SNOW

SCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

The area was saturated from recent rain. The temperature was below freezing.

HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY OWLEDGE AND BELIEF

IGNED [signature] TITLE Environmental Engineer DATE March 2, 1987

IFY

**ATTACH ADDITIONAL SHEETS IF NECESSARY

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

July 25, 1986

Mr. Frank Chavez
Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410

Mr. David Boyer
Land Office Building
P. O. Box 2088
Santa Fe, New Mexico 87501

Gentlemen:

Attached is a subsequent notification of a minor spill of 20 barrels of naphtha that occurred at Bloomfield Refining Company on July 24, 1986. The spill occurred inside a tank dike. Immediate action was taken to clean up the spill, resulting in a minimal loss.

Please call me if you need additional information.

Sincerely,

Chris Hawley
Environmental Engineer

CH/jm

Enclosure

Cc: Richard Traylor
Mike Macy
Chad King

P.O. Box 159 • Bloomfield, New Mexico 87413 • 505/632-8013

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF COMPANY	Bloomfield Refining Company				ADDRESS	P. O. Box 159, Bloomfield, New Mexico 87413	
TYPE OF REPORT	FIRE	BREAK	SPILL X	LEAK	BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY X	OTHER*
NAME OF FACILITY	Bloomfield Refining Company						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)					SEC. 27	TWP. T29N	RGE. R11W	COUNTY San Juan
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	2 miles south of Bloomfield, New Mexico						
DATE AND HOUR OF OCCURENCE	July 24, 1986 at 7:00 a.m.				DATE AND HOUR OF DISCOVERY	July 24, 1986 at 7:20 a.m.	
WAS IMMEDIATE NOTICE GIVEN?	YES	NO	NOT REQUIRED X		IF YES, TO WHOM		
BY WHOM					DATE AND HOUR		
TYPE OF FLUID LOST	Naphtha				QUANTITY OF LOSS	< 1 barrel	VOLUME RECOVERED	20 barrels
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO X	QUANTITY				

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

Naphtha was being gravitated from one tank into another tank. A drain valve, about 1 foot up from the bottom of the second tank, was left open. About 20 barrels went to grade before the open valve was discovered and closed. The Operator was counseled by supervision.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

The spill occurred inside a tank dike and was immediately cleaned up by vacuum truck.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* Industrial			
SURFACE CONDITIONS	SANDY X	SANDY LOAM	CLAY	ROCKY	WET X	DRY	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

The area was saturated from recent rainfall, therefore, a minimal amount of naphtha soaked into the soil. The morning was cool and clear.

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

Signed: Glenn A. Hurley — Environmental Engineer — July 25, 1986

SIGNED — TITLE — DATE

*SPECIFY

**ATTACH ADDITIONAL SHEETS IF NECESSARY

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

July 11, 1986

Mr. Frank Chavez
Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410

Mr. David Boyer
Land Office Building
P. O. Box 2088
Santa Fe, New Mexico 87501

Gentlemen:

Attached is a subsequent notification of a minor spill of 10 barrels of light natural gasoline that occurred at Bloomfield Refining Company on July 5, 1986. Please call me if you need addtional information.

Sincerely,

Chris Hawley
Environmental Engineer

CH/jm

Enclosure

Cc: Richard Traylor
Mike Macy
Chad King

P.O. Box 159 • Bloomfield, New Mexico 87413 • 505/632-8013

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR Bloomfield Refining Company					ADDRESS P. O. Box 159, Bloomfield, New Mexico 87413	
REPORT	FIRE	BREAK	SPILL X	LEAK	BLOWOUT	OTHER*
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY X	OTHER*
NAME OF FACILITY Bloomfield Refining Company						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)					SEC. 27	TWP. T29N	RGE. R11W	COUNTY San Juan
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK 2 miles south of Bloomfield, New Mexico						
DATE AND HOUR OF OCCURENCE July 5, 1986 at 6:45 p.m.					DATE AND HOUR OF DISCOVERY July 5, 1986 at 6:45 p.m.	
WAS IMMEDIATE NOTICE GIVEN?	YES	NO	NOT REQUIRED X		IF YES, TO WHOM	
BY WHOM					DATE AND HOUR	
TYPE OF FLUID LOST Light Natural Gasoline					QUANTITY OF LOSS 2 bbls	VOLUME RECOVERED 8 bbls
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO X	QUANTITY			

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

Improper hookup for truck unloading. Driver was made aware of the proper procedure and why the spill occurred.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

Light natural was vacuumed up with vacuum truck and the area was washed down.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* Industrial			
SURFACE CONDITIONS	SANDY	SANDY LOAM	CLAY	ROCKY	WET	DRY	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

Summer day.

