GW - 8

GENERAL CORRESPONDENCE

YEAR(S):

07/1985

OCD received July 6/1983

GWR 8

File Copy - Do not Remove

DISCHARGE PLAN FOR EL PASO NATURAL GAS COMPANY'S MONUMENT PLANT LEA COUNTY, NEW MEXICO

El Paso Natural Gas Company

PREPARED BY:

EL PASO NATURAL GAS COMPANY
EL PASO, TEXAS

JULY 1983

DISCHARGE PLAN FOR

EL PASO NATURAL GAS COMPANY'S

MONUMENT PLANT

LEA COUNTY, NEW MEXICO

EL PASO NATURAL GAS COMPANY

EL PASO, TEXAS

MONUMENT DISCHARGE PLAN

TABLE OF CONTENTS

Figures

Tables

Appendices

Appendix	
A	Monument Plant Closure Plan
B	Copies of April 1983 Cooling Tower Sludge Analyses
C	Copies of Hazardous Waste Evaluations Analyses
D	EPA Hazardous Waste Notification
E	NMOCD Resolution
F	Rice Engineering Contract
G	Material Safety Data Sheets
H	Letter from V. D. Rheay to Plant Superintendents
I	Field Log
	Flow Records
J	Hydrologic Data Sheets for Monument Plant
K	Monument Plant Drain Line Test Procedure

Executive Summary

The Monument Plant has been in operation since the early 1950's to compress, treat, and transport natural gas. Groundwater from the Ogallala formation has been produced from the general area for both domestic and industrial use at the Plant. Wastewater resulting from Plant operations which was previously discharged to evaporation ponds is now being routed through a classifier system to remove suspended solids and oil and disposed of by contract with Rice Engineering, Inc. Rice Engineering uses this and other liquid streams for secondary recovery of oil.

This discharge plan demonstrates that all waste streams generated at the plant are now being disposed of properly. The Plan has been extensively revised to clarify the methods and procedures which El Paso Natural Gas Company is using, in accordance with the New Mexico Water Quality Control Commission Regulations, to ensure that groundwater quality in the general area of the Plant is not degraded. This report supersedes the previously submitted discharge plan and subsequent addendum and provides an update in accordance with New Mexico Oil Conservation Division (NMOCD) directions on developments that have taken place since the original plan was submitted. In addition, monthly progress reports have been submitted to the Agency since May 1982. This report therefore contains all the information included in those reports.

It is El Paso's intent to sufficiently describe the treatment of all waste streams from the Plant to comply with each part of the regulation. Therefore, the format of this plan has been structured to identify each part of the regulation which is applicable to discharge plans and then to supply information sufficient to indicate compliance.

Discharge Plan For
El Paso Natural Gas Company's
Monument Plant
Lea County, New Mexico

I. Introduction

This document describes a wastewater discharge plan (Plan) pertaining to El Paso Natural Gas Company (El Paso) Monument Field Plant (Plant) and is directed to officials of the New Mexico Oil Conservation Division (NMOCD) of the Energy and Minerals Department who in this case are implementing the New Mexico Water Quality Control Commission (NMWQCC) Regulations. The purpose of this Plan is to describe the methods and processes which El Paso is using to ensure that the water quality in the general area is not degraded. Figure 1 shows the general area of the Plant and related El Paso activities in southern Lea County.

El Paso has assembled, evaluated, and included in this Plan existing information from all known sources that could be used in defining the existing environment of the area. Much of the information presented herein is based on data previously published by the U.S. Geological Survey and New Mexico agencies, including the State Engineer, the NMOCD and the New Mexico Environmental Improvement Division (NMEID). Water sampling and analysis was conducted to characterize existing water quality in the general area of the Plant as well as the specific wastewater discharge.

