AP - 001

STAGE 1 & 2 WORKPLANS

DATE: Aug. 14, 1998

BDM

STAGE 2 ABATEMENT PLAN
FORMER BRICKLAND REFINERY SITE
HUNTSMAN POLYMERS CORPORATION

August 14, 1998

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Environmental Bureau
Oil Conservation Division

Prepared for:

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2400 S. Grandview Ave.
Odessa, Texas 79760

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EXECUTIVE SUMMARY

Located in Sunland Park, New Mexico, the Brickland Refinery site (the site) consists of approximately 33 acres situated along the west bank of the Rio Grande. From 1933 to 1958, the site was operated as a petroleum refinery, which was producing both gasoline for the automobile market and jet fuels. Huntsman Polymers Corporation (formerly Rexene Corporation) currently owns the site, which was closed and the plant dismantled in 1958. All that remains on site are concrete foundations and rubble. Between 1964 and 1989, the site was leased to various parties to service trucks, conduct automobile salvage operations, graze livestock, and store used bricks (Eder, 1990). Petroleum hydrocarbons from the operations of the facility have been detected in soil and groundwater at the site. The nature and extent of the petroleum hydrocarbons were initially investigated by Eder and further quantified by GCL (GCL, 1994; BDM, 1996), then a wholly owned subsidiary and now a part of BDM International, Inc. (BDM). These investigations provide the basis for this Stage 2 Abatement Plan. The site is not currently in use and is secured from unauthorized access by a chain-link fence and locked gate. There are no plans for future use of the site by Huntsman Polymers Corporation (Huntsman), however, the City of Sunland Park has discussed its desire to obtain the northern portion of the property to construct a sewage treatment unit. Deed restrictions from Huntsman will prohibit the installation of any water wells or constructed facilities that would interfere with the proposed abatement for the site.

In 1989, the predecessor of the New Mexico Environment Department, the New Mexico Environmental Improvement Division (NMEID), conducted a Screening Site Inspection (SSI) (NMEID, 1989). The findings of the SSI were submitted to the Environmental Protection Agency (EPA) Region VI for review and possible inclusion of the site on the Superfund National Priority List (NPL). The site is not, nor has it ever been, listed or proposed for listing on the NPL. Because all of the constituents of concern were directly related to petroleum, including crude oil, fractions thereof, and refined products, jurisdiction of the site resides within the regulatory authority of the New Mexico Water Quality Control Commission (WQCC) rather than the EPA Superfund Program. Because a refinery formerly occupied the site, WQCC jurisdiction is administered by the New Mexico Oil Conservation Division (NMOCD) rather than the New Mexico Environment Department (NMED).

Huntsman has fulfilled the requirements of the WQCC Regulations for completion of a Stage 1 Abatement Plan for the Brickland Refinery site. The Final Site Investigation (FSI) Report, dated December 18, 1996, presents the site characterization required for the Stage 1 Abatement Plan. NMOCD approved the FSI Report on May 21, 1997. This Stage 2 Abatement Plan presents the

proposed methods for abating contamination of groundwater and soil in compliance with 1) WQCC regulations on prevention and abatement of water pollution (20NMAC 6.2, Subpart IV), and 2) NMOCD requirements to protect public health and the environment with respect to wastes from the refinement of crude oil (§70-2-12.B(22) NMSA 1978).

The site characterization identified the following impacts to either soil or groundwater from past operations at the site:

a) Hydrocarbons in the form of benzene, toluene, ethylbenzene, xylenes (BTEX), polyaromatic hydrocarbons (PAHs), and phenols; and metals, including iron, manganese, aluminum, cobalt, copper, molybdenum, nickel, zinc, arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver have been detected in the soil or groundwater at the site.

b) Free-phase product occurs in localized pockets and does not occur extensively throughout the site and has not migrated from the locations where it was first detected, based on site groundwater monitoring data.

c) Dissolved-phase hydrocarbons and metals (other than lead) have been detected above NMWQCC standards in groundwater beneath the site and in MW-6S.

d) Lead, the primary metal of concern in soil on the site, has not been detected in any of the on-site monitor wells. Although one soil sample exhibited the characteristic of toxicity for lead based on the Toxic Characteristic Leaching Procedure (TCLP), the fact that no lead has been detected in the groundwater beneath the site demonstrates that leaching of lead into groundwater is not occurring.

e) Surface water monitoring has shown that the Rio Grande River is not impacted, and groundwater and contaminant transport modeling has shown the Rio Grande will not be impacted in the future (BDM, 1996).

Based on the results of the site investigation and analyses of abatement technologies applicable to the site, the following approach is planned to abate hydrocarbons and other constituents of concern (COCs) in the soil and groundwater:

- COCs in soil, including hydrocarbons and metals, will be abated by natural attenuation. Natural attenuation results from a group of naturally occurring simultaneous processes, including metabolizing of organic compounds by microorganisms; transformation and/or redistribution of inorganic constituents through interaction with certain elements found in the soil; and dilution, volatilization, and adsorption that occurs in contaminated soils and groundwaters. Long-term monitoring of groundwater will be conducted to verify that COCs

in soil are decreasing in concentration or are stabilized so as to not act as a continuing source of COCs to groundwater.

- Free-phase product on groundwater will be removed by active recovery from monitor well MW-10 and periodic recovery of localized occurrences of free-phase product from other monitor wells and well points by hand bailing in the event that it is detected during routine monitoring.
- Dissolved-phase hydrocarbons and metals in groundwater will be abated by natural attenuation processes, engineering controls, and administrative controls. Long-term monitoring will be conducted to verify that concentrations of COCs are decreasing over time.
- Impacts of lead in soil to human health through airborne or direct contact will be controlled by installing a protective cover over the soil containing lead where concentrations above 400 milligrams per kilogram (mg/kg) exist. The other metals, which occur as a result of several factors, including natural background concentrations, potential contributions from the nearby Asarco smelter, and occurrences on the site, will be monitored in groundwater to verify that COCs in soil are decreasing or stabilized so as to not provide a continuing source of COCs to groundwater.

Semi-annual monitoring for BTEX, PAHs, and metals in groundwater and the adjacent Rio Grande, according to the NMOCD-approved monitoring plan along with changes proposed in Section 3.5, will continue until sampling results from the monitoring network are below WQCC standards. At that time, quarterly sampling will be initiated, and when four consecutive rounds of semiannual sampling results are below WQCC standards, Huntsman will submit an abatement completion report for review and approval by the NMOCD.

A summary of the selected abatement program is summarized below:

SELECTED ABATEMENT PROGRAM

CONSTITUENT	MEDIUM	METHOD OF ABATEMENT
Hydrocarbons and metals	Soil	Monitored natural attenuation, engineering, and administrative controls
Lead	Soil	Soil cover, engineering, and administrative controls
Free-phase hydrocarbons	Groundwater	Active and passive recovery, and administrative controls
Dissolved-phase hydrocarbons and metals	Groundwater	Monitored natural attenuation and administrative controls

Groundwater monitoring will be conducted until WQCC standards are achieved.

1.0 SUMMARY OF SITE CONDITIONS

The Brickland Refinery site consists of 33 acres located in Sunland Park, Doña Ana County, New Mexico (Figure 1). The former petroleum refinery operated from 1933 to 1958 and was subsequently dismantled. The site is adjacent to the Rio Grande and has been vacant except for foundations from former refinery structures. Some construction and demolition debris is present on the site, including concrete from the refinery structures and rubble from road construction. Native vegetation grows over most of the site, but is more concentrated at the northern portion of the property.

The area in the vicinity of the site is composed of mixed residential/commercial and commercial/industrial property. The status of land usage within a mile of the site and a list of property owners is included in the Final Site Investigation (FSI) Report (BDM, 1996). The site adjoins several private and government land parcels that are described in detail in Section 2.3 of the FSI Report. Land usage in the area of the site was determined from information gathered from County Assessors offices in Doña Ana County, New Mexico and El Paso County, Texas.

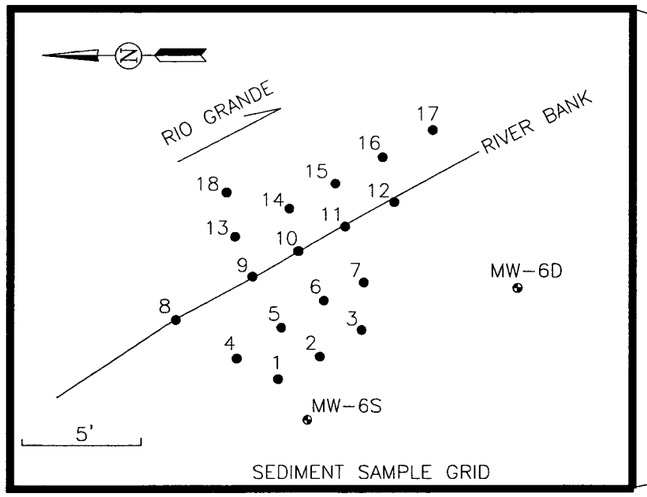
1.1 General Site Conditions

Climatic Conditions

Climate in the lower Mesilla Valley is characterized as arid continental with wide temperature ranges, low humidity, high evaporation, and low precipitation. Precipitation occurs mostly as rain, with about one-half of the total annual precipitation occurring from July to September. Rainfall during these three months is usually from brief, intense thunderstorms (Eder, 1990). Annual precipitation at the site averages 10 inches per year. Pan evaporation is in excess of 90 inches per year, and therefore much of the precipitation evaporates.

Regional and Site Hydrogeologic Conditions

The Brickland Refinery site is located at the southern portion of the Mesilla Valley near the United States and Mexico border on the western flood plain of the Rio Grande, northeast of the Cerro de Cristo Rey geologic uplift. The southern portion of the Mesilla Valley is bounded by the Franklin Mountains on the east and the Cerro de Cristo Rey uplift on the west. Surficial unconsolidated material in the valley consists of the Quaternary Rio Grande alluvium. This alluvium is estimated to be about 70 to 80 feet thick in the central portions of the valley, becoming very thin near the bedrock contacts at valley margins. Below the alluvium is the folded Muleros formation comprised of shaley limestones and siltstones.



SEDIMENT SAMPLE GRID

RIO GRANDE RIVER

TEXAS

NEW MEXICO

DSMW-9S

MW-09D

MW-09S

USMW-6SD

DSMW-6SD

MW-06S

MW-06D

CVL-1

CVL-2

CVL-3

CVL-4

DSMW-3SD

MW-03S

MW-03D

MW-17

MW-15

MW-16

MW-10

MW-11

MW-07

MW-08

MW-04

MW-01

MW-02

MW-13

MW-05

MISCELLANEOUS DIRT PILES

CISTERN

A

B

C

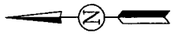
D

E

F

G

USMW-12



0 200'

SCALE: 1" = 200'

LEGEND

- CONCRETE SLAB/PAD - BLDG FOUNDATION
- WALL - MASONRY
- TREE
- POST
- FENCE
- INTERMITTENT STREAM
- RIVER
- MONITORING WELL
- TEST PIT
- TEST BORING
- HAND AUGER BORING
- SURFACE SAMPLING LOCATIONS
- CISTERN SAMPLING LOCATION
- RIVER SAMPLING LOCATION
- STORM WATER OUTFALL WITH A DITCH
- WELL POINT
- SEDIMENT SAMPLE LOCATION
- TEST TRENCH LOCATION IDENTIFIER
- GCL SAMPLING LOCATION
- EDER SAMPLING LOCATION

TEST PIT RESAMPLING LOCATIONS IN THE COLUMN A. CORRESPONDS TO THOSE IN THE COLUMN B.

A	B
E-TP-4-2	E-TP-12
E-TP-5-2	E-TP-17
E-TP-6-2	E-TP-20
E-TP-8-2	E-TP-32
F-TP-9-2	F-TP-34
F-TP-10-2	F-TP-61
G-TP-11-2	G-TP-68
G-TP-12-2	G-TP-73
G-TP-13-2	G-TP-76
G-TP-14-2	G-TP-80
G-TP-15-2	G-TP-82
G-TP-16-2	G-TP-77

GCL

FIGURE 1
SITE MAP SHOWING LOCATIONS OF TEST PITS, BORINGS, MONITOR WELLS, WELL POINTS.

CLIENT:	REXENE
DATE:	5/23/96
AUTHORED BY:	JH
DRAWN BY:	RG
CHECKED BY:	MWS
DWG. NO.:	D:\REXENE\RXBASE2.DWG

Groundwater occurs within the alluvium, with a regional groundwater flow direction toward the southeast. Sources of groundwater are from upgradient throughflow, upland runoff, direct infiltration of precipitation, and recharge from the Rio Grande when, during high-flow periods, it is a losing stream. Groundwater discharges in the valley are primarily pumpage, evapotranspiration, downgradient throughflow, and discharge to the river at low-flow periods, when the river is a gaining stream. Surface water is dominated by the Rio Grande, whose flow is predominantly controlled by upstream Elephant Butte and Caballo reservoirs (Lovejoy, 1976).

The site is situated on Quaternary alluvial deposits of the Rio Grande. The upper lithologic zone (0 to 15 feet below ground surface [bgs]) consists of thin-bedded, fine-grained sand, silt, and silty clays. The deeper lithology (below 15 feet bgs) consists of fine-grained sand characterized by well-sorted, subrounded sand grains that appear to coarsen with depth.

Groundwater Flow

Groundwater beneath the site occurs under confined and unconfined conditions. Much of the shallow groundwater occurs in thin lenses of silt and fine sand interbedded with clay-rich sediments that do not readily transmit water. The depth to water measured in monitor wells ranges from about 1.7 to 11.4 feet bgs. The water table elevation varies up to about 3.5 feet with levels typically highest in summer and lowest in winter, correlating with irrigation and changes in flow in the Rio Grande.

Groundwater flows primarily from northwest to southeast under a relatively flat hydraulic gradient of about 0.0005 to 0.0008 feet/foot across the site. Although there are local variations in the direction of groundwater flow, there is an overall southerly trend, parallel to the Rio Grande. Based on water level differences in monitor well clusters MW-3S, MW-3D, MW-6S, and MW-6D (deep and shallow), small vertically downward and upward head differences of up to 0.1 foot have been observed. Slug test results show an average hydraulic conductivity of 0.0002 feet per second (14 feet per day) for the shallow interbedded sands, silts, and clays. Groundwater flow velocity within the shallow materials is estimated at about 14 to 20 feet per year.

Rio Grande flow rates between 1990 and 1995 average approximately 700 cubic feet per second (cfs). During high flow periods of the year, the river will recharge the shallow aquifer, and, during low-flow periods, the aquifer will recharge the river.

Groundwater Quality

Hydrocarbons and metals have been detected in soils and groundwater at the site. The hydrocarbons include free-phase product, benzene, toluene, ethylbenzene and xylenes (BTEX),

phenols, and polyaromatic hydrocarbons (PAHs). A summary of metals found in soil and groundwater beneath the site is presented in Section 3 of the FSI Report (BDM, 1996), the conclusions of which are reiterated below.

Two extensive environmental investigations have evaluated groundwater chemistry and regional and local hydrogeologic conditions that influence the fate and transport of compounds in subsurface soils and the underlying shallow aquifer. These investigations were also conducted to establish soil and groundwater chemical conditions prior to determining an appropriate response to the observed COCs.

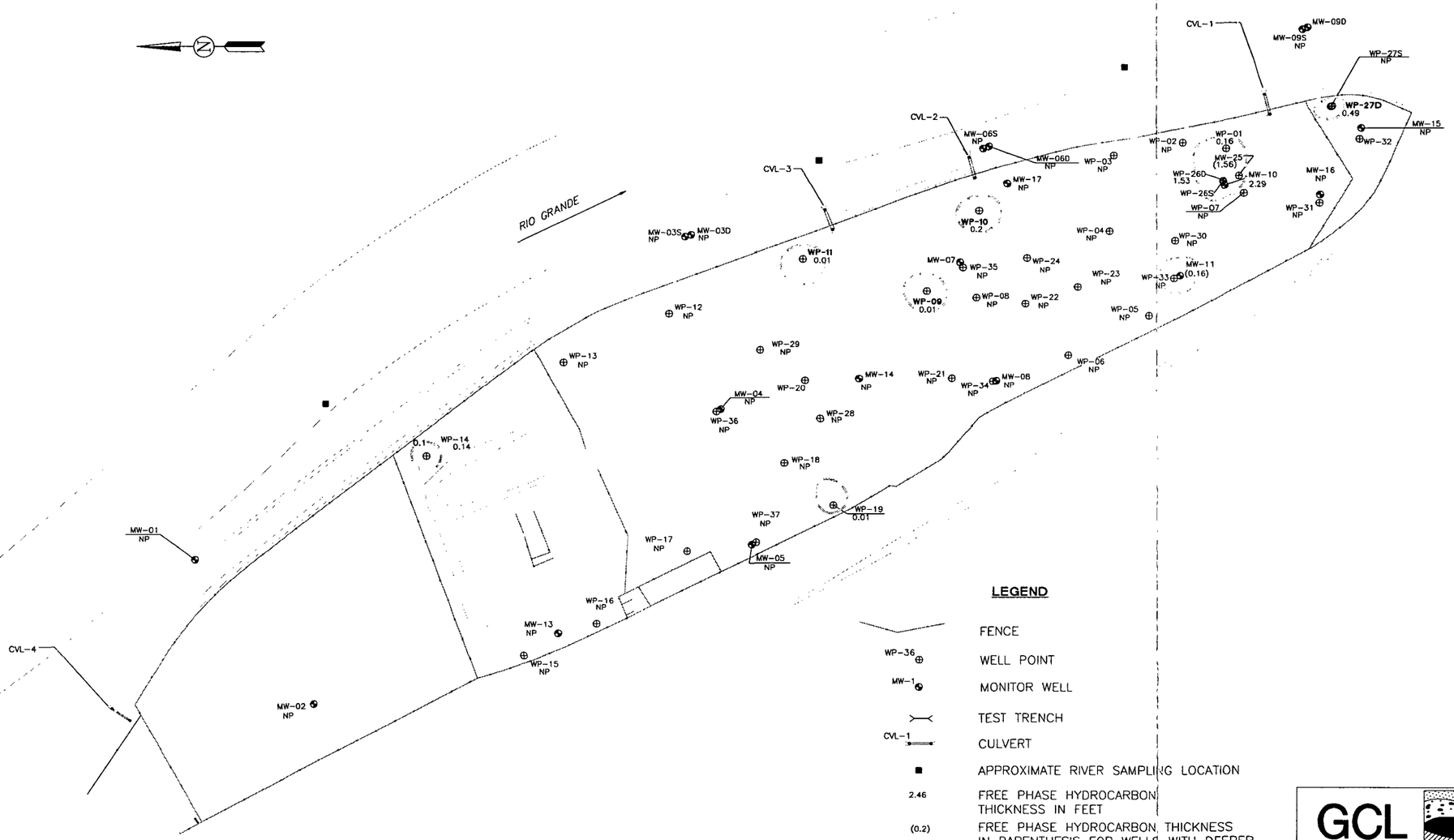
1.2 Soil And Groundwater Investigation Results

Data obtained from site investigations conducted by Geoscience Consultants, Ltd. (GCL, 1994), then a wholly owned subsidiary of BDM International, Inc. (BDM), and Eder and Associates, Inc. (Eder, 1990) indicate hydrocarbons in on-site soils are restricted to approximately the southern half of the property. Hydrocarbons in soil are present only within the property boundary and below the surface. Hydrocarbon constituents detected in groundwater monitor wells show a spatial correlation with areas of impacted soil, and suggest migration of hydrocarbons from soil to groundwater. GCL's studies indicated the areal extent of free-phase product is much less than originally projected by Eder's 1990 data. Eder's investigation had projected free-phase product over much of the southern half of the site. Based on GCL's investigation, free-phase product was observed only locally in several wells and well points in the southern portion of the site, with a maximum thickness of approximately 5 feet in MW-10 and WP-26S (Figure 2). Metals are found in the shallow soil and groundwater at the site, primarily in the southern half of the property. The approximate magnitude and extent of lead in soil is shown in Figure 3. Lead, which is the primary metal of concern, has not been detected in groundwater beneath the site.

GCL's evaluation of regional and local geologic and hydrologic conditions indicated the heterogeneous clays and silts in subsurface soils have acted to restrict migration of COCs. The observed hydrocarbons are confined to the property itself and the narrow strip of land between the site and the Rio Grande near monitor well MW-6S. On this small strip of land there exists a levee to prevent the river from flooding the area in times of high water flow. Because of its elevated construction, the only drainage from the site would be through any one of three drainage culverts that extend through the levee. Stormwater runoff from the southern portion of the site, where hydrocarbons and metals are present in soils, cannot occur because the three southern drainage culverts are now closed. The International Boundary and Water Commission (IBWC) has closed these three gates and will keep the gates on these culverts closed until completion of the project. A

MONITOR WELL/ WELL POINT	FREE PHASE HYDROCARBONS THICKNESS (FEET)	MEASUREMENT DATE
MW-01	NP	12-12-94
MW-02	NP	12-12-94
MW-03S	NP	03-27-95
MW-03D	NP	03-28-95
MW-04	NP	03-27-95
MW-05	NP	03-27-95
MW-06S	NP	03-28-95
MW-06D	NP	03-28-95
MW-07	NM	–
MW-08	NP	03-28-95
MW-9S	NP	03-28-95
MW-09D	NM	–
MW-10	2.29	06-20-95
MW-11	0.16	06-20-95
MW-12	NM	–
MW-13	NP	12-12-94
MW-14	NP	03-27-95
MW-15	NP	03-27-95
MW-16	NP	03-27-95
MW-17	NP	03-27-95
WP-01	0.16	06-20-95
WP-02	NP	12-12-94
WP-03	NP	12-12-94
WP-04	NP	12-12-94
WP-05	NP	12-12-94
WP-06	NP	12-12-94
WP-07	NP	12-12-94
WP-08	NP	12-12-94
WP-09	0.01	10-06-93
WP-10	0.20	09-26-94
WP-11	0.01	10-06-93
WP-12	NP	07-11-94
WP-13	NP	12-12-94
WP-14	0.14	06-20-95
WP-15	NP	12-12-94
WP-16	NP	07-11-94
WP-17	NP	07-11-94
WP-18	NP	12-12-94
WP-19	0.01	12-03-93
WP-20	NP	09-26-94
WP-21	NP	12-12-94
WP-22	NP	12-12-94
WP-23	NP	12-12-94
WP-24	NP	12-12-94
WP-25	1.56	06-20-95
WP-26D	1.53	12-12-94
WP-27S	NP	12-12-94
WP-27D	0.49	12-12-94
WP-28	NP	12-12-94
WP-29	NP	12-12-94
WP-30	NP	12-12-94
WP-31	NP	12-12-94
WP-32	NM	–
WP-33	NP	12-12-94
WP-34	NP	12-12-94
WP-35	NP	12-12-94
WP-36	NP	12-12-94
WP-37	NP	12-12-94

NP = NO FREE PHASE HYDROCARBONS DETECTED
NM = NOT MEASURED



0 200'

SCALE: 1" = 200'

LEGEND

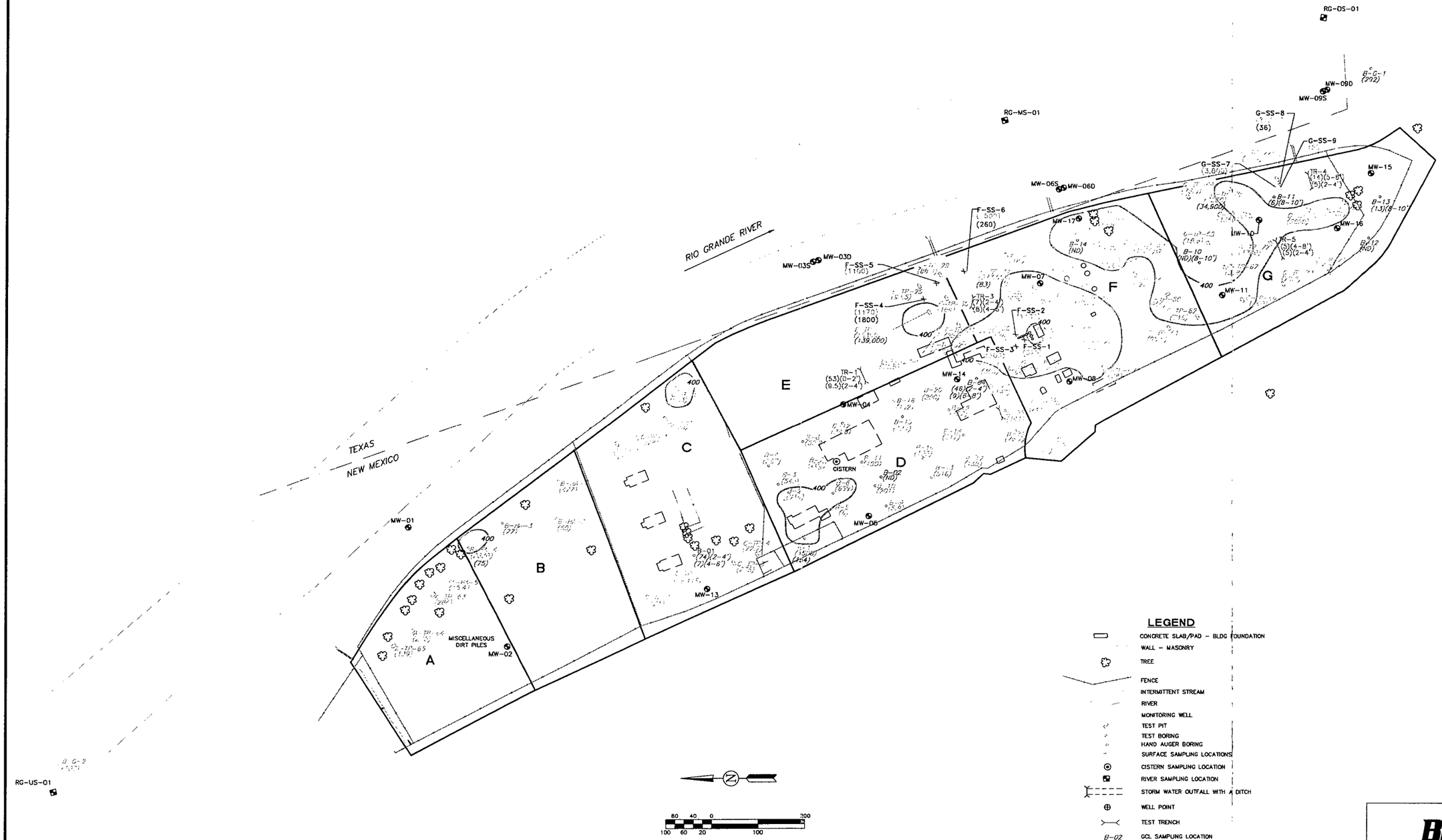
- FENCE
- WP-36 — WELL POINT
- MW-1 — MONITOR WELL
- TEST TRENCH
- CVL-1 — CULVERT
- APPROXIMATE RIVER SAMPLING LOCATION
- 2.46 — FREE PHASE HYDROCARBON THICKNESS IN FEET
- (0.2) — FREE PHASE HYDROCARBON THICKNESS IN PARENTHESIS FOR WELLS WITH DEEPER SCREENED INTERVAL
- ZERO CONTOUR

NOTE: DATA COLLECTED DURING QUARTERLY GROUNDWATER SAMPLING EVENTS (1993–1995).

GCL

FIGURE 2
FREE PHASE HYDROCARBON THICKNESS MAP
BRICKLAND REFINERY SITE

CLIENT: REXENE
DATE: 9/13/95
AUTHORED BY:
DRAWN BY: MP
CHECKED BY: TS/BAL
DWG. NO.: \REXENE\FPRDCT2.DWG



BDM

FIGURE 3
DISTRIBUTION OF LEAD IN SOIL SAMPLES SURFACE AND SUBSURFACE

CLIENT: REXENE	
DATE: 6/29/98	REV. NO.:
AUTHOR: MWS	DRAWN BY: DAG
CK'D BY: MWS	FILE: SSAMPPL1.DWG

limited stormwater runoff study and analysis was conducted to estimate the ponding capacity of the site and determine the likelihood that runoff of a 6-hour, 100-year rainfall event could be contained on site (Appendix A). Based on the available topographic and meteorological data used in the study, the site has the capacity to contain a 100-year, 6-hour rainfall.

Since the submission of the FSI Report, additional work approved by the NMOCD for interim site stabilization and improvement was conducted by Daniel B. Stephens & Associates and included the closure of a wash-water collection sump, capping and entombing of pipes at the levee, capping two spill areas of an asphalt-like material, removal of a dispenser island and pump, removal of a flow-through process tank, and closure of a service pit. (See Appendices B and C.) These voluntary potential source control actions further support the abatement recommendations contained in this report.

There is no evidence the site poses a significant or imminent off-site threat to human health or the environment. Site conditions make this site a favorable candidate for restoration of soil and groundwater through active abatement, monitored natural attenuation, engineering and administrative controls. A detailed summary of the site characterization is provided in the FSI Report (BDM, 1996). The conclusions from the FSI are summarized below.

1.3 Conclusions based on the Final Site Investigation (FSI) Report

This characterization of the Brickland Refinery site has determined the current extent and nature of hydrocarbons in the form of BTEX, PAHs, and phenols associated with refinery operations and metals concentrations that may be due to a combination of site activities and potential off-site metals refining operations. COCs above WQCC standards have been confined to the site with the exception of MW-6S. The results of soil and groundwater sampling demonstrate that hydrocarbons observed at this site have not impacted water quality in the Rio Grande. Furthermore, the results of contaminant transport modeling, presented in Section 3.5 of the FSI Report, demonstrated that hydrocarbons that occur on-site will not impact the Rio Grande in the future. In addition, there should be no discharges of COCs to the Rio Grande via a stormwater pathway, because the three drainage culverts are closed and will remain closed until the completion of the project.

Below is a summary based on the conclusions of the FSI Report concerning COCs in soil, groundwater, and surface water. *Concentration ranges for the COCs are presented in Section 3.0 of* the FSI Report, and Table 1 presents WQCC regulatory standards for the COCs in groundwater.

Table 1. New Mexico Water Quality Control Commission - Regulatory Standards

Constituent of Concern in Groundwater	New Mexico Water Quality Control Commission Regulatory Standard
BTEX	***(micrograms per liter)***
Benzene	10
Toluene	750
Ethylbenzene	750
Xylenes	620
PAHs	***(micrograms per liter)***
Total Naphthalene plus Monomethylnaphthalenes	30
Benzo-a-pyrene	0.7
Metals	***(micrograms per liter)***
Arsenic	100
Barium	1,000
Cadmium	10
Chromium	50
Lead	50
Total Mercury	2
Selenium	50
Silver	50
Copper	1,000
Iron	1,000
Manganese	200
Zinc	10,000
Aluminum	5,000
Boron	750
Cobalt	50
Molybdenum	1,000
Nickel	200

Soil

- TPH is not regulated specifically by WQCC, and the regulated constituents of TPH are addressed on a compound-specific basis.
- BTEX, PAHs, and phenols have been detected to varying degrees in soils. Hydrocarbon compounds detected in on-site soils are restricted to the southern two-thirds of the facility.
- Soil samples collected at the site were analyzed for arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Measured concentrations of arsenic, barium, chromium, and lead are above background ranges. However, TCLP testing resulted in only one sample

exhibiting the characteristic of toxicity for lead. TCLP testing for other metals did not exhibit the characteristic of toxicity.

- The slight increase from north to south within the site boundaries in background concentrations of lead, arsenic, chromium, cadmium, and mercury may be related to the increased proximity to the Asarco smelter located to the south of the site.
- Site security effectively breaks the pathway of direct human contact with the COCs and potential receptors.

Groundwater

- Hydrocarbons detected in groundwater beneath the site are restricted to the southern two-thirds of the facility. Within this area, these COCs have exceeded WQCC standards.
- Benzene has been detected in groundwater at concentrations greater than WQCC standards at only one off-site location (MW-6S). The other BTEX compounds have either not been detected or have been measured below WQCC standards in off-site monitor wells.
- Free-phase hydrocarbons have been observed in on-site monitor wells MW-10, MW-11, and several on-site well points. The investigation determined that this free-phase hydrocarbon occurs locally in discontinuous pockets associated with thin, discontinuous sand lenses. No free-phase hydrocarbons have been observed in off-site wells.
- PAHs and phenols have been detected in the shallow aquifer at the site. Within this area, these COCs have exceeded WQCC standards. None have been detected above WQCC standards in off-site monitor wells since the sampling program was initiated in December 1993. PAHs were detected in only one sample from an off-site monitor well, and analyses shows the concentrations to be below WQCC standards.
- Lead has not been detected in any on-site monitor wells.
- Other metals have been detected sporadically in monitor wells.
- Monitored natural attenuation and containment of the COCs; current land use and planned deed restrictions for future land use; and water well prohibitions will effectively break the pathway between the COCs and potential receptors.

Surface Water

- No hydrocarbon compounds have been detected in water samples collected from the Rio Grande at locations along the upstream property boundary and immediately downstream from MW-6S. Furthermore, contaminant transport modeling has shown no significant risk of benzene entering the Rio Grande in the future.

- The gates to the three culverts that drain the site are closed. Thus, there is no surface discharge from the site to the Rio Grande.
- The surface water quality monitoring program that is included in the ongoing semi-annual sampling program will be continued to provide ongoing evaluation of potential surface water quality impacts.

2.0 ABATEMENT OPTIONS

Abatement options were assessed to determine the most appropriate approach for the Brickland Refinery Site. The goal for the abatement is to attain WQCC groundwater standards and protect public health and the environment. The goal will be achieved through a combination of reduction in COC concentrations and engineering/administrative controls. Various abatement options were considered for both soil and groundwater and are discussed in the following sections.

An initial screening was carried out to identify the options that appeared to have merit for further consideration. The results of this abatement options screening are summarized in Table 2 at the end of this section. This process demonstrated that there are a number of abatement options that, when combined, can offer an effective abatement strategy for this site.

The results of this screening demonstrated the following abatement options had merit for further consideration and comparison with specific site conditions:

- Engineering controls, including access restriction, site inspection and maintenance
- Administrative controls, including deed restrictions
- Monitored natural attenuation
- Containment of areas with elevated soil lead concentrations via soil cover
- Free-phase product recovery, both active and passive.

Some of these options, such as engineering controls, passive free product recovery, and monitoring, are already in place. More detailed discussions follow.

2.1 Soil

COCs in soils at the site are comprised of BTEX, PAHs, and metals (primarily lead). WQCC regulations do not specifically regulate COCs in the soil but require abatement of COCs in soil such that groundwater is protected from a continuing source (NMED, 1995). The FSI Report (BDM, 1996) presents the magnitude and distribution of the COCs. Elevated levels of the COCs are mainly confined to the southern portion of the site.

Option 2.1.1 Natural Attenuation

Natural attenuation results from a group of naturally occurring simultaneous processes. These processes include metabolizing of organic compounds by microorganisms; transformation and/or redistribution of inorganic matter through interaction with certain elements found in the soil; and dilution, volatilization, and adsorption that occur in contaminated soils and groundwater (Wiedemeier, 1995). Natural attenuation reduces the concentration and/or toxicity of contaminants

in the environment without any engineered influence. This remedial option is well suited to sites in areas where natural attenuation processes are sufficiently active to reduce any threat to public health or the environment to acceptable levels. This method is not appropriate at sites where COCs are migrating unchecked in the subsurface and/or a significant risk to human health or the environment exists.

Since the COCs in groundwater appear to be contained beneath the site and in the area between the site and MW-6S (BDM, 1996), it also appears that the hydrocarbons and metals in the soil, which could act as a continuing source of COCs to the groundwater, are either naturally attenuating or stable in the soil. Since access to the site is restricted, there will be no threat to the public throughout the continuing natural attenuation processes. This is an appropriate soil abatement method for this site.

Option 2.1.2 Soil Cover

At this site, the existing soils are clay-rich and have low permeability. The only layer of material actually needed is one that will provide sufficient cover over the lead-impacted soil, while preventing surface erosion from rainfall runoff, wind, and damage to the surface by animals and unauthorized people. A protective cover installed on top of the affected areas will secure the soil in place and prevent off-site transport. The cover would consist of a minimum of a 6-inch layer of imported soil placed on top of the designated areas where concentrations of lead in soil exceed 400 mg/kg (based on EPA guidance for recommended screening levels for lead in soil for residential land use in OSWER Directive #9355.4-12) (EPA, 1994). Maintenance requirements would include repair of the surface whenever it becomes damaged or eroded.

Option 2.1.3 Engineering and Administrative Controls

Lead concentrations above screening levels are found in shallow soil at the site, primarily in the southern half. The lead is apparently bound in soil, since no lead has been detected in groundwater beneath the site. Although the lead poses no threat to groundwater based on the FSI, it presents a potential human exposure pathway at the ground surface, where the soil could possibly be accessed directly by people traversing the site, or could be blown by wind or carried by rainfall runoff to a place where people could be exposed. To eliminate these possible pathways, the site will be securely fenced to keep people out, and the culverts will remain closed to prevent surface water from running off site. There are no plans for future use of the site by Huntsman. The City of Sunland Park has discussed its desire to construct a sewage treatment plant on the northern portion of the site. Deed restrictions from Huntsman will prohibit the installation of any water wells or any constructed site improvements that would interfere with the proposed abatement for the site. An existing agreement

with IBWC will prohibit the installation of any water wells on their property that is adjacent to the site (Appendix D).