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED [signature] TITLE Environmental Engineer DATE July 11, 1986

SPECIFY

**ATTACH ADDITIONAL SHEETS IF NECESSARY

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

April 9, 1986

Mr. Frank Chavez
Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410

Dear Mr. Chavez

On April 9, 1986, Bloomfield Refining Company in Bloomfield, New Mexico had a spill occur in the crude unit area of our facility. Enclosed please find the completed notification report. It you need more information, please contact me.

Sincerely,

Chris Hawley
Environmental Engineer

CH/jm

Enclosure

Cc: Richard Traylor
Mike Macy
Chad King
David Boyer, Oil Conservation Division, Santa Fe

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	Bloomfield Refining Company				ADDRESS	P. O. Box 159, Bloomfield, NM 87413	
REPORT FOR	FIRE	BREAK	SPILL	LEAK X	BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY X	OTHER*
NAME OF FACILITY	Bloomfield Refining Company						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)					SEC. 27	TWP. T29N	RGE. R11W	COUNTY San Juan
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	2 miles south of Bloomfield, New Mexico						
DATE AND HOUR OF OCCURENCE	7:00 p.m. 4/8/86 to 7:40 a.m.4/9/86				DATE AND HOUR OF DISCOVERY	7:40 a.m. on 4/9/86	
WAS IMMEDIATE NOTICE GIVEN?	YES X	NO	NOT REQUIRED		IF YES, TO WHOM	Frank Chavez	
BY WHOM	Chris Hawley				DATE AND HOUR	4/9/86, 9:45 a.m.	
TYPE OF FLUID LOST	Diesel				QUANTITY OF LOSS	150 BBL	VOLUME RECOVERED	50 BBL
DID ANY FLUIDS REACH WATERCOURSE?	YES	NO X	QUANTITY				

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**
New 6" diesel rundown line was installed and put in service at 7:00 p.m. on 4/8/86. Two 6" flanges were not tightened properly and leaked. When leak was found at 7:40 a.m. on 4/9/86, diesel rundown was rerouted to slop, the flanges were tightened and the line to storage was thoroughly checked for more problems. The line was back in service after 20 minutes.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**
The leak was in the low piperack just east of the crude unit. Immediately upon detection, the vacuum truck was used to recover pooled diesel and sand was added to eliminate fire hazard. Because of the slow and long duration of the leak, a substantial amount of the spill soaked into the soil. The area is not accessible for soil removal.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* Industrial - Under piperack			
SURFACE CONDITIONS	SANDY X	SANDY LOAM	CLAY	ROCKY	WET	DRY X	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**
The temperature during the night was in the 30 to 40° range. The weather was clear.

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED Chris Hawley — TITLE Environmental Engineer — DATE 4/9/86

SPECIFY

**ATTACH ADDITIONAL SHEETS IF NECESSARY

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	Bloomfield Refining Company				ADDRESS	P. O. Box 159, Bloomfield, New Mexico 87413	
REPORT OF	FIRE	BREAK	SPILL	LEAK X	BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY X	OTHER*
NAME OF FACILITY	Bloomfield Refining Company						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)					SEC. 27	TWP. T29N	RGE. R11W	COUNTY San Juan
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	2 miles south of Bloomfield, New Mexico						
DATE AND HOUR OF OCCURENCE	1:30 p.m. on May 19, 1985				DATE AND HOUR OF DISCOVERY	1:35 p.m. on May 19, 1985	
WAS IMMEDIATE NOTICE GIVEN?	YES	NO X	NOT REQUIRED		IF YES, TO WHOM	-----	
BY WHOM	-----				DATE AND HOUR	-----	
TYPE OF FLUID LOST	Diesel Fuel				QUANTITY OF LOSS	80 bbls	VOLUME RECOVERED 60 bbls
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO X	QUANTITY				

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

The bottom of Tank No. 19 (diesel sales) developed a leak (approximately 80 gallons per minute). This was probably due to long-term corrosion to bottom of tank. Product make into the tank was immediately taken out. Diesel sales were temporarily shut down. Water was -
(See attached sheet)

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

The leak occurred inside the tank dike area.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* Inside tank dike.			
SURFACE CONDITIONS	SANDY X	SANDY LOAM	CLAY	ROCKY	WET	DRY X	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

Temperature was approximately 75°F with light winds from northwest. The sky was cloudy with some precipitation.