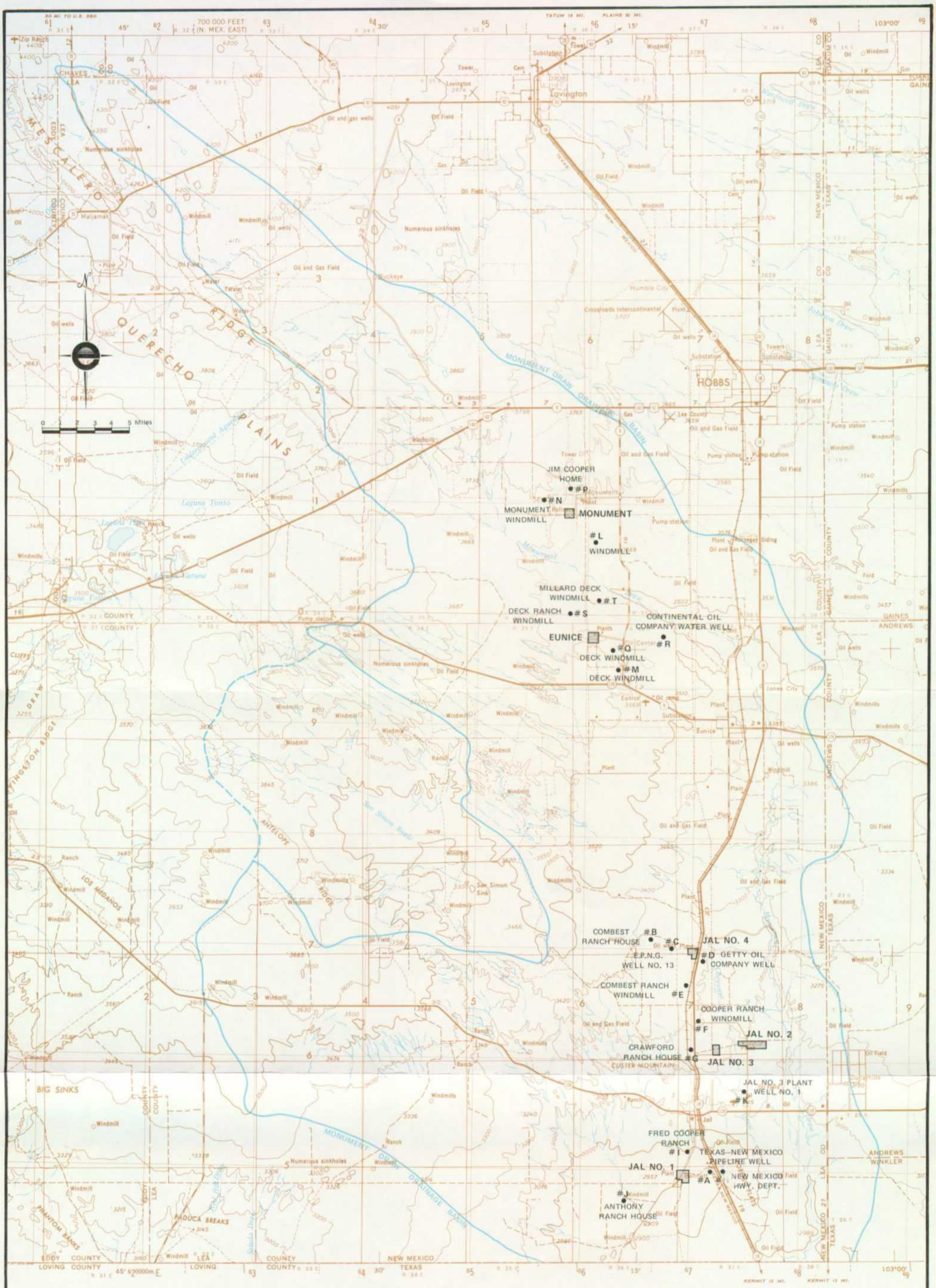
The Plan is presented in Section III following the background information section, and has been formatted to respond directly to all applicable provisions of Part 3 of the NMWQCC regulations. Each regulation is identified by number and the text is reproduced and underlined for reference. The response to each regulation directly follows and is intended to directly answer the specific information requirement for that regulation.

II. Background Information

Historical

In the late 1920's Maljamar Oil and Gas Corporation made the first discoveries of oil and gas in Lea County (Mangan, 1977). These discoveries were soon followed by successful exploration to the north of Jal in the Eunice area. The communities of Jal, Eunice and Hobbs profited and grew with the Permian Basin boom and have continued to prosper to this day.