2.2 Groundwater

Based on the final site investigation, dissolved-phase hydrocarbons occur in groundwater and limited free-phase product occurs locally beneath the site (Figure 3). Dissolved-phase hydrocarbons have been observed off site in only one monitor well, MW-6S. In that well, benzene was the only hydrocarbon compound detected above WQCC standards. This limited off-site occurrence indicates that, with the exception of MW-6S, hydrocarbons above WQCC standards are restricted to the site, and migration is attenuated on site by the interbedded silty/clayey sediments as discussed in the FSI Report. Various abatement options were examined and are presented in the following sections.

Option 2.2.1 Free-Phase Product Removal

Free-phase product removal involves one or more product recovery wells strategically placed throughout the site to remove hydrocarbon products that float on the top of the water table. This approach is effective where continuous product occurs on top of unconfined groundwater in relatively homogeneous and porous sediments. This method is not effective where hydrocarbons are discontinuous and/or trapped within fine-grained, clay-rich sediments. The distribution of free product at the site, based on the FSI and subsequent monitoring, is illustrated in Figure 2.

This method has limited applicability to the site in that only the localized pockets of free-phase product will be amenable to active recovery. However, the known pockets at the site are expected to be removed relatively quickly, after which passive collection, accomplished by hand bailing, would be the more appropriate method.

Option 2.2.2 Pump-and-Treat Dissolved Phase

Pump-and-treat methods are typically applied to sites with relatively homogeneous and transmissive sediments. Areas of low permeability in the subsurface media inhibit the ability of this method to withdraw COCs from the pore space. This approach can be quite effective for the early stages of remediation; however, it has often been proven to be ineffective and costly when contaminant concentrations approach low-concentration cleanup goals.

This method would be inappropriate at the site for two primary reasons:

- The COCs cannot easily be extracted from the pore spaces of the fine grained sediments beneath the site. A very high density of pumping wells would be required to capture COCs from the clay-rich sediments.

- Permeabilities, although typically low throughout the site, vary from low in the fine sand and silty units to very low in the clay and clay-rich units. Pumping from these interlayered units will result in a high yield and quick response in the relatively higher permeability units with low yield and slow response, along with extended cleanup times in the very low permeability units. This could lead to short-circuiting of recharge waters from the adjacent Rio Grande into the relatively higher permeability units, resulting in remedial extraction and treatment of river water instead of groundwater.

Option 2.2.3 Monitored Natural Attenuation - Dissolved Phase

Natural attenuation of dissolved phase hydrocarbons in groundwater is identical to the process for soils. This option is described in Section 2.1.1. Since the FSI has shown that COCs above WQCC Standards are restricted to groundwater beneath the site, and the area between off-site monitor well MW-6S and the site, natural attenuation appears to be an effective abatement method for the site.

The following Table 2 summarizes the abatement options screening.

TABLE 2. ABATEMENT OPTIONS SCREENING

POTENTIALLY APPLICABLE RESPONSE AND TECHNOLOGIES			
TYPE	METHOD	DESCRIPTION	REMARKS
Engineering Controls	Access Restriction (Soil/Air)	Install fencing, place signs, and provide security patrols	In place. Effective. Blocks a major exposure pathway
	Inspect and Maintain Site (Soil/Air)	Knowledgeable environmental technician physically walk site and monitor for physical change	In place. Effective. Blocks a major exposure pathway
Administrative Controls	Deed Restriction (Soil/Air/Groundwater/Surface Water)	Limit future land use to prevent COC disruption until abatement complete	Contemplated for the future with the city of Sunland Park
Monitored Natural Attenuation	Surface Water Monitoring (Surface Water)	Collect river water samples and stormwater runoff and analyze for COCs	3 culverts that extend through the levee are now closed. River was monitored for initial characterization and semi-annually afterward.
	Groundwater Monitoring (Groundwater)	Monitor groundwater to ensure COCs are decreasing or stabilized	In place. Done semi-annually. Recommended abatement action on expanded monitoring network
Subsurface Horizontal Barrier	Grout/Slurry (Groundwater)	Install below the zone of contamination to protect aquifer	Retire from further consideration. Site water table is too erratic to make this method reliably executable.
Cap/Cover	Asphalt/Concrete or Multimedia/Geosynthetic Fiber (Soil/Groundwater)	Provide an impermeable cap to prevent wind from blowing COCs off-site, and rainwater from percolating through the vadose zone and moving COCs to the aquifer. Also prevents stormwater contact with COCs.	This method would inhibit air flow to the underlying soil bacteria and hinder natural attenuation. In addition, the runoff generated from intense thunderstorms common to the area would require a temporary storage basin to be provided. May be used in localized areas.
	Native Soil (Soil)	Place and compact over impacted areas. Monitor for erosion control and maintain.	Recommended abatement option
	Low Permeability Clay (Soil/Groundwater)	Same as above, but is more resistant to erosion, and offers some protection to the underlying acquifer	This method would inhibit air flow to the underlying soil bacteria and hinder natural attenuation. In addition, the runoff generated from intense thunderstorms common to the area would require a temporary storage basin to be provided. May be used in localized areas.

POTENTIALLY APPLICABLE RESPONSE AND TECHNOLOGIES			
TYPE	METHOD	DESCRIPTION	REMARKS
Free Product Recovery	Hand Bailing (Groundwater)	Free product is periodically removed from monitoring wells in conjunction with sampling events.	Recommended abatement option
	Engineered Active Recovery (Groundwater)	Use an automatic recovery system with oil water separator where evidence demonstrates large amounts of free product exist.	Recommended abatement option
Excavate and Dispose	Excavate With Heavy Equipment (Soil)	Remove the top 4 foot (est) layer of soil, haul to a landfill, backfill with clean soil, and reestablish to grade. Metals present may categorize pockets of soil as a RCRA hazardous waste. Land ban on such requires treatment prior to disposal. High water table may complicate construction.	The fluctuating and high water table at this site makes this method very risky to execute in the field. Not recommended for site.
In-situ	Electrokinetics (Soil)	This innovative approach requires a voltage gradient be set up across the site. Metals migrate to the cathode where they are collected and removed.	Still in the innovative phase and would only address the metals. Not recommended for site.
In-situ	Soil Vapor Extraction (SVE) (Soil)	A vacuum system is applied to create air flow through the vadose zone, removing the volatiles and treating via GAC or catalytic oxidation for air emission control	Site lithology is too divergent to support such a successful application. Not recommended for site.
	Solidification/Stabilization (Soil)	Polymers and cements are mixed with the ambient soil and encapsulate metals into an unleachable mass. The volume of the zone of contamination increases and careful regrading is required.	This method would not be effective against the organics. Not recommended for site.
	Air Sparging (Soil/Groundwater)	Air is injected below the water table to remove dissolved phase hydrocarbons. This method is usually used in conjunction with SVE. The collected vapors are treated with GAC or catalytic oxidation to comply with regional air quality standards if applicable.	Lack of uniformity in site lithology, and the fluctuating of the water table suggests that this method would be difficult to implement in the field and would produce varying results. Not recommended for site.

POTENTIALLY APPLICABLE RESPONSE AND TECHNOLOGIES			
TYPE	METHOD	DESCRIPTION	REMARKS
Excavate and Treat	Soil Washing with or without Leaching (Soil)	Soil contaminants can be effectively physically separated from the soil mass by gravitational separation and additional scrubbing. Acid leaching can be further employed to remove the metal microfines and metal salts. Major site preparation and detailed treatability studies are required to successfully carry out such a process.	Characterization has indicated this soil is not amenable to leaching, and metals concentrations are not sufficient to warrant the high cost of this technology. The fluctuating and high water table would make the soil excavation and staging elements risky to execute in the field. Not recommended for site.
Pump and Treat	Pump and Treat (Groundwater)	This is the most common method employed for abating contaminated groundwater. Recently this method has been criticized for the time required to achieve water quality standards as well as the associated O&M costs. In the case of the hydrocarbons removed from the aquifer, the treatment method would be an air stripping tower. Because the water table fluctuates twice a year on the average of 3 to 4 feet, the added advantage to employing this method would be that some of the vadose zone would also be abated of contaminants. Impacts of metals, their oxides and salts on the air stripping tower would have to be evaluated.	The COCs cannot easily be extracted from the pore spaces of the fine grained sediments beneath the site. A very high density of pumping wells would be required to capture COCs from the clay-rich sediments. Permeabilities, although typically low throughout the site, vary from low in the fine sand and silty units to very low in the clay and clay-rich units. Pumping from these interlayered units will result in a high yield and quick response in the relatively higher permeability units with low yield and slow response, along with extended cleanup times in the very low permeability units. This could lead to short-circuiting of recharge waters from the adjacent Rio Grande into the relatively higher permeability units, resulting in remedial extraction and treatment of river water. Not recommended for site.

3.0 SELECTED ABATEMENT METHOD

Based on the results of the site investigation and analyses of remediation technologies applicable to the site, the following approach to abate hydrocarbons and other COCs in the soil and/or groundwater is recommended:

- Hydrocarbons in soil will be abated by natural attenuation, with engineering controls to prevent access, and long-term monitoring to evaluate its effectiveness.
- Free-phase product on groundwater will be removed by active recovery from monitor well MW-10 and passive recovery (hand-bailing) of minor localized product from other monitor wells and well points if it is detected during routine monitoring.
- Dissolved-phase hydrocarbons and metals other than lead in groundwater will be abated by monitored natural attenuation. Long-term groundwater monitoring will be used to evaluate the effectiveness of this selected abatement method.
- Risk to public health and the environment posed by metals in soil through airborne or direct contact will be controlled with the installation of a cover over areas where soil lead concentrations are 400 mg/kg or greater and through restricted access to the site via the existing security fencing. Metals in groundwater will be monitored to demonstrate that concentrations in groundwater are not increasing and metals are stable in soil so as not to provide a continuing source.

SELECTED ABATEMENT PROGRAM

CONSTITUENT	MEDIUM	METHOD OF ABATEMENT
Hydrocarbons and metals	Soil	Monitored natural attenuation, engineering and administrative controls
Lead	Soil	Soil cover, engineering and administrative controls
Free-phase hydrocarbons	Groundwater	Active and passive recovery, and administrative controls
Dissolved-phase hydrocarbons and metals	Groundwater	Monitored natural attenuation and administrative controls

Groundwater monitoring of COCs will be conducted until WQCC standards are achieved.

3.1 Rationale

3.1.1 Hydrocarbons and Metals in Soil

The potential impact to public health and the environment from hydrocarbons and metals in the soil is derived from various potentially existing pathways. These include the following:

a) Contaminants contained in the groundwater

b) Displacement of COCs from the site by surface water runoff into the Rio Grande

c) Wind carrying contaminants into the air and locally transporting and dispersing off-site

d) Direct contact with the soil.

The results of the site investigation determined that hydrocarbons and metals in on-site soil are found at highly variable concentrations and in localized areas, primarily in the southern half of the site, and are not readily mobile. The following observations were considered in selecting the soil abatement option.

Impact to Groundwater:

- The lithology beneath the site is composed of discontinuous interlayers of clay, silt, and fine sand. The low saturated and unsaturated hydraulic conductivity associated with this lithology limits the mobility of hydrocarbons and metals.
- Most hydrocarbons occur locally and are effectively trapped and contained in and between the fine-grained layers of sand.
- No hydrocarbons have been identified in off-site soils.
- Hydrocarbons will degrade in soil over time or be sufficiently immobilized in soil so as to not continue as a source of COCs to groundwater.
- The hydrocarbons move slowly and disperse into groundwater as the water table fluctuates. This is evidenced by the fact that, with the exception of monitor well MW-6S, no hydrocarbon exceedences of WQCC standards have occurred in off-site groundwater monitor wells. Free-phase product is found only in very limited and localized areas on the site. The product is associated with discontinuous silty and sandy lenses and occurs in pockets.
- Only one TCLP analysis of soil samples exhibited the toxicity characteristic for lead, while no lead has been detected in groundwater from any of the on-site monitor wells during both the Eder and GCL investigations. TCLP testing for other metals tested did not exhibit the characteristic of toxicity.
- Lead, the primary metal of concern, is not migrating to groundwater.

Displacement of COCs to the Rio Grande:

- Runoff from a 6-hour, 100-year rainfall event will be contained on site since the culverts are closed and will remain closed until the project is completed (Appendix A).
- No hydrocarbons have been detected in surface water samples collected from the Rio Grande upstream and downstream from the site.

Wind carrying contaminant into the air and locally transporting and dispersing off-site:

- A soil cover over the area of soil containing lead in concentrations above 400 mg/kg will eliminate wind-blown soil contact.

Direct contact with the soil:

- Access to the site is restricted by a security fence with a locked gate. This security will continue to be maintained in the future.
- A soil cover over the area of soil containing lead in concentrations above 400 mg/kg will eliminate wind-blown and direct soil contact.

Based on the above determinations, the selected soil abatement actions for hydrocarbons and metals in soil are restriction of access, localized cover, closure of the culverts and monitored natural attenuation.

3.1.2 Free-Phase Product on Groundwater

Potential exposure pathways for the free-phase product include:

a) Groundwater transport and exposure to the public via water wells

b) Groundwater seepage into the Rio Grande and exposure to the public via surface water.

In order to select the appropriate method to remove potential continuing sources of hydrocarbons to groundwater, the following observations were considered in selecting the groundwater abatement option:

Groundwater transport and exposure to the public via water wells:

- Free-phase product is found only in limited and localized areas on the site. The product is associated with discontinuous silty and sandy lenses and occurs in isolated pockets.
- Free-phase product does not appear to be migrating.
- No free-phase product has been detected off site.
- There are no water wells on the site, and deed restrictions will prohibit future installation of water wells.
- There are no water wells on the adjacent property between the site and the Rio Grande and downgradient from the site. In an agreement with Huntsman, the IBWC will prohibit future installation of water wells on that property (Appendix D).

Groundwater seepage into the Rio Grande and exposure to the public via surface water:

- Free-phase product may be floating on the water table, trapped below the water table, or trapped above the water table, as a function of fluctuating groundwater levels.

- No free-phase product has been detected off site.
- Free-phase product does not appear to be migrating.
- Groundwater modeling has demonstrated that the Rio Grande will not be impacted in the future.

The selected free-phase product abatement action is to remove the product from the groundwater and thereby remove the potentially continuing sources of hydrocarbons that can impact groundwater. As a result of the site investigation, it has been determined that within the entire monitoring network only one monitor well, MW-10, contains a significant thickness (two to five feet) of floating product. One other monitor well, MW-11, and several well points have contained minor amounts (*0.01 to 0.49 feet*) of free-phase product. *An active solar- or electric-powered recovery* system will be used to remove the floating product in MW-10. Passive product collectors are recommended to collect minor localized product in MW-11 and well points where free-phase product has collected. They will be manually emptied during routine groundwater monitoring events, as required by the long-term monitoring plan.

3.1.3 Dissolved-Phase Hydrocarbons and COCs in Groundwater

Dissolved-phase hydrocarbons above WQCC Standards occur in groundwater beneath the site and off site in the immediate area of monitor well MW-6S. The potential exposure pathways for dissolved-phase hydrocarbons and COCs in groundwater include:

a) Migration of dissolved-phase hydrocarbons and other COCs from groundwater beneath the site to the Rio Grande

b) New water wells on or immediately adjacent to the site.

The following observations were considered in selecting the groundwater abatement option for dissolved-phase hydrocarbons.

Migration of dissolved-phase hydrocarbons from groundwater beneath the site to the Rio Grande:

- Dissolved-phase hydrocarbons in groundwater above WQCC Standards occur only within the site boundaries, with the exception of monitor well MW-6S, which is between the Rio Grande and the site.
- Dissolved-phase hydrocarbons have not been detected in surface water samples collected from the Rio Grande, indicating the dissolved-phase hydrocarbons that occur in MW-6S are not impacting the Rio Grande.

- Contaminant transport modeling has demonstrated that dissolved-phase hydrocarbons in groundwater beneath and adjacent to the site will not impact the Rio Grande in the foreseeable future (BDM, 1996).
- Natural attenuation of dissolved-phase hydrocarbons in groundwater appears to be occurring. This is evidenced by the lack of dissolved-phase hydrocarbon migration to the Rio Grande as has been demonstrated by six consecutive semiannual groundwater monitoring events, beginning in September 1995.

New water wells on or immediately adjacent to the site:

- There are no water wells on the site.
- There are no water wells on the adjacent IBWC property.
- There is no known pumping from private, industrial, or municipal water wells in the immediate area of the site.
- A covenant has been executed with the International Boundary and Water Commission (IBWC), who owns or controls the land and water rights to the adjacent property, to prohibit installation of water wells to ensure no new pumping will be created that may draw hydrocarbons beyond current locations (Appendix D).

Based on the above determinations, monitored natural attenuation is the selected abatement alternative for dissolved-phase hydrocarbons in groundwater. To ensure migration does not occur undetected in the future, a long-term monitoring program, further described in Section 3.5, will be implemented and remain active until it is demonstrated that groundwater quality is within WQCC regulatory standards.

3.2 Abatement Implementation

3.2.1 Free Product Recovery

Free-phase product in monitor well MW-10 will be recovered using a stand-alone recovery system. The stand-alone system is designed to periodically remove the free-phase product in remote locations where continual monitoring is not possible. The system will either be solar or electric powered.

The proposed recovery system would consist of a Xitech pneumatically operated skimmer pump (or equivalent) with an electronic timer and a high-level product tank shutoff, a 55-gallon free-phase product holding tank in a secondary containment lined-dike, and a solar panel and storage battery for power delivery. If electric power can be cost effectively supplied to the site, it will replace the solar panel and associated equipment. Product literature for this system is included as Appendix E.

Additionally, the system will be enclosed with locked access, since the location is remote and vandalism in the area is recognized as a possible problem.

The free-phase product recovery pump will initially be set to pump 5 minutes per day for the first 12 months. When active pumping no longer yields measurable amounts of free-phase product, the system will be disconnected. If after 12 months product removal is incomplete, additional periodic free-phase product recovery may continue on the same schedule or be accelerated or decelerated as deemed necessary.

Other monitor wells and well points have periodically contained minor, but measurable thickness of free-phase product. Active pumping of these monitor wells and well points is not practical since measurable thicknesses of free-phase product may take weeks or months to be re-established after each removal. Therefore, monitor wells and well points will be measured for product thickness during semi-annual monitoring events, and any trace thicknesses of product will be hand bailed. Minor thicknesses of free-phase product that do not warrant active removal will be removed with passive free-phase product collectors (Appendix F). The collectors will be manually emptied during routine groundwater monitoring events, as required by the long-term monitoring plan. Hand-bailed free-phase product and/or free-phase product collected from passive collectors will be combined with the MW-10 free-phase product recovery system. Recovered free-phase product will be sold to a local recycler whenever the containers become full.

3.2.2 Soil Cover

The proposed cover will prevent off-site migration of soil that may contain lead concentrations above regulatory screening levels. It has been determined from previous investigations that lead exists in the soil in some areas of the site, and a potential risk exists by the possibility of lead being transported off site by wind and water erosion of the soil. A protective cover installed on top of the affected areas will secure the soil in place and prevent off-site transport. The proposed cover will consist of a minimum of a 6-inch layer of imported soil placed on top of the designated lead-containing areas. The approximate areas to be covered are identified in Figure 3 and represent the zones of soil that contain greater than 400 mg/kg of lead. The Figure also illustrates a typical cross section of the proposed cover.

Since the purpose of the cover is the prevention of wind and water erosion, a simplified design can be used. The current topography of the site is relatively flat. Site preparation will consist only of removing debris and brush that may interfere with the integrity of the cover. The cover material will be deposited directly on top of the areas to be covered, and will be spread and compacted. No

additional surface treatment will be required. However, asphalt, concrete, topsoil, or other similar surface treatments may be used as deemed necessary by Hunstman or a future landowner.

Specifications. The U.S. Environmental Protection Agency (EPA) publication entitled "Seminar Publication: Design and Construction of RCRA/CERCLA Final Covers" (EPA/825/4-91/025) was utilized as a reference for the proposed cover specification. This document provides guidance on designing and constructing covers for various hazardous and non-hazardous sites and provides some useful criteria that are applicable to the Brickland Refinery site. The following specifications for covering the lead-impacted areas of the site are based on the principles of this document as adapted to actual site conditions and requirements.

1. Clearing and Grubbing – The areas within the designated limit lines (i.e., soil lead concentrations above 400 mg/kg) shall first be cleared of all natural and man-made material to include brush, weeds, boulders, fences, walls, rubbish, etc., and grubbed. All removed materials shall be deposited on site at a location designated by the design engineer.
2. Material – The soil to be used for construction of the cover shall be natural subbase material described in the *New Mexico Standard Specifications for Public Works Construction*. It shall contain a satisfactory mixture of clay and sand, as to be readily workable and compactible. The material shall be imported from off site and screened to be sure that it shall be free of any deleterious substance.
3. Compaction – The selected material shall be compacted to reach a minimum of 70 percent and a target of 90 percent of maximum density as determined by American Society for Testing and Materials (ASTM) D1557. The minimum compacted thickness of the cover shall be 6 inches, as determined by relative elevation measurements taken at locations designated by the design engineer.
4. A top layer of asphalt, concrete, or topsoil is not required and is not included in the current cover plan. Use of vegetation is reserved for later consideration dependent upon the level of maintenance required.

Construction Quality Assurance Plan. The EPA publication, "Technical Guidance Document: Construction Quality Assurance for Hazardous Waste Land Disposal Facilities" (EPA/530-(S)SW-86-031) will be used as a guide in developing a construction quality assurance (CQA) plan for the Brickland Refinery site. The document defines the elements of a CQA plan required by EPA for hazardous waste land disposal facilities. The site is not a hazardous waste disposal facility; however, this document provides criteria that can be used to ensure the site is closed

according to the approved plans and specifications. A CQA plan appropriate to the site will be developed as part of the project work plan, and will consist of the following five elements:

1. Responsibility and authority of organizations and key personnel
2. CQA personnel qualifications
3. Inspection activities
4. Sampling strategies to demonstrate compaction densities are achieved
5. Documentation.

Erosion Indicators. Erosion indicators made of 2-inch diameter by 2-feet long, capped galvanized steel pipe shall be inserted at locations designated by the design engineer to provide a means of measuring any potential loss of cover elevation and thickness due to erosion by wind or surface water runoff.

Health and Safety Plan. A health and safety (H&S) plan will be prepared to ensure adequate protection of persons on or near the site during construction activities. The condition of concern is blowing of loose soil due to disturbance by construction equipment. Grubbing and leveling is to be kept to a minimum and, where required, is to be conducted to prevent excessive soil disturbance. Dust masks will be required during these activities and at other times as designated by the H&S officer. General safety requirements are expected to include safety hats, safety shoes, leather gloves, and long coveralls.

Regulatory Approval. The work plan containing the CQA plan and H&S plan, along with the construction plans and specifications, will be presented to the NMOCD for approval prior to the start of construction.

3.3 Engineering And Administrative Controls

Engineering controls maintain site security and prevent the general public from accessing the site and potential exposure to COCs. These measures include perimeter fencing with barbed wire outriggers and locked gates. In addition, the culverts have been closed by IBWC to contain any surface water from rainfall events on the site. Administrative controls to prevent the public from exposure to COCs in groundwater include a covenant with IBWC to prohibit installation of water wells on IBWC property adjacent to the site (Appendix D) and will include similar deed restrictions on any parcels of land deeded to Sunland Park.

3.4 Operation and Maintenance

Once the product recovery system has been installed, operation and maintenance of the system will be required and will consist of emptying the product holding tank at an approved disposal facility,

ensuring equipment is functioning and connected properly, and verifying the system has not been damaged or deactivated. Operation and maintenance of the free-phase product recovery system and the cover shall be conducted concurrent with the semi-annual sampling events for the first year of operation and will continue while the system is in operation.

The perimeter fence, all gates and locks, and the product recovery system housing will be inspected for breaches in integrity. In addition, the culverts will be inspected to ensure complete closure is maintained. The inspection will occur concurrent with semi-annual sampling. Any identified breaches will be repaired or immediately corrected.

3.5 Groundwater Monitoring

Groundwater monitoring will continue on a semi-annual basis, in June and December, according to the existing approved groundwater and surface water monitoring plan. The plan requires sampling of MW-3S, MW-3D, MW-6S, MW-6D, MW-9S, and two river samples (one upstream from the site and one immediately downstream from MW-6S). Once free-phase product removal is complete, on-site monitor wells MW-5, MW-8, MW-10, MW-11, and MW-17 will be added to the monitoring plan and sampled during the June sampling event. The June and December sampling events will include analyses for BTEX, water level measurements in all monitor wells, and product thickness measurements in all monitor wells and well points. The June sampling event will also include analyses for PAHs and metals. All sampling and analysis will be conducted pursuant to EPA approved methods. In addition, monitor wells MW-4, MW-7, MW-14, and MW-15 will be sampled every other year for BTEX, PAHs, and metals. An annual report will be submitted no later than February of each year summarizing the results of both sampling events.

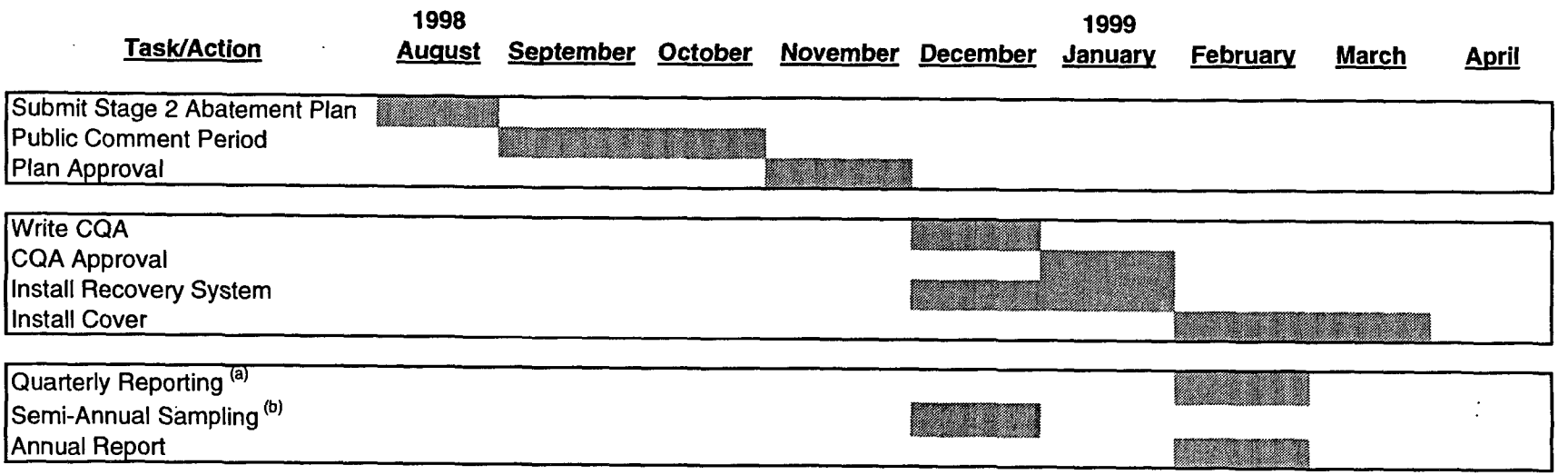
3.6 Public Notice

Public notice will be performed following the requirements cited in Sections 4108.B and 4108.C of the NMWQCC Regulations. NMOCD has approved the text of the public notice and the list of recipients of such notice.

3.7 Schedule

Huntsman will begin implementation of the Stage 2 Abatement Plan within 60 days after NMOCD approval of the Stage 2 Abatement Plan. A detailed breakdown of the schedule for abatement activities is provided in Table 3.

Table 3
Abatement Plan Schedule



(a) Quarterly reporting will commence in February 1999.

(b) Semiannual sampling will be performed in December and June of each year.

4.0 CONTINGENCY PLANS

Section 4111.A and 4111.B of the NMWQCC Regulations provide guidelines for modification of the abatement plan summarized in this document if analysis and evaluation of data collected during the monitoring program indicates the measures described in this plan do not meet the stated requirements. If the abatement activities at the site are ineffective at meeting WQCC standards, then Huntsman will meet with the NMOCD to determine appropriate modifications to achieve abatement goals.

5.0 TERMINATION OF ABATEMENT ACTIVITIES

5.1 Free-Phase Product

Following cessation of product collection, groundwater monitoring data for two consecutive semi-annual events will be evaluated for indications of the re-appearance of measurable thicknesses of free-phase product. If measurable thicknesses are observed, product collection will be resumed until the following monitoring event, at which time data will be re-evaluated. Free product collection will be re-activated or continued at any time monitoring indicates the existence of product.

5.2 *Dissolved-Phase Hydrocarbons*

Semi-annual groundwater monitoring will proceed until concentrations of dissolved phase hydrocarbons remain below regulatory action levels (Table 1) for two consecutive sampling events. At that time, quarterly closure monitoring will be initiated. When COC concentrations sampled from the compliance monitoring network are below the regulatory action level for eight consecutive quarterly sampling events, monitoring will cease and an abatement completion report will be submitted to NMOCD requesting site closure. In the event that dissolved phase hydrocarbons are detected above action levels at any point in this progression, regular semi-annual site monitoring will resume, and the timelines restarted.

5.3 Site Maintenance Activities After Termination of Abatement Activities

In the event that erosion of the cover is observed during inspection, contingency repairs as described in the CQA will be implemented. Culvert closure and the fenceline will also be inspected and maintained annually.

6.0 REFERENCES

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Appendix A

Ponding Capacity Report, Former Brickland Refinery Site, Sunland Park, New Mexico

PONDING CAPACITY REPORT
FORMER BRICKLAND REFINERY SITE
SUNLAND PARK, NEW MEXICO

April 3, 1997

Prepared for:

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Ponding Capacity Report
Former Brickland Refinery Site

BDM International, Inc. (BDM) performed a hydrologic flood analysis on the former Brickland Refinery site, located in Sunland Park, New Mexico. The site was operated as a petroleum refinery from 1933 to 1958 and is currently owned by the Rexene Corporation (Rexene). The objective of this analyses was to perform an off- and on-site hydrologic analyses of the volume and duration of surface runoff for both probable and extreme storm events. The site was evaluated to determine if surface water runoff from rainfall events had the potential to wash on-site soils into the Rio Grande. This task was carried out using the U.S. Army Corps of Engineers (COE) model, HEC-1, as the design basis to model expected average runoff volumes and consider impacts to the site, under the following two rainfall events:

1. A two-year, 24-hour storm was selected for evaluation because it is the most likely scenario to occur at the site and is an interim guideline employed by the New Mexico State Highway and Transportation Department (NMSHTD) in their National Pollution Discharge and Elimination System (NPDES) implementation package design criteria (NMSHTD, June 1993).

2. A 100-year, six-hour storm was evaluated because it represents conventional worst-case design criteria.

The site was evaluated to determine if the volume of water produced by these storm events would be effectively captured by the existing ponding capacity at the Rexene site.

Hydrologic Analyses

The HEC-1 model is designed to simulate the surface water runoff resulting from a rainfall. The hydrologic analysis was performed using the U.S. Army COE HEC-1 Flood Hydrograph Package computer model (version 4.0). Basin boundaries (Figure 1) were delineated using a U.S. Geological Survey (USGS) 7.5-minute quadrangle map, Smeltertown, Texas-New Mexico, N3145-W10630/7.5, photorevised in 1967 and 1973. Both off- and on-site hydrologic analyses were calculated for the Rexene site. The off-site (basin 1) and on-site (basin 2) drainage basin areas are approximately 42 acres (0.067 square mile), and 33 acres (0.0515 square mile), respectively, and are shown in Figure 1. The following parameters were derived for the two-year, 24-hour and the 100-year, six-hour storm:

- Runoff volume
- Peak flow rate
- Time to peak

The assumptions used are conservative because the simulations are limited to a single storm event for each scenario and provisions are not made for soil moisture recovery during periods of no precipitation.

All assumptions and information required for the HEC-1 model were obtained from the following sources:

- Realistic six-hour and 24-hour rainfall distributions were generated from depth-duration data presented in the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), Precipitation-Frequency Atlas for New Mexico.

- A synthetic unit hydrograph was generated by the Snyder method in accordance with procedures presented in the U.S. Army COE, "Flood Hydrograph Analysis and Computations," Engineering Manual 1110-2-1405, August 1959. Snyder unit hydrograph parameters Ct, Cp640 were obtained from "Report on Hydrologic Investigations, Flood Insurance Study, Northeast and Central El Paso, Texas," February 1978, using the curve for undeveloped areas.

- Infiltration loss rates were obtained from the Las Cruces Flood Insurance Study (March 1981). An initial loss of 0.7 inch and a constant loss of 0.2 inch/hour were used for the two-year, 24-hour design storm analysis. For the 100-year, six-hour storm, no initial loss was used (0.0 inches), and a constant loss of 0.2 inches per hour was used.

Results of HEC-1 Model

The peak flow rate, time to peak, and runoff volume (for basins 1 and 2) for the selected storm events are *presented in Table 1.*

Table 1

	Two-Year, 24-Hour			100-Year, Six-Hour		
	Peak Flows (cfs)	Time to Peak (hr)	Volume (ac-ft)	Peak Flows (cfs)	Time to Peak (hr)	Volume (ac-ft)
Basin 1	41	0.83	1.11	281	0.67	8.23
Basin 2	18	0.92	0.79	112	0.75	6.84
Total			**1.9**			**15.07**

The results of the analysis indicate surface-water runoff is 1.9 acre feet from a two-year, 24-hour storm and 15.07 acre feet from a 100-year, six-hour storm.

Actual Site Ponding Capacity Calculations

The 33-acre Rexene site was divided into six sub-areas onto which a 50 foot by 50 foot grid was superimposed for the purposes of calculating the total actual site ponding capacity. The ponding capacity volume for each sub-area was determined by summing the individual volumes of the grid squares. The volume of each 50-foot long by 50-foot wide grid square was calculated by multiplying the area by an estimated average depth obtained from mapped contour elevations (appendix). A map showing sub-area designation and grid placement is located in the appendix. Table 2 shows the calculated actual volume results for each of the sub-areas.

Table 2

SUB-AREA	SUB-AREA VOLUME (acre-feet)
Area 1	5.492
Area 2	2.484
Area 3	5.601
Area 4	4.968
Area 5	0.957
Area 6	0.286
TOTAL VOLUME:	**19.788**

Site topography indicates storm-water runoff would begin ponding in sub-area 3 and would extend into sub-areas 2, 1, 4, 5, and 6, respectively, as additional storm water runoff enters and crosses the site.

Conclusions

The following conclusions are estimates based on the analyses presented and summarized above:

- The ponding capacity of the site is 19.79 acre-feet.
- A two-year, 24-hour storm generates 1.9 acre-feet of water.
- A 100-year, six-hour storm generates 15.07 acre-feet of water.
- The total site ponding capacity (19.79 acre-feet) contains runoff from a 100-year, six-hour storm with a 1.3 factor of safety.
- Sub-areas 1, 2, 3, and 4 provide a total ponding volume of 18.5 acre-feet and would be utilized for the 100-year, six-hour storm.

Based on the topographic information used in this study, the site has sufficient ponding capacity to contain runoff from a 100-year, six-hour storm. However, several factors may contribute to decreasing the 1.3 safety factor of the calculations:

1. Topographic data is not recent and some earthmoving has occurred at the site. Rubbish, dirt, and construction debris have been removed while some clean soil has been brought to the site. We believe, however, any net gain or loss of material is negligible.

2. Although calculations show the site will contain surface water runoff, it is known that some runoff has occurred in the past across the northern portion of the site. Minor earth work to improve the border between the site and adjacent private property to the north was completed in 1996 to prevent runoff in the future.

A greater safety factor can be achieved by surveying the site to verify volumetric calculations and making minor improvements to the border and levee.

References

U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), Precipitation-Frequency Atlas for New Mexico.

U.S. Army Corps of Engineers, 1959. Flood Hydrograph Analysis and Computations, Engineering Manual 1110-2-1405, August.

"Report on Hydrologic Investigations, Flood Insurance Study, Northeast and Central El Paso, Texas," February 1978.

U.S. Federal Emergency Management Agency, 1983. Flood Insurance Study: City of Las Cruces, New Mexico, Doña Ana County.

New Mexico State Highway Transportation Department, 1993. National Pollutant Discharge Elimination System Implementation Package, June.

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ENGINEERING CALCULATION

Sheet: ____ of ____
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E
N S
W

North to South, West to East

1 cm²—0.1550 in²
1 m²—6.452 cm²
1m²—10.764 ft²
1 ft²—929.0 cm²

1 acre—43,560 ft²
—4049 m²

1 hectare—10,000 m²
—2.471 acres

1 mi²—2.590 km²
—640 acres

Volume

1 m³—1000 liters
—35.314 ft³
—264 gal (U.S.)

1 ft³—28.320 liters
—7.481 gal (U.S.)