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED Claude King TITLE Operations Superintendent DATE May 20, 1985

SPECIFY

**ATTACH ADDITIONAL SHEETS IF NECESSARY

pumped into the tank so water would leak instead of hydrocarbon. A small pit was dug to contain leak and a vacuum truck used to pump pit out. These actions were done within one hour of discovery of the leak.

Piping modifications were done to allow contents of this tank to be pumped to another tank. Diesel sales were started. Water level will be maintained until tank is empty and vacuum truck will continue to recover water from pit. These actions are on-going.

PLATEAU, INC.

P.O. BOX 26251
ALBUQUERQUE, N.M. 87125-6251
PHONE 505/262-2221

March 29, 1984

Mr. Joe Ramey, Director
Oil Conservation Division
P.O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87501

Dear Mr. Ramey:

On March 27, 1984, the Plateau refinery in Bloomfield, New Mexico, had a spill occur in the tank farm. The spill amounted to 400 barrels. We were able to recover all but 20 barrels. Immediate action was taken to clean up the spill; a subsequent telephone notification was given within 24 hours to yourself. Enclosed please find the completed report for notification of fire, leaks, breaks, spills and blowouts. If you have further questions, feel free to contact me.

Sincerely,

Dwight J. Stockham

Dwight J. Stockham
Associate Environmental Engineer

RECEIVED
MAR 30 19[illegible]
P.W. LISCOM

DJS/rm

cc: P. W. Liscom
G. A. Masson
Ernie Busch - Oil Conservation Division
1000 Rio Brazos Boulevard
Aztec, New Mexico 87410

Plateau

PETROLEUM REFINERS • MARKETERS

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	Plateau, Inc.				ADDRESS	P.O. Box 159, Bloomfield, NM 87413	
REPORT OF	FIRE	BREAK	SPILL XXXX	LEAK	BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY xxx	OTHER*
NAME OF FACILITY	Bloomfield Refinery						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)					SEC.	TWP.	RGE. / COUNTY
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK							
DATE AND HOUR OF OCCURENCE	3/27/84 9:30 pm				DATE AND HOUR OF DISCOVERY	3/27/85 10:00 pm	
WAS IMMEDIATE NOTICE GIVEN?	YES	NO xxx	NOT REQUIRED		IF YES, TO WHOM		
BY WHOM					DATE AND HOUR		
TYPE OF FLUID LOST	unleaded gasoline				QUANTITY OF LOSS	20 bbls	VOLUME RECOVERED 380 bbls
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO xxx	QUANTITY				

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

The cause of the problem was due to operator error. The operator will pay closer attention to his duties to remedy this situation.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

The area affected was inside a tank dike on refinery property. A vacuum truck was used to pick up the spill.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* refinery property			
SURFACE CONDITIONS	SANDY	SANDY LOAM	CLAY	ROCKY	WET xxxx	DRY	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

clear skies, temperature 25°F

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED Dwight J. Hooker TITLE Assoc Environ Engin DATE 3/28/84

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

Bloomfield Refining Company
A Gary Energy Corporation Subsidiary

November 14, 1984

Mr. Frank Chavez
Oil Conservation Division
State of New Mexico
1000 Rio Brazos
Aztec, New Mexico 87410

Dear Frank:

This letter is notification that a hydrocarbon spill occurred at this refinery on November 7, 1984 at approximately 12:15 p.m. As I mentioned in our conversation on November 8th, the spilled product was naphtha out of a storage tank. A total of 880 bbls. of product spilled and was contained in the tank dike. 800 bbls. of this product was recovered and returned to our system.

If you need more information, please contact me.

Sincerely,

Chad King
Operations Supervisor

CK/jm

cc: Paul Liscom

PLATEAU, INC.