Originally, oil operations separated the oil and gas at the wellhead and burned the gas in thousands of huge flares that lit up the whole basin. In the Kendrick Field alone, oil operations flared 200 million cubic feet of gas daily simply because there was nothing else to


700 000 FEET (N. MEX. EAST)
103°00'
Lovington
HOBBS
Eunice
Jal
JIM COOPER HOME
#P
#N
MONUMENT WINDMILL
MONUMENT
#L
WINDMILL
MILLARD DECK WINDMILL
#T
DECK RANCH WINDMILL
#S
CONTINENTAL OIL COMPANY WATER WELL
#R
#Q
DECK WINDMILL
#M
DECK WINDMILL
COMBEST RANCH HOUSE
#B
#C
JAL NO. 4
E.P.N.G. WELL NO. 13
#D GETTY OIL COMPANY WELL
COMBEST RANCH WINDMILL
#E
COOPER RANCH WINDMILL
#F
JAL NO. 2
CRAWFORD RANCH HOUSE
#G
JAL NO. 3
JAL NO. 3 PLANT WELL NO. 1
#K
FRED COOPER RANCH
#I
TEXAS-NEW MEXICO PIPELINE WELL
JAL NO. 1
#A
NEW MEXICO HWY. DEPT.
#J
ANTHONY RANCH HOUSE
MESCALERO RIDGE
QUERECHO PLAINS
MONUMENT DRAW DRAINAGE BASIN
BIG SINKS
PADUCA BREAKS
0 1 2 3 4 5 Miles
LEGEND
E.P.N.G. PLANTS
WATER WELLS
MONUMENT DRAW DRAINAGE BASIN
El Paso Natural Gas Company
FIGURE 1
LOCATION OF
EL PASO NATURAL GAS COMPANY
PLANTS AND MONUMENT DRAW
DRAINAGE BASIN
SOUTHERN LEA COUNTY, NEW MEXICO
F283 16038108
Prepared By
Pipeline Services Division

do with it. In September 1928, surveys for a planned pipeline to El Paso, Texas were begun at Jal. Soon after completion of the pipeline the first treating plant, called Jal No. 1, was constructed near the village of Jal. That plant initially treated up to three million cubic feet of gas per day. As the demand for natural gas increased, Jal Plant No. 2 was constructed in 1940, followed by Jal 3, Jal 4, Eunice and Monument during and after World War II.

The Monument Plant was constructed 3.5 miles southwest of Monument, New Mexico and began operations in May 1950. Natural gas from the Phillips Lea Plant, the Warren Monument Plant, and the El Paso Hobbs Plant was treated and compressed at the Monument Plant for transport to the Eunice Compressor Station. The Plant has been modified and/or upgraded from time to time, with additions or deletions as gas supplies dictated. Facilities at the Plant have consisted of a treatment plant, a dehydration plant, a compressor station and a gasoline absorption unit. However, the compression facilities are the only ones remaining in operation; the processing facilities have been shut down since February 24, 1976. No products are stored in retired vessels nor is there evidence of leaks occurring from the idled processing facilities. There are never any routine discharges of the products produced in a processing plant. Such products are put in storage tanks and sold. Accidental discharges are reported to the NMOCD.

The Plant occupies approximately 94 acres and can be seen in the 1981 aerial photograph on Figure 2. It also has an 18-house camp, of which 17 are currently occupied by El Paso employees.