1 gal—3.785 liters

1 acre foot—43,560 ft³
—3.259 × 10⁵ gal
—1234 m³

Discharge

1ft³/min—0.472 liters/sec
1 acre foot/day
—3.259 × 10⁵ gal/day
1 ft³/sec—448.8 gal/min
—724 acre feet/year

Density

Water 1.000 g/cm³ at 4°C
0.998 g/cm³ at 20°C
Sea water 1.025 g/cm³ at 15°C
Mercury 13.55 g/cm³ at 20°C
Air 1.29 × 10⁻³ g/cm³ at 20°C and atmospheric pressure

Specific weight water in air

8.335 lb gal at 0°C
8.328 lb gal at 60° F
8.322 lb gal at 20° C
62.18 lb/ft³ at 60° F

Pressure

1 bar—0.9869 atmosphere
—10⁶ dynes/cm²
—14.50 lb/in²

pressure developed from static liquid
1 cm mercury
—0.01316 atmosphere
1 ft water
—0.02950 atmosphere
33.90 ft water
—1.00 atmosphere

Area 1 (50X50 Grid)

Row 1 A = 2500 D = 3730 − 3729.6

2500 ft² × 0.4 ft = 1000 ft³ × $\frac{1 \text{ ac ft}}{43560 \text{ ft}^3}$ = 0.0229 ac·ft

0.0631 "
0.0459 "
0.2467 "

Row 1 A = 2500 ft², D = 3735.6 − 3730 = 5.6

2500 × 5.6 = 14000 ÷ 43560 = ~~0.007 ac ft~~ 0.3213 ac ft

2500 × 6.4 = 16000 ÷ 43560 = 0.3673
2500 × 1.0 = 2500 ÷ " = ~~0.5739~~ 0.0573
" = ~~2.5739~~ 0.0573
2500 × 4.5 = 11250 ÷ " = 0.2582
2500 × " = 0.2582
2500 × " = 0.2582
" = 0.2582
" = 0.2582
" = 0.2582
2500 × " = 0.2582
2500 × 1.1 = 2750 ÷ " = 0.0631 2.6524
~~3.3850~~ ac·ft

Row 2
2500 × 2.4 = 6000 ÷ " = 0.1377
2500 × 3.9 = 9750 ÷ " = 0.2238
2500 × 0.2 = 500 ÷ " = 0.0114
2500 × 4 = 10,000 ÷ " = 0.2295
2500 × 1 = 2500 ÷ " = ~~0.0573~~ 0.0573
2500 × 1 = 2500 ÷ " = ~~0.0573~~ 0.0573
2500 × 1.1 = 2750 ÷ " = 0.0631
" = 0.0631
" = 0.0631
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~~2.1977~~ 1.1567

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ENGINEERING CALCULATION

Sheet: ____ of ____
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1 cm²—0.1550 in²
1 in²—6.452 cm²
1m²—10.764 ft²
1 ft²—929.0 cm²

1 acre—43.560 ft²
—4049 m²

1 hectare—10,000 m²
—2.471 acres

1 mi²—2.590 km²
—640 acres

Volume

1 m³—1000 liters
—35.314 ft³
—264 gal (U.S.)

1 ft³—28.320 liters
—7.481 gal (U.S.)

1 gal—3.785 liters

1 acre foot—43 560 ft³
—3.259 × 10⁵ gal
—1234 m³

Discharge

1ft³/min—0.472 liters/sec
1 acre foot/day
—3.259 × 10⁵ gal/day
1 ft³/sec—448.8 gal/min
—724 acre feet/year

Density

Water 1.000 g/cm³ at 4°C
0.998 g/cm³ at 20°C
Sea water 1.025 g/cm³ at 15°C
Mercury 13.55 g/cm³ at 20°C
Air 1.29 × 10⁻³ g/cm³ at 20°C and atmospheric pressure

Specific weight water in air

8.335 lb/gal at 0°C
8.328 lb/gal at 60° F
8.322 lb/gal at 20° C
62.18 lb/ft³ at 60° F

Pressure

1 bar—0.9869 atmosphere
—10⁶ dynes/cm²
—14.50 lb/in²

pressure developed from static liquid
1 cm mercury
—0.01315 atmosphere
1 ft water
—0.02950 atmosphere
33.90 ft water
—1.00 atmosphere

Row 3

2500 × 0.2 = 500 ÷ 43560 = 0.0114 ac. ft
" " = 0.0114
2500 × 0.4 = 1000 ÷ 43560 = 0.0229
2500 × = 0.0229
" = 0.0229
" = 0.0229
2500 × 0.5 = 1250 ÷ " = 0.0286
" 0.2 = 500 ÷ " = 0.0114
" " = 0.0114
2500 × 1.5 = 3750 ÷ " = 0.0860
" = 0.0860

0.3378

Row 4

2500 × 0.4 = 1000 ÷ 43560 = 0.0229 × 11 = 0.2519

Row 5

0.3378

Row 6

0.3378

Row 7

~~0.5734~~ × 7 = ?
0.0573 × 9 = 0.5157 ac. ft

Area 1 total ac. ft = [illegible] 5.4921 — seems too high

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1 cm²—0.1550 in²
1 m²—6.452 cm²
1m²—10.764 ft²
1 ft²—929.0 cm²

1 acre—43,560 ft²
—4049 m²

1 hectare—10,000 m²
—2 471 acres

1 mi²—2.590 km²
—640 acres

Volume

1 m³—1000 liters
—35.314 ft³
—264 gal (U S)

1 ft³—28.320 liters
—7 481 gal (U S)

1 gal—3.785 liters

1 acre foot—43,560 ft³
—3 259 × 10⁶ gal
—1234 m³

Discharge

1ft³/min—0 472 liters/sec
1 acre foot/day
—3 259 × 10³ gal/day
1 ft³/sec—448 8 gal/min
—724 acre feet/year

Density

Water 1 000 g/cm³ at 4°C
0 998 g/cm³ at 20°C
Sea water 1 025 g/cm³ at 15°C
Mercury 13 55 g/cm³ at 20°C
Air 1 29 × 10⁻³ g/cm³ at 20°C and atmospheric pressure

Specific weight water in air

8 335 lb/gal at 0°C
8 328 lb/gal at 60° F
8 322 lb/gal at 20° C
62 18 lb/ft³ at 60° F

Pressure

1 bar—0 9869 atmosphere
—10⁶ dynes/cm²
—14 50 lb/in²

pressure developed from static liquid
1 cm mercury
—0 01316 atmosphere
1 ft water
—0 02950 atmosphere
33 90 ft water
—1 00 atmosphere

Area 2 (50 × 50)

Row 1

2500 x 1.0 = 2500 ÷ 43560 = 0.0573 x 7 = 0.4017 ac·ft

Row 2

2500 x 1.0 = 2500 ÷ " = 0.0573 x 7 = 0.4017 ac·ft

Row 3

2500 x 1,2 = 3000 ÷ " = 0.0688 x 6 = 0.4132 ac·ft
2500 x 2 = 5000 ÷ " = 0.1147 ac·ft
0.~~5274~~ 0.5279 ac·ft

Row 4

2500 x 0.5 = 1250 ÷ " = 0.02869 x 7 = 0.2008 ac·ft

Row 5

2500 x 0.1 = 250 ÷ 43560 = 0.0057 x 6 = 0.0344
2500 x 0.9 = 1000 ÷ " = 0.0229
0.0573 ac·ft

Row 6

2500 x 0.1 = 250 ÷ 43560 = ~~0.0344~~ 0.0057 x 6 = 0.0344 ac·ft

Row 7

2500 x 0.1 = 250 ÷ 43560 = 0.0057 x 6 = 0.0344 ac·ft

Row 8

2500 x 0.3 = ~~0~~ 750 ÷ 43560 = 0.0172 x 7 = 0.1205 ac·ft

Row 9

2500 x 0.7 = 1750 ÷ 43560 = 0.0401 x 6 = 0.2410

Row 10

2500 x 2.7 = 6750 ÷ 43560 = 0.1549 x 3 = 0.4648

Total ~~Area~~ Ponding Area 2 = 2.4845

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1 cm²—0.1550 in²
1 in²—6.452 cm²
1m²—10.764 ft²
1 ft²—929.0 cm²

1 acre—43,560 ft²
—4049 m²

1 hectare—10,000 m²
—2 471 acres

1 m²—2 590 km²
—640 acres

Volume

1 m³—1000 liters
—35 314 ft³
—264 gal (U S.)

1 ft³—28 320 liters
—7 481 gal (U.S.)

1 gal—3 785 liters

1 acre foot—43,560 ft³
—3 259 × 10⁶ gal
—1234 m³

Discharge

1ft³/min—0 472 liters/sec
1 acre foot/day
—3 259 × 10⁶ gal/day
1 ft³/sec—448.8 gal/min
—724 acre feet/year

Density

Water 1 000 g/cm³ at 4°C
0 998 g/cm³ at 20°C
Sea water 1 025 g/cm³ at 15°C
Mercury 13 55 g/cm³ at 20°C
Air 1 29 × 10⁻³ g/cm³ at 20°C and atmospheric pressure

Specific weight water in air

8 336 lb/gal at 0°C
8 325 lb/gal at 60° F
8 322 lb/gal at 20° C
62 18 lb/ft³ at 60° F

Pressure

1 bar—0 9869 atmosphere
—10⁶ dynes/cm²
—14 50 lb/in²

pressure developed from static liquid
1 cm mercury
—0 01316 atmosphere
1 m water
—0 09950 atmosphere
33 90 ft water
—1 00 atmosphere

Area 3 (50×50)

Row1
2500 × 0.1 = 250 ÷ 43560 = 0.0057 × 9 = 0.0513 ac·ft

Row2
2500 × 0.1 = 250 ÷ 11 = 0.0057 × 9 = 0.0513 ac·ft

Row3
2500 × 0.1 = 250 ÷ 11 = 0.0057 × 9 = 0.0513 ac·ft

Row4
2500 × 0.4 = 1000 ÷ 11 = 0.0229 × 9 = 0.3061 ac·ft

Row5
2500 × 0.8 = 2000 ÷ 11 = 0.0459 × 10 = 0.4591 ac·ft

Row6
2500 × 3.9 = 9750 ÷ 11 = 0.2238 × 10 = 2.238 ac·ft

Row7
2500 × 2.0 = 5000 ÷ 11 = 0.1147 × 9 = 1.033 ac·ft

Row8
2500 × 1.1 = 2750 ÷ 11 = 0.0631 × 10 = 0.6313 ac·ft

Row9
2500 × 0.2 = 500 ÷ 11 = 0.0114 × 9 = 0.1032 ac·ft

Row10
2500 × 1.2 = 3000 ÷ 11 = 0.0688 × 9 = 0.6197 ac·ft

Row11
625 × 1.6 = 1000 ÷ 11 = 0.0229 × 9 = 0.2061 ac·ft

Total Existing Area 3 = [illegible]

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Sheet: ____ of ____
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File: ____

1 cm²—0.1550 in²
1 in²—6 452 cm²
1m²—10.764 ft²
1 ft²—929.0 cm²

1 acre—43,560 ft²
—4049 m²

1 hectare—10,000 m²
—2.471 acres

1 mi²—2.590 km²
—640 acres

Volume

1 m³—1000 liters
—35 314 ft³
—264 gal (U S)

1 ft³—28 320 liters
—7 481 gal (U S)

1 gal—3 785 liters

1 acre foot—43,560 ft³
—3 259 × 10⁵ gal
—1234 m³

Discharge

1ft³/min—0 472 liters/sec
1 acre foot/day
—3 259 × 10⁵ gal/day
1 ft³ sec—448 8 gal/min
—724 acre feet/year

Density

Water 1 000 g/cm³ at 4°C
0 958 g/cm³ at 20°C
Sea water 1 025 g/cm³
at 15°C
Mercury 13 55 g/cm³
at 20°C
Air 1 29 × 10⁻³ g/cm³
at 20°C and
atmospheric pressure

Specific weight water in air

8 335 lb/gal at 0°C
8 325 lb/gal at 50° F
8 322 lb/gal at 20° C
62 18 lb/ft³ at 60° F

Pressure

1 bar—0 9869 atmosphere
—10⁶ dynes cm²
—14 50 lb/in²

pressure developed
from static liquid
1 cm mercury
—0 01316 atmosphere
1 m water
—0 09950 atmosphere
33 90 ft water
—1 00 atmosphere

Area 4

Row 1

2500 × 1.1 = 2750 ÷ 43560 = 0.0631 × 2 = 0.1262 ac.ft

Row 2

2500 × 2.0 = 5000 ÷ 43560 = 0.1147 × 5 = 0.57341 ac.ft
2500 × 0.5 = 1250 ÷ " = 0.0286 × 8 = 0.2288
0.8027 ac.ft

Row 3

2500 × 1.2 = 3000 ÷ 43560 = 0.0688 × 12 = 0.8264 ac.ft

Row 4

2500 × 1.2 = 3000 ÷ " = 0.0688 × 12 = 0.8264 ac.ft

Row 5

2500 × 1.5 = 3750 ÷ " = 0.0860 × 12 = 1.033 ac.ft

Row 6

2500 × 1.0 = 2500 ÷ " = 0.0573 × 12 = 0.6876 ac.ft

Row 7

2500 × 0.7 = 1750 ÷ " = 0.0401 × 12 = 0.4820 ac.ft

Row 8

2500 × 0.2 = 500 ÷ " = 0.0114 × 11 = 0.1262 ac.ft

Row 9

2500 × 0.1 = 250 ÷ " = 0.0057 × 7 = 0.0401 ac.ft

Row 10

2500 × 0.1 = 250 ÷ " = 0.0057 × 3 = 0.0171 ac.ft

Total Ponding Area 4 = 4.9677 ac.ft

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1 cm²—0.1550 in²
1 in²—6.452 cm²
1m²—10.764 ft²
1 ft²—929.0 cm²

1 acre—43,560 ft²
—4049 m²

1 hectare—10,000 m²
—2 471 acres

1 mi²—2.590 km²
—640 acres

Volume

1 m³—1000 liters
—35 314 ft³
—264 gal (U.S.)

1 ft³—28.320 liters
—7 481 gal (U.S.)

1 gal—3.785 liters

1 acre foot—43.560 ft³
—3 259 × 10⁵ gal
—1234 m³

Discharge

1ft³/min—0 472 liters/sec
1 acre foot/day
—3 259 × 10⁵ gal/day
1 ft³/sec—448 8 gal/min
—724 acre feet/year

Density

Water 1 000 g/cm³ at 4°C
0 998 g/cm³ at 20°C
Sea water 1 025 g/cm³
at 15°C
Mercury 13 55 g/cm ³
at 20°C
Air 1 29 × 10⁻³ g/cm³
at 20°C and
atmospheric pressure

Specific weight
water in air

8 335 lb/gal at 0°C
8 326 lb/gal at 60° F
8 322 lb/gal at 20° C
62 18 lb/ft³ at 60° F

Pressure

1 bar—0 9869 atmosphere
—10⁶ dynes/cm²
—14 50 lb/in²

pressure developed
from static liquid
1 cm mercury
—0 01316 atmosphere
1 ft water
—0 02950 atmosphere
33 90 ft water
—1 00 atmosphere

Area 5

Row 1
2500 X 0.2 = 500 X 43560 = 0.0114 X 5 = 0.0573 ac.ft

Row 2
2500 X 0.1 = 250 ÷ 11 = 0.0057 X 6 = 0.0342 ac.ft

Row 3
2500 X 0.1 = 250 ÷ 11 = 0.0057 X 6 = 0.0342 ac.ft

Row 4
2500 X 1.0 = 2500 ÷ 11 = 0.0573 X 5 = 0.2865 ac.ft

Row 5
2500 X 1.0 = 2500 ÷ 11 = 0.0573 X 5 = 0.2865 ac.ft

Row 6
2500 X 1.5 = 3750 ÷ 11 = 0.0860 X 3 = 0.2582 ac.ft

Total Ponding Area 5 = 0.9569 ac.ft

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Sheet ____ of ____
Date ____
By ____
File ____

1 cm²—0.1550 in²
1 in²—6.452 cm²
1m²—10.764 ft²
1 ft²—929.0 cm²

1 acre—43,560 ft²
—4049 m²

1 hectare—10,000 m²
—2.471 acres

1 mi²—2.590 km²
—640 acres

Volume

1 m³—1000 liters
—35.314 ft³
—264 gal (U.S.)

1 ft³—28.320 liters
—7.481 gal (U.S.)

1 gal—3.785 liters

1 acre foot—43,560 ft³
—3.259 × 10⁵ gal
—1234 m³

Discharge

1ft³/min—0.472 liters/sec
1 acre foot/day
—3.259 × 10⁵ gal/day
1 ft³/sec—448.8 gal/min
—724 acre feet/year

Density

Water 1.000 g/cm³ at 4°C
0.998 g/cm³ at 20°C
Sea water 1.025 g/cm³
at 15°C
Mercury 13.55 g/cm³
at 20°C
Air 1.29 × 10⁻³ g/cm³
at 20°C and
atmospheric pressure

Specific weight
water in air

8.335 lb/gal at 0°C
8.329 lb/gal at 60° F
8.322 lb/gal at 20° C
62.18 lb/ft³ at 60° F

Pressure

1 bar—0.9869 atmosphere
—10⁶ dynes/cm²
—14.50 lb/in²

pressure developed
from static liquid
1 cm mercury
—0.01316 atmosphere
1 ft water
—0.02950 atmosphere
33.90 ft water
—1.00 atmosphere

Area 6

Row 1 2500 X 1.0 = 2500 ÷ 43 560 = 0.0573 ac.ft

Row 2 2500 X 1.0 = 2500 ÷ 43560 = 0.0573 X2 = 0.1146 ac.ft

Row 3 0.0573

Row 4 0.0573

Total Ponding ~~Area 6~~ = 0.2865 acft

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Sheet ____ of ____
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By ____
File ____

1 cm² = 0.1550 in²
1 in² = 6.452 cm²
1 m² = 10.764 ft²
1 ft² = 929.0 cm²

1 acre = 43,560 ft²
= 4049 m²

1 hectare = 10,000 m²
= 2.471 acres

1 mi² = 2.590 km²
= 640 acres

Volume

1 m³ = 1000 liters
= 35.314 ft³
= 264 gal (U.S.)

1 ft³ = 28.320 liters
= 7.481 gal (U.S.)

1 gal = 3.785 liters

1 acre foot = 43,560 ft³
= 3.259 × 10⁵ gal
= 1234 m³

Discharge

1 ft³/min = 0.472 liters/sec
1 acre foot/day
= 3.259 × 10⁵ gal/day
1 ft³/sec = 448.8 gal/min
= 724 acre feet/year

Density

Water 1.000 g/cm³ at 4°C
0.998 g/cm³ at 20°C
Sea water 1.025 g/cm³
at 15°C
Mercury 13.55 g/cm³
at 20°C
Air 1.29 × 10⁻³ g/cm³
at 20°C and
atmospheric pressure

Specific weight
water in air

8.335 lb/gal at 0°C
8.328 lb/gal at 60° F
8.322 lb/gal at 20° C
62.18 lb/ft³ at 60° F

Pressure

1 bar = 0.9869 atmosphere
= 10⁶ dynes/cm²
= 14.50 lb/in²

pressure developed
from static liquid
1 cm mercury
= 0.01316 atmosphere
1 ft water
= 0.02950 atmosphere
33.90 ft water
= 1.00 atmosphere

Total Ponding Areas 1-6

19.788 ac-ft

```
ID BASINS 1 & 2 - BRICKLAND WEST SLOPE, SUNLAND PARK, NM
ID 100-YEAR 6-HOUR RAINFALL FROM NOAA ATLAS - RELISTIC DISTRIBUTION PATTERN
ID WITH EXPECTED PROBABILITY ADJUSTMENT
ID FROM LAS CRUCES FIS: 0.00 INCH INITIAL LOSS & 0.20 INCH HOURLY LOSS
ID MARCH 1988 - BL
IT  5        300
IO  1
JR FLOW   1.03
KK   1   RUNOFF HYDROGRAPH FOR BASIN 1
BA0.0666
PB 3.10
PI 0.02  0.02  0.03  0.08  0.10  0.11  0.70  0.39  0.29  0.22
PI 0.16  0.15  0.08  0.07  0.07  0.02  0.02  0.02  0.02  0.02
PI 0.02  0.02  0.02  0.02  0.02  0.02  0.02  0.02  0.01  0.01
PI 0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01
PI 0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01
PI 0.01  0.01  0.01  0.01  0.01  0.01    0     0     0   0.01
PI 0.01  0.01  0.01  0.01  0.01  0.01    0     0     0     0
PI   0     0
LU 0.00   0.20
US0.0591   0.61
KK   2   RUNOFF HYDROGRAPH FOR BASIN 2
BA0.0371
PB 3.10
LU 0.00   0.20
US0.1202   0.61
ZZ
```

```
!*****************************************                    *****************************************
*                   *                   *                    *                   *
* FLOOD HYDROGRAPH PACKAGE (HEC-1)  *                    *  U.S. ARMY CORPS OF ENGINEERS  *
*       SEPTEMBER 1990          *                    *  HYDROLOGIC ENGINEERING CENTER  *
*        VERSION 4.0            *                    *       609 SECOND STREET         *
*                   *                   *  DAVIS, CALIFORNIA 95616    *
* RUN DATE 04/05/1980  TIME  10:14:21 *                    *       (916) 756-1104        *
*                   *                   *                    *                   *
*****************************************                    *****************************************
```

```
X   X XXXXXXX  XXXXX      X
X   X X     X   X     XX
X   X X     X         X
XXXXXXX XXXX   X    XXXXX X
X   X X     X         X
X   X X     X   X     X
X   X XXXXXXX  XXXXX     XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  1       ID  BASINS 1 & 2 - BRICKLAND WEST SLOPE, SUNLAND PARK, NM
  2       ID  100-YEAR 6-HOUR RAINFALL FROM NOAA ATLAS - RELISTIC DISTRIBUTION PATTERN
  3       ID  WITH EXPECTED PROBABILITY ADJUSTMENT
  4       ID  FROM LAS CRUCES FIS: 0.00 INCH INITIAL LOSS & 0.20 INCH HOURLY LOSS
  5       ID  MARCH 1988 - BL
  6       IT   5         300
  7       IO   1
  8       JR  FLOW   1.03

  9       KK    1   RUNOFF HYDROGRAPH FOR BASIN 1
 10       BA 0.0666
 11       PB  3.10
 12       PI  0.02  0.02  0.03  0.08  0.10  0.11  0.70  0.39  0.29  0.22
 13       PI  0.16  0.15  0.08  0.07  0.07  0.02  0.02  0.02  0.02  0.02
 14       PI  0.02  0.02  0.02  0.02  0.02  0.02  0.02  0.02  0.01  0.01
 15       PI  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01
 16       PI  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.01
 17       PI  0.01  0.01  0.01  0.01  0.01  0.01   0     0     0   0.01
 18       PI  0.01  0.01  0.01  0.01  0.01  0.01   0     0     0     0
 19       PI    0     0
 20       LU  0.00  0.20
 21       US 0.0591  0.61

 22       KK    2   RUNOFF HYDROGRAPH FOR BASIN 2
 23       BA 0.0371
 24       PB  3.10
 25       LU  0.00  0.20
 26       US 0.1202  0.61
 27       ZZ
```

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*****************************************          ***************************************
*                   *                   *          *                 *
* FLOOD HYDROGRAPH PACKAGE (HEC-1)  *                    * U.S. ARMY CORPS OF ENGINEERS  *
*       SEPTEMBER 1990        *                  * HYDROLOGIC ENGINEERING CENTER  *
*       VERSION 4.0           *                *      609 SECOND STREET        *
*                   *                   *    DAVIS, CALIFORNIA 95616     *
* RUN DATE 04/05/1980  TIME  10:14:21 *                    *      (916) 756-1104         *
*                   *                   *          *                 *
*****************************************          ***************************************
```

BASINS 1 & 2 - BRICKLAND WEST SLOPE, SUNLAND PARK, NM
100-YEAR 6-HOUR RAINFALL FROM NOAA ATLAS - RELISTIC DISTRIBUTION PATTERN
WITH EXPECTED PROBABILITY ADJUSTMENT
FROM LAS CRUCES FIS: 0.00 INCH INITIAL LOSS & 0.20 INCH HOURLY LOSS
MARCH 1988 - BL

7 IO OUTPUT CONTROL VARIABLES
IPRNT 1 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA
NMIN 5 MINUTES IN COMPUTATION INTERVAL
IDATE 1 0 STARTING DATE
ITIME 0300 STARTING TIME
NQ 101 NUMBER OF HYDROGRAPH ORDINATES
NDDATE 1 0 ENDING DATE
NDTIME 1120 ENDING TIME
ICENT 19 CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 8.33 HOURS

ENGLISH UNITS
DRAINAGE AREA SQUARE MILES
PRECIPITATION DEPTH INCHES
LENGTH, ELEVATION FEET
FLOW CUBIC FEET PER SECOND
STORAGE VOLUME ACRE-FEET
SURFACE AREA ACRES
TEMPERATURE DEGREES FAHRENHEIT

JP MULTI-PLAN OPTION
NPLAN 1 NUMBER OF PLANS

JR MULTI-RATIO OPTION
RATIOS OF RUNOFF
1.03

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
     **************
     *      *
 9 KK  *     1 *      RUNOFF HYDROGRAPH FOR BASIN 1
     *      *
     **************

       SUBBASIN RUNOFF DATA

 10 BA      SUBBASIN CHARACTERISTICS
            TAREA      .07 SUBBASIN AREA

       PRECIPITATION DATA

 11 PB          STORM      3.10 BASIN TOTAL PRECIPITATION

 12 PI      INCREMENTAL PRECIPITATION PATTERN
            .02   .02   .03   .08   .10   .11   .70   .39   .29   .22
            .16   .15   .08   .07   .07   .02   .02   .02   .02   .02
            .02   .02   .02   .02   .02   .02   .02   .02   .01   .01
            .01   .01   .01   .01   .01   .01   .01   .01   .01   .01
            .01   .01   .01   .01   .01   .01   .01   .01   .01   .01
            .01   .01   .01   .01   .01   .01   .00   .00   .00   .01
            .01   .01   .01   .01   .01   .01

 20 LU      UNIFORM LOSS RATE
            STRTL      .00 INITIAL LOSS
            CNSTL      .20 UNIFORM LOSS RATE
            RTIMP      .00 PERCENT IMPERVIOUS AREA

 21 US      SNYDER UNITGRAPH
              TP       .06 LAG
              CP       .61 PEAKING COEFFICIENT

       SYNTHETIC ACCUMULATED-AREA VS. TIME CURVE WILL BE USED

                                  ***
TC INCREASED TO DELTA T OF  .08 HR
CLARK DID NOT CONVERGE TO GIVEN SNYDER COEFFICIENTS
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC=  .08 AND R=  .04 INTERVALS

                              UNIT HYDROGRAPH PARAMETERS
                            CLARK  TC=  .08 HR,     R=  .04 HR
                            SNYDER  TP=  .07 HR,    CP=  .50

                                UNIT HYDROGRAPH
                              2 END-OF-PERIOD ORDINATES
      258.    258.
```

HYDROGRAPH AT STATION 1

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q	DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	0300	1	.00	.00	.00	0.	1	0715	52	.01	.01	.00	0.		
1	0305	2	.02	.02	.00	1.	1	0720	53	.01	.01	.00	0.		
1	0310	3	.02	.02	.00	2.	1	0725	54	.01	.01	.00	0.		
1	0315	4	.03	.02	.01	4.	1	0730	55	.01	.01	.00	0.		
1	0320	5	.08	.02	.06	20.	1	0735	56	.01	.01	.00	0.		
1	0325	6	.10	.02	.08	38.	1	0740	57	.01	.01	.00	0.		
1	0330	7	.11	.02	.09	46.	1	0745	58	.00	.00	.00	0.		
1	0335	8	.70	.02	.68	200.	1	0750	59	.00	.00	.00	0.		
1	0340	9	.39	.02	.37	272.	1	0755	60	.00	.00	.00	0.		
1	0345	10	.29	.02	.27	167.	1	0800	61	.01	.01	.00	0.		
1	0350	11	.22	.02	.20	123.	1	0805	62	.01	.01	.00	0.		
1	0355	12	.16	.02	.14	89.	1	0810	63	.01	.01	.00	0.		
1	0400	13	.15	.02	.13	71.	1	0815	64	.01	.01	.00	0.		
1	0405	14	.08	.02	.06	51.	1	0820	65	.01	.01	.00	0.		
1	0410	15	.07	.02	.05	30.	1	0825	66	.01	.01	.00	0.		
1	0415	16	.07	.02	.05	28.	1	0830	67	.01	.01	.00	0.		
1	0420	17	.02	.02	.00	15.	1	0835	68	.00	.00	.00	0.		
1	0425	18	.02	.02	.00	2.	1	0840	69	.00	.00	.00	0.		
1	0430	19	.02	.02	.00	2.	1	0845	70	.00	.00	.00	0.		
1	0435	20	.02	.02	.00	2.	1	0850	71	.00	.00	.00	0.		
1	0440	21	.02	.02	.00	2.	1	0855	72	.00	.00	.00	0.		
1	0445	22	.02	.02	.00	2.	1	0900	73	.00	.00	.00	0.		
1	0450	23	.02	.02	.00	2.	1	0905	74	.00	.00	.00	0.		
1	0455	24	.02	.02	.00	2.	1	0910	75	.00	.00	.00	0.		
1	0500	25	.02	.02	.00	2.	1	0915	76	.00	.00	.00	0.		
1	0505	26	.02	.02	.00	2.	1	0920	77	.00	.00	.00	0.		
1	0510	27	.02	.02	.00	2.	1	0925	78	.00	.00	.00	0.		
1	0515	28	.02	.02	.00	2.	1	0930	79	.00	.00	.00	0.		
1	0520	29	.02	.02	.00	2.	1	0935	80	.00	.00	.00	0.		
1	0525	30	.01	.01	.00	1.	1	0940	81	.00	.00	.00	0.		
1	0530	31	.01	.01	.00	0.	1	0945	82	.00	.00	.00	0.		
1	0535	32	.01	.01	.00	0.	1	0950	83	.00	.00	.00	0.		
1	0540	33	.01	.01	.00	0.	1	0955	84	.00	.00	.00	0.		
1	0545	34	.01	.01	.00	0.	1	1000	85	.00	.00	.00	0.		
1	0550	35	.01	.01	.00	0.	1	1005	86	.00	.00	.00	0.		
1	0555	36	.01	.01	.00	0.	1	1010	87	.00	.00	.00	0.		
1	0600	37	.01	.01	.00	0.	1	1015	88	.00	.00	.00	0.		
1	0605	38	.01	.01	.00	0.	1	1020	89	.00	.00	.00	0.		
1	0610	39	.01	.01	.00	0.	1	1025	90	.00	.00	.00	0.		

I	0615	40	.01	.01	.00	0.	*	I	1030	91	.00	.00	.00	0.
I	0620	41	.01	.01	.00	0.	*	I	1035	92	.00	.00	.00	0.
I	0625	42	.01	.01	.00	0.	*	I	1040	93	.00	.00	.00	0.
I	0630	43	.01	.01	.00	0.	*	I	1045	94	.00	.00	.00	0.
I	0635	44	.01	.01	.00	0.	*	I	1050	95	.00	.00	.00	0.
I	0640	45	.01	.01	.00	0.	*	I	1055	96	.00	.00	.00	0.
I	0645	46	.01	.01	.00	0.	*	I	1100	97	.00	.00	.00	0.
I	0650	47	.01	.01	.00	0.	*	I	1105	98	.00	.00	.00	0.
I	0655	48	.01	.01	.00	0.	*	I	1110	99	.00	.00	.00	0.
I	0700	49	.01	.01	.00	0.	*	I	1115	100	.00	.00	.00	0.
I	0705	50	.01	.01	.00	0.	*	I	1120	101	.00	.00	.00	0.
I	0710	51	.01	.01	.00	0.	*							

TOTAL RAINFALL = 3.10, TOTAL LOSS = .82, TOTAL EXCESS = 2.28

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	8.33-HR
+ (CFS)	(HR)				
	(CFS)				
+ 272.	.67	16.	12.	12.	12.
	(INCHES)	2.283	2.283	2.283	2.283
	(AC-FT)	8.	8.	8.	8.

CUMULATIVE AREA = .07 SQ MI

HYDROGRAPH AT STATION 1
PLAN 1, RATIO = 1.03

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
I	0300	1	0.	*	I	0510	27	2.	*	I	0720	53	0.	*	I	0930	79	0.				
I	0305	2	1.	*	I	0515	28	2.	*	I	0725	54	0.	*	I	0935	80	0.				
I	0310	3	2.	*	I	0520	29	2.	*	I	0730	55	0.	*	I	0940	81	0.				
I	0315	4	4.	*	I	0525	30	1.	*	I	0735	56	0.	*	I	0945	82	0.				
I	0320	5	20.	*	I	0530	31	0.	*	I	0740	57	0.	*	I	0950	83	0.				
I	0325	6	39.	*	I	0535	32	0.	*	I	0745	58	0.	*	I	0955	84	0.				
I	0330	7	47.	*	I	0540	33	0.	*	I	0750	59	0.	*	I	1000	85	0.				
I	0335	8	206.	*	I	0545	34	0.	*	I	0755	60	0.	*	I	1005	86	0.				
I	0340	9	281.	*	I	0550	35	0.	*	I	0800	61	0.	*	I	1010	87	0.				
I	0345	10	172.	*	I	0555	36	0.	*	I	0805	62	0.	*	I	1015	88	0.				
I	0350	11	127.	*	I	0600	37	0.	*	I	0810	63	0.	*	I	1020	89	0.				

I	0355	12	92.	*	I	0605	38	0.	*	I	0815	64	0.	*	I	1025	90	0.					
I	0400	13	73.	*	I	0610	39	0.	*	I	0820	65	0.	*	I	1030	91	0.					
I	0405	14	52.	*	I	0615	40	0.	*	I	0825	66	0.	*	I	1035	92	0.					
I	0410	15	31.	*	I	0620	41	0.	*	I	0830	67	0.	*	I	1040	93	0.					
I	0415	16	28.	*	I	0625	42	0.	*	I	0835	68	0.	*	I	1045	94	0.					
I	0420	17	15.	*	I	0630	43	0.	*	I	0840	69	0.	*	I	1050	95	0.					
I	0425	18	2.	*	I	0635	44	0.	*	I	0845	70	0.	*	I	1055	96	0.					
I	0430	19	2.	*	I	0640	45	0.	*	I	0850	71	0.	*	I	1100	97	0.					
I	0435	20	2.	*	I	0645	46	0.	*	I	0855	72	0.	*	I	1105	98	0.					
I	0440	21	2.	*	I	0650	47	0.	*	I	0900	73	0.	*	I	1110	99	0.					
I	0445	22	2.	*	I	0655	48	0.	*	I	0905	74	0.	*	I	1115	100	0.					
I	0450	23	2.	*	I	0700	49	0.	*	I	0910	75	0.	*	I	1120	101	0.					
I	0455	24	2.	*	I	0705	50	0.	*	I	0915	76	0.	*									
I	0500	25	2.	*	I	0710	51	0.	*	I	0920	77	0.	*									
I	0505	26	2.	*	I	0715	52	0.	*	I	0925	78	0.	*									

****

PEAK FLOW TIME MAXIMUM AVERAGE FLOW

			6-HR	24-HR	72-HR	8.33-HR
+	(CFS)	(HR)				
		(CFS)				
+	281.	.67	17.	12.	12.	12.
		(INCHES)	2.352	2.352	2.352	2.352
		(AC-FT)	8.	8.	8.	8.

CUMULATIVE AREA = .07 SQ MI

*** ***

****
* *
22 KK * 2 * RUNOFF HYDROGRAPH FOR BASIN 2
* *
****

SUBBASIN RUNOFF DATA

23 BA SUBBASIN CHARACTERISTICS
TAREA .04 SUBBASIN AREA

PRECIPITATION DATA

24 PB STORM 3.10 BASIN TOTAL PRECIPITATION

12 PI INCREMENTAL PRECIPITATION PATTERN

```
.02   .02   .03   .08   .10   .11   .70   .39   .29   .22
.16   .15   .08   .07   .07   .02   .02   .02   .02   .02
.02   .02   .02   .02   .02   .02   .02   .02   .01   .01
.01   .01   .01   .01   .01   .01   .01   .01   .01   .01
.01   .01   .01   .01   .01   .01   .01   .01   .01   .01
.01   .01   .01   .01   .01   .01   .00   .00   .00   .01
.01   .01   .01   .01   .01   .01
```

25 LU UNIFORM LOSS RATE
STRTL .00 INITIAL LOSS
CNSTL .20 UNIFORM LOSS RATE
RTIMP .00 PERCENT IMPERVIOUS AREA

26 US SNYDER UNITGRAPH
TP .12 LAG
CP .61 PEAKING COEFFICIENT

SYNTHETIC ACCUMULATED-AREA VS. TIME CURVE WILL BE USED

***

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= .13 AND R= .10 INTERVALS

UNIT HYDROGRAPH PARAMETERS
CLARK TC= .13 HR, R= .10 HR
SNYDER TP= .12 HR, CP= .61

UNIT HYDROGRAPH
8 END-OF-PERIOD ORDINATES
59. 108. 70. 29. 12. 5. 2. 1.

****

HYDROGRAPH AT STATION 2

****

DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q		DA	MON	HRMN	ORD	RAIN	LOSS	EXCESS	COMP Q
1	0300	1	.00	.00	.00	0.	1		0715	52	.01	.01	.00	0.		
1	0305	2	.02	.02	.00	0.	1		0720	53	.01	.01	.00	0.		
1	0310	3	.02	.02	.00	1.	1		0725	54	.01	.01	.00	0.		
1	0315	4	.03	.02	.01	1.	1		0730	55	.01	.01	.00	0.		
1	0320	5	.08	.02	.06	5.	1		0735	56	.01	.01	.00	0.		
1	0325	6	.10	.02	.08	13.	1		0740	57	.01	.01	.00	0.		
1	0330	7	.11	.02	.09	19.	1		0745	58	.00	.00	.00	0.		
1	0335	8	.70	.02	.68	58.	1		0750	59	.00	.00	.00	0.		
1	0340	9	.39	.02	.37	105.	1		0755	60	.00	.00	.00	0.		
1	0345	10	.29	.02	.27	108.	1		0800	61	.01	.01	.00	0.		