P.O. BOX 26251
ALBUQUERQUE, NEW MEXICO 87125
PHONE 505/262-2221

May 17, 1982

Mr. Jeff Edmister
1000 Rio Brazos Boulevard
Aztec, New Mexico 87410

Dear Jeff:

On May 14, 1982, the Plateau Refinery had a spill occur in the tank farm. The spill amounted to 20 barrels. We were able to recover all but 10 barrels that coated the gravel and was mixed with dirt during the cleanup operation. Immediate action was taken to clean up the spill, a subsequent telephone notification was given the same day to yourself. Enclosed please find the completed report for notification of fire, breaks, leaks and blow-outs. If you have further questions, feel free to contact me.

Sincerely yours,

Dwight J. Stockham

D. J. Stockham
Associate Environmental Engineer

DJS/shm

Enclosure

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	Plateau, Inc.				ADDRESS	P. O. Box	
REPORT OF	FIRE	BREAK	SPILL XXX	LEAK	BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY XXX	OTHER*
NAME OF FACILITY	Plateau, Inc.						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)					SEC. --	TWP. --	RGE. -- COUNTY San Juan
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK							
DATE AND HOUR OF OCCURENCE	5-16-82 (3:00 AM)				DATE AND HOUR OF DISCOVERY	5-16-82 (3:00 AM)	
WAS IMMEDIATE NOTICE GIVEN?	YES	NO	NOT REQUIRED XXX		IF YES, TO WHOM		
BY WHOM					DATE AND HOUR		
TYPE OF FLUID LOST					QUANTITY OF LOSS 10	VOLUME RECOVERED 10	
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO XXX	QUANTITY				

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

The cause of the problem was due to operator error. A tank spill occurred due to the operator error. The operator will pay closer attention to his duties to remedy this situation.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

The area affected was inside a tank dike on refinery property. A front end loader and hand shovels were used to clean up the spill.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* Refinery Property			
SURFACE CONDITIONS	SANDY XXX	SANDY LOAM	CLAY	ROCKY	DAMP XXX	DRY	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

Overcast skies, temperature of 60°F

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED Dwight J. Stockton TITLE Assoc. Environ. Engr. DATE May 17, 1982

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

MAR - 4 1982

PLATEAU, INC.

P.O. BOX 26251
ALBUQUERQUE, NEW MEXICO 87125
PHONE 505/262-2221

March 3, 1982

Mr. Frank Chavez
1000 Rio Brazos Blvd.
Aztec, New Mexico 87410

Dear Frank:

On February 24, 1982, the Plateau Refinery had a spill occur at the crude unloading rack. The spill amounted to approximately 20 barrels. We were able to recover all but 3 or 4 barrels that coated the gravel and was mixed with dirt in the cleanup operation. Immediate action was taken to cleanup the spill. Enclosed please find the completed report for notification of fire, breaks, leaks and blowouts.

If you have further questions, feel free to contact me.

Sincerely yours,

Dwight J. Stockham

D. J. Stockham
Associate Environmental Engineer

DJS:sac

Enclosure

cc: K. D. Sinks

Plateau

PETROLEUM REFINERS • MARKETERS

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	Plateau, Inc.				ADDRESS	P. O. Box 159	
REPORT OF	FIRE	BREAK	SPILL XXXXX	LEAK	BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY XXX	OTHER*
NAME OF FACILITY	Plateau, Inc.						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)					SEC. -------	TWP. ------	RGE. ------- COUNTY San Juan
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	One Mile South of the City of Bloomfield						
DATE AND HOUR OF OCCURENCE	2/24/82 (2:00 a.m.)				DATE AND HOUR OF DISCOVERY	2/24/82 (2:00 a.m.)	
WAS IMMEDIATE NOTICE GIVEN?	YES	NO	NOT REQUIRED XXX		IF YES, TO WHOM		
BY WHOM					DATE AND HOUR		
TYPE OF FLUID LOST	Crude Oil				QUANTITY OF LOSS	5 BBLS	VOLUME RECOVERED 15 BBLS
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO XXX	QUANTITY				

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

The cause of the problem was due to operator error. A valve was accidently left open at the crude unloading rack causing crude oil to spill onto the ground. The operator will pay closer attention to his duties to remedy this situation.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

The area affected was the Plateau Refinery property (crude unloading), a front end loader and hand shovels were used to cleanup the spill.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* Refinery Property(crude unloading)			
SURFACE CONDITIONS	SANDY XXXXXX	SANDY LOAM	CLAY	ROCKY	WET XXXXX	DRY	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

The temperature was 35°F with no precipitation prevailing.