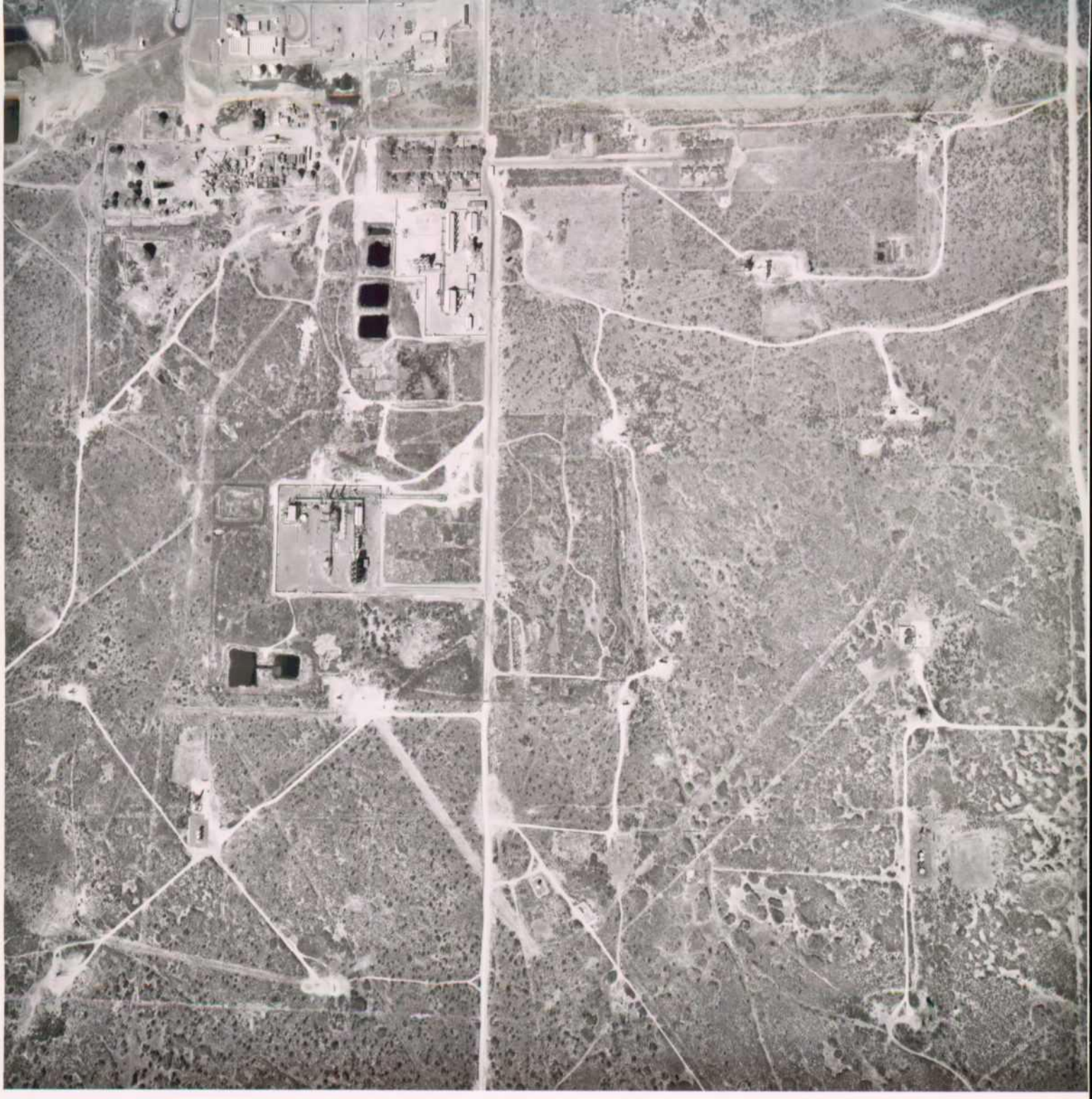
Information regarding ownership of tracts adjacent to the Plant site is contained in Figure 3. No other righs-of-way or easements exist within the Plant confines. All Plant property is owned by El Paso.

Water Supply

Groundwater from wells producing from the Ogallala formation is used to supply both industrial and domestic needs at the Plant. The Plant and its associated facilities use approximately 64 acre feet of water per year obtained from nine wells located north of the Plant in Section 13, Township 19 South, Range 36 East NMPM. The well field and collection system are shown on Figure 4 (map pocket).

Water Use and Past Disposal Practices

Water is used primarily by the cooling tower to cool compressed gas. The cooling towers require considerable make-up to replace water constantly being lost to evaporation. Water is also used for the domestic (home use and yard irrigation) needs of the employee camp facilities. Another use for water is in the closed cooling system for engine oil (oil cooling) and engine jackets (jacket cooling). This water is generally circulated to dry, external, heat exchangers where ambient air is blown across heat exchanger surfaces by large vertical-axis fans. In the past, waste streams (cooling tower blowdown and septic tank effluent) were disposed of in several earthen evaporation