I	0350	11	.22	.02	.20	89.	*	I	0805	62	.01	.01	.00	0.
I	0355	12	.16	.02	.14	70.	*	I	0810	63	.01	.01	.00	0.
I	0400	13	.15	.02	.13	54.	*	I	0815	64	.01	.01	.00	0.
I	0405	14	.08	.02	.06	41.	*	I	0820	65	.01	.01	.00	0.
I	0410	15	.07	.02	.05	29.	*	I	0825	66	.01	.01	.00	0.
I	0415	16	.07	.02	.05	21.	*	I	0830	67	.01	.01	.00	0.
I	0420	17	.02	.02	.00	15.	*	I	0835	68	.00	.00	.00	0.
I	0425	18	.02	.02	.00	8.	*	I	0840	69	.00	.00	.00	0.
I	0430	19	.02	.02	.00	4.	*	I	0845	70	.00	.00	.00	0.
I	0435	20	.02	.02	.00	2.	*	I	0850	71	.00	.00	.00	0.
I	0440	21	.02	.02	.00	1.	*	I	0855	72	.00	.00	.00	0.
I	0445	22	.02	.02	.00	1.	*	I	0900	73	.00	.00	.00	0.
I	0450	23	.02	.02	.00	1.	*	I	0905	74	.00	.00	.00	0.
I	0455	24	.02	.02	.00	1.	*	I	0910	75	.00	.00	.00	0.
I	0500	25	.02	.02	.00	1.	*	I	0915	76	.00	.00	.00	0.
I	0505	26	.02	.02	.00	1.	*	I	0920	77	.00	.00	.00	0.
I	0510	27	.02	.02	.00	1.	*	I	0925	78	.00	.00	.00	0.
I	0515	28	.02	.02	.00	1.	*	I	0930	79	.00	.00	.00	0.
I	0520	29	.02	.02	.00	1.	*	I	0935	80	.00	.00	.00	0.
I	0525	30	.01	.01	.00	1.	*	I	0940	81	.00	.00	.00	0.
I	0530	31	.01	.01	.00	0.	*	I	0945	82	.00	.00	.00	0.
I	0535	32	.01	.01	.00	0.	*	I	0950	83	.00	.00	.00	0.
I	0540	33	.01	.01	.00	0.	*	I	0955	84	.00	.00	.00	0.
I	0545	34	.01	.01	.00	0.	*	I	1000	85	.00	.00	.00	0.
I	0550	35	.01	.01	.00	0.	*	I	1005	86	.00	.00	.00	0.
I	0555	36	.01	.01	.00	0.	*	I	1010	87	.00	.00	.00	0.
I	0600	37	.01	.01	.00	0.	*	I	1015	88	.00	.00	.00	0.
I	0605	38	.01	.01	.00	0.	*	I	1020	89	.00	.00	.00	0.
I	0610	39	.01	.01	.00	0.	*	I	1025	90	.00	.00	.00	0.
I	0615	40	.01	.01	.00	0.	*	I	1030	91	.00	.00	.00	0.
I	0620	41	.01	.01	.00	0.	*	I	1035	92	.00	.00	.00	0.
I	0625	42	.01	.01	.00	0.	*	I	1040	93	.00	.00	.00	0.
I	0630	43	.01	.01	.00	0.	*	I	1045	94	.00	.00	.00	0.
I	0635	44	.01	.01	.00	0.	*	I	1050	95	.00	.00	.00	0.
I	0640	45	.01	.01	.00	0.	*	I	1055	96	.00	.00	.00	0.
I	0645	46	.01	.01	.00	0.	*	I	1100	97	.00	.00	.00	0.
I	0650	47	.01	.01	.00	0.	*	I	1105	98	.00	.00	.00	0.
I	0655	48	.01	.01	.00	0.	*	I	1110	99	.00	.00	.00	0.
I	0700	49	.01	.01	.00	0.	*	I	1115	100	.00	.00	.00	0.
I	0705	50	.01	.01	.00	0.	*	I	1120	101	.00	.00	.00	0.
I	0710	51	.01	.01	.00	0.	*							

TOTAL RAINFALL = 3.10, TOTAL LOSS = .82, TOTAL EXCESS = 2.28

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	8.33-HR

```
+ (CFS)     (HR)
              (CFS)
+   108.     .75          9.      7.      7.      7.
           (INCHES)    2.278   2.278   2.278   2.278
            (AC-FT)     5.      5.      5.      5.

           CUMULATIVE AREA =    .04 SQ MI
```

****

HYDROGRAPH AT STATION 2
PLAN 1, RATIO = 1.03

****

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1	0300	1	0.		1	0510	27	1.		1	0720	53	0.		1	0930	79	0.	
1	0305	2	0.		1	0515	28	1.		1	0725	54	0.		1	0935	80	0.	
1	0310	3	1.		1	0520	29	1.		1	0730	55	0.		1	0940	81	0.	
1	0315	4	1.		1	0525	30	1.		1	0735	56	0.		1	0945	82	0.	
1	0320	5	6.		1	0530	31	0.		1	0740	57	0.		1	0950	83	0.	
1	0325	6	13.		1	0535	32	0.		1	0745	58	0.		1	0955	84	0.	
1	0330	7	20.		1	0540	33	0.		1	0750	59	0.		1	1000	85	0.	
1	0335	8	60.		1	0545	34	0.		1	0755	60	0.		1	1005	86	0.	
1	0340	9	109.		1	0550	35	0.		1	0800	61	0.		1	1010	87	0.	
1	0345	10	112.		1	0555	36	0.		1	0805	62	0.		1	1015	88	0.	
1	0350	11	92.		1	0600	37	0.		1	0810	63	0.		1	1020	89	0.	
1	0355	12	72.		1	0605	38	0.		1	0815	64	0.		1	1025	90	0.	
1	0400	13	56.		1	0610	39	0.		1	0820	65	0.		1	1030	91	0.	
1	0405	14	42.		1	0615	40	0.		1	0825	66	0.		1	1035	92	0.	
1	0410	15	30.		1	0620	41	0.		1	0830	67	0.		1	1040	93	0.	
1	0415	16	22.		1	0625	42	0.		1	0835	68	0.		1	1045	94	0.	
1	0420	17	15.		1	0630	43	0.		1	0840	69	0.		1	1050	95	0.	
1	0425	18	8.		1	0635	44	0.		1	0845	70	0.		1	1055	96	0.	
1	0430	19	4.		1	0640	45	0.		1	0850	71	0.		1	1100	97	0.	
1	0435	20	2.		1	0645	46	0.		1	0855	72	0.		1	1105	98	0.	
1	0440	21	1.		1	0650	47	0.		1	0900	73	0.		1	1110	99	0.	
1	0445	22	1.		1	0655	48	0.		1	0905	74	0.		1	1115	100	0.	
1	0450	23	1.		1	0700	49	0.		1	0910	75	0.		1	1120	101	0.	
1	0455	24	1.		1	0705	50	0.		1	0915	76	0.						
1	0500	25	1.		1	0710	51	0.		1	0920	77	0.						
1	0505	26	1.		1	0715	52	0.		1	0925	78	0.						

****

PEAK FLOW TIME MAXIMUM AVERAGE FLOW

```
                    6-HR     24-HR     72-HR     8.33-HR
+ (CFS)     (HR)
              (CFS)
+   112.    .75          9.       7.       7.        7.
            (INCHES)   2.346    2.346    2.346     2.346
            (AC-FT)      5.       5.       5.        5.

            CUMULATIVE AREA =    .04 SQ MI

1

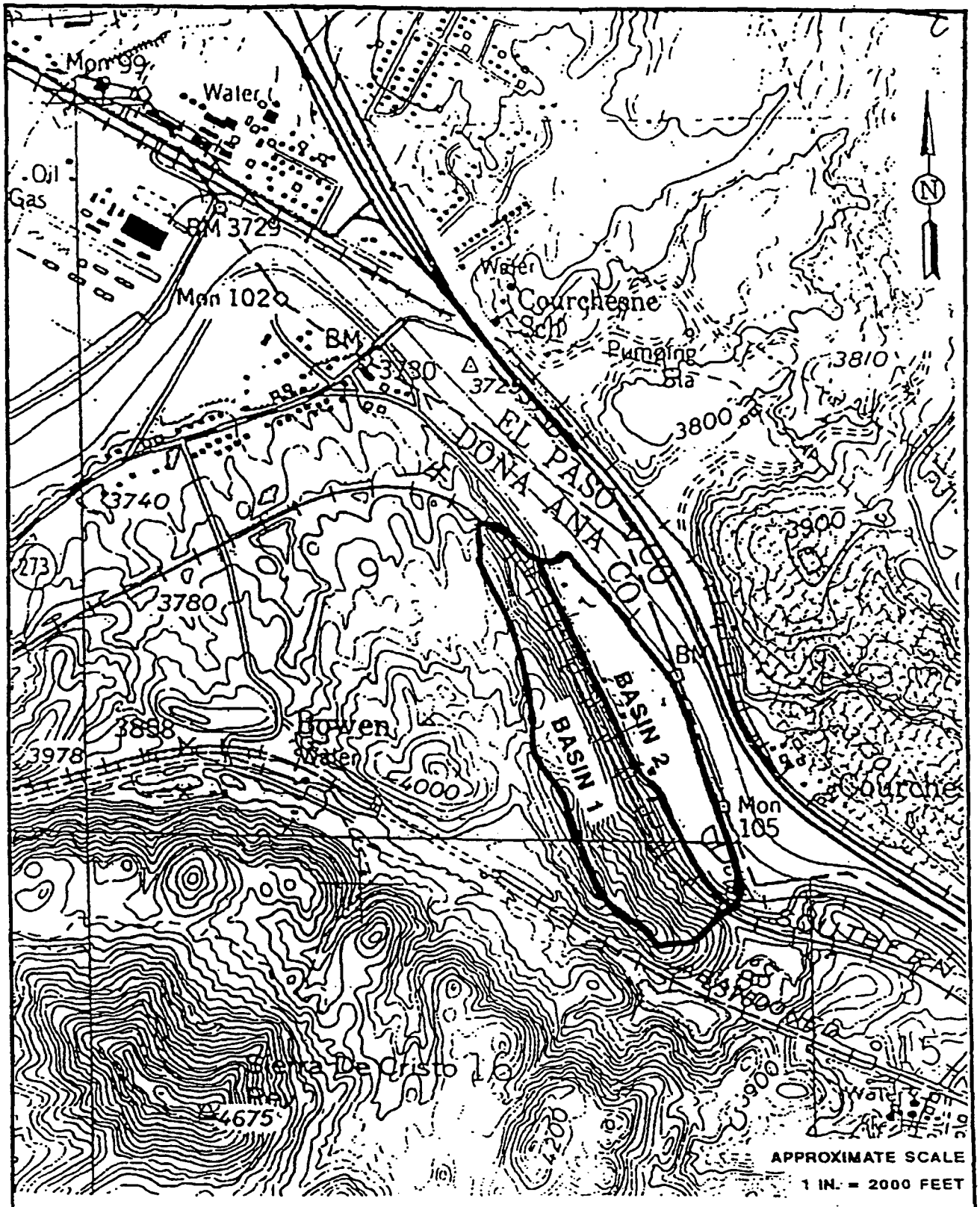
        PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                        TIME TO PEAK IN HOURS


                                        RATIOS APPLIED TO FLOWS
OPERATION     STATION    AREA   PLAN        RATIO 1
                          1.03

HYDROGRAPH AT
+             1     .07   1  FLOW      281.
                          TIME       .67

HYDROGRAPH AT
+             2     .04   1  FLOW      112.
                          TIME       .75


*** NORMAL END OF HEC-1 ***
```



GCL

CLIENT: REXENE	
DATE: 12/13/96	REV. NO.: 0
AUTHOR: M.G.H.	DRAWN BY: R.M.G.
CK'D BY: D.R.L.	FILE: F1TRIB.DWG

FIGURE 1
BRICKLAND REFINERY SITE
2 YEAR - 24 HOUR EVENT
TRIBUTARY AREAS

Appendix B

Daniel B. Stephens & Associates, Inc., Closure of Service Pit and Flow Through Process Tank, Brickland Refinery, Sunland Park, New Mexico, March 7, 1997

(12)

DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

Environmental Regulatory Affairs
MAR 7 '97

		Action	Info.
	TMC		
	SAM		
	BRB		
	RIM		
	JEB		
	DJB		
	SJ		
Diary	JB		

File: 415.2

March 6. 1997

Mr. Bill Olson
Hydrogeologist
Environmental Bureau
New Mexico Oil Conservation Division
2040 S. Pacheco
Santa Fe. New Mexico 87505

Re: Report of Service Pit and Flow Through Process Tank Closure, Brickland Refinery, Sunland Park. New Mexico (DBS&A #REXBRI001)

Dear Mr. Olson:

Daniel B. Stephens & Associates, Inc. (DBS&A), on behalf of Rexene Corporation, is pleased to submit the attached report which outlines the work performed in closing the flow-through process tank and service pit at the Brickland Facility, Sunland Park, New Mexico. If you have any questions regarding the removal activity or soil sample results, please do not hesitate to call me at (915) 520-6615 or (806) 798-9969.

Sincerely.

DANIEL B. STEPHENS & ASSOCIATES, INC.

P. Damian Reed

P. Damian Reed
Project Manager

c:\client\rex\bri\report\cvr.wpd

DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

Closure of Service Pit and Flow Through Process Tank Brickland Refinery Sunland Park, New Mexico

Prepared for
Rexene Corporation
Odessa, Texas 79760

March 6, 1997

6701 ABERDEEN • SUITE 10 • LUBBOCK, TEXAS 79424 • (806) 794-9969

DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

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DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

1. Introduction

The Brickland Refinery is currently owned by Rexene Corporation (Rexene) and consists of 35-acres located in Sunland Park, Dona Ana County, New Mexico. The former petroleum refinery operated from 1933 to 1958 and was subsequently dismantled. A service pit and a flow-through process tank used during refinery operations was located in the central portion of the facility. It was determined, given the past usage of the flow-through process tank, that the New Mexico Oil Conservation Division (NMOCD) had regulatory jurisdiction with respect to the removal and disposal of the tank. A work plan was submitted to the NMOCD on December 26, 1996 for closing the service pit and the flow through process tank. Approval was received from the NMOCD on January 2, 1997. The following report provides a brief description of previous site activities, a description of the work performed, a summary of the analytical results, disposition of all wastes generated, and conclusions.

2. Summary of Previous Site Activities

To date, two environmental investigations have been performed to evaluate soil and groundwater chemistry at the Brickland Refinery. These studies included extensive soil sampling, monitor well construction, and groundwater sampling and analysis. The studies by Geoscience Consultants, Ltd. (GCL) in 1994 and Eder in 1990 demonstrated that petroleum hydrocarbon impacts to soil and groundwater on site are restricted to the southern two-thirds of the facility. A correlation was established between the constituents of concern found in the groundwater and those found in the soil, suggesting migration of hydrocarbons from soil to groundwater (GCL, 1994).

Phase-separated hydrocarbons (PSH) were observed in several wells in the southern portion of the site. PSH appears to be restricted to on site and the narrow strip of land that separates

the site from the Rio Grande. The heterogeneous clays and silts at the site appear to have retarded the migration of these constituents of concern such that restoration of the soil and groundwater is currently taking place through natural attenuation (GCL 1994). A complete discussion of the site hydrogeology and distribution of contaminants is provided in "The Final Site Investigation Report for the Former Brickland Refinery", (GCL 1994).

3. Service Pit and Flow Through Process Tank Closure

3.1 Service Pit Closure

A service pit for servicing trucks was located in the central portion of the property (Figure 1). The service pit is constructed of concrete and has approximate dimensions of three-feet by 30-feet by six-feet. The pit was clean and free of debris and wastes. In accordance with the approved work plan, the service pit was abandoned in place by backfilling with clean fill material on December 18, 1996. The fill was compacted by wheel rolling to finished grade (Appendix A, Pictures 1 and 2).

3.2 Flow-Through Process Tank Removal

A flow-through process tank was located in the central portion of the Brickland facility (Figure 1). The tank is estimated to have had a capacity of approximately 1,000 gallons. This tank was originally used as a flow-through process tank during refinery operations. However, during the course of operational changes at the site, the tank was used to accumulate waste oil, oil filters, and debris. Based on the exposed portion of the sump, it was assumed that the tank was constructed of metal.

On December 14, 1996, the tank contents were sampled and analyzed to determine if the contents were characteristically hazardous. Based on the analytical results, the contents of the tank were classified as non-hazardous (Table 1).

On December 26, 1996, the top and sidewalls of the tank were excavated, and it appeared that the tank was constructed of concrete (Picture 3). The exterior dimensions of the concrete sump were approximately 12-feet by four-feet by four-feet.

Groundwater was encountered in the tank pit approximately four-feet below the ground surface. This was anticipated due to the close proximity of the Rio Grande and observed water levels in site monitor wells. On December 26, 1996, visual inspection of the groundwater in the tankhold revealed a very slight sheen on the water table. However, on January 28, 1997, when the sump was removed from the tankhold, no visual product or sheen was observed (Picture 4).

An attempt was made on December 27, 1996 to purge the liquids from the sump. However, no product was recovered due to the discovery that the sump contained debris and oil filters which filled the sump to an approximate depth of two-thirds the tank height.

Due to the potential for spillage, it was decided not to remove the oil filters and debris with the sump in-place. On January 28, 1997, a containment structure was constructed by placing a 30-mil high density polyethylene (HDPE) liner on the concrete pad adjacent to the sump. The four sides of the containment structure were bermed (Picture 5). A chain was carefully placed under the base of the sump and a backhoe was used to lift the sump from the excavation (Pictures 6 and 7). The sump was then carefully placed within the containment structure (Picture 8).

An attempt was made to remove the lid of the tank in order to evacuate the debris. However, while jack-hammering the lid of the sump, the concrete crumbled away to reveal a steel tank (Picture 9). It was later determined that due to the presence of the high water table, it was necessary to entomb the steel tank in concrete in order to prevent the tank from floating. The concrete which surrounded the tank was clean and free from any hydrocarbon contamination.

Therefore, the concrete was removed and segregated in order to prevent it from coming in contact with the tank contents (Picture 10).

The oil filters and debris were then removed from the tank and placed in Department of Transportation (DOT) approved drums (Picture 11). A total of 220 gallons of waste oil was collected and drummed for recycling. A small amount of waste oil was spilled while removing the tank from the excavation, transporting it to the containment structure, and removing the remaining contents. The affected soil was removed with the backhoe and placed in DOT approved drums. Additionally, the HDPE used for the containment structure was drummed. In total, four drums of waste oil, five drums of debris, oil filters, and HDPE and one drum of soil were generated in association with the sump removal.

Following soil sample collection, (discussed below), the excavation was backfilled by placing the excavated soil and approximately seven-yards of clean fill material in the excavation. The backfill was then wheel rolled and soil was left mounded in anticipation of the soil settling (Picture 12).

3.3 Soil Sampling and Analysis

Prior to backfilling the excavation, soil samples were collected from each of the four sidewalls of the tankhold and a composite sample was collected from the base of the tankhold. The sidewall samples were collected with the bucket of the backhhoe. The surface material was removed from the soil in the backhoe bucket in order to collect the most representative native soil sample. The soil sample was collected from the center portion of the soil in the bucket. The soil samples collected for TPH and metals analysis were placed in two 250-ml jars with teflon lids (no preservative) and the soil samples collected for aromatic and halogenated volatile organic compounds were placed in two 20-ml vials with Teflon lids (preserved with methanol). These procedures were performed for each of the

four sidewall samples. Upon collection, samples were placed in a cooler and packed with ice for shipment.

The bottom sample was a composite collected from the north, center, and south portion of the bottom of the tankhold. Since the bottom of the tankhold was below the water table, it was important to ensure that the soil samples be as representative of the native material as possible. The backhoe reached through the water and collected a full bucket of soil from the bottom of the tankhold on the north side. A representative portion from the center of the soil in the backhoe bucket was collected and placed in a one-gallon plastic bag. This procedure was repeated for the center and southern sample locations at the bottom of the tankhold. The combined soil in the plastic bag was homogenized. Representative samples from the plastic bag were collected for TPH and metals analysis and placed in two 250-ml jars with teflon lids (no preservative) and representative samples collected for aromatic and halogenated volatile organic compounds analysis were placed in two 20-ml vials with Teflon lids (preserved with methanol). The soil samples were placed in a cooler and packed with ice for shipment.

3.4 Laboratory analyses

Soil samples were delivered to Hall Environmental Analysis Laboratories on January 29, 1997. The soil samples were analyzed for aromatic and halogenated volatile organic compounds using EPA Methods 8010/8020, total recoverable petroleum hydrocarbons using EPA Method 418.1, and total metals using EPA Method 6010. A summary of the analytical results are provided in Table 2.

4. Analytical Results

4.1 Tank Contents

The tank contents were analyzed to determine if they were characteristically hazardous. The tests included reactivity, ignitability, corrosivity, pH, sulfides, cyanides, toxicity characteristic leachate procedure (TCLP) volatiles, TCLP semi volatiles, and TCLP metals. None of the constituents of concern exceeded the EPA limits. A summary of the waste determination analytical results are provided in Table 1. Analytical laboratory reports are provided in Appendix B.

4.2 Tankhold Soil Samples

Analytical results from soil samples collected from the tankhold indicated total recoverable petroleum hydrocarbon (TRPH) concentrations ranging from 8,800 mg/Kg to 15,000 mg/Kg. Benzene concentrations ranged from 23 mg/Kg to 42 mg/Kg, ethylbenzene concentrations ranged from 1.5 mg/Kg to 11.0 mg/Kg, and total xylenes concentrations ranged from 4.3 mg/kg to 18.0 mg/kg. No other aromatic or halogenated organic compounds were present above detection limits.

Total metals analysis revealed lead concentrations ranging from 7 μg/g to 14 μg/g, chromium levels ranging from 6 μg/g to 9 μg/g and barium concentrations ranging from 110 μg/g to 140 μg/g. Cadmium was detected in one sample at a concentration of 1 μg/g. None of the five soil samples contained arsenic, mercury, selenium, or silver concentrations above the method detection limit. A complete summary of the tankhold analytical chemistry data is provided in Tables 2 and 3. Analytical laboratory reports are provided in Appendix B.

5. Waste Disposition and Disposal

As previously mentioned, the tank contents were classified as non-hazardous. The waste oil removed from the sump was collected in four DOT drums and transported to Mesa Environmental, Belen, New Mexico for recycling. The remaining six drums of debris, oil filters, soil, and HDPE were transported to Hydrocarbon Recyclers, Inc., San Antonio, Texas. Since the concrete, which surrounded the tank, was not contaminated with petroleum hydrocarbons, the concrete was removed from the containment structure and placed with the existing construction debris stockpile located in the southern portion of the site (Picture 13). The metal tank was transported to the Rhino Environmental Services' landfill in Newman, New Mexico, for destruction and disposal. Copies of the waste hauling manifests, waste disposal documentation, and tank demolition certificate are provided in Appendix C.

6. Conclusions

Extensive soil and groundwater sampling was performed at this site during previous studies. Greater than 1,000 mg/Kg soil TPH concentrations were discovered in the central and southern portions of the facility during these investigations (Figure 2). The flow-through process tank was located within this area of TPH contamination. Soil samples collected near the tank revealed TPH concentrations between 254 and 3,760 mg/Kg. The analytical results indicate that the tank is surrounded by soil TPH concentrations that are consistent with those previously identified within this portion of the facility. Likewise, benzene was also detected in soil matrix in this portion of the site during the previous studies. The historical benzene chemical analysis data collected in the vicinity of the sump ranged from 11,900 μg/Kg to 56,600 μg/Kg. This further demonstrates that the tank is within an area of impacts to soil related to historical refinery operations. Finally, similar findings for lead in soil were noted.

The tank contents were sampled and analyzed prior to tank removal in order to determine if they were characteristically hazardous. The contents were found to be non-hazardous; therefore, all wastes generated during tank abandonment activities were disposed or recycled as non-hazardous in accordance with applicable code.

Based on the previous studies, groundwater at the site flows in a southerly direction, parallel to the Rio Grande. Groundwater analytical data collected during these studies indicated benzene concentrations decreasing in value both to the east (towards the Rio Grande) and to the south. Soil impacts related to historical operation of the flow-through process tank lie within previously identified areas of similarly impacted soil. As a result, it is unlikely that any past releases from the tank pose additional threat to groundwater at the site. Therefore, soil remediation related to releases from the tank should be consistent and concurrent with execution of the Stage 1 Abatement Plan proposed for the site-wide impacts.

Figures

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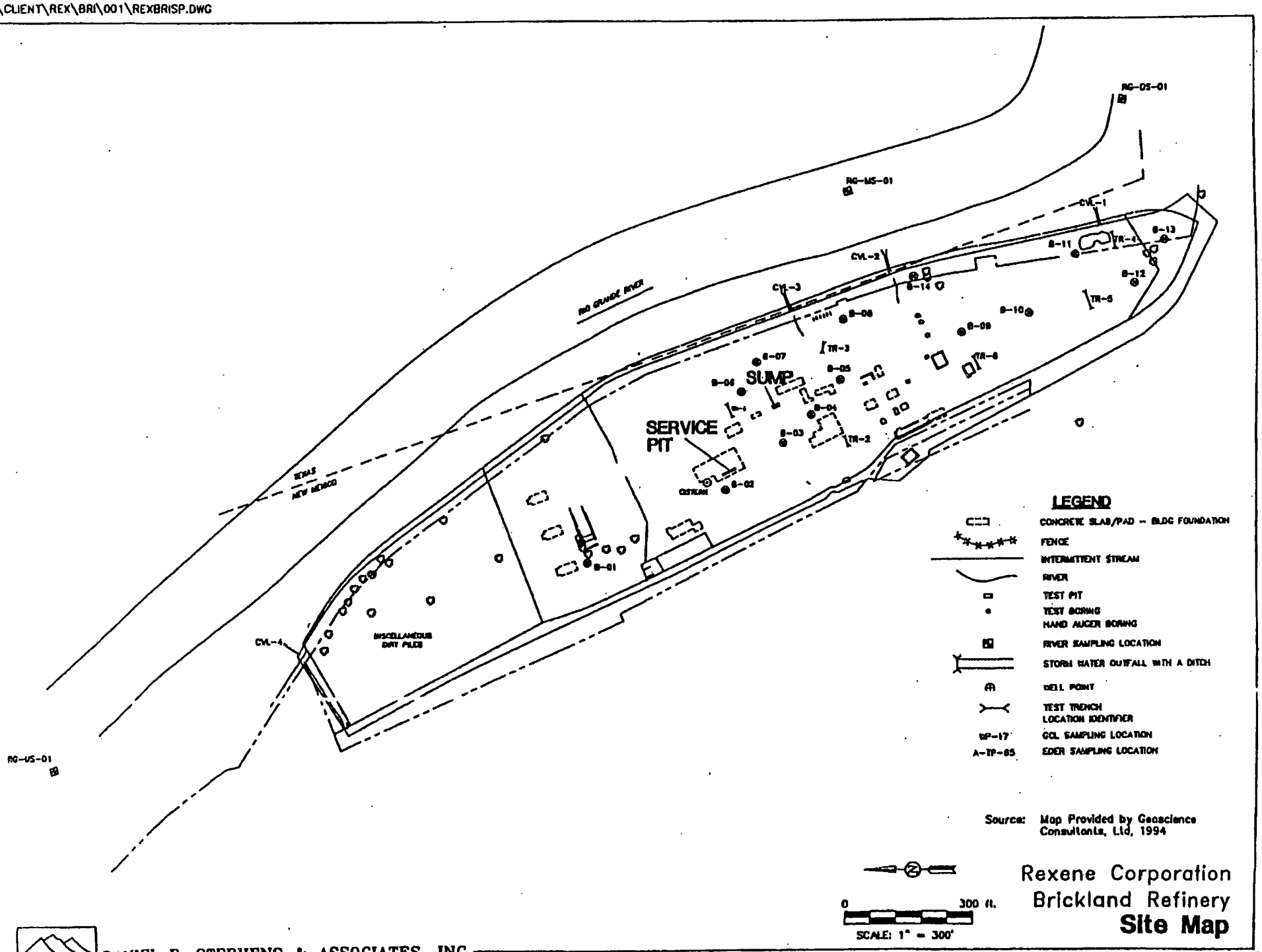

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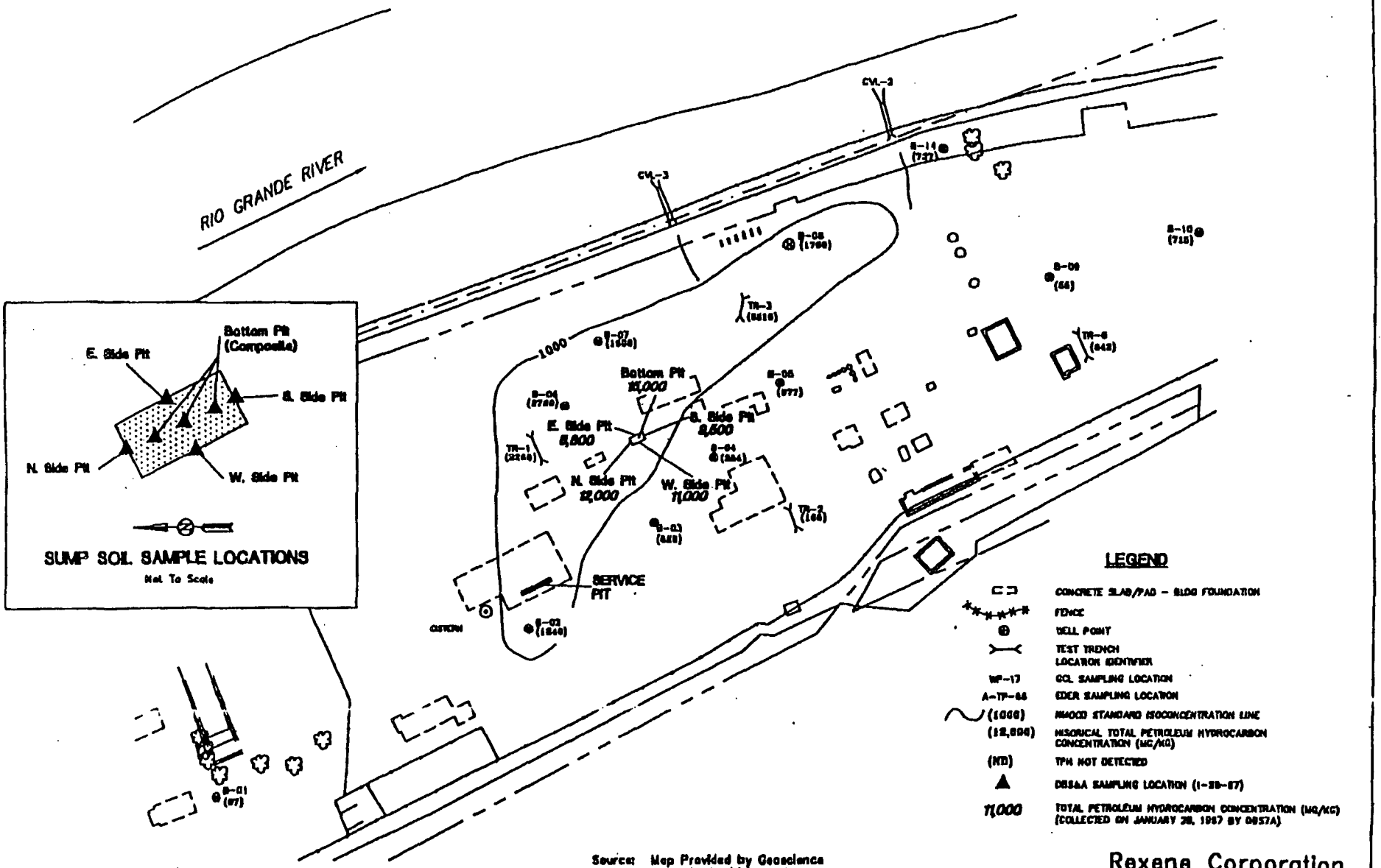
02-97 JN MIDREXBRI.001

Figure 1



Rexene Corporation
Brickland Refinery

Distribution of Total Petroleum Hydrocarbon Concentrations In Soil

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02-97
JN MIDREXBRI.001

Figure 2

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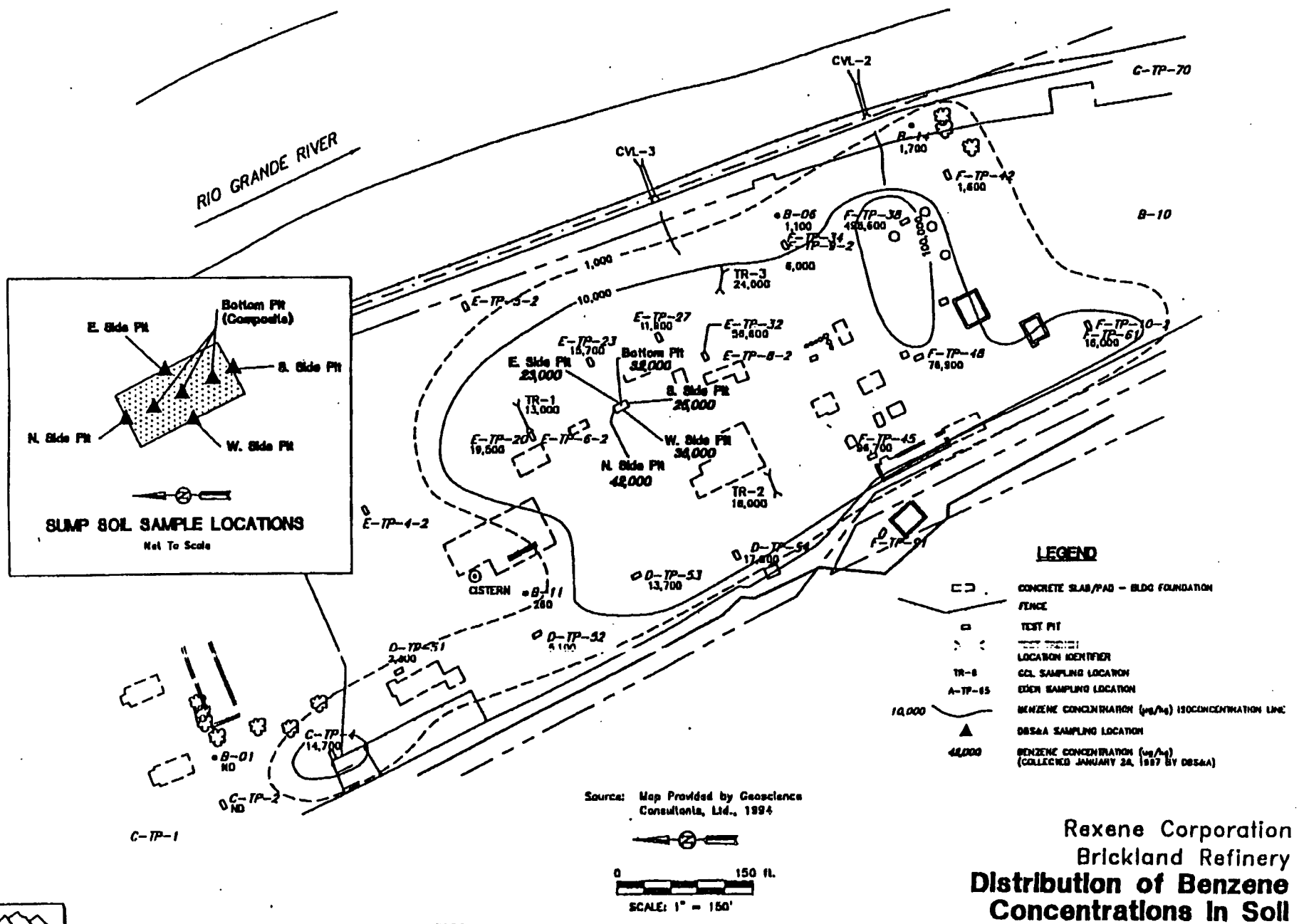

Rexene Corporation
Brickland Refinery

Distribution of Benzene Concentrations In Soil

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Figure 3

Tables

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Table 1. Summary of Tank Contents Waste Characterization
Rexene Corporation - Brickland Refinery

RCRA Characteristic

	EPA Limit	Tank Contents Results	Exceeds EPA Limit Yes/No
Reactivity	---	Non-Reactive	No
Sulfides	500 ppm	<10 ppm	No
Cyanides	250 ppm	<2.5 ppm	No
Corrosivity	>6.5 mm/yr	0.61 mm/yr	No
pH	<2, >12.5	8.1	No
Flashpoint	>140° F	>150° F	No

Analyzed by EPA Method 1010

Toxic Characteristic Leaching Procedure

TCLP Volatiles	EPA Limit (mg/L)	Tank Contents Results (mg/L)	Exceeds EPA Limit Yes/No
Vinyl Chloride	0.2	<0.05	No
1,1-Dichloroethene	0.7	0.06	No
Methyl Ethyl Ketone	200.0	<0.5	No
Chloroform	6.0	<0.05	No
1,2-Dichloroethane	0.5	<0.05	No
Benzene	0.5	0.08	No
Carbon Tetrachloride	0.5	<0.05	No
Trichloroethene	0.5	<0.05	No
Tetrachloroethene	0.7	<0.05	No
Chlorobenzene	100.0	<0.05	No
1,4-Dichlorobenzene	7.5	<0.05	No

TCLP Volatiles analyzed by EPA Method 8260

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ENVIRONMENTAL SCIENTISTS

Table 1 (continued). Summary of Tank Contents Waste Characterization Rexene Corporation - Brickland Refinery