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED Dwight J. Stockton TITLE Assoc. Environ. Engr. DATE 2/25/82

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

PLATEAU, INC.

P.O. BOX 26251
ALBUQUERQUE, NEW MEXICO 87125
PHONE 505/262-2221

February 11, 1982

Mr. Frank Chavez
1000 Rio Brazos Blvd.
Aztec, New Mexico 87410

Dear Frank:

On January 26, 1982, the Plateau Transportation Department had a line freeze, causing a sump to overflow. The overflow amounted to approximately 10 barrels spilling onto the ground. Immediate action was taken to cleanup the spill.

Enclosed please find the completed report for notification of fire, breaks, spills, leaks and blowouts. If you have any further questions, feel free to contact me.

Sincerely yours,

Dwight J. Stockham

D. J. Stockham
Associate Environmental Engineer

DJS:sac

Enclosure

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	Plateau Inc.				ADDRESS	P.O. Box 159	
REPORT OF	FIRE	BREAK	SPILL	LEAK	BLOWOUT	OTHER* Overflow	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFYXXX	OTHER*
NAME OF FACILITY	Plateau Transportation						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)					SEC. --	TWP. --	RGE. -- COUNTY San Juan
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	One mile south of the city of Bloomfield						
DATE AND HOUR OF OCCURENCE	1-26-82 (Night a.m.)				DATE AND HOUR OF DISCOVERY	1-26-82 (Morning a.m.)	
WAS IMMEDIATE NOTICE GIVEN?	YES XXX	NO	NOT REQUIRED		IF YES, TO WHOM	Frank Chavez	
BY WHOM	Lenn McQuitty				DATE AND HOUR	1-26-82 (Morning a.m.)	
TYPE OF FLUID LOST	Crude Oil				QUANTITY OF LOSS	None	VOLUME RECOVERED 10 Bbls
DID ANY FLUIDS REACH A WATERCOURSE?	YES	NO XXX	QUANTITY				

IF YES, DESCRIBE FULLY**

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN**

The drain line froze causing the sump to overflow. Heat tracing was installed on the drain line to prevent the line from freezing.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN**

The area affected was the Plateau Transportation Property. A front-end loader and hand shovels were used to cleanup the spill.

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* Refinery Property			
SURFACE CONDITIONS	SANDY XXX	SANDY LOAM	CLAY	ROCKY	WET	DRY	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

The temperature was below freezing, the ground at that time was frozen.

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED Dwight J. Stuckhan TITLE Ass. Environmental Engr. DATE 2-8-82

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

NEW MEXICO OIL CONSERVATION COMMISSION

NOTIFICATION OF FIRE, BREAKS, SPILLS, LEAKS, AND BLOWOUTS

NAME OF OPERATOR	Plateau Refinery				ADDRESS	Box 159, Bloomfield, NM 87413	
REPORT OF	FIRE	BREAK	SPILL	LEAK X	BLOWOUT	OTHER*	
TYPE OF FACILITY	DRLG WELL	PROD WELL	TANK BTTY	PIPE LINE	GASO PLNT	OIL RFY X	OTHER*
NAME OF FACILITY	Plateau Refinery						
LOCATION OF FACILITY (QUARTER/QUARTER SECTION OR FOOTAGE DESCRIPTION)	S ½ of NE ¼				SEC. 27	TWP. 29N	RGE. 11W	COUNTY S.J.
DISTANCE AND DIRECTION FROM NEAREST TOWN OR PROMINENT LANDMARK	Approximately 2 miles south of Bloomfield - East on Hammond Road						
DATE AND HOUR OF OCCURENCE	Approximately 1/4/82				DATE AND HOUR OF DISCOVERY	Approximately 1/6/82	
WAS IMMEDIATE NOTICE GIVEN?	YES	NO X	NOT REQUIRED		IF YES, TO WHOM		
BY WHOM					DATE AND HOUR		
TYPE OF FLUID LOST	Diesel product				QUANTITY OF LOSS	Less than one barrel	VOLUME RECOVERED	Same
DID ANY FLUIDS REACH A WATERCOURSE?	YES X	NO	QUANTITY	Same			

IF YES, DESCRIBE FULLY**

It was found that a hydrocarbon, appearing as diesel, was seeping into the Hammond irrigation ditch.