Toxic Characteristic Leaching Procedure

TCLP Semi Volatiles	EPA Limit (mg/L)	Tank Contents Results (mg/L)	Exceeds EPA Limit Yes/No
Pyridine	5.0	<0.05	No
1,4-Dichlorobenzene	7.5	<0.05	No
o-Cresol	200.0	<0.05	No
m,p-Cresol	200.0	<0.05	No
Total Cresol	200.0	<0.05	No
Hexachlorethane	3.0	<0.05	No
Nitrobenzene	2.0	<0.05	No
Hexzchlorbutadiene	0.5	<0.05	No
2,4,6-Trichlorophenol	2.0	<0.05	No
2,4,5-Trichlorophenol	400.0	<0.05	No
2,4-Dinitrotoluene	0.13	<0.05	No
2,4-D	10.0	<0.05	No
Hexachlorobenzene	0.13	<0.05	No
2,4,5-TP	1.0	<0.05	No
Pentachlorophenol	100.0	<0.05	No
Chlordane	0.03	<0.001	No
Tozaphene	0.5	<0.05	No
Lindane	0.4	<0.001	No
Heptachlor	0.008	<0.001	No
Heptachlor epoxide	0.008	<0.001	No
Total Heptachlor	0.008	<0.001	No
Endrin	0.02	<0.001	No
Methoxychlor	10.0	<0.1	No

TCLP Semi Volatiles analyzed by EPA Method 8270, 8080

Tank Contents - TCLP Metals

TCLP Metals	EPA Limit (MG/L)	Tank Content Results (mg/L)	Exceeds EPA Limit Yes/No
Arsenic	5.0	<0.10	No
Selenium	1.0	<0.10	No
Cadmium	1.0	<0.02	No
Chromium	5.0	<0.05	No
Lead	5.0	<0.10	No
Mercury	0.20	<0.01	No
Barium	100.0	0.41	No
Silver	5.0	<0.05	No

mg/L = Milligrams per liter
Total metals analyzed by EPA Method 6010, 7470

Table 2. Summary of Tankhold Analytical Organic Chemistry Data - Soil
Rexene Corporation - Brickland Refinery

Sample Designation	Date Sampled	Sample Depth (bgl)	Concentration (mg/Kg)					
			Benzene	Toluene	Ethylbenzene	Xylenes	Total BTEX	TRPH
N. Side Pit	1/28/97	3'	42	<1.0	2.3	6.2	50.5	12,000
E. Side Pit	1/28/97	3'	23	<1.0	1.5	4.3	28.8	8,800
S. Side Pit	1/28/97	3'	25	<1.0	1.6	5.0	31.6	9,500
W. Side Pit	1/28/97	3'	36	<1.0	11.0	18.0	65.0	11,000
Bottom Pit	1/28/97	7'	32	<1.0	2.6	4.8	39.4	15,000

mg/Kg - Milligrams per kilogram
BTEX - benzene, toluene, ethylbenzene, & xylenes; analyzed by EPA method 8010/8020
TRPH - total recoverable petroleum hydrocarbons; analyzed by EPA method 418.1

Note: All other aromatic and halogenated organic compounds were below detection limit

Table 3. Summary of Tankhold Analytical Inorganic Chemistry Data
Rexene Corporation - Brickland Refinery

Tankhold Total Metals - Soil

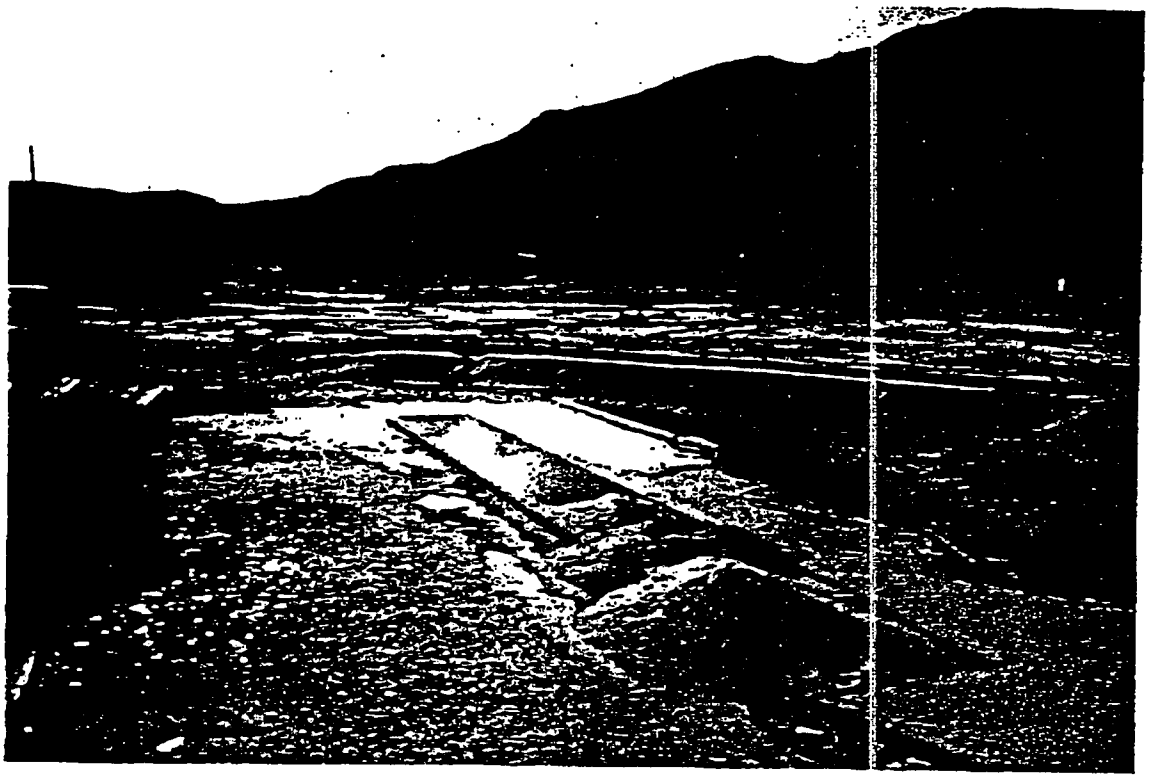
Sample Designation	Date Sampled	Sample Depth (bgl)	Concentration (ug/g)							
			Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
N. Side Pit	1/28/97	3'	<5	130	<1	8	8	<1	<5	<5
E. Side Pit	1/28/97	3'	<5	130	1	7	7	<1	<5	<5
S. Side Pit	1/28/97	3'	<5	110	<1	7	9	<1	<5	<5
W. Side Pit	1/28/97	3'	<5	140	<1	9	14	<1	<5	<5
Bottom Pit	1/28/97	7'	<5	81	<1	6	8	<1	<5	<5

ug/g - Micro grams per gram or parts per million

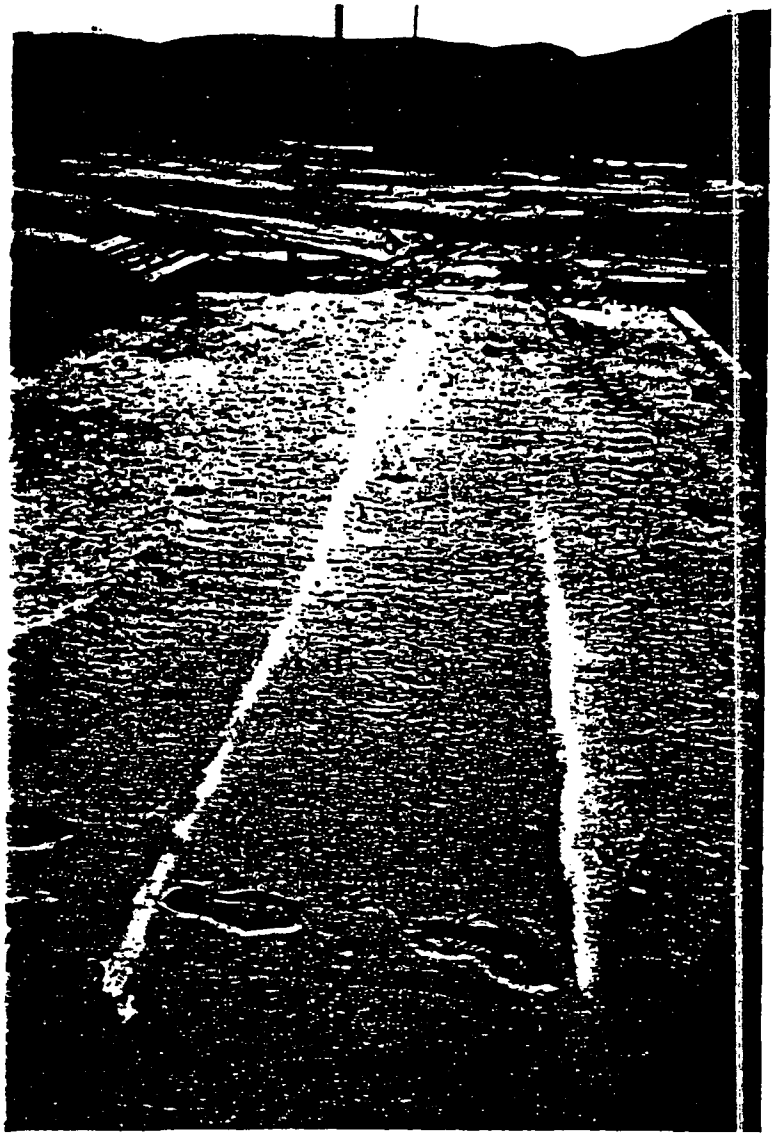
Total metals analyzed by EPA Method 3050 and 7471

Appendix A

Photographic Documentation

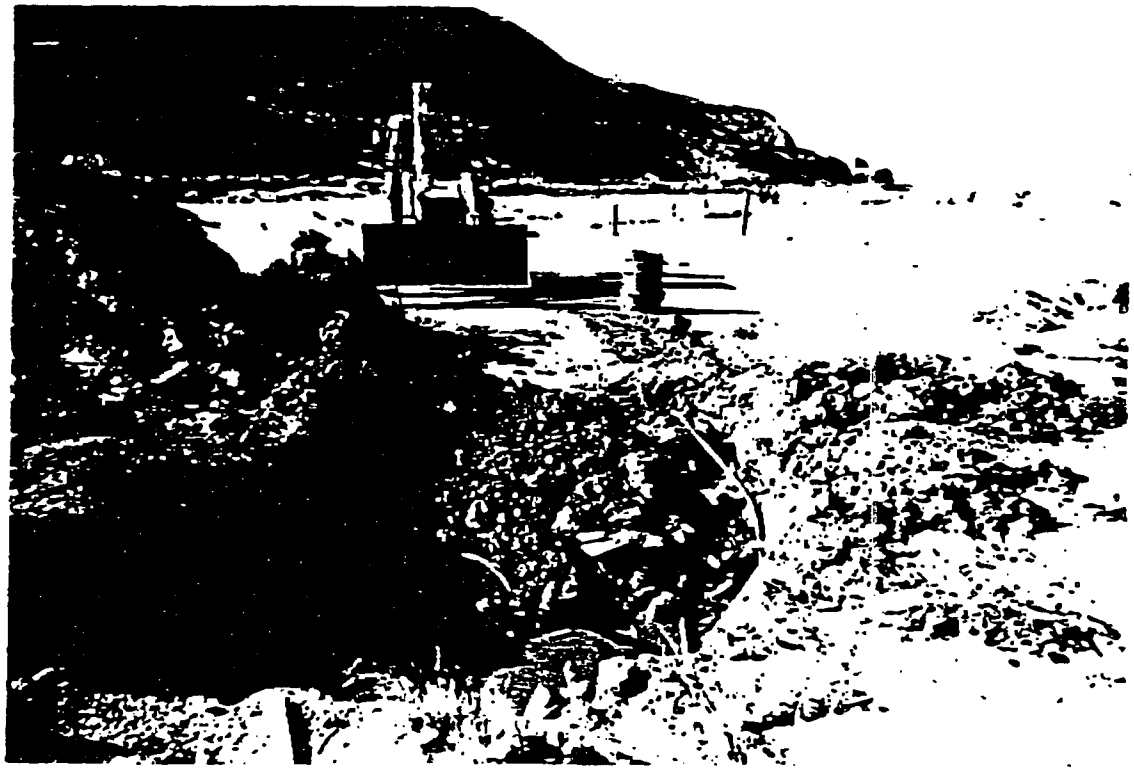


1: View looking south; backfilling service pit.



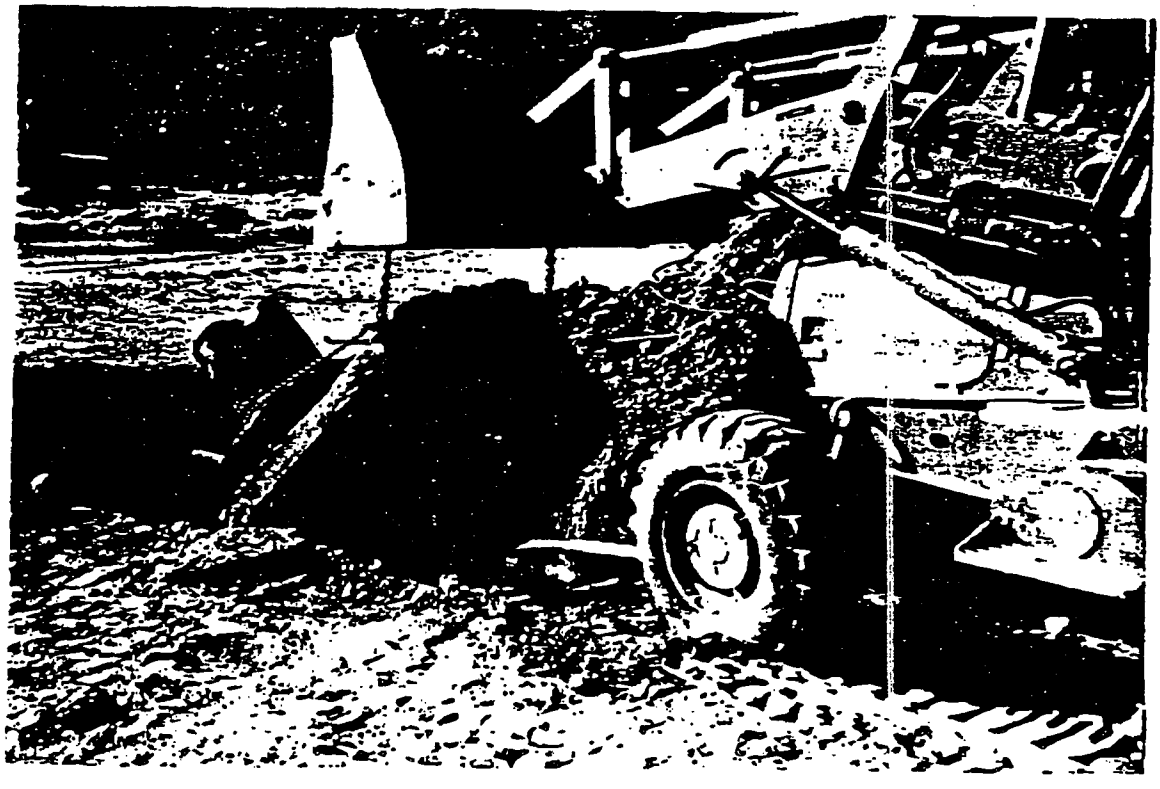
2: Service pit backfilled to finished grade

3: Excavated top and sidewalls revealing concrete sump.



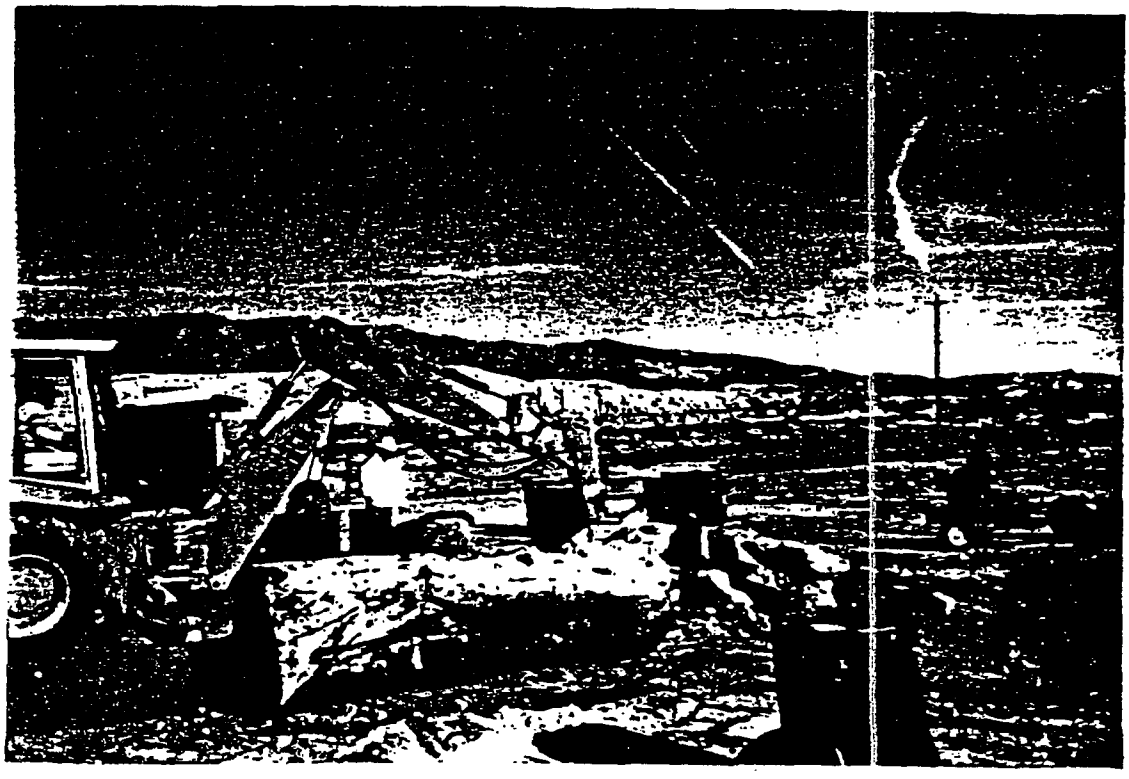
4: View looking northwest at groundwater in tankhold.

5: Constructing containment structure. Service pit located below backhoe.

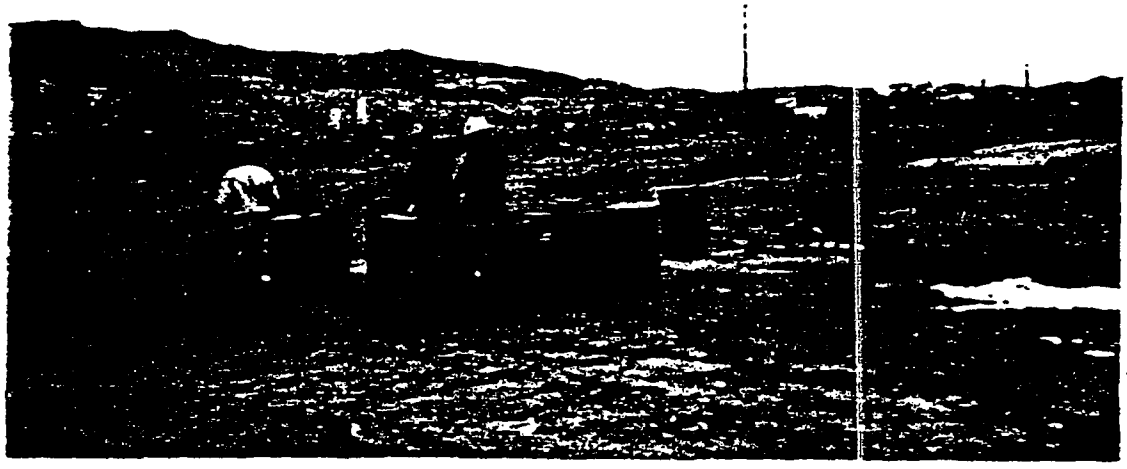


6: View looking southwest; lifting sump from tankhold.

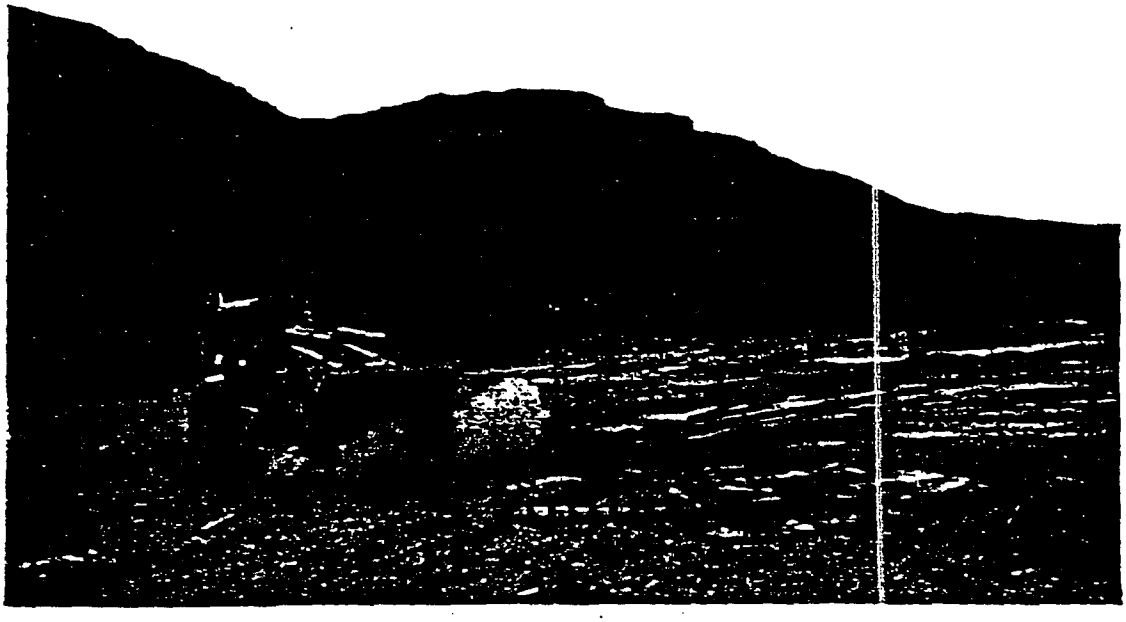
9: Jackhammer on backhoe used to remove concrete from metal tank.



10: Concrete from sump is segregated to prevent coming in contact with the tank contents.



11: Waste is placed in DOT approved drums and sealed for transportation.



12: Sump tankhold is backfilled and wheel rolled.

13: Concrete from sump is placed with existing construction stockpile.

Appendix B

Analytical Chemistry Data

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
DANIEL B. STEPHENS
Attention: Damian Reed
6701 Aberdeen, Suite 10
Lubbock, TX 79424

December 18, 1996
Receiving Date: 12/16/96
Sample Type: Water
Project No: LTXREX001
Project Location: Brickland Facility
COC# 101

Prep Date: 12/16/96
Analysis Date: 12/16/96
Sampling Date: 12/14/96
Sample Condition: Intact & Cool
Sample Received by:ML
Project Name: Brickland Site

TA#	Field Code	REACTIVITY	SULFIDES (ppm)	CYANIDES (ppm)	CORROSIVITY (mm/yr)	pH (s.u.)	FLASHPOINT (^{O} F)
	EPA LIMIT =	---	500	250	>6.5 mm/yr	<2 >12.5	>140 ^{O} F
T64567	0 - Tank	Non-reactive	<10	<2.5	Non-corrosive 0.61	8.1	>150
QC	Quality Control	---	---	---	---	7.0	---
RPD		0	0	0	0	0	0
% Extraction Accuracy		---	---	--	---	---	---
% Instrument Accuracy		---	---	--	---	100	---

METHODS: EPA SW 846-2.1.3, 2.1.2, 1010.
CHEMIST: JT

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

12-18-96
DATE

6701 Aberdeen Avenue
Lubbock, Texas 79424
806•794•1296
FAX 806•794•1298

ANALYTICAL RESULTS FOR
DANIEL B. STEPHENS
Attention: Damian Reed
6701 Aberdeen Avenue, Suite 10
Lubbock, TX 79424

December 18, 1996
Receiving Date: 12/16/96
Sample Type: Water
Project No: LTXREX001
Project Location: Brickland Facility
COC# 101

Extraction Date: 12/17/96
Analysis Date: 12/17/96
Sampling Date: 12/14/96
Sample Condition: I & C
Sample Received by: ML
Project Name: Brickland Site

TCLP VOLATILES (mg/L)	EPA LIMIT	Reporting Limit*	T64567 0 - Tank	QC	RPD	%EA	%IA
Vinyl chloride	0.2	0.05	ND	(.101	1	92	101
1,1-Dichloroethene	0.7	0.05	0.06	(.097	2	105	97
Methyl Ethyl Ketone	200.0	0.5	ND	(.084	2	110	84
Chloroform	6.0	0.05	ND	(.093	2	99	93
1,2-Dichloroethane	0.5	0.05	ND	(.089	2	93	89
Benzene	0.5	0.05	0.08	(.092	1	98	92
Carbon Tetrachloride	0.5	0.05	ND	(.093	2	107	93
Trichloroethene	0.5	0.05	ND	(.096	0	100	96
Tetrachloroethene	0.7	0.05	ND	(.094	1	105	94
Chlorobenzene	100.0	0.05	ND	(.093	2	97	93
1,4-Dichlorobenzene	7.5	0.05	ND	(.092	0	93	92

SURROGATES	% Recovery
Dibromofluoromethane	95
Toluene-d8	98
4-Bromofluorobenzene	94

ND = Not Detected

*NOTE: Elevated Reporting Limits due to matrix interference.

METHODS: EPA SW 846-1311, 8260.
CHEMIST: RP

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

12-18-96
DATE

TRACE ANALYSIS, INC.
6701 Aberdeen Avenue Lubbock, Texas 79424 806•794•1296 FAX 806•794•1298

ANALYTICAL RESULTS FOR
DANIEL B. STEPHENS
Attention: Damian Reed
6701 Aberdeen, Suite 10
Lubbock, TX 79424

December 18, 1996
Receiving Date: 12/16/96
Sample Type: Water
Project No: LTXREX001
Project Location: Brickland Facility
COC# 101

Extraction Date: 12/16/96
Analysis Date: 12/18/96
Sampling Date: 12/14/96
Sample Condition: I & C
Sample Received by: ML
Project Name: Brickland Site

TCLP METALS (mg/L)

TA#	Field Code	As	Se	Cd	Cr	Pb	Ag	Ba	Hg
	EPA LIMIT =	5.0	1.0	1.0	5.0	5.0	5.0	100.0	0.20
T64567	0 - Tank	<0.10	<0.10	<0.02	<0.05	<0.10	<0.05	0.41	<0.01
QC	Quality Control	4.95	4.82	4.95	4.84	5.24	2.6	4.91	0.0048
	Reporting Limit	0.10	0.10	0.02	0.05	0.10	0.05	0.20	0.01
	RPD	3	10	3	1	8	3	4	10
	% Extraction Accuracy	105	93	106	102	98	95	115	96
	% Instrument Accuracy	99	97	99	97	105	104	98	99

CHEMIST: As, Se, Cd, Cr, Pb, Ag, Ba: RR Hg: CB
METHODS: EPA SW 846-1311, 6010, 7470.
TCLP METALS SPIKE: 1.0 mg/L As, Se, Cd, Cr, Pb, Ag, Ba; 0.05 mg/L Hg.
TCLP METALS QC: 5.0 mg/L As, Se, Cd, Cr, Pb, Ba; 2.5 mg/L Ag; 0.005 mg/L Hg.

BE

Director, Dr. Blair Leftwich
Director, Dr. Bruce McDonell

12-18-96
Date

64567

TraceAnalysis, Inc.

6701 Aberdeen Avenue Lubbock, Texas 79424
Tel (806) 794 1296 Fax (806) 794 1298
1 (800) 378 1296

239

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: DAMIAN REED
Phone #: 806-798-4969
FAX #: 806-798-5542

Company Name & Address: OBS&A

Project #: LTXREX001
Project Name: Brickland Site

Project Location: Brickland Facility
Sampler Signature: Roger Mansfield

LAB # (LAB USE ONLY)	FIELD CODE	# CONTAINERS	Volume/Amount	MATRIX: WATER	SOIL	AIR	SLUDGE	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	SAMPLING: DATE	TIME
64567	O-TANK	4		X						X		12/14/96	9930

ANALYSIS REQUEST

BTEX, MTBE	TPH	Total Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	8240 / 8260	8270
			X	X	X	X		

SPECIAL HANDLING

Turn around # of days	Fax ASAP	Hold
	X	

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Roger Mansfield	12-14-96	10:15			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received at Laboratory by:	Date:	Time:
				12-16-96	11:00

REMARKS: RUSH TURN-AROUND

CC#: #101
FED EX #: 4[illegible]

Hall Environmental Analysis Laboratory

Hall Environmental Analysis Laboratory
4901 Hawkins, NE Suite A
Albuquerque, NM 87109
(505)345-3975

2/10/97

Daniel B. Stephens and Associates, Inc.
6701 Aberdeen Ave., Suite 10
Lubbock, TX 79424

Dear Mr. Damian Reed,

Enclosed are the results for the analyses that were requested. These were done according to EPA procedures or the equivalent.

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

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

Sincerely,

Scott Hallenbeck 2/12/97

Scott Hallenbeck, Lab Manager

Project: 9701039/Rexene Brickland

Hall Environmental Analysis Laboratory

Client:	Daniel B. Stephens & Assoc.	**Project:**	Rexene Erickland
Address:	6701 Aberdeen Ave.	**Project Number:**	6090
	Suite 10	**Project Manager:**	Damian Peed
	Lubbock, TX 79424	**Date Collected:**	1/28/97
		Date Received:	1/29/97
Report Date:	2/10/97	**Sample Matrix:**	Soil
Analysis Date:	1/31/97	**Extraction Date**	1/30/97

EPA Method - 418.1

Final volume of Freon-113 used (ml)	20
Sample weight (g)	10

HEAL ID	Client ID	Absorbance	Dilution	T P H (mg/kg)
9701039-1	N. Side Pit	0.496	20	12,000
9701039-2	E. Side Pit	0.360	20	8,800
9701039-3	S. Side Pit	0.389	20	9,500
9701039-4	W. Side Pit	0.441	20	11,000
9701039-5	Bottom Pit	0.615	20	15,000

QA/QC

Ext Blk 1/30	N/A	0.003	1	<20
Sample ID:	**Sample Amount**	**Spike**	**Recovery**	**% Recovery**
BS 1/30	<20	100	95	95
Sample ID:	**Sample Amount**	**Duplicate**	**RPD**	
9701039-2	8,800	8,300	6	

Sincerely:

Jerry Richardson
Semi-Volatiles Supervisor

Scott Hallenbeck
Laboratory Manager

4901 Hawkins NE, Suite A, Albuquerque, NM 87109
Voice (505) 345-3975, Fax (505) 345-4107

Results for sample: N. Side Pit

Date collected: 1/28/97	Date received: 1/29/97
Date extracted: 1/28/97	Date analyzed: 1/29/97
Client: Daniel B. Stephens and Associates, Inc..	
Project Name: Rexene Brickland	HEAL #: 9701039-1
Project Manager: Damian Reed	Sampled by: C. Pigman
Matrix: Non- Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	42	1.0	PPM (mg/kg)
Bromodichloromethane	nd	0.2	PPM (mg/kg)
Bromoform	nd	1.0	PPM (mg/kg)
Bromomethane	nd	1.0	PPM (mg/kg)
Carbon Tetrachloride	nd	0.2	PPM (mg/kg)
Chlorobenzene	nd	0.2	PPM (mg/kg)
Chloroethane	nd	0.2	PPM (mg/kg)
Chloroform	nd	0.2	PPM (mg/kg)
Chloromethane	nd	0.2	PPM (mg/kg)
2-Chloroethylvinyl Ether	nd	1.0	PPM (mg/kg)
Dibromochloromethane	nd	0.2	PPM (mg/kg)
1,3-Dichlorobenzene	nd	0.2	PPM (mg/kg)
1,2-Dichlorobenzene	nd	0.2	PPM (mg/kg)
1,4-Dichlorobenzene	nd	0.2	PPM (mg/kg)
Dichlorodifluoromethane	nd	0.2	PPM (mg/kg)
1,1-Dichloroethane	nd	0.2	PPM (mg/kg)
1,2-Dichloroethane	nd	0.2	PPM (mg/kg)
1,1-Dichloroethene	nd	0.2	PPM (mg/kg)
1,2-Dichloroethene (Cis)	nd	0.2	PPM (mg/kg)
1,2-Dichloroethene (Trans)	nd	0.2	PPM (mg/kg)
1,2-Dichloropropane	nd	0.2	PPM (mg/kg)
cis-1,3-Dichloropropene	nd	0.2	PPM (mg/kg)
trans-1,3-Dichloropropene	nd	0.2	PPM (mg/kg)
Ethylbenzene	2.3	1.0	PPM (mg/kg)
Dichloromethane	nd	2.0	PPM (mg/kg)
1,1,2,2-Tetrachloroethane	nd	0.2	PPM (mg/kg)
Tetrachloroethene (PCE)	nd	0.2	PPM (mg/kg)
Toluene	nd	1.0	PPM (mg/kg)
1,1,1-Trichloroethane	nd	0.2	PPM (mg/kg)
1,1,2-Trichloroethane	nd	0.2	PPM (mg/kg)
Trichloroethene (TCE)	nd	0.2	PPM (mg/kg)
Vinyl Chloride	nd	0.2	PPM (mg/kg)
Xylenes (Total)	6.2	1.0	PPM (mg/kg)
Trichlorofluoromethane	nd	0.2	PPM (mg/kg)
MTBE	nd	2.0	PPM (mg/kg)

BFB (Surrogate) Recovery = 93 %

BCM (Surrogate) Recovery = 99 %

Dilution Factor = 20

Results for sample: E. Side Pit

Date collected: 1/28/97	Date received: 1/29/97
Date extracted: 1/28/97	Date analyzed: 1/29/97
Client: Daniel B. Stephens and Associates, Inc..	
Project Name: Rexene Brickland	HEAL #: 9701039-2
Project Manager: Damian Reed	Sampled by: C. Pigman
Matrix: Non- Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	23	1.0	PPM (mg/kg)
Bromodichloromethane	nd	0.2	PPM (mg/kg)
Bromoform	nd	1.0	PPM (mg/kg)
Bromomethane	nd	1.0	PPM (mg/kg)
Carbon Tetrachloride	nd	0.2	PPM (mg/kg)
Chlorobenzene	nd	0.2	PPM (mg/kg)
Chloroethane	nd	0.2	PPM (mg/kg)
Chloroform	nd	0.2	PPM (mg/kg)
Chloromethane	nd	0.2	PPM (mg/kg)
2-Chloroethylvinyl Ether	nd	1.0	PPM (mg/kg)
Dibromochloromethane	nd	0.2	PPM (mg/kg)
1.3-Dichlorobenzene	nd	0.2	PPM (mg/kg)
1.2-Dichlorobenzene	nd	0.2	PPM (mg/kg)
1.4-Dichlorobenzene	nd	0.2	PPM (mg/kg)
Dichlorodifluoromethane	nd	0.2	PPM (mg/kg)
1.1-Dichloroethane	nd	0.2	PPM (mg/kg)
1.2-Dichloroethane	nd	0.2	PPM (mg/kg)
1.1-Dichloroethene	nd	0.2	PPM (mg/kg)
1.2-Dichloroethene (Cis)	nd	0.2	PPM (mg/kg)
1.2-Dichloroethene (Trans)	nd	0.2	PPM (mg/kg)
1.2-Dichloropropane	nd	0.2	PPM (mg/kg)
cis-1.3-Dichloropropene	nd	0.2	PPM (mg/kg)
trans-1.3-Dichloropropene	nd	0.2	PPM (mg/kg)
Ethylbenzene	1.5	1.0	PPM (mg/kg)
Dichloromethane	nd	2.0	PPM (mg/kg)
1.1.2.2-Tetrachloroethane	nd	0.2	PPM (mg/kg)
Tetrachloroethene (PCE)	nd	0.2	PPM (mg/kg)
Toluene	nd	1.0	PPM (mg/kg)
1.1.1-Trichloroethane	nd	0.2	PPM (mg/kg)
1.1.2-Trichloroethane	nd	0.2	PPM (mg/kg)
Trichloroethene (TCE)	nd	0.2	PPM (mg/kg)
Vinyl Chloride	nd	0.2	PPM (mg/kg)
Xylenes (Total)	4.3	1.0	PPM (mg/kg)
Trichlorofluoromethane	nd	0.2	PPM (mg/kg)
MTBE	nd	2.0	PPM (mg/kg)

BFB (Surrogate) Recovery = 92 %

BCM (Surrogate) Recovery = 97 %

Dilution Factor = 20

Results for sample: S. Side Pit

Date collected: 1/28/97	Date received: 1/29/97
Date extracted: 1/28/97	Date analyzed: 1/29/97
Client: Daniel B. Stephens and Associates, Inc..	
Project Name: Rexene Brickland	HEAL #: 9701039-3
Project Manager: Damian Reed	Sampled by: C. Pigman
Matrix: Non- Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	25	1.0	PPM (mg/kg)
Bromodichloromethane	nd	0.2	PPM (mg/kg)
Bromoform	nd	1.0	PPM (mg/kg)
Bromomethane	nd	1.0	PPM (mg/kg)
Carbon Tetrachloride	nd	0.2	PPM (mg/kg)
Chlorobenzene	nd	0.2	PPM (mg/kg)
Chloroethane	nd	0.2	PPM (mg/kg)
Chloroform	nd	0.2	PPM (mg/kg)
Chloromethane	nd	0.2	PPM (mg/kg)
2-Chloroethylvinyl Ether	nd	1.0	PPM (mg/kg)
Dibromochloromethane	nd	0.2	PPM (mg/kg)
1,3-Dichlorobenzene	nd	0.2	PPM (mg/kg)
1,2-Dichlorobenzene	nd	0.2	PPM (mg/kg)
1,4-Dichlorobenzene	nd	0.2	PPM (mg/kg)
Dichlorodifluoromethane	nd	0.2	PPM (mg/kg)
1,1-Dichloroethane	nd	0.2	PPM (mg/kg)
1,2-Dichloroethane	nd	0.2	PPM (mg/kg)
1,1-Dichloroethene	nd	0.2	PPM (mg/kg)
1,2-Dichloroethene (Cis)	nd	0.2	PPM (mg/kg)
1,2-Dichloroethene (Trans)	nd	0.2	PPM (mg/kg)
1,2-Dichloropropane	nd	0.2	PPM (mg/kg)
cis-1,3-Dichloropropene	nd	0.2	PPM (mg/kg)
trans-1,3-Dichloropropene	nd	0.2	PPM (mg/kg)
Ethylbenzene	1.6	1.0	PPM (mg/kg)
Dichloromethane	nd	2.0	PPM (mg/kg)
1,1,2,2-Tetrachloroethane	nd	0.2	PPM (mg/kg)
Tetrachloroethene (PCE)	nd	0.2	PPM (mg/kg)
Toluene	nd	1.0	PPM (mg/kg)
1,1,1-Trichloroethane	nd	0.2	PPM (mg/kg)
1,1,2-Trichloroethane	nd	0.2	PPM (mg/kg)
Trichloroethene (TCE)	nd	0.2	PPM (mg/kg)
Vinyl Chloride	nd	0.2	PPM (mg/kg)
Xylenes (Total)	5.0	1.0	PPM (mg/kg)
Trichlorofluoromethane	nd	0.2	PPM (mg/kg)
MTBE	nd	2.0	PPM (mg/kg)

BFB (Surrogate) Recovery = 90 %

BCM (Surrogate) Recovery = 96 %

Dilution Factor = 20

Results for sample: W. Side Pit

Date collected: 1/28/97	Date received: 1/29/97
Date extracted: 1/28/97	Date analyzed: 1/29/97
Client: Daniel B. Stephens and Associates, Inc..	
Project Name: Rexene Brickland	HEAL #: 9701039-4
Project Manager: Damian Reed	Sampled by: C. Pigman
Matrix: Non- Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	36	1.0	PPM (mg/kg)
Bromodichloromethane	nd	0.2	PPM (mg/kg)
Bromoform	nd	1.0	PPM (mg/kg)
Bromomethane	nd	1.0	PPM (mg/kg)
Carbon Tetrachloride	nd	0.2	PPM (mg/kg)
Chlorobenzene	nd	0.2	PPM (mg/kg)
Chloroethane	nd	0.2	PPM (mg/kg)
Chloroform	nd	0.2	PPM (mg/kg)
Chloromethane	nd	0.2	PPM (mg/kg)
2-Chloroethylvinyl Ether	nd	1.0	PPM (mg/kg)
Dibromochloromethane	nd	0.2	PPM (mg/kg)
1,3-Dichlorobenzene	nd	0.2	PPM (mg/kg)
1,2-Dichlorobenzene	nd	0.2	PPM (mg/kg)
1,4-Dichlorobenzene	nd	0.2	PPM (mg/kg)
Dichlorodifluoromethane	nd	0.2	PPM (mg/kg)
1,1-Dichloroethane	nd	0.2	PPM (mg/kg)
1,2-Dichloroethane	nd	0.2	PPM (mg/kg)
1,1-Dichloroethene	nd	0.2	PPM (mg/kg)
1,2-Dichloroethene (Cis)	nd	0.2	PPM (mg/kg)
1,2-Dichloroethene (Trans)	nd	0.2	PPM (mg/kg)
1,2-Dichloropropane	nd	0.2	PPM (mg/kg)
cis-1,3-Dichloropropene	nd	0.2	PPM (mg/kg)
trans-1,3-Dichloropropene	nd	0.2	PPM (mg/kg)
Ethylbenzene	11	1.0	PPM (mg/kg)
Dichloromethane	nd	2.0	PPM (mg/kg)
1,1,2,2-Tetrachloroethane	nd	0.2	PPM (mg/kg)
Tetrachloroethene (PCE)	nd	0.2	PPM (mg/kg)
Toluene	nd	1.0	PPM (mg/kg)
1,1,1-Trichloroethane	nd	0.2	PPM (mg/kg)
1,1,2-Trichloroethane	nd	0.2	PPM (mg/kg)
Trichloroethene (TCE)	nd	0.2	PPM (mg/kg)
Vinyl Chloride	nd	0.2	PPM (mg/kg)
Xylenes (Total)	18	1.0	PPM (mg/kg)
Trichlorofluoromethane	nd	0.2	PPM (mg/kg)
MTBE	nd	2.0	PPM (mg/kg)

BFB (Surrogate) Recovery = 94 % BCM (Surrogate) Recovery = 96 %

Dilution Factor = 20

Results for sample: Bottom Pit

Date collected: 1/28/97	Date received: 1/29/97
Date extracted: 1/28/97	Date analyzed: 1/29/97
Client: Daniel B. Stephens and Associates, Inc..	
Project Name: Rexene Brickland	HEAL #: 9701039-5
Project Manager: Damian Reed	Sampled by: C. Pigman
Matrix: Non- Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	32	1.0	PPM (mg/kg)
Bromodichloromethane	nd	0.2	PPM (mg/kg)
Bromoform	nd	1.0	PPM (mg/kg)
Bromomethane	nd	1.0	PPM (mg/kg)
Carbon Tetrachloride	nd	0.2	PPM (mg/kg)
Chlorobenzene	nd	0.2	PPM (mg/kg)
Chloroethane	nd	0.2	PPM (mg/kg)
Chloroform	nd	0.2	PPM (mg/kg)
Chloromethane	nd	0.2	PPM (mg/kg)
2-Chloroethylvinyl Ether	nd	1.0	PPM (mg/kg)
Dibromochloromethane	nd	0.2	PPM (mg/kg)
1,3-Dichlorobenzene	nd	0.2	PPM (mg/kg)
1,2-Dichlorobenzene	nd	0.2	PPM (mg/kg)
1,4-Dichlorobenzene	nd	0.2	PPM (mg/kg)
Dichlorodifluoromethane	nd	0.2	PPM (mg/kg)
1,1-Dichloroethane	nd	0.2	PPM (mg/kg)
1,2-Dichloroethane	nd	0.2	PPM (mg/kg)
1,1-Dichloroethene	nd	0.2	PPM (mg/kg)
1,2-Dichloroethene (Cis)	nd	0.2	PPM (mg/kg)
1,2-Dichloroethene (Trans)	nd	0.2	PPM (mg/kg)
1,2-Dichloropropane	nd	0.2	PPM (mg/kg)
cis-1,3-Dichloropropene	nd	0.2	PPM (mg/kg)
trans-1,3-Dichloropropene	nd	0.2	PPM (mg/kg)
Ethylbenzene	2.6	1.0	PPM (mg/kg)
Dichloromethane	nd	2.0	PPM (mg/kg)
1,1,2,2-Tetrachloroethane	nd	0.2	PPM (mg/kg)
Tetrachloroethene (PCE)	nd	0.2	PPM (mg/kg)
Toluene	nd	1.0	PPM (mg/kg)
1,1,1-Trichloroethane	nd	0.2	PPM (mg/kg)
1,1,2-Trichloroethane	nd	0.2	PPM (mg/kg)
Trichloroethene (TCE)	nd	0.2	PPM (mg/kg)
Vinyl Chloride	nd	0.2	PPM (mg/kg)
Xylenes (Total)	4.8	1.0	PPM (mg/kg)
Trichlorofluoromethane	nd	0.2	PPM (mg/kg)
MTBE	nd	2.0	PPM (mg/kg)

BFB (Surrogate) Recovery = 89 % BCM (Surrogate) Recovery = 94 %

Dilution Factor = 20

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1120 SOUTH 27TH STREET • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Scott Hallenbeck
ADDRESS: Hall Environmental Analysis Laboratory
4901 Hawkins NE, Suite C
Albuquerque, NM 87109

LAB NO.: 97-14937
DATE: 02/07/97 kr

SOIL ANALYSIS

Proj. #6090.001
9701039-1, N. Side Pit
Sampled 01/28/97 @ 1410
Submitted 01/31/97
Digested 02/03/97

Total Metals[1]	Detection Limit, µg/g (ppm)	µg/g (ppm)	Date Analyzed
Arsenic	5	<5	02/04/97
Barium	5	130	02/04/97
Cadmium	1	<1	02/05/97
Chromium	5	8	02/04/97
Lead	5	8	02/04/97
Mercury[2]	1	<1	02/05/97
Selenium	5	<5	02/04/97
Silver	5	<5	02/04/97

(1) Sample was digested by EPA Method 3050.
(2) Sample was digested by EPA Method 7471.

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1120 SOUTH 27TH STREET • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Scott Hallenbeck
ADDRESS: Hall Environmental Analysis Laboratory
4901 Hawkins NE, Suite C
Albuquerque, NM 87109

LAB NO.: 97-14938
DATE: 02/07/97 kr

SOIL ANALYSIS

Proj. #6090.001
9701039-2, E. Side Pit
Sampled 01/28/97 @ 1425
Submitted 01/31/97
Digested 02/03/97

Total Metals[1]	Detection Limit, µg/g (ppm)	µg/g (ppm)	Date Analyzed
Arsenic	5	<5	02/04/97
Barium	5	130	02/04/97
Cadmium	1	1	02/04/97
Chromium	5	7	02/04/97
Lead	5	7	02/04/97
Mercury[2]	1	<1	02/05/97
Selenium	5	<5	02/04/97
Silver	5	<5	02/04/97

(1) Sample was digested by EPA Method 3050.
(2) Sample was digested by EPA Method 7471.

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1120 SOUTH 27TH STREET • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Scott Hallenbeck
ADDRESS: Hall Environmental Analysis Laboratory
4901 Hawkins NE, Suite C
Albuquerque, NM 87109

LAB NO.: 97-14939
DATE: 02/07/97 kr

SOIL ANALYSIS

Proj. #6090.001
9701039-3, S. Side Pit
Sampled 01/28/97 @ 1335
Submitted 01/31/97
Digested 02/03/97

Total Metals[1]	Detection Limit, µg/g (ppm)	µg/g (ppm)	Date Analyzed
Arsenic	5	<5	02/04/97
Barium	5	110	02/04/97
Cadmium	1	<1	02/04/97
Chromium	5	7	02/04/97
Lead	5	9	02/04/97
Mercury[2]	1	<1	02/05/97
Selenium	5	<5	02/04/97
Silver	5	<5	02/04/97

[1] Sample was digested by EPA Method 3050.
[2] Sample was digested by EPA Method 7471.

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1120 SOUTH 27TH STREET • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Scott Hallenbeck
ADDRESS: Hall Environmental Analysis Laboratory
4901 Hawkins NE, Suite C
Albuquerque, NM 87109

LAB NO.: 97-14940
DATE: 02/07/97 kr

SOIL ANALYSIS

Proj. #6090.001
9701039-4, W. Side Pit
Sampled 01/28/97 @ 1350
Submitted 01/31/97
Digested 02/03/97

Total Metals[1]	Detection Limit, µg/g (ppm)	µg/g (ppm)	Date Analyzed
Arsenic	5	<5	02/04/97
Barium	5	140	02/04/97
Cadmium	1	<1	02/04/97
Chromium	5	9	02/04/97
Lead	5	14	02/04/97
Mercury[2]	1	<1	02/05/97
Selenium	5	<5	02/04/97
Silver	5	<5	02/04/97

[1] Sample was digested by EPA Method 3050.
[2] Sample was digested by EPA Method 7471.

ENERGY LABORATORIES, INC.
P.O. BOX 30916 • 1120 SOUTH 27TH STREET • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: Scott Hallenbeck
ADDRESS: Hall Environmental Analysis Laboratory
4901 Hawkins NE, Suite C
Albuquerque, NM 87109

LAB NO.: 97-14940 dup
DATE: 02/07/97 kr

QUALITY ASSURANCE DUPLICATE ANALYSIS

Proj. #6090.001
9701039-4, W. Side Pit
Sampled 01/28/97 @ 1350
Submitted 01/31/97
Digested 02/03/97

Total Metals[1]	Detection Limit, µg/g (ppm)	µg/g (ppm)	Date Analyzed
Arsenic	5	<5	02/04/97
Barium	5	140	02/04/97
Cadmium	1	<1	02/04/97
Chromium	5	8	02/04/97
Lead	5	12	02/04/97
Mercury[2]	1	<1	02/05/97
Selenium	5	<5	02/04/97
Silver	5	<5	02/04/97

[1] Sample was digested by EPA Method 3050.
[2] Sample was digested by EPA Method 7471.

HAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite C
Albuquerque, New Mexico 87109
505.345.3975
Fax 505.345.4107

ant: DANIEL B. STEPHENS & ASSOC	Project Name: REXENE BRICKLAND
ress: 6701 ABERDEEN SUITE 10 LUBBOCK TEXAS 79424	Project #: 6090,001
	Project Manager: DAMIAN REED
one #: 806-798-8969	Sampler: CLARENCE PIGMAN
x #: 806-798-5542	Samples Cold? ☑ Yes ☐ No

ANALYSIS REQUEST

te	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative: $HgCl_2$	Preservative: HCl	Preservative: Other	HEAL No.	BTEX + MTBE (602/8020)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015 MOD (Gas/Diesel)	THP (Method 418.1)	8010/8020 Volatiles	EDB (Method 504)	EDC	8310 (PNA or PAH)	RCRA 8 Metals	Cations (Na, K, Ca, Mg)	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	Basic Soil Test (PH, EC, SAR, PSA)	8080 Pesticides / PCB's	Air Bubbles or Headspace (Y or N)
/97	1410	SOIL	N. SIDE PIT	2/250ml			METH/NONE	97U039-1				X	X				X					
/97	1425	SOIL	E. SIDE PIT	"			"	-2				X	X				X					
/97	1325	SOIL	S. SIDE PIT	"			"	-3				X	X				X					
/97	1350	SOIL	W. SIDE PIT	"			"	-4				X	X				X					
/97	1440	SOIL	BOTTOM PIT	2/250ml			METH/NONE	-5				X	X				X					
/96	1200	METH	MeOH BLANK	1/20ml			METH	-6					X									

te:	Time:	Relinquished By: (Signature)	Received By: (Signature)
/97	1430	Clarence Pigman	Andy Freeman 1/29
	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks: IF ANY METALS 20 TIMES EPA STANDARD CONTACT DB,S&A ABOUT!

07/07/98 TUE 17:58 FAX 801 776 7853 HUNTSMAN PKG 021

Appendix C

Waste Manifests

MESA ENVIRONMENTAL

A DIVISION OF MESA OIL, INC.

RECYCLING MANIFEST / RECEIPT

Service Order # 103727

75
Mailing Address
Rhino Environmental - Albuq
P.O. Box 25547
Accts Payable - Teresa Saloga
Albuquerque NM 87125
Andy Landoll
(505) 242-6464 Ext. 000

5220
Sub-otl

Service Address
Rhino Environmental Services
Sunland Park
Sunland Park NM 87102
(505) 242-8023 Ext. 0000
Contact: Otis O'Niel

Account Number	P.O. Number	Order Date	Terms
RHIN003		02/06/97	Net 30 days

Description	Ordered	Unit	Price	Quantity	Total
Used Oil Removal	1	Gal-Drum	0.7200	467	336.24
Used Oil Removal Min. Charge	1	Drum	100.0000	2-20	
Oily Water Removal	1	Gal-Drum	0.7200		
Oily Water Removal Min. Charge	1	Drum	100.0000		
Call Jerry Dunlop 505-526-6634					
Thursday 6:30 Am					

1-800-762-0241

SPECIAL INSTRUCTIONS Service Address 3CC McNutt, Sunland Park, NM 77102 (505-644-0932) mcnut

SALES TAX 19.13
TOTAL DUE MESA OIL $ 355.37

FORM OF PAYMENT

PAID CASH: _____ CREDIT APP.# _____ MC / VISA _____

PAID CHECK: _____ APPROVED BY _____ P.O.# _____

GENERATORS CERTIFICATION: This material is described to the best of my ability. This material has not been mixed with PCB's or hazardous waste identified in 40 CFR Part 261. Used oil filters meet the exclusion requirements of 40 CFR Part 261.4. I acknowledge the accuracy of the total due on this receipt. If to be charged on account I understand that an invoice will follow with terms of NET 30 DAYS.

Printed / Typed Name | Signature | Date 12/13/97

TRANSPORTER, STORER AND RECYCLER

MESA OIL, INC. - PLANT
Belen, NM
EPA# NMD 0000096024
TEXAS TWC ID# 40849

MESA OIL, INC. - PLANT
Golden, CO
EPA# COD 983772955

Mailing Address:
Mesa Oil, Inc.
7239 Bradburn Blvd.
Denver, CO 80030
(303) 426-4777

IN CASE OF SPILL CONTACT: MESA OIL, INC. 1-800-USED-OIL

D.O.T. REQUIREMENT - MAXIMUM LOAD 7000 GALLONS USED PETROLEUM OIL N.O.S.

TRANSPORTER ACKNOWLEDGMENT OF RECEIPT OF MATERIALS:
I certify materials have been tested and are below 1,000 PPM halogens.

Printed / Typed Name | Signature | Date FEB 13-97

TREATMENT FACILITY OPERATOR:
The described materials were handled by me, the treatment facility named above, and were accepted.

Printed / Typed Name | Signature | Date 2/17/97

Mesa Oil Inc.
7239 Bradburn Blvd.
Westminster, CO 80030

123787

RECEIVED FEB 2 8 1997

5000

China Environmental - Albuq
P.O. Box 25547
Accts Payable - Teresa Saloga
Albuquerque NM 87125
Andy Landoll

China Environmental Services
Sunland Park
[illegible]
Sunland Park NM 87122

RM:N025 13 Mesa Oil Truck Net 30 Days 02/26/97 1

*****RETURN*****

247 10 Used Oil Removal 0.7200 $177.84-
Adjustment Per Basti 02/26/97

2-26-97

$177.84-

1.00
$18.12-

Comments:

TEXAS NATURAL RESOURCE
CONSERVATION COMMISSION
P.O. Box 13087
Austin, Texas 78711-3087

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form approved. OMB No. 2050-0039. expires 09/30/95

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No.

2. Page 1 of | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address

4. Generator's Phone ( )

A. State Manifest Document Number: 01276113

B. State Generator's ID

5. Transporter 1 Company Name | 6. US EPA ID Number

C. State Transporter's ID

D. Transporter's Phone

7. Transporter 2 Company Name | 8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address | 10. US EPA ID Number

G. State Facility's ID

H. Facility's Phone

11A. HM	11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
	a.					
	b.					
	c.					
	d.					

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations, including applicable state regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name | Signature | Month Day Year

GENERATOR

17. Transporter 1 Acknowledgement of Receipt of Materials | Date

Printed/Typed Name | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials | Date

Printed/Typed Name | Signature | Month Day Year

TRANSPORTER

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19. | Date

Printed/Typed Name | Signature | Month Day

FACILITY

LAIDLAW ENVIRONMENTAL SERVICES

FORM A

Customer Notification And Certification

Page 1 of 2

Generator Name/Location: REXENE CORP., 3010 McNUTT RD, SUNLAND PARK, NM 88063

EPA I.D. Number: NMCESQG

Waste Profile or ARF Designation: SA97-0181

Manifest Number: 01276113

EPA Waste Number(s): —

Waste Analysis Available? Yes (attached) ____ No ____ On file at receiving facility X

Unrestricted Waste Notification (*Category 1*)

Mark the statement below if you generate a waste that is not a land disposal restricted waste (the waste has no applicable treatment standards).

☒ *I notify that I am familiar with the waste through analysis and testing or through knowledge of the waste to support this notification that the waste is not restricted as specified in 40 CFR §268, Subpart D or any applicable prohibitions set forth in 40 CFR §268.32 or RCRA Section 3004(d).*

Restricted Waste/Debris Notification (*Category 2*)

Mark statement (2a) below if you generate a waste that is restricted from land disposal (the waste has applicable treatment standards). NOTE-1: A waste may pass one or more standards and require treatment or be varianced for others. In this case, all applicable categories must be checked. NOTE-2: D001, D002 and D012 - D043 wastes must be evaluated for underlying constituents found in 40 CFR §268. 48 (Table UTS), that are reasonably expected to be present. A list of these constituents must be included on FORM B, or attached to and accompany this notification with each waste shipment. Mark statement (2b) if you generate a debris waste that will be treated to the alternate debris standards located in 40 CFR §268.45.

☐ **(2a) Restricted Waste Notification**

I notify that I am familiar with the waste through analysis and testing or through knowledge of the waste to support this notification that the waste is subject to the treatment standards specified in 40 CFR §268 Subpart D. The waste: (a) must be treated to the appropriate regulatory treatment standard, by the appropriate regulatory treatment method; (b) qualifies for a variance as described in category 3 below; or (c) meets some or all of the standards as described in Category 4 below.

☐ **(2b) Alternate Debris Treatment Notification: This hazardous debris is subject to the alternate treatment standards of 40 CFR §268.45.**
The waste contains the following contaminants subject to treatment [check all that apply]:

_____ §268.45(b)(1) - Toxicity characteristic debris;
_____ §268.45(b)(2) - Debris contaminated with listed waste;
_____ §268.45(b)(3) - Cyanide reactive debris.

Restricted Waste Variance Notification (*Category 3*)

Mark the statement below and list the applicable variance date on Form B, if you generate a waste which does not require treatment prior to land disposal because of a variance (including a case-by-case extension under 40 CFR §268.5, a nationwide variance under 40 CFR §268 Subpart C, a no migration petition under 40 CFR §268.6, or other applicable variance).

☐ *I notify pursuant to 40 CFR §268.7(a)(3) that I am familiar with the waste through analysis and testing or through knowledge of the waste to support this notification that this waste is subject to a national capacity variance under 40 CFR §268 Subpart C, or a case-by-case extension under 40 CFR §268.5, or an exemption under 40 CFR §268.6.*

Restricted Waste Certification (Treatment Standards Met) (*Category 4*)

Mark the certification statement below if you generate a waste that is restricted from land disposal (the waste has applicable treatment standards), and the waste meets the standards as generated. Note: All applicable constituent standards must be accounted for. A waste may pass one or more standards and require treatment or be variance for other constituents. In this case, all applicable categories must be checked.

☐ *I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA § 3004(d). I believe that the information I submitted is true, accurate and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.*

SIGNATURE: _____ DATE: _____

PRINT NAME: _____

FORM B1 (*Must be accompanied by Form A*

Generator Name/Location REXENE CORP, 3010 McNUTT RD SUNLAND PARK, NM Page 2 of 2

EPA I.D. Number: NMCESQG Manifest: 01276113

Waste Profile or ARF	Category No.	EPA or State Waste Code	Variance Date	Description/Sub Category	Treatability Group (WW or NWW)	Waste Constituents or Legend #
SA97-0181	1	—	—	NON REG. MATERIAL	W/NW	—

CONSTITUENTS IN SOLVENT, CALIFORNIA LIST AND CHARACTERISTIC WASTES.

F001 - F005 spent solvents

Legend #	Constituent Name
1	Acetone
2	Benzene
3	n-Butyl alcohol
*4	Carbon disulfide
5	Carbon tetrachloride
6	Chlorobenzene
7	Cresol (m-and p-isomers)
8	o-Cresol
*9	Cyclohexanone
10	1,2-Dichlorobenzene
11	Ethyl Acetate
12	Ethyl Benzene
13	Ethyl Ether
14	Isobutyl alcohol
*15	Methanol
16	Methylene Chloride
17	Methyl Ethyl Ketone
18	Methyl isobutyl ketone
19	Nitrobenzene
20	Pyridine
21	Tetrachloroethylene
22	Toluene
23	1,1,1-Trichloroethane
24	1,1,2-Trichloroethane
25	Trichlorothylene
26	1,1,2-Trichloro-1,2,2-trifluoroethane
27	Trichloromonofluoro-methane
28	Xylenes (total)

Legends 29-31 RESERVED

** If these constituents are present alone or in any combination of the three, then non waste water forms of these constituents must be treated to TCLP levels as indicated in §268.40.*

Technology-Based standards For F005 when the constituent is the only listed F00-F005 solvent

Legend #	Constituent Name
32	2-Ethoxyethanool
33	2-Nitropropane

Legends 34-43 RESERVED

CALIFORNIA LIST WASTES

Legend #	Constituent Name
44	Nickel
45	Thallium
46	Cyanide (Liquid)
47	Liquid Polychlorinated Biphenyls (PCB's)
48	Halogenated Organic compounds (HOC's)

SEE BACK FOR THE UNIVERSAL TREATMENT STANDARDS (UTS), Legends 49 - 264

SWOF 4002

ENVIRONMENTAL SERVICES

OMER NO. EPREX	BILLING ID 970530	SALESPERSON DC	DATE 2/25/97
KUP DATE 2/25/97	CLIENT P.O. #10002	DISP. SITE SWO —	COUNTY DONA AN

NG CUSTOMER
ONSTRUCTIVE SOLUTIONS, INC.
O BOX 25547
LBUQUERQUE, NM 87125
CCOUNTS PAYABLE
505-242-6464

PICK-UP CUSTOMER AND ADDRESS
REXENE CORPORATION
3010 McNUTT RD
SUNLAND PARK, NM 88063
DAMIAN REED 915-520-661

CHEMIST/DRIVER TAVARES / MONTES

TRANSPORTATION (04000)	UNIT/PRICE 30/55/3-5	UNIT/PRICE 85	EXTENSION
0-50 MILES			
51-100 MILES			
101-200 MILES			
200-500 MILES			
► 500 MILES			
TOTAL			

LABOR (04045)	HOURS	PRICE
mist Tavares	.5	
ER Montes	.5	
ct Manager		

PROFESSIONAL SERVICES (04035)	QUANTITY	PRICE
SAMPLE ANALYSIS		
WASTE STREAM EVALUATION		

EQUIPMENT (04065)	QUANTITY	PRICE

POSAL (04060)

MATERIALS (04040)	QUANTITY	PRICE
85-G Salvage Drum-New		
55-G 17C, 17H, 17E Recon.		
55-G 37M - New		
30-G 17H - New		
30-G, 20-G Fiber New		
5-G Pail - 37E, 37A-New, 34-5, 35 50		
Dot Spec. Wooden Box		
Drum Thief		
Disposal Coliwassa		
Absorbant, Clay, Vermiculite, Corn Cob - Bag		
Drum Pump-Use & Decon.		
4 Mil Liners		
Reactive Bags		
Dot Labels		
EPA Labels	6	
Sample Bottles		
Protective Gear - Level I		
Protective Gear - Level II		
Packing Materials 5G		
Packing Materials 20G		
Packing Materials 30G, 55G		
OTHER (04055)	QUANTITY	PRICE
Minimum Charge		

OFILE/LABPACK	DESCRIPTION	QTY.	UM	UNIT PRICE
197-0181	oily debris	6	55	
		6		

arks

CTG-1	2. Customer Service Rep.	3. Customer Service Supv.	4. Operations

THIS WASTE DOES NOT CONTAIN ANY EXPLOSIVES OR RADIOACTIVE MATERIALS:

BULK QC REPORT

RQ —

Line Item —

	YR	MO	DAY	CODE	NUMBER	CHEMIST			
Container Number	97	02	25	EPREX	1-6	DT	Profile Number SH 97-0181	TK	DS
DOT Shipping Name	Non RCRA / DOT REG. MAT.						Disposal Site		
UN/NA Number	—			Hazard Class	—		Approval Code		
EPA Codes	—			(OILY DEBRIS)			Reactive Weight EST WT 3600 LB		

Drum	Color	pH	%Liquid	%Sol	%Sludge	%Full	Layers	Pumpable	Type/Size	Appearance	
1	VARIOUS	—	—	100	—	100	MULT	ALL	DMTI	NORMAL	VARIOUS
2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
5	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
6	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓

LAIDL-W-ENVIRONMENTAL ID:210-533-2041 MAR 05 '97 8:26 No.006 P.02

TEXAS NATURAL RESOURCE
CONSERVATION COMMISSION
P.O. Box 13087
Austin, Texas 78711-3087

Please print or type. (Form designed for use on elite (12 pitch) typewriter.)

Form approved. OMB No. 2050-0039, expires 09/30/97

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator's US EPA ID No. N M C E S O G	Manifest Document No. 761113	2. Page 1 of 1	Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
REXENE CORPORATION
3010 MC NUTT ROAD
SUNLAND PARK, NEW MEXICO

4. Generator's Phone (915) ~~589-4615~~ 589-7200 DAMIAN REED

A. State Manifest Document Number: D 1276113
B. State Generator's ID: R2935
C. State Transporter's ID: 84570
D. Transporter's Phone: 210-304-3000
E. State Transporter's ID: 75425
F. Transporter's Phone: 210-304-3000
G. State Facility's ID: 81905
H. Facility's Phone: 210-304-3000

5. Transporter 1 Company Name: US POLLUTION CONTROL, INC
6. US EPA ID Number: U T D 9 8 0 6 3 5 8 9 0

7. Transporter 2 Company Name: LAIDLAW ENVIRONMENTAL SVCS. (FS)
8. US EPA ID Number: T X D 9 8 8 0 2 3 3 0 5

9. Designated Facility Name and Site Address
HYDROCARBON RECYCLERS, INC
4303 PROFIT DRIVE
SAN ANTONIO, TEXAS 78219
10. US EPA ID Number: T X D 0 5 2 6 4 9 0 2 7

11A HM	11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Container No.	12. Container Type	13. Total Quantity	14. Unit Wt./Vol.	I. Waste No.
	a. NON RCRA/DOT REGULATED MATERIAL (OILY DEBRIS)	006	DM	03600 EST.	P	OUTS3191 N/R
	b.					
	c.					
	d.					

J. Additional Descriptions for Materials Listed Above
a. SA 97-0181

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
EMERGENCY CONTACT: WALT STRINGER 210-304-3000
EMERGENCY CONTACT*** 1-800-535-5053 (730-700)

BILLING ADDRESS:
CONSTRUCTIVE SOLUTIONS, INC.
P.O. BOX 25547
ALBUQUERQUE, N.M. 87125
ACCOUNTS PAYABLE (505) 242-6464

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations, including applicable state regulations.
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month	Day	Year
MICHAEL E. SALAZAR		02	25	97

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
FERNANDO MONTES		02	25	97

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month	Day	Year
LEONARD FRAZIER		03	03	97

FACILITY

19. Discrepancy Indication Space CORRECTIONS AS SECTION 4 PER MANUAL PAGE 3 PHONE (210) 333-7100

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month	Day	Year
ALICIA GUERRERO		03	04	97

TNRCC-0311 (Rev 07/13/94) White - original Pink - TSD Facility Yellow - Transporter Green - Generator's first copy

RHINO
Environmental Services, Inc.
300 Broadway NE • Albuquerque, New Mexico 87102
(505) 242-6464 • Fax (505) 247-4941

CERTIFICATE OF DESTRUCTION
BILL OF SALE

February 14, 1997

Seller of Tanks
Rexene Corp.
P.O Box 3986
Odessa, TX 79760
(915) 333-7200

Tank Facility
Brickland Refinery
3210 McNutt Road
Sunland Park, NM

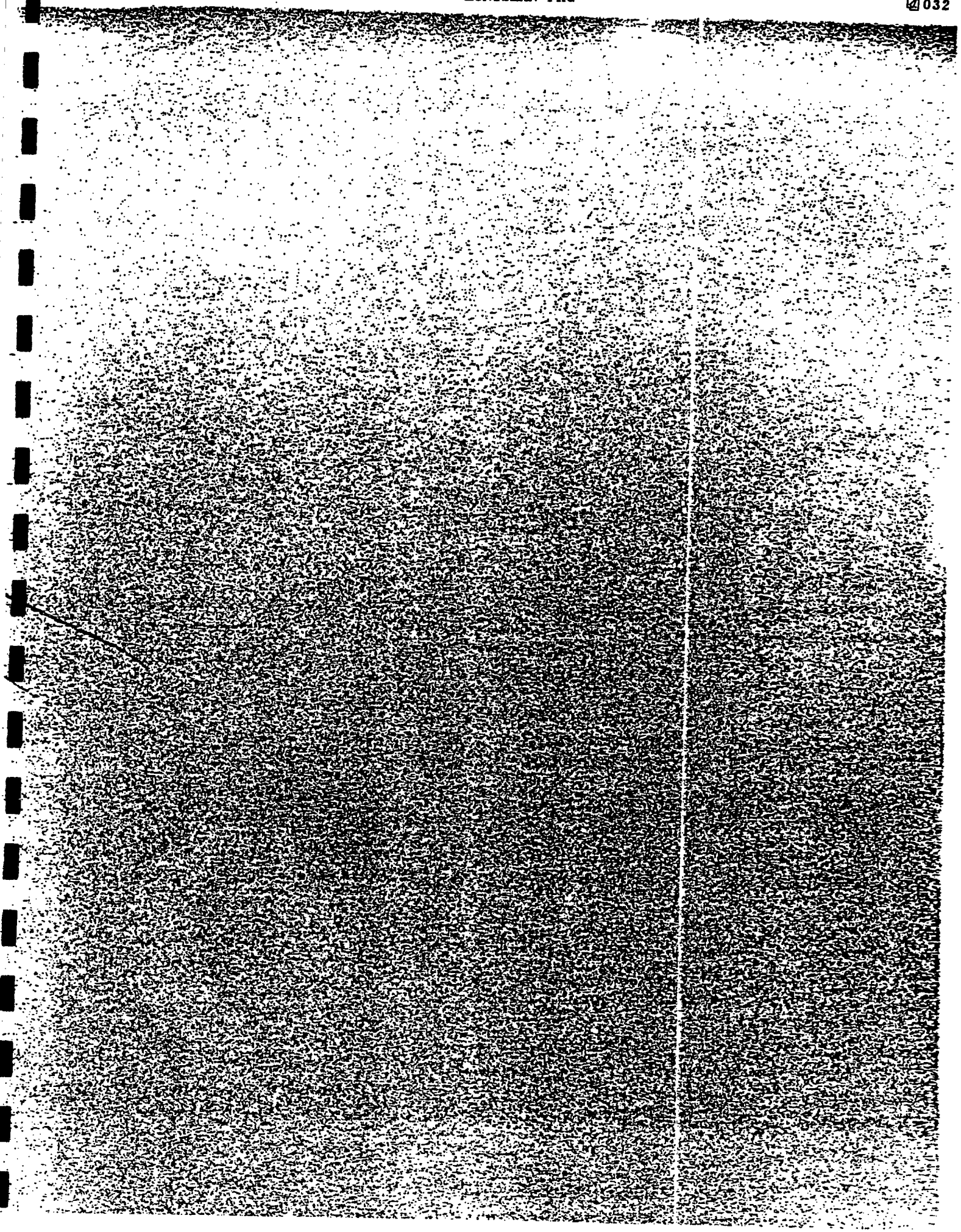
Buyer of Tanks
Rhino Environmental Services, Inc.
P.O. Box 25547
Albuquerque, NM 87125

Tank Identification: (1) - 1,000 gallon Underground Storage Tank

The ownership of the above referenced tank was transferred to Rhino Environmental Services, Inc. (Rhino). Upon transfer of ownership to Rhino, all future liabilities connected with the tanks from the date of the destruction was relieved from the former tank owner.

I certify that the above described tanks have been cut into scrap and disposed of in accordance with all applicable local, state and federal regulations.

Steve Dyer
President
Rhino Environmental Services, Inc.



****
*** ACTIVITY REPORT ***
****

RECEPTION OK

TX/RX NO.	6533
CONNECTION TEL	801 776 7953
CONNECTION ID	HUNTSMAN PKG
START TIME	07/07 17:54
USAGE TIME	25'21
PAGES	30
RESULT	OK

Appendix C

Daniel B. Stephens & Associates, Inc., Closure of Wash Water Collection Sump, Pipes at Levee, Asphalt Spills, and Pump Dispenser Island; Brickland Refinery, Sunland Park, New Mexico. March 7, 1997.

(13)

DANIEL B. STEPHENS & ASSOCIATES, INC
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

Environmental Regulatory Affairs
MAR 7 '97

		Action	Info.
	TMC		
	SAM		
	BRB		
	RIM		
	JEB		
	DJB		
	SJ		
Diary	JB		

File: 415.2

PIÑON AWARD QUALITY New Mexico 1995

Library

March 6, 1997

Reggie Baker
Environmental Manager
Rexene Corporation
P.O. Box 3986
Odessa, Texas 79760

Re: Closure of Wash Water Collection Sump, Pipes at Levee, Asphalt Spills, and Pump Dispenser Island; Brickland Refinery, Sunland Park, New Mexico

Dear Mr. Baker:

Daniel B. Stephens & Associates, Inc., is pleased to present this letter report which documents site activities performed at the Brickland Refinery, Sunland Park, New Mexico. Site activities included closure of a wash-water collection sump, capping and entombing pipes at the levee, capping two asphalt spill areas, and removal of a dispenser island and pump. Additional work performed contemporaneous with these activities included removal of a flow-through process tank and closing a service pit; however, these activities were described in a report prepared on behalf of Rexene Corporation that was submitted to the New Mexico Oil Conservation Division on March 5, 1997.

Wash-Water Collection Sump

A wash-water collection sump was located in the central portion of the property (Figure 1). Based on the past use of the sump, notification to the New Mexico Environmental Department Underground Storage Tank Bureau (NMED USTB) for abandoning the sump was not required in that wash water collection tanks are categorically exempt by USTR Section 102.CCC(5).

The wash-water collection sump appears to have been originally constructed of bricks with a concrete reinforced lid. Using a backhoe, the top of the sump was pushed in. Water within the sump was approximately two to three feet below the ground surface (Photographs 1 & 2). Based on the close proximity to the Rio Grande and water levels observed in on-site monitor wells, it was determined that the water level in the sump probably represented the groundwater table. Once the lid was dismantled, the walls of the sump were collapsed into the excavation (Photograph 3). Clean fill material was placed in the excavation and wheel rolled to finished grade (Photographs 4 & 5).