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN** The problem appears to be caused by hydrocarbon spills occurring in the refinery area over the past 25 years. This has caused the ground to be saturated with the hydrocarbon and during periods of declining water table (such as when the water flow in the Hammond

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN** Approximately 1000 feet of the Hammond Ditch located north of the refinery was affected by this seep. The water and small amount of hydrocarbon in the ditch was immediately pumped out with a vacuum truck. The plan is to sink 36" diameter by 4' long conduit

DESCRIPTION OF AREA	FARMING	GRAZING	URBAN	OTHER* Refinery			
SURFACE CONDITIONS	SANDY	SANDY LOAM	CLAY	ROCKY	WET X	DRY	SNOW

DESCRIBE GENERAL CONDITIONS PREVAILING (TEMPERATURE, PRECIPITATION, ETC.)**

The weather has been cold and wet during this period.

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF

SIGNED Kenneth W. Smith TITLE General Mgr DATE 22 JAN 1982

*SPECIFY **ATTACH ADDITIONAL SHEETS IF NECESSARY

DESCRIBE CAUSE OF PROBLEM AND REMEDIAL ACTION TAKEN (continued)

Ditch is cut off during winter), this hydrocarbon seeps to the lowest point, being the Hammond Ditch.

DESCRIBE AREA AFFECTED AND CLEANUP ACTION TAKEN (continued)

vertically at two places in the ditch. These will attract water and any hydrocarbon and will be pumped on a continual basis. Also, accidental hydrocarbon spills in the refinery area have been virtually eliminated.

Plateau is engineering a well to be placed in the area of the past spills. This will recover the oil in the spill area and should reduce the likelihood of the diesel migrating toward the Hammond irrigation ditch.

APPENDIX B

TECHNOLOGY SCREENING MATRIX

TECHNOLOGY SCREENING MATRIX
SOIL REMEDIATION

TECHNOLOGY CONSIDERED	APPLICABILITY to SITE				RELATIVE COSTS		TREATMENT TIME ACCEPTABILITY	RATING SUMMATION	RETAIN YES/NO
	Advantage	Disadvantage	Relative Applicability Technical 0 - 5 A	Permits 0 - 3 P	Capital C	Operating O	Not Acceptable Acceptable T		
					High$ 1 2 3 4 5 Low$		1 2 3	A*P*(C+O+T)	
Risk Assessment	i	CNT, C1	5	3	4	5	3	180	YES
in situ vapor extraction/	DEST, PERE,i, MRED	ADTRT	5	2	3	4	2	90	YES
in situ Bio	DEST	ADTRT, SMAT	3	2	3	3	1	35	NO
in situ Soil Washing	VRED	iA, AREA	2	2	4	2	1	28	NO
Chemical Fracture	MRED	iA, AREA	2	3	2	4	2	50	NO
Vitrification	MRED	ET	1	3	5	4	2	44	NO
Steam Stripping	VRED	iA	2	3	5	2	3	66	NO

LEGEND

ADVANTAGES LEGEND	DISADVANTAGES		TIME LEGEND	COST LEGEND	TECHNICAL
mred - Mobility Reduction	et - Emerging Technology	smat = inappropriate soil material	1 > 3 years	1 > $500K/CY	O = improbable
dest - Destruction	ia - Inappropriate Technology	dtw = depth to water	2 > 1-3 years	2 $200-500K/CY	5 = very implementable
vred - Volume Reduction	nperm - Not Permittable	na = not available	3 < 1 year		3 =

0225TTL2.TSM

TECHNOLOGY SCREENING MATRIX
LNAPL PHASE RECOVERY

TECHNOLOGY CONSIDERED	APPLICABILITY to SITE				RELATIVE COSTS		TREATMENT TIME ACCEPTABILITY	RATING SUMMATION	RETAIN YES/NO
	Advantage	Disadvantage	Relative Applicability Technical 0 - 5 A	Permits 0 - 3 P	Capital C	Operating O	Not Acceptable Acceptable T		
					High$ 1 2 3 4 5 Low$		1 2 3	A*P*(C+O+T)	
Skimming Pumps	VRED, PERF,i	AREA	3	3	3	5	1	81	YES
DVEL Pump System	MRED, PERF, i	AREA, ADTRT	4	1	2	3	1	24	NO
Vapor Extraction	DEST, PERF, i	ADTRT	5	2	4	4	2	100	YES
Hi VAC Total Fluid Ext.	DEST, MRED	ET, ADTRT	4	2	2	3	3	64	YES
Total Fluid Pumping	MRED, VRED, i	ADTRT, AREA	4	1	2	3	1	24	NO
Sparging/Vapor Extraction	DEST, i	iA	2	2	3	3	2	32	NO