SOIL AND GROUND-WATER INVESTIGATIONS • REMEDIAL ACTION • LITIGATION SUPPORT • VADOSE ZONE HYDROLOGY
1301 ANDREWS HIGHWAY, SUITE 310-A • MIDLAND, TEXAS 79701 • (915) 520-6615 • FAX (915) 699-4611
ALBUQUERQUE • SANTA FE • SILVER CITY • PINEDALE

DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

PIÑON AWARD QUALITY New Mexico 1995

Ten-Inch Pipe at Levee

A ten-inch steel pipe (conduit) protrudes from the levee located on the eastern property line of the facility (Figure 1). Two three-inch pipes are contained inside the ten-inch conduit. On December 18, 1996, the soil around the conduit was excavated approximately two-feet into the levee (Photograph 6). The conduit and three-inch pipes were cut to within approximately three feet of the excavation back wall (Photograph 7). Steel caps were welded on each of the two three-inch pipes and on the conduit (Photographs 7 & 8). A three-foot by three-foot by two-foot concrete monument was placed at the end of the conduit in order to entomb the pipes (Photograph 9). "Rexene Monu" was inscribed on the top surface of the monument (Photograph 10). The monument was allowed to cure for nine days. The concrete forms were removed from the monument on December 27, 1996. Clean fill material was then placed around the monument and compacted with the backhoe bucket (Photograph 11).

Asphalt Spills

Two main asphalt spill areas are located on the eastern side of the site (Figure 1). The north spill area has areal dimensions of approximately 15-foot by 20-foot and the south spill area has areal dimension of approximately 20-foot by 90-foot. The spills appeared to be surficial in nature, infiltrating to an average depth of approximately six inches. Due to the nature of the spills, the primary emphasis of capping is the future prevention of precipitation and storm water runoff from coming in contact with the spills, thereby minimizing the potential for hydrocarbon contaminated surface discharge from the facility.

Six-feet beyond the edge of each asphalt spills, a one-foot deep perimeter trench was cut with the backhoe in order to secure a 30-mil high density polyethylene (HDPE) cover (Photographs 13, 14, 15, 16, & 17). The edge of the HDPE was secured with native fill in the perimeter trench (Photographs 18, 19, 20, 21, & 22). After securing the HDPE cover, approximately two-feet of clean soil cover was placed on top and compacted by wheel rolling. The cover soil was placed such that it extends five-feet beyond the edge of the HDPE and is sloped to drain away from the spill area. The cover soil was then seeded with a mixture of blue grama and buffalo grass at a density of approximately one-pound per 150-square feet (Photographs 23 & 24).

SOIL AND GROUND-WATER INVESTIGATIONS • REMEDIAL ACTION • LITIGATION SUPPORT • VADOSE ZONE HYDROLOGY
1301 ANDREWS HIGHWAY, SUITE 310-A • MIDLAND, TEXAS 79701 • (915) 520-6615 • FAX (915) 699-4611
ALBUQUERQUE • SANTA FE • SILVER CITY • RICHLAND • LUBBOCK

DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

PIÑON AWARD QUALITY New Mexico 1995

Pump Island and Dispenser

A pump island and dispenser was located near the main entrance gate to the facility (Figure 1). The pump had been previously disconnected from the dispenser lines. On January 28, 1997, the dispenser was removed and transported to Rhino Environmental's landfarm in Newman, New Mexico for destruction and disposal (Photograph 25). The concrete pump island was demolished on-site. Since the rubble was free of any hydrocarbon contamination, it was placed with the existing construction debris stockpile located on the southern portion of the facility. The former pump island area was then backfilled with clean soil and wheel rolled to grade (Photograph 26).

We appreciate the opportunity to provide environmental services for Rexene Corporation. Please feel free to contact me at (915) 520-6615 if you have any questions or comments regarding the work described in this report.

Sincerely,

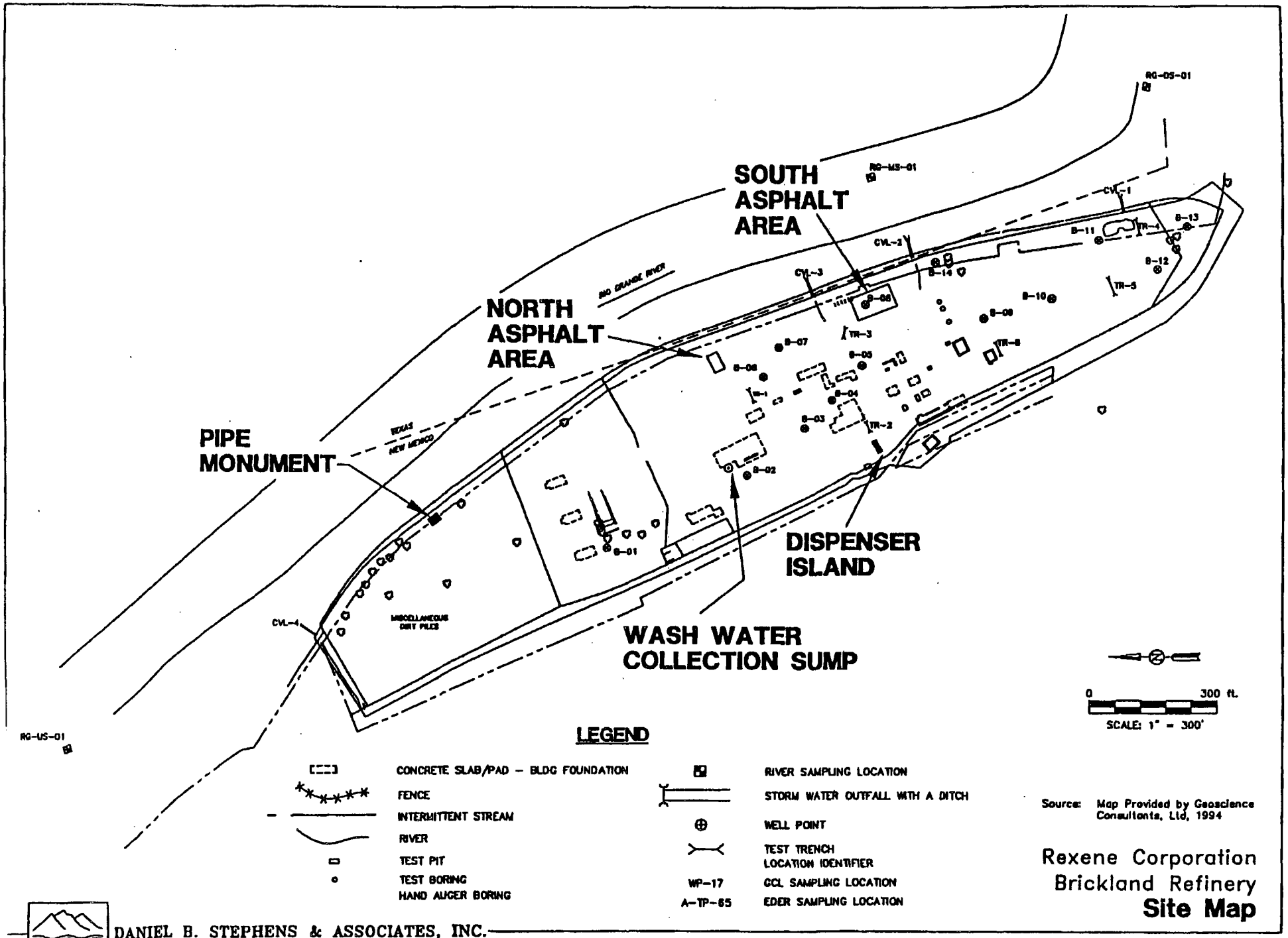
DANIEL B. STEPHENS & ASSOCIATES, INC.

P. Damian Reed

P. Damian Reed
Project Manager

E:\client\rex\bricklan\cdbriltr.228

Figures



Source: Map Provided by Geoscience Consultants, Ltd, 1994

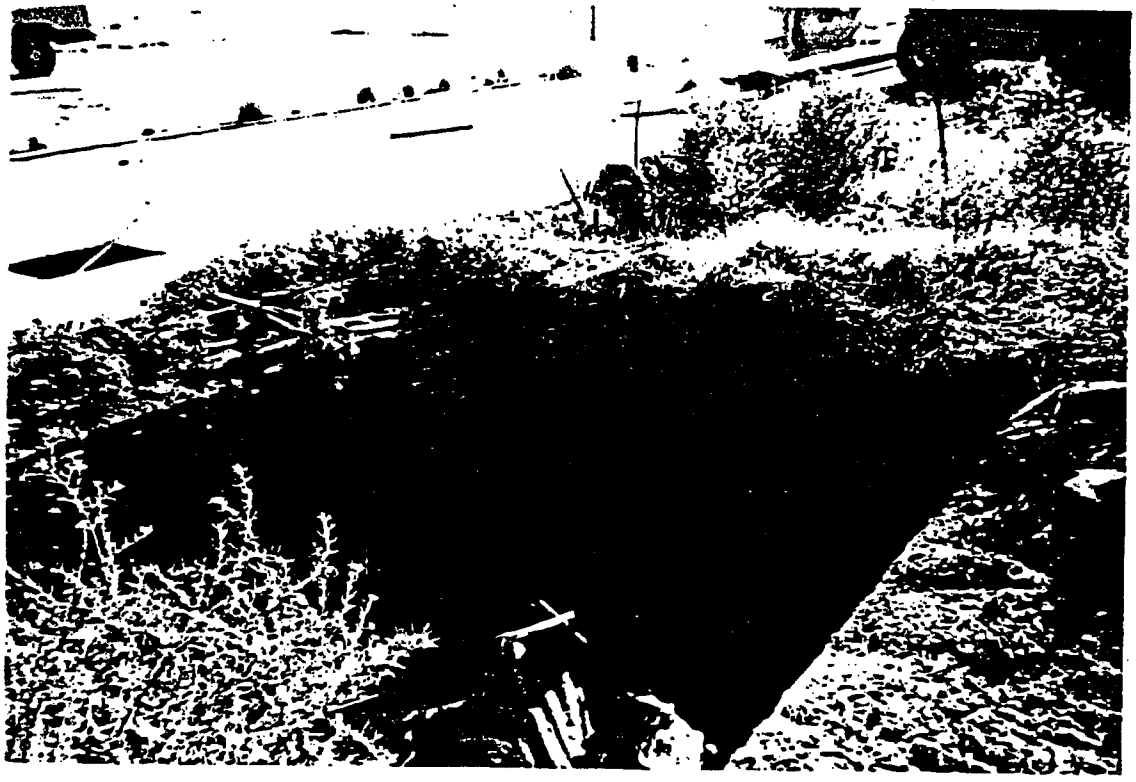
Rexene Corporation
Brickland Refinery
Site Map

DANIEL B. STEPHENS & ASSOCIATES, INC.
02-97
JN MIDREXBRI.001

Figure 1

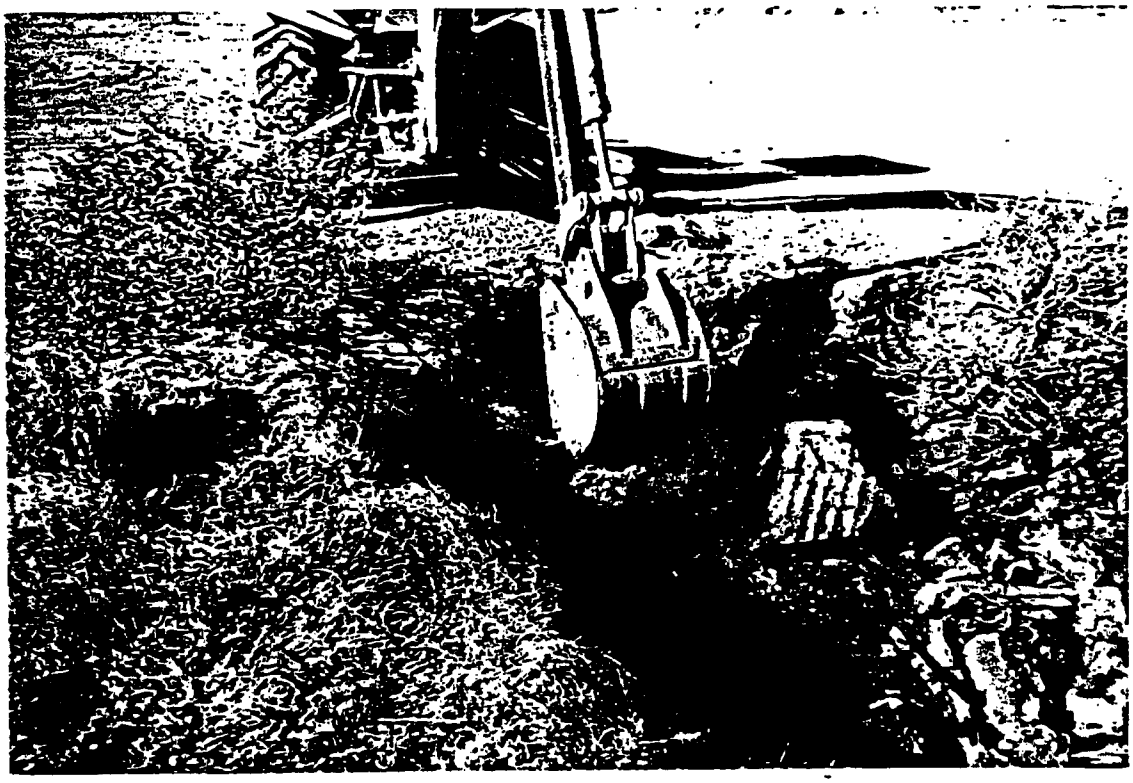
Attachment

Photographic Documentation



1: View looking southeast; lid pushed in on wash water collection sump.

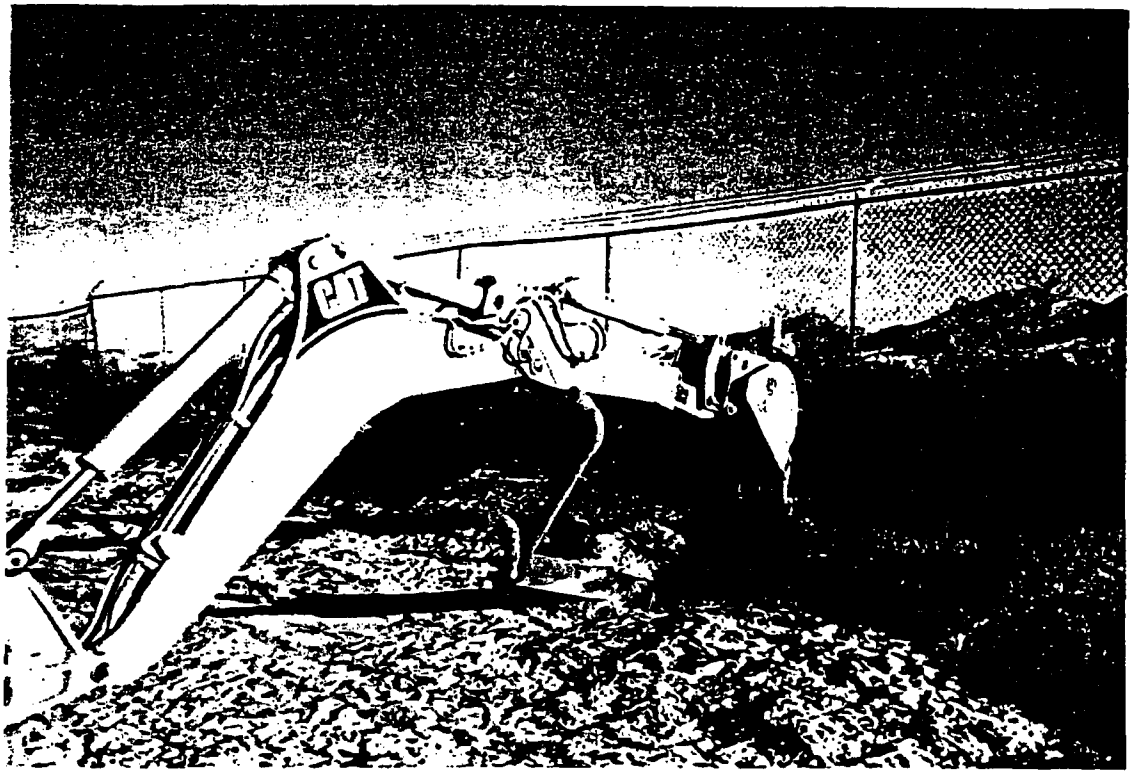
2: View looking west at wash water collection sump.



3: View looking northwest: pushing in sides of wash water collection sump.

4: View looking east; backfilling wash water collection sump.

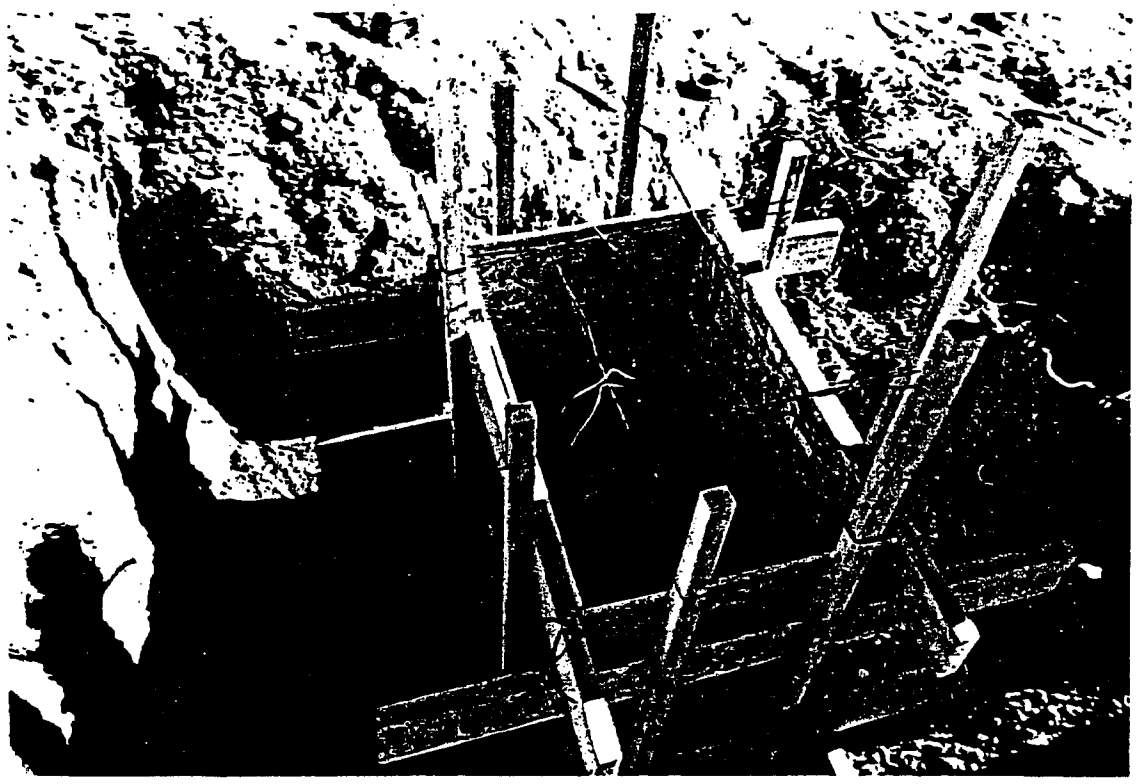
5: Compacting backfill in wash water collection sump by wheel rolling with backhoe.



6: Excavating into levee around ten-inch conduit.

7: Three-inch pipes cut and capped; placing cap on ten-inch conduit.

8: Welding ten-inch cap on conduit.



9: Forms set to pour monument and seal conduit.

10: Monument with "REXENE MONU" etched in surface.

11: Backfill around monument at levee; finished to grade.

12: Cutting trench around south asphalt spill area.

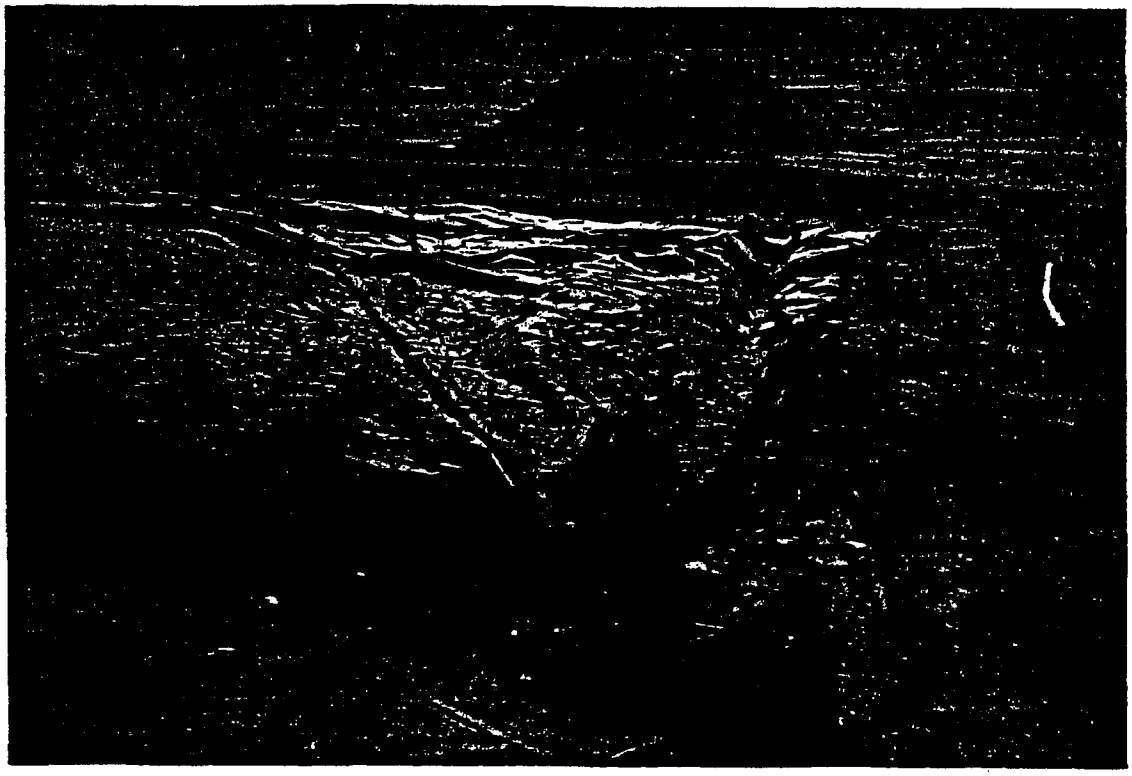
13: View looking north at south asphalt spill area.

14: View looking west at trench around south asphalt spill area; clean fill material located in left background.

15: View looking north at trench around south asphalt spill area.

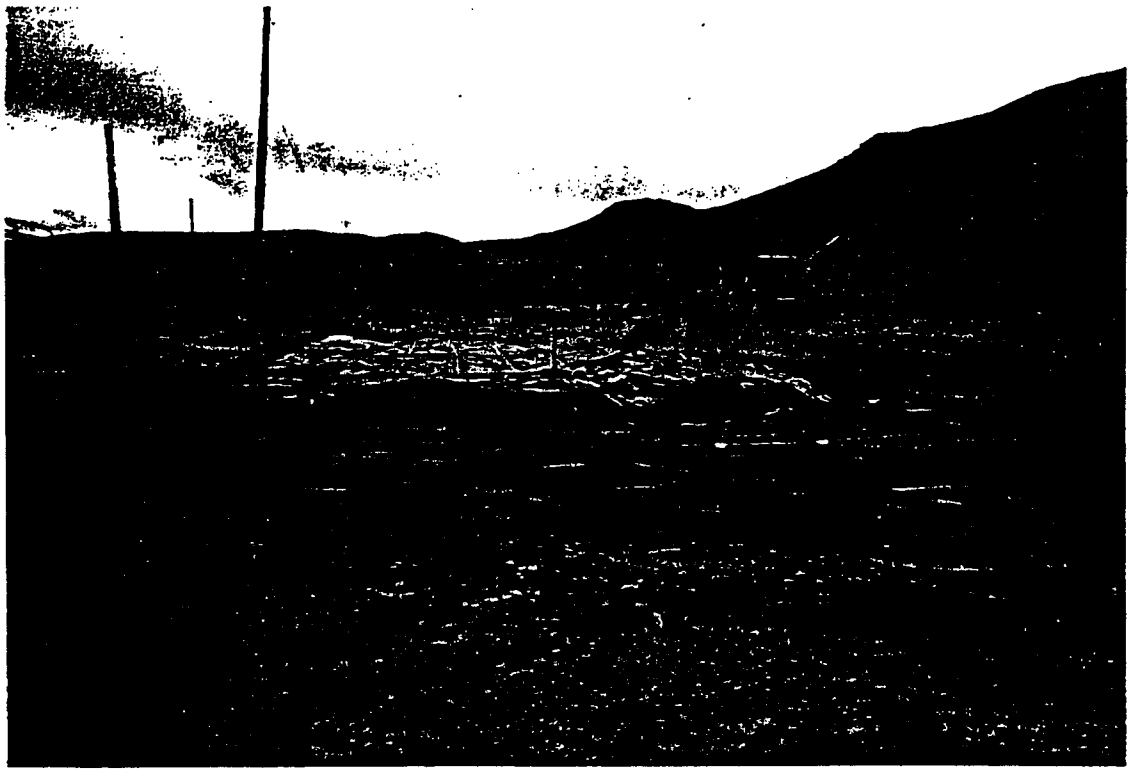
16: View looking south at trench around north asphalt spill area; south asphalt spill area in background; clean fill material on the right.

17: View looking west at north asphalt spill area; clean fill material in the background.

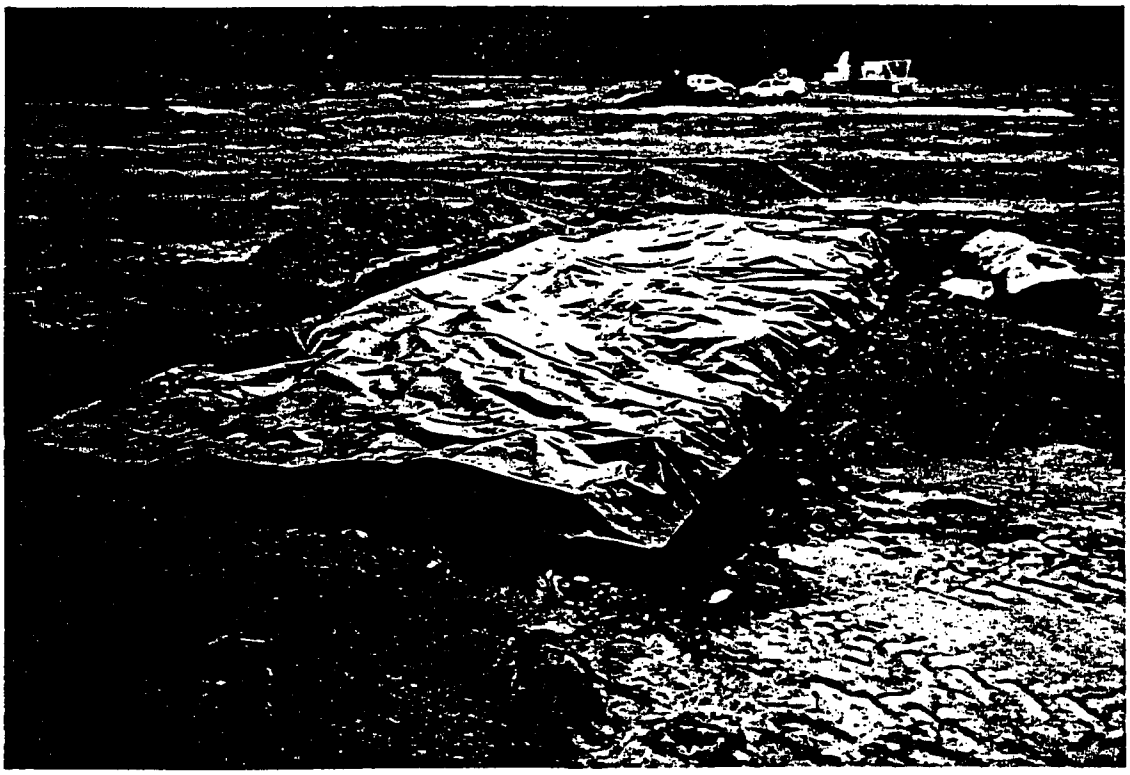


18: View looking west; HDPE covering south asphalt spill area.

19: View looking north; HDPE covering south asphalt spill area; HDPE placed into perimeter trench.



20: View looking south; backfilling south asphalt spill area.

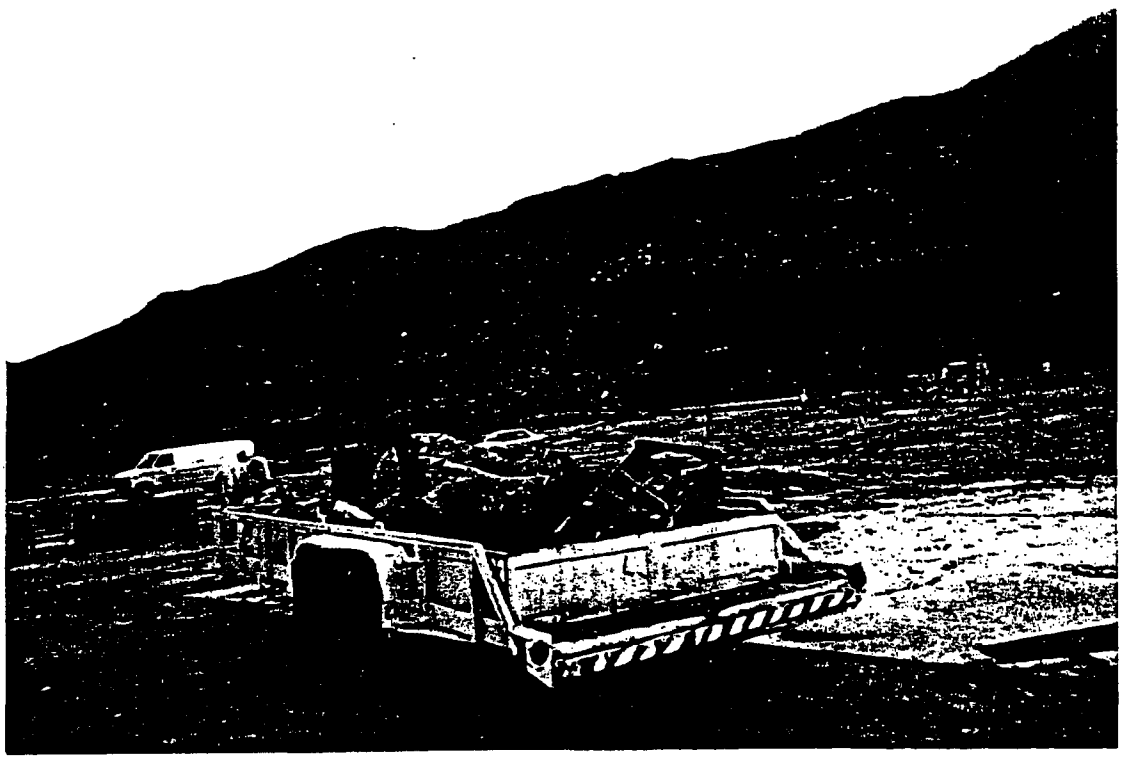


21: View looking west; HDPE covering north asphalt spill area.

22: View looking west; HDPE covering north asphalt spill area; backfilling trench on south side of spill.

23: View looking north; completed backfilling and wheel rolling south asphalt spill area; seeding surface with mixture of blue grama and buffalo grass.

24: View looking west; completed backfilling and seeding north asphalt spill area.



25: Dispenser loaded on trailer and ready for transportation to Rhino Environmental Facility for disposal.

26: Removing concrete pump island.

****
*** ACTIVITY REPORT ***
****

RECEPTION OK

TX/RX NO.	6532
CONNECTION TEL	801 776 7914
CONNECTION ID	HUNTSMAN PKG
START TIME	07/07 17:23
USAGE TIME	30'19
PAGES	22
RESULT	OK

Appendix D

Environmental Agreement Between Rexene and the International Boundary and Water Commission, Former Brickland Refinery Site, Sunland Park, New Mexico

ENVIRONMENTAL AGREEMENT

An environmental risk assessment conducted on behalf of Rexene Corporation ("Rexene") has been completed with respect to the Rexene facility known as the Old Brickland Refinery site located in Doña Anna County, New Mexico (the "plant site"). That assessment indicates that past industrial practices on the property have affected the groundwater underneath the plant site and at the site monitored by the groundwater monitoring well designated MW-6-S.

Rexene and the International Boundary and Water Commission ("IBWC") desire to minimize or eliminate the potential for human consumption of such water and also desire to maintain the current hydrogeology of the site to minimize the off-site migration of affected groundwater.

Therefore, the IBWC and Rexene agree that no water supply wells will be installed, constructed, placed, erected or permitted on the following lands so long as the subsurface water under such lands fails to meet drinking water standards as set by the state of New Mexico. The lands covered by this Agreement consist of land owned by the IBWC which is adjacent to the Rexene property as described on Exhibit A, and the land owned by Rexene as described in Exhibit B.

SO AGREED:

REXENE CORPORATION

BY: Todd M Carver

NAME: Todd M. Carver

TITLE: V.P. - E.H.&S.

DATE: 7/16/96

INTERNATIONAL BOUNDARY WATER COMMISSION

BY: Randall A McManus

NAME: Randall A McManus

TITLE: Legal Advisor

DATE: 1/31/97

ENV96.BRICKLAND.121

THE LAND GROUP INC.
SURVEYING • PLANNING • ENGINEERING
CONSTRUCTION MANAGEMENT

IBWC PROPERTY

Exhibit A

DESCRIPTION OF A 3.769 ACRE TRACT

EOF TRACT 350-2

A tract of land situate in Sunland Park, Dona Ana County, New Mexico as part of Section 15, Township 29 South, Range 4 East New Mexico Principal Meridian and being more particularly described as follows, to wit;

BEGINNING at a square pin found for the southwesterly corner of the tract herein described, whence a brass cap set in concrete for Texas/New Mexico State Line Reference Monument No. 19 bears N.28°49'32"W., 380.90 feet;
THENCE N.23°04'57"W., 117.05 feet to a square pin found for an angle point;
THENCE N.34°08'58"W., 142.50 feet to a square pin found for an angle point;
THENCE N.47°02'06W., 196.90 feet to a square pin found for an angle point;
THENCE N.57°29'38"W., 367.66 feet to a square pin found for an angle point;
THENCE N.54°52'04"W., 118.24 feet to a square pin found for an angle point;
THENCE N.67°55'58"W., 223.18 feet to a square pin found for an angle point;
THENCE N.73°22'29"W., 147.55 feet to a 1/2 inch rebar with survey cap set for the southwesterly corner of the tract herein described;
THENCE N.12°36'00"E., 40.14 feet to a point for the northwesterly corner of the tract herein described;
THENCE S.77°41'30"E., 153.82 feet to an angle point;
THENCE S.71°33'00"E., 96.45 feet to an angle point;
THENCE S.69°31'30"E., 344.15 feet to an angle point;
THENCE S.65°52'30"E., 300.75 feet to an angle point;
THENCE S.54°21'00"E., 150.62 feet to an angle point on the Texas/New Mexico State Line;
THENCE following along the Texas/New Mexico State Line S.28°41'30"E., 466.78 feet to an angle point being Boundary Monument No. 108 and the northeasterly corner of the tract herein described;
THENCE continuing along the Texas/New Mexico State Line S.09°10'00"W., 107.37 feet to a 1/2 inch rebar with survey cap set for the most southerly corner of the tract herein described;
THENCE N.51°51'43"W., 193.09 feet to the point of beginning;

PHONE (505) 526-2444 FAX (505) 526-0901
100 E. Hadley • P.O. Box 16227 • Las Cruces, NM 88004

Said tract containing **3.769 acres** more or less;

I hereby certify that this description was prepared by me or under my supervision.

Isaac Camacho

ISAAC CAMACHO, NMPS No. 9254

960356-A.DOC

LAND GROUP INC.
SURVEYING • PLANNING • ENGINEERING
CONSTRUCTION MANAGEMENT

January 31, 1997

DESCRIPTION OF A 1.238 ACRE TRACT

EOF TRACT 352-3

A tract of land situate in Sunland Park, Dona Ana County, New Mexico as part of Lot 6, Section 16, Township 29 South, Range 4 East New Mexico Principal Meridian and being more particularly described as follows, to wit;

BEGINNING at a 1/2 inch rebar with survey cap set on the north line of said Section 16 for the northeasterly corner of the tract herein described, whence a brass cap set in concrete for Texas/New Mexico State Line Reference Monument No. 21 bears S.08°56'16"E., 381.61 feet;
THENCE S.18°22'00"E., 313.10 feet to a 1/2 inch rebar with survey cap set for an angle point;
THENCE S.32°09'00"E., 96.57 feet to a 1/2 inch rebar with survey cap set for an angle point;
THENCE S.73°17'00"E., 112.93 feet to a 1/2 inch rebar set for the southeasterly corner of the tract herein described;
THENCE S.85°58'30"W., 114.23 feet to a 2 inch pipe found for an angle point;
THENCE S.60°50'02"W., 12.86 feet to a 2 inch pipe found for an angle point;
THENCE N.84°43'27"W., 78.66 feet to a 1/2 inch rebar found for an angle point;
THENCE N.76°04'16"W., 79.11 feet to a 2 inch pipe found for the southwesterly corner of the tract herein described;
THENCE N.08°42'12"W., 403.36 feet to a 1/2 inch rebar found for the northwesterly corner of the tract herein described;
THENCE N.89°31'35"E., 83.01 feet to the point of beginning;

Said tract containing 1.238 acres more or less;

I hereby certify that this description was prepared by me or under my supervision.

Isaac Camacho

ISAAC CAMACHO, NMPS No. 9254

ISAAC CAMACHO NEW MEXICO 9254 REGISTERED PROFESSIONAL LAND SURVEYOR

960356-B.DOC

THE LAND GROUP INC.
SURVEYING • PLANNING • ENGINEERING
CONSTRUCTION MANAGEMENT

January 31, 1997

DESCRIPTION OF A 0.668 ACRE TRACT

EOF TRACT 352-2

A tract of land situate in Sunland Park, Dona Ana County, New Mexico as part of Lot 8, Section 9, Township 29 South, Range 4 East New Mexico Principal Meridian and being more particularly described as follows, to wit;

BEGINNING at a 1/2 inch rebar with survey cap set for Boundary Monument No. 105 on the Texas/New Mexico State Line, whence a brass cap set in concrete for Texas/New Mexico State Line Reference Monument No. 21 bears S.11°30'49"E., 625.67 feet;
THENCE following along the State Line S.20°02'30"E., 103.00 feet to a 1/2 inch rebar with survey cap set for an angle point;
THENCE S.12°16'00"E., 142.60 feet to a 1/2 inch rebar with survey cap set on the south line of said Section 9 for the southeasterly corner of the tract herein described;
THENCE following along the south line of said Section 9 S.89°31'35"W., 83.01 feet to a 1/2 inch rebar found for the southwesterly corner of the tract herein described;
THENCE N.07°50'15"W., 90.51 feet to a 1/2 inch rebar found for an angle point;
THENCE N.81°33'28"E., 27.80 feet to a 1/2 inch rebar found for an angle point;
THENCE N.08°36'48"W., 51.23 feet to a 1/2 inch rebar with survey cap set for an angle point;
THENCE S.81°34'15"W., 27.75 feet to a 1/2 inch rebar found for an angle point;
THENCE N.08°29'45"W., 79.27 feet to a 1/2 inch rebar found for an angle point;
THENCE N.11°29'04"W., 112.07 feet to a 2 inch pipe found for an angle point;
THENCE N.17°09'12"W., 111.86 feet to a 1/2 inch rebar found for an angle point;
THENCE N.20°02'30"W., 31.90 feet to a nail in post found for an angle point;
THENCE N.70°55'04"E., 7.36 feet to a 1/2 inch rebar found for an angle point;
THENCE N.19°58'05"W., 25.85 feet to a 1/2 inch rebar found for an angle point;
THENCE S.66°56'20"W., 7.36 feet to a 1/2 inch rebar found for an angle point;
THENCE N.20°04'09"W., 135.53 feet to a 1/2 inch rebar found for the northwesterly corner of the tract herein described;

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THENCE N.71°13'22"E., 30.07 feet to a 1/2 inch rebar with survey cap set on the Texas/New Mexico State Line for the northeasterly corner of the tract herein described;
THENCE S.20°02'30"E., 414.50 feet to the point of beginning;

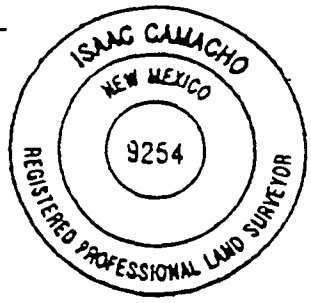
Said tract containing **0.668 acres** more or less;

I hereby certify that this description was prepared by me or under my supervision.

Isaac Camacho

ISAAC CAMACHO, NMPS No. 9254

960356-C.DOC



THE LAND GROUP INC.
SURVEYING • PLANNING • ENGINEERING
CONSTRUCTION MANAGEMENT

January 31, 1997

DESCRIPTION OF A 2.895 ACRE TRACT

EOF TRACT 353-1

A tract of land situate in Sunland Park, Dona Ana County, New Mexico as part of Lots 7 and 8, Section 9, Township 29 South, Range 4 East New Mexico Principal Meridian and being more particularly described as follows, to wit;

BEGINNING at a 1/2 inch rebar with survey cap set for the northwesterly corner of the tract herein described, whence a brass cap set in concrete found for Texas/New Mexico State Line Reference Monument No. 22 bears N.30°47'39"E., 146.11 feet;
THENCE N.67°52'00"E., 162.10 feet to a 1/2 inch rebar with survey cap set for the northeasterly corner of the tract herein described;
THENCE S.49°50'00"E., 119.87 feet to an angle point;
THENCE S.39°49'30"E., 621.84 feet to an angle point on the Texas/New Mexico State Line;
THENCE following along the Texas/New Mexico State Line S.20°02'44"E., 137.28 feet to a point being Boundary Monument No. 104;
THENCE continuing along the Texas/New Mexico State Line S.20°02'44"E., 628.78 feet to a 1/2 inch rebar with survey cap set for the southeasterly corner of the tract herein described;
THENCE S.71°13'22"W., 30.07 feet to a 1/2 inch rebar found for the southwesterly corner of the tract herein described;
THENCE N.20°01'49"W., 380.60 feet to a 2 inch iron pipe found for an angle point;
THENCE N.29°02'59"W., 169.41 feet to a 1/2 inch rebar with survey cap set for an angle point;
THENCE N.38°00'30"W., 647.23 feet to 1/2 inch rebar found for an angle point;
THENCE N.47°13'36"W., 175.28 feet to a 1/2 inch rebar found for an angle point;
THENCE N.56°43'32"W., 160.03 feet to the point of beginning;

Said tract containing 2.895 acres more or less;

I hereby certify that this description was prepared by me or under my supervision.

Isaac Camacho

ISAAC CAMACHO, NMPS No. 9254

960356-D.DOC

ISAAC CAMACHO NEW MEXICO 9254 REGISTERED PROFESSIONAL LAND SURVEYOR

PHONE (505) 526-2444 FAX (505) 526-0901
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THE LAND GROUP INC.
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CONSTRUCTION MANAGEMENT

January 31, 1997

DESCRIPTION OF A 0.111 ACRE TRACT

EOF TRACT 354-1/2

A tract of land situate in Sunland Park, Dona Ana County, New Mexico as part of Lots 5 and 7, Section 9, Township 29 South, Range 4 East New Mexico Principal Meridian and being more particularly described as follows, to wit;

BEGINNING at a 1/2 inch rebar set for the southwesterly corner of the tract herein described, whence a brass cap set in concrete found for Texas/New Mexico State Line Reference Monument No. 22 bears **S.51°34'47"E., 1002.89 feet;**
THENCE N.41°08'14"W., 13.69 feet to a 2 inch iron pipe found for the northwesterly corner of the tract herein described;
THENCE N.44°50'30"E., 140.60 feet to a 1/2 inch rebar with survey cap set for an angle point;
THENCE N.51°29'30"W., 41.20 feet to a 1/2 inch rebar with survey cap set for an angle point;
THENCE N.38°46'30"E., 45.02 feet to a 1/2 inch rebar with survey cap set for the northeasterly corner of the tract herein described;
THENCE S.68°12'01"E., 61.84 feet to a point for the southeasterly corner of the tract herein described;
THENCE S.44°09'30"W., 206.00 feet to the point of beginning;

Said tract containing 0.111 acres more or less.

I hereby certify that this description was prepared by me or under my supervision.

Isaac Camacho
ISAAC CAMACHO, NMPS No. 9254

ISAAC CAMACHO NEW MEXICO 9254 REGISTERED PROFESSIONAL LAND

960356-F.DOC

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THE LAND GROUP INC.
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January 31, 1997

DESCRIPTION OF A 1.033 ACRE TRACT

EOF TRACT 355-1

A tract of land situate in Sunland Park, Dona Ana County, New Mexico as part of Lots 5 and 7, Section 9, Township 29 South, Range 4 East New Mexico Principal Meridian and being more particularly described as follows, to wit;

BEGINNING at a 1/2 inch rebar found for the southwesterly corner of the tract herein described, whence a brass cap set in concrete found for Texas/New Mexico State Line Reference Monument No. 22 bears **S.54°09'04"E., 807.22 feet;**
THENCE N.41°08'14"W., 199.80 feet to a 1/2 rebar with survey cap set for the northwesterly corner of the tract herein described;
THENCE N.44°09'30"E., 206.00 feet to a point for the northeasterly corner of the tract herein described;
THENCE S.41°23'00"E., 60.55 feet to an angle point;
THENCE S.47°09'50"E., 165.28 feet to a point for the southeasterly corner of the tract herein described;
THENCE S.50°58'30"W., 10.84 feet to a point;
THENCE S.50°58'30"W., 212.23 feet to the point of beginning;

Said tract containing 1.033 acres more or less.

I hereby certify that this description was prepared by me or under my supervision.

Isaac Camacho

ISAAC CAMACHO, NMPS No. 9254

960356-G.DOC

ISAAC CAMACHO NEW MEXICO 9254 REGISTERED PROFESSIONAL LAND SURVEYOR

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LAND GROUP INC.
SURVEYING • PLANNING • ENGINEERING
CONSTRUCTION MANAGEMENT

January 31, 1997

DESCRIPTION OF A 0.877 ACRE TRACT

EOF TRACT 355-2

A tract of land situate in Sunland Park, Dona Ana County, New Mexico as part of Lots 5 and 7, Section 9, Township 29 South, Range 4 East New Mexico Principal Meridian and being more particularly described as follows, to wit;

BEGINNING at a 1/2 inch rebar found for the southwesterly corner of the tract herein described, whence a brass cap set in concrete found for Texas/New Mexico State Line Reference Monument No. 22 bears **S.51°26'24"E., 1016.35 feet;**
THENCE N.38°55'58"W., 264.73 feet to a 2 inch iron pipe found for the northwesterly corner of the tract herein described;
THENCE N.56°39'30"E., 146.40 feet to a 1/2 inch rebar with survey cap set for the northeasterly corner of the tract herein described;
THENCE S.39°43'00"E., 38.99 feet to a 1/2 inch rebar with survey cap set for an angle point;
THENCE S.49°58'12"E., 149.20 feet to a 1/2 inch rebar with survey cap set for the southeasterly corner of the tract herein described;
THENCE S.38°46'30"W., 45.02 feet to a 1/2 inch rebar with survey cap set for an angle point;
THENCE S.51°29'30"E., 41.20 feet to a 1/2 inch rebar with survey cap set for an angle point;
THENCE S.44°50'30"W., 140.60 feet to the point of beginning;

Said tract containing **0.877 acres** more or less.

I hereby certify that this description was prepared by me or under my supervision.

Isaac Camacho

ISAAC CAMACHO, NMPS No. 9254

ISAAC CAMACHO NEW MEXICO 9254 REGISTERED PROFESSIONAL LAND SURVEYOR

960356-H.DOC

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THE LAND GROUP INC.
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January 31, 1997

DESCRIPTION OF A 1.044 ACRE TRACT

EOF TRACT 356

A tract of land situate in Sunland Park, Dona Ana County, New Mexico as part of Lot 5, Section 9, Township 29 South, Range 4 East New Mexico Principal Meridian and being more particularly described as follows, to wit;

BEGINNING at a 2 inch iron pipe found for the southwesterly corner of the tract herein described, whence a brass cap set in concrete found for Texas/New Mexico State Line Reference Monument No. 22 bears **S.48°51'54"E., 1276.09 feet;**
THENCE N.42°55'37"W., 258.30 feet to a 2 inch iron pipe found for an angle point;
THENCE N.54°17'44"W., 82.52 feet to a 2 inch iron pipe found for the northwesterly corner of the tract herein described;
THENCE N.43°05'30"E., 124.63 feet to a 1/2 inch rebar with survey cap set for the northeasterly corner of the tract herein described;
THENCE S.48°29'45"E., 374.00 feet to a 1/2 inch rebar with survey cap set for the southeasterly corner of the tract herein described;
THENCE S.56°39'30"W., 146.40 feet to the point of beginning;

Said tract containing 1.044 acres more or less.

I hereby certify that this description was prepared by me or under my supervision.

Isaac Camacho
ISAAC CAMACHO, NMPS No. 9254

960356-I.DOC

ISAAC CAMACHO NEW MEXICO 9254 REGISTERED PROFESSIONAL LAND SURVEYOR

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100 E. Hadley • P.O. Box 16227 • Las Cruces, NM 88004

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Post-it™ Fax Note 7671	Date 1/20	# of pages ▶ 1
To Reggie Baker	From Mike Seike	
Co./Dept. Reject	Co. BDM	
Phone # (915) 333-7200	Phone # (505) 848-5289	
Fax # (915) 333-8238	Fax # (505) 848-5299	

January 31,

DESCRIPTION OF A 4.434 ACRE TRACT

EOF TRACT 354

A tract of land situate in Sunland Park, Dona Ana County, New Mexico as part of Lot 7, Section 9, Township 29 South, Range 4 East New Mexico Principal Meridian and being more particularly described as follows, to wit;

BEGINNING at a 1/2 inch rebar with survey cap set for the southwesterly corner of the tract herein described, whence a brass cap set in concrete found for Texas/New Mexico State Line Reference Monument No. 22 bears **N.30°47'39"E., 146.11 feet;**
THENCE N.56°27'03"W., 312.88 feet to a 1/2 inch rebar found for an angle point;
THENCE N.12°14'05"W., 32.04 feet to a concrete monument found for an angle point;
THENCE N.31°38'17"W., 41.07 feet to a 1/2 inch rebar found for an angle point;
THENCE N.35°53'50"W., 160.79 feet to a 1/2 inch rebar found for an angle point;
THENCE N.41°18'51"W., 270.35 feet to a 2 inch iron pipe found for an angle point;
THENCE N.34°25'07"W., 31.22 feet to a 1/2 inch rebar found for the northwesterly corner of the tract herein described;
THENCE N.50°58'30"E., 21.23 feet to a point;
THENCE N.50°58'30"E., 10.84 feet to a point for the northeasterly corner of the tract herein described;
THENCE S47°52'30"E., 50.17 feet to an angle point;
THENCE S.42°17'30"E., 176.62 feet to an angle point;
THENCE S.34°16'00"E., 111.79 feet to a 1/2 inch rebar with survey cap set for an angle point;
THENCE S.44°50'00"E., 202.06 feet to a 1/2 inch rebar with survey cap set for an angle point;
THENCE S.35°03'51"E., 339.23 feet to a 1/2 inch rebar with survey cap set for the southeasterly corner of the tract herein described;
THENCE S.67°52'00"W., 162.10 feet to the point of beginning;

Said tract containing **4.434 acres** more or less;

I hereby certify that this description was prepared by me or under my supervision.

Isaac Camacho
ISAAC CAMACHO, NMPS No. 9254

960356-E.DOC

ISAAC CAMACHO NEW MEXICO 9254 REGISTERED PROFESSIONAL LAND SURVEYOR

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THE LAND GROUP INC.
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CONSTRUCTION MANAGEMENT

REXENE PROPERTY Exhibit B

DESCRIPTION OF A 5.046 ACRE TRACT

TRACT 1

A tract of land located in Sunland Park, Dona Ana County, New Mexico as part of Lots 7 and 8, Section 9, Township 29 South, Range 4 East, New Mexico Principal Meridian and being more particularly described as follows, to wit:

BEGINNING at a 1/2 inch rebar with survey cap set for the northwest corner of the tract herein described, whence a brass cap set in concrete found for Texas/New Mexico State Line Reference Monument No. 22 bears N.**54°04'04"E., 369.29 feet**;

THENCE N.67°52'00"E., 242.05 feet to a 1/2 inch rebar with survey cap set for the northeast corner of the tract herein described:

THENCE S.56°43'32"E., 160.03 feet to a 1/2 inch rebar found for an angle point;

THENCE S.47°13'36"E., 175.28 feet to a 1/2 inch rebar found for an angle point;

THENCE S.38°00'08"E., 302.03 feet to a 1/2 inch rebar set for the southeast corner of the tract herein described;

THENCE S.67°52'00"W., 465.36 feet to a 1/2 inch rebar set for the southwest corner of the tract herein described;

THENCE N.24°32'41"W., 581.51 feet to the point of beginning;

Said tract containing 5.046 acres, more or less.

I hereby certify that this description was prepared by me or under my supervision.

Isaac Camacho
ISAAC CAMACHO NMPS No. 9254

ISAAC CAMACHO NEW MEXICO 9254 REGISTERED PROFESSIONAL LAND SURVEYOR

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LAND GROUP INC.
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January 24, 1997

DESCRIPTION OF A 10.004 ACRE TRACT

TRACT 2

A tract of land located in Sunland Park, Dona Ana County, New Mexico as part of Lots 7 and 8, Section 9, Township 29 South, Range 4 East, New Mexico Principal Meridian and being more particularly described as follows, to wit:

BEGINNING at a 1/2 inch rebar set for the southwest corner of the tract herein described, whence a brass cap set in concrete found for Texas/New Mexico State Line Reference Monument No. 21 bears **S.41°36'11"E, 1123.16 feet**;

THENCE N.27°42'40"W., 651.18 feet to a 1/2 inch rebar set for an angle point;

THENCE S.64°43'00"W., 20.00 feet to a 1/2 inch rebar with survey cap set for an angle point;

THENCE N.24°27'00"W., 206.73 feet to a 1/2 inch rebar with survey cap set for the northwest corner of the tract herein described;

THENCE N.67°52'00"E., 465.36 feet to a 1/2 inch rebar with survey cap set for the northeast corner of the tract herein described;

THENCE S.38°00'30"E., 346.03 feet to a 1/2 inch rebar with survey cap set for an angle point;

THENCE S.29°02'59"E., 169.41 feet to a 2 inch pipe found for an angle point;

THENCE S.20°01'49"E., 380.60 feet to a 1/2 inch rebar found for the southeast corner of the tract herein described;

THENCE S.71°13'00"W., 475.64 feet to the point of beginning;

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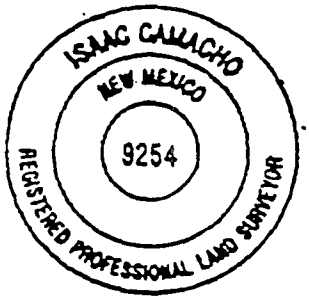
100 E. Hadley • P.O. Box 16227 • Las Cruces, NM 88004

Said tract containing 10.004 acres, more or less.

I hereby certify that this description was prepared by me or under my supervision.

Isaac Camacho

ISAAC CAMACHO NMPS No. 9254



LAND GROUP INC.
SURVEYING • PLANNING • ENGINEERING
CONSTRUCTION MANAGEMENT

January 24, 1997

DESCRIPTION OF A 5.028 ACRE TRACT

TRACT 3

A tract of land located in Sunland Park, Dona Ana County, New Mexico as part of Lot 8, Section 9, Township 29 South, Range 4 East, New Mexico Principal Meridian and being more particularly described as follows, to wit:

BEGINNING at a 1/2 inch rebar found for the southeast corner of the tract herein described, whence a brass cap set in concrete found for Texas/New Mexico State Line Reference Monument No. 21 bears **S.20°42'51"E., 402.30 feet;**

THENCE S.89°44'00"W., 298.07 feet to a 1/2 inch rebar with survey cap set for the southwest corner of the tract herein described;

THENCE N.26°10'37"W., 387.73 feet to a 1/2 inch rebar found for an angle point;

THENCE N.52°22'37"W., 155.37 feet to a 1/2 inch rebar with survey cap set for an angle point;

THENCE N.26°58'00"W., 24.85 feet to a 1/2 inch rebar with survey cap set for the northwest corner of the tract herein described;

THENCE N.71°13'00"E., 475.64 feet to a 1/2 inch rebar found for the northeast corner of the tract herein described;

THENCE S.20°04'09"E., 135.53 feet to a 1/2 inch rebar found for an angle point;

THENCE N.66°56'20"E., 7.36 feet to a 1/2 inch rebar found for an angle point;

THENCE S.19°58'05"E., 25.85 feet to a 1/2 inch rebar found for an angle point;

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100 E. Hadley • P.O. Box 16227 • Las Cruces, NM 88004

THENCE S.70°55'04"W., 7.36 feet to a 1/2 inch rebar found for an angle point;

THENCE S.20°02'30"E., 31.90 feet to a 1/2 inch rebar found for an angle point;

THENCE S.17°09'12"E., 111.86 feet to a 1/2 inch pipe found for an angle point;

THENCE S.11°29'04"E., 112.07 feet to a 1/2 inch rebar found for an angle point;

THENCE S.8°29'45"E., 79.27 feet to a 1/2 inch rebar found for an angle point;

THENCE N.81°34'15"E., 27.75 feet to a 1/2 inch rebar with survey cap set for an angle point;

THENCE S.8°36'48"E., 51.23 feet to a 1/2 inch rebar found for an angle point;

THENCE S.81°33'28"W., 27.80 feet to a 1/2 inch rebar found for an angle point;

THENCE S.7°50'15"E., 90.51 feet to the point of beginning.

Said tract containing 5.028 acres, more or less.

I hereby certify that this description was prepared by me or under my supervision.

Isaac Camacho

ISAAC CAMACHO NMPS No. 9254

THE LAND GROUP INC.
SURVEYING • PLANNING • ENGINEERING
CONSTRUCTION MANAGEMENT

January 24, 1997

DESCRIPTION OF A 12.765 ACRE TRACT

TRACT 4

A tract of land located in Sunland Park, Dona Ana County, New Mexico as part of Lot 6, Section 16, Township 29 South, Range 4 East, New Mexico Principal Meridian and being more particularly described as follows, to wit:

BEGINNING at a 1/2 inch rebar found for the most northerly corner of the tract herein described, whence a brass cap set in concrete found for Texas/New Mexico Stateline Reference Monument No. 21 bears **S.20°42'51"E., 402.30 feet;**

THENCE S.8°42'12"E., 403.36 feet to a 2 inch pipe found for an angle point;

THENCE S.76°04'16"E., 79.11 feet to a 1/2 inch rebar found for an angle point;

THENCE S.84°43'27"E., 78.86 feet to a 2 inch pipe found for an angle point;

THENCE N.60°50'02"E., 12.86 feet to a 1/2 inch rebar with survey cap set for an angle point;

THENCE N.85°58'30"E., 114.23 feet to a 1/2 inch rebar with survey cap set for an angle point;

THENCE S.69°54'35"E., 87.72 feet to a 1/2 inch rebar with survey cap set for an angle point;

THENCE N.60°28'25"E., 188.50 feet to a 1/2 inch rebar with survey cap set for the northeast corner of the tract herein described;

THENCE S.00°08'39"E., 692.17 feet to a 1/2 inch rebar found for the southeast corner of the tract herein described;

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THE LAND GROUP INC.
SURVEYING • PLANNING • ENGINEERING
CONSTRUCTION MANAGEMENT

January 24, 1997

DESCRIPTION OF A 0.424 ACRE TRACT

TRACT 5

A tract of land located in Sunland Park, Dona Ana County, New Mexico as part of Lot 8, Section 9, Township 29 South, Range 4 East, New Mexico Principal Meridian and being more particularly described as follows, to wit:

BEGINNING at a 1/2 inch rebar found for the southeast corner of the tract herein described, whence a brass cap set in concrete found for Texas/New Mexico Stateline Reference Monument No. 21 bears **S.51°09'12"E., 527.52 feet;**

THENCE S.89°44'00"W., 55.00 feet to a 1/2 inch rebar with survey cap set for the southwest corner of the tract herein described;

THENCE N.25°23'00"W., 433.34 feet to a 1/2 inch rebar with survey cap set for the northwest corner of the tract herein described;

THENCE S.62°28'03"E., 65.21 feet to a 1/2 inch rebar with survey cap set for the northeast corner of the tract herein described;

THENCE S.26°52'00"E., 404.80 feet to the point of beginning;

Said tract containing 0.424 acres, more or less.

I hereby certify that this description was prepared by me or under my supervision.

Isaac Camacho

ISAAC CAMACHO NMPS No. 9254

ISAAC CAMACHO NEW MEXICO 9254 REGISTERED PROFESSIONAL LAND SURVEYOR

PHONE (505) 526-2444 FAX (505) 526-0901
100 E. Hadley • P.O. Box 16227 • Las Cruces, NM 88004

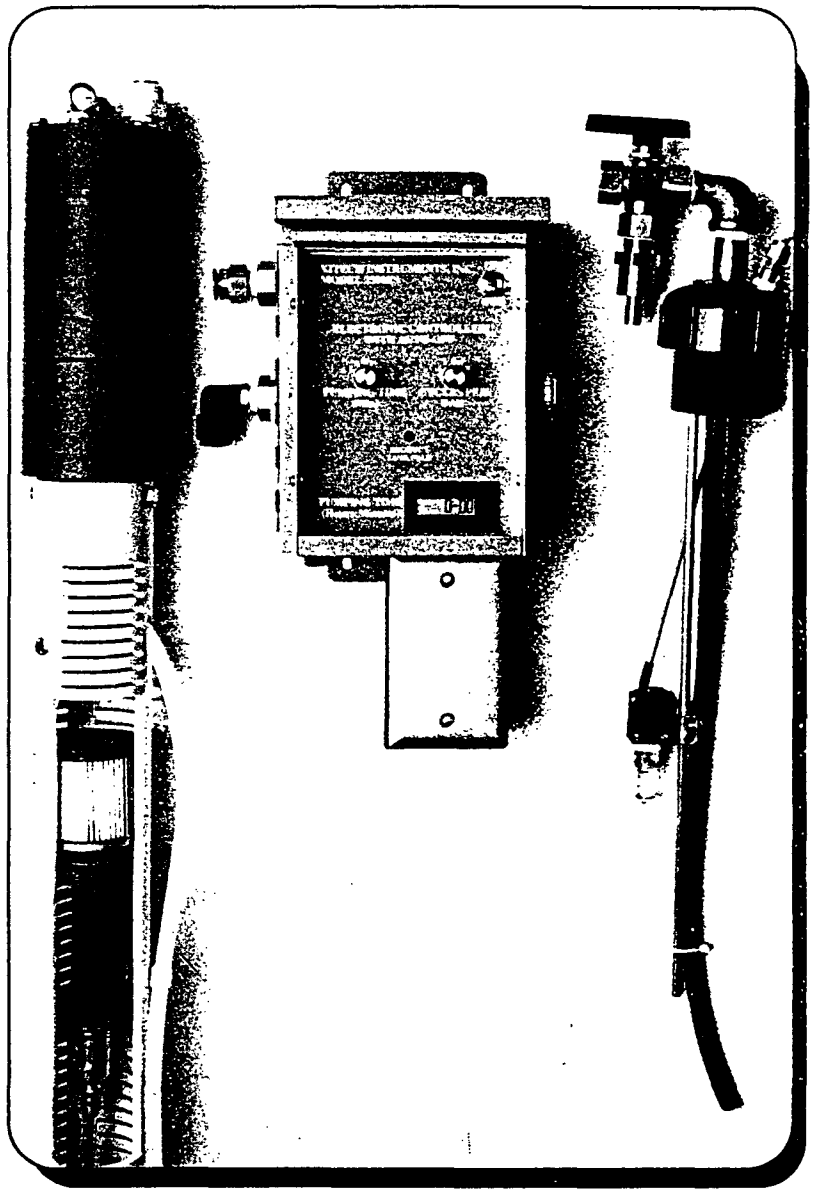
Appendix E

XITECH Product Recovery System

XITECH
Instruments, Inc.

Product Recovery System

ur Product Recovery System can operate with- the use of AC power, remove product ONLY own to a sheen, operate on bottled gas, and can be alled in less than 2 hours. The Xitech Product ecovery System consists of a pneumatically rated Smart skimmer, electronic timer, and tronic high level product tank shutoff. The nart skimmer requires no above ground controls perate, has 30 inches of float travel, uses a high olume hydrophobic filter, pumps over 25GPH, consumes less than .5CFM of air. The ctronic timer provides intermittent pumping ntrol for several Smart skimmers, provides inuous monitoring of the high level tank shutoff nsor, displays total run time of system, and rates on 12DC/120AC/220AC. The electronic gh level shutoff assembly has a three way prod- inlet switching valve, double wall tubing fit- for the product line, and an infrared electronic quid level sensor that is intrinsically safe.



Smart Skimmer
mping range from 5-25 GPH
mmer float travel: 30 inches
erating pressure range: 35-125 PSIG
imum operating well depth: 200 feet
imum air requirements: .5 CFM @ 125 PSIG
r quality requirements: 5-10 Microns
ght: 8 LBS
3-1/2" DIA. X 48" long
aterials : PVC, sst, viton, Buna, Aluminum
er No. **ADJ 1000**

Electronic Timer with Tank Shutoff
Selectable pumping cycles
Infrared sensor tank over-fill protection
Visual indicator displays tank full condition
Elapsed pumping timer displays in hours and minutes
Power supply choices: 12DC&110AC, or 12DC, 220AC
Size: 8"X6"X4" NEMA 3R locking enclosure
Pumping times (MINS):5,10,20,30,60,CONT.
Pumping cycles per day: 1,3,6,12,24,48
Infrared sensor assembly requires a 2"IPS tank port
Order No. **2500ES**

Xitech Instruments, Inc.
300-C Industrial Park Loop, Rio Rancho, New Mexico 87124 USA
Phone: 505-892-6501 Fax: 505-892-6637

Appendix F

WELEX Environmental, Inc., Hydro-skimmer

WELEX ENVIRONMENTAL, INC.

HYDRO-SKIMMER

NEW:

The WELEX Hydrocarbon Skimmer is now available in a ***clear calibrated*** PVC collection chamber. This will aid in:

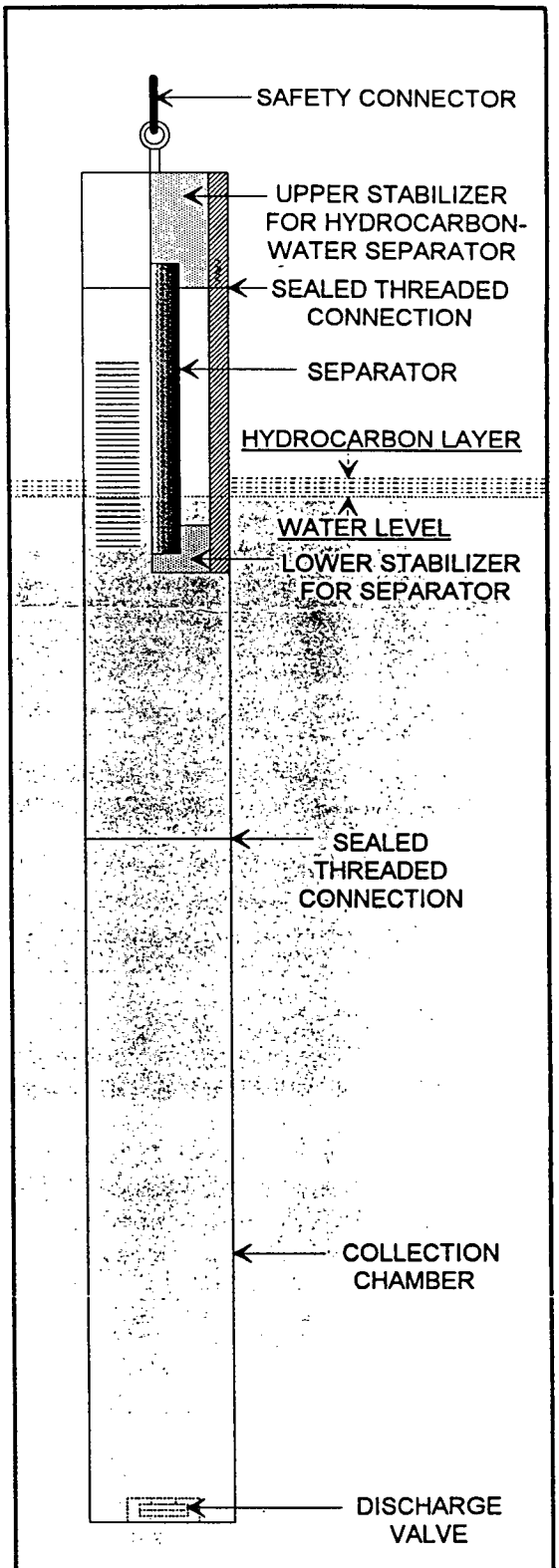
(1) Determining the volume of hydrocarbon collection.

(2) Allowing the field technician to view the filtration element for maintenance purposes.

WELEX **HYDRO-SKIMMER** Has:

- ✔ **FILTER ELEMENT** easily cleaned or changed by a field technician to prevent cross contamination and improve the efficiency of the **HYDRO-SKIMMER**
- ✔ **NO HYDROCARBON BASED (PVC) GLUES** that will leach in water thus giving off contaminates that will set off hydrocarbon detection equipment.
- ✔ **NO MOVING PARTS:** Eliminates springy collection tubes that eventually impede flotation. Eliminates need for vent tubes.
- ✔ **ACCESSORY EQUIPMENT** can be added to make the basic **HYDRO-SKIMMER** a continuous or active system.
- ✔ **THREADED CONNECTIONS** allow you to add or remove an extra collection chamber as needed.

WELL DIAMETER	ASSEMBLY LENGTHS		
	64 INCH	96 INCH	128 INCH
2" OR LARGER	.29 GALLON	.51 GALLON	.72 GALLON
	MODEL 201	MODEL 202	MODEL 203
3" OR LARGER	.57 GALLON	1.02 GALLON	1.47 GALLON
	MODEL 301	MODEL 302	MODEL 303
4" OR LARGER	1.33 GALLON	2.34 GALLON	3.36 GALLON
	MODEL 401	MODEL 402	MODEL 403



U.S. PATENT No. 5,322,388

DISTRIBUTED BY:

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HYDRO-SKIMMER INSTALLATION PROCEDURES

I. Take measurements:
   A. Total well depth to top of well casing.
   B. Depth to water.
   C. Depth to hydrocarbon product.
   Taking the above measurements is important because when installing the Hydro-Skimmer, the displacement of water may create a false water table, and cause the Hydro-Skimmer to be installed at an improper height, impeding collection.

II. Attach safety cord to eyebolt at top of Hydro-Skimmer.

III. Installation can be accomplished easier with the use of color cut paste to determine that the water/hydrocarbon interface comes within two to three inches of the lower slotted area of the Hydro-Skimmer.
   If color cut paste is not available, SLOWLY lower Hydro-Skimmer into monitor well, allowing it to locate its own buoyancy.

IV. Remove Hydro-Skimmer from well. The Hydro-Skimmer is preweighted to be buoyant with the water/hydrocarbon interface ideally within two inches into the lower slotted area of the skimmer. If the Hydro-Skimmer is not resting in this position, the following conditions should be considered:
   A. If the hydrocarbon thickness as measured in Step I exceeds 12", the Hydro-Skimmer will ride above the suggested level but will function properly as it will weight itself when collection of hydrocarbon product begins.
   B. If the hydrocarbon product is in excess of 6", the Hydro-Skimmer will collect to capacity in approximately 30 minutes, thus requiring the collection chamber to be emptied.
   C. If water salinity does not allow the Hydro-Skimmer to rest within the recommended water/hydrocarbon area, galvanized washers (included in shipment) may need to be threaded onto the safety connector to weight the unit so that EFFECTIVE collection may take place.

V. After above adjustments have been made, reinsert the Hydro-Skimmer into monitor well allowing 4" of slack in safety connector between the two eyebolts when the well cap is in its installed position.

VI. Removal and collection procedures:

A. Remove Hydro-Skimmer from monitor well.

B. Hold unit upright over recommended hydrocarbon collection container and open valve at base, allowing product to drain into container.

C. Close valve and reinsert Hydro-Skimmer into monitor well following installation procedures as outlined above.

VII. Maintenance of separator element:

The Hydro-Skimmer is designed with a removable separator element, thus allowing it to be cleaned. **REMOVE SEPARATOR ONLY WHEN NECESSARY.** Replacement elements are available if the element becomes damaged.

A. Remove upper stabilizer cap from Hydro-Skimmer. With your fingers carefully pull up on the inner aluminum tube. This will disengage the element from an O-ring seal in the lower stabilizer.

B. The element may be sprayed or immersed in any EPA approved hydrocarbon cleaning solution. If immersed in a solution, use a gentle rotation action to facilitate cleaning. **DO NOT SQUEEZE OR MASH ON PLASTIC WEBBING AREA.** This could dislocate or tear the inner filtration element.

C. To re-install the separator, place a non-hydrocarbon lubricant such as soap on the lower two inches of the aluminum tubing. Check bevel on lower edge of tubing to insure it is free of burrs that might cut O-ring in lower stabilizer. Place separator in Hydro-Skimmer and align with hole in lower stabilizer. Gently push down on separator (approximately one inch) until it is fully engaged in the lower stabilizer. The separator is held in place when the upper stabilizer cap is fully screwed onto the top of the Hydro-Skimmer.

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PRICE LIST
HYDRO SKIMMER

The prices quoted are Net 30 and are effective September 1, 1994.

Opaque Chamber Models		Clear Chamber Models	
Model 201	$295.00	Model 201C	$349.00
Model 202	355.00	Model 202C	424.00
Model 203	415.00	Model 203C	499.00
Model 301	349.00	Model 301C	395.00
Model 302	419.00	Model 302C	485.00
Model 303	489.00	Model 303C	575.00
Model 401	425.00	Model 401C	495.00
Model 402	515.00	Model 402C	620.00
Model 403	605.00	Model 403C	745.00

2" Locking well cap arranged to tie off safety line $19.50
4" Locking well cap arranged to tie off safety line $26.50
Filtration element replacement (fits all models) $79.95

Quantity Discounts

For orders of 6-10 units, a 10% discount is offered.
For orders of 11-20 units, a 20% discount is offered.

For quantity discounts, any variety of models may be ordered and are payable net 30.

Distributorships Available