LEGEND

ADVANTAGES LEGEND	DISADVANTAGES		TIME LEGEND	COST LEGEND	TECHNICAL
mred - Mobility Reduction	et - Emerging Technology	smat = Inappropriate soil material	1 > 3 years improbable	1 > $500K/CY	0 =
dest - Destruction	ia - Inappropriate Technology	dtw = depth to water	2 > 1-3 years	2 $200-500K/CY	5 = very implementable
vred - Volume Reduction	nperm - Not Permittable	na = not available	3 < 1 year		3 9

0225TTL2.TSM

TECHNOLOGY SCREENING MATRIX
MITIGATE SEEPAGE

TECHNOLOGY CONSIDERED	APPLICABILITY to SITE				RELATIVE COSTS		TREATMENT TIME ACCEPTABILITY	RATING SUMMATION	RETAIN YES/NO
	Advantage	Disadvantage	Relative Applicability Technical 0 - 5 A	Permits 0 - 3 P	Capital C	Operating O	Not Acceptable Acceptable T		
					High$ 1 2 3 4 5 Low$		1 2 3	A*P*(C+O+T)	
Dewater entire site	VRED	ADTRT	1	1	1	1	1	3	NO
Grout Curtain	MRED, i, PERF	CNT, DTW	5	3	3	5	3	88	YES
Air Curtain	MRED	ET, CNT	1	3	4	4	2	30	NO
Intercept Trench	MRED, i, PERF	CNT, ADTRT, DTW	5	1	3	3	3	45	YES
Reverse Gradient	MRED, i	ADTRT	3	1	2	2	2	24	NO
Water Curtain	MRED	ADTRT	3	1	3	3	2	24	NO
Dewater Near Seeps	MRED, VRED	ADTRT	5	1	4	4	3	55	YES

LEGEND

ADVANTAGES LEGEND	DISADVANTAGES		TIME LEGEND	COST LEGEND	TECHNICAL
mred - Mobility Reduction	et - Emerging Technology	smat = inappropriate soil material	1 > 3 years improbable	1 > $500K/CY	O =
dest - Destruction	ia - Inappropriate Technology	dtw = depth to water	2 > 1-3 years	2 $200-500K/CY	5 = very implementable
vred - Volume Reduction	nperm - Not Permittable	na = not available	3 < 1 year		3 =

TECHNOLOGY SCREENING MATRIX
REDUCE DISSOLVED CONCENTRATIONS

TECHNOLOGY CONSIDERED	APPLICABILITY to SITE				RELATIVE COSTS		TREATMENT TIME ACCEPTABILITY	RATING SUMMATION	RETAIN YES/NO
	Advantage	Disadvantage	Relative Applicability Technical 0 - 5 A	Permits 0 - 3 P	Capital C	Operating O	Not Acceptable Acceptable T		
					High$ 1 2 3 4 5 Low$		1 2 3	A*P*(C+O+T)	
Risk Assessment	i	CNT, Ci	5	3	4	5	3	180	YES
Pump, Treat, Reject	MRED, VRED	AREA, ADTRT	3	2	3	4	2	63	YES
Pump, Treat, Infiltrate	MRED, VRED, i	AREA, ADTRT	3	2	4	3	1	24	NO
Sparging/Vapor Extraction	MRED, DEST, i, PERF	ET, ADTRT	4	2	3	3	2	64	YES
in situ Bio	DEST	AREA	2	1	3	3	1	14	NO
Source reduction	i	CNT	4	3	5	4	1	120	YES

LEGEND

ADVANTAGES LEGEND	DISADVANTAGES		TIME LEGEND	COST LEGEND	TECHNICAL
mred - Mobility Reduction	et - Emerging Technology	smat = inappropriate soil material	1 > 3 years improbable	1 > $500K/CY	O =
dest - Destruction	ia - Inappropriate Technology	dtw = depth to water	2 > 1-3 years	2 $200-500K/CY	5 = very implementable
vred - Volume Reduction	nperm - Not Permittable	na = not available	3 < 1 year		3 =