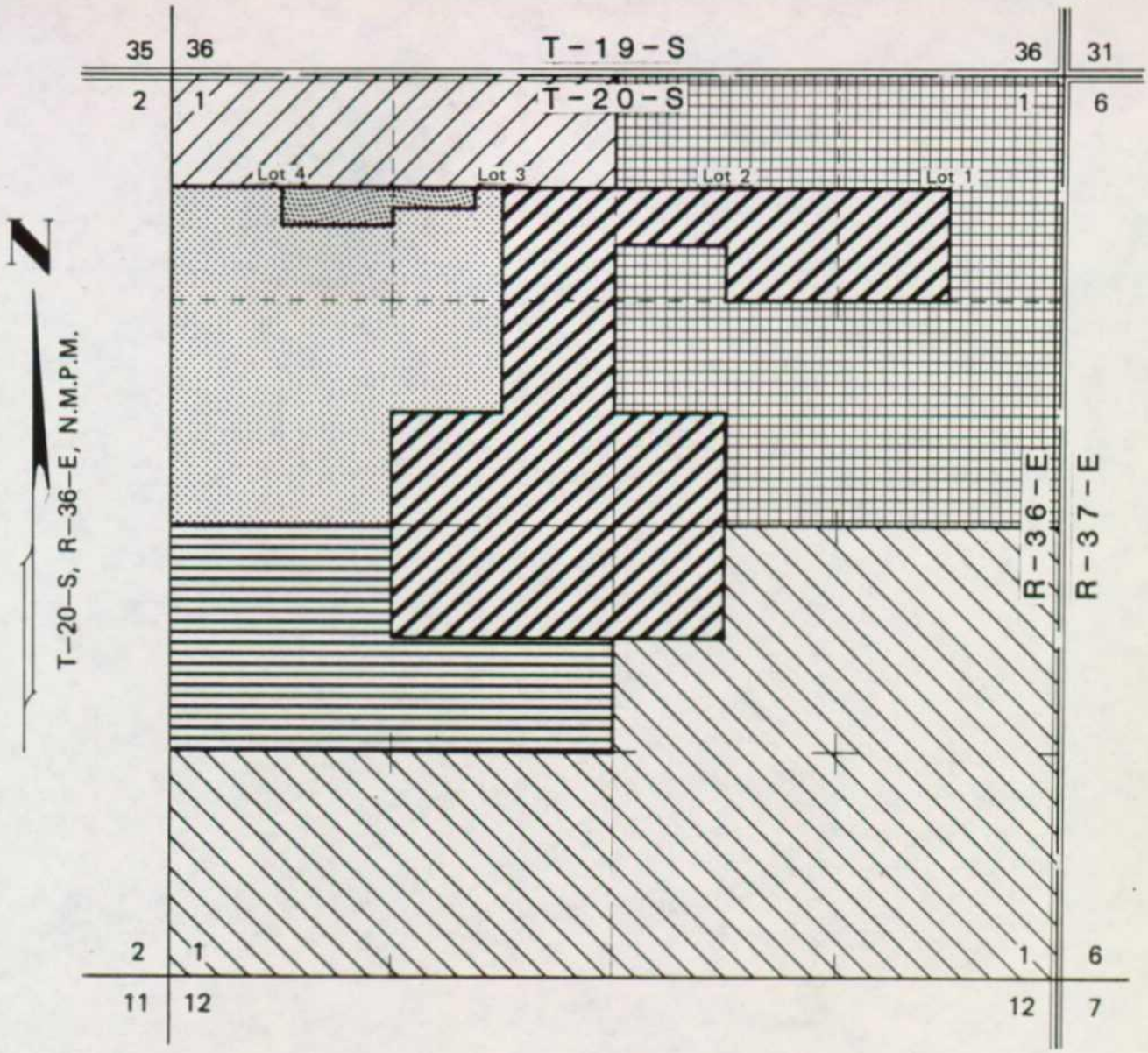
El Paso Natural Gas Company

FIGURE 2

1981 AERIAL VIEW OF
MONUMENT PLANT
LEA COUNTY, NEW MEXICO

N

NO SCALE



LEGEND

- El Paso Natural Gas Company
- Clarice F. Byrd, c/o James R. Byrd
- State of New Mexico/James R. Byrd
- State of New Mexico/ Climax Chemical Co.
- State of New Mexico/ Southern Union Refinery c/o Bob L. Caldwell, Agent
- Southern Union Refinery c/o Bob L. Caldwell, Agent
- Warren Petroleum Company c/o Gulf Oil Co. Tax Dept.

El Paso NATURAL GAS COMPANY

FIGURE 3

MONUMENT PLANT SITE

SECTION 1, T-20-S, R-36-E
LEA COUNTY, NEW MEXICO

Sheet 1 of 2

MONUMENT PLANT SITE

SUBDIVISION	OWNER/OCCUPANT/ADDRESS
SW¼ of Lot 1; SE¼ & N. 259' of the SW¼ of Lot 2; SE¼ of Lot 3; NE¼SE¼NW¼; S½SE¼NW¼; SW¼SW¼NE¼; N½NE¼SW¼; NW¼NW¼SE¼	El Paso Natural Gas Company P. O. Box 1492 El Paso, TX 79978
N½ & SE¼ Of Lot 1; N½ & S. 400.9' of the SW¼ of Lot 2; SE¼NE¼; N½SW¼NE¼; SE¼SW¼NE¼	Clarice F. Byrd c/o James R. Byrd 2617 Northacres Drive Hobbs, NM 88240
S½S½; NE¼SE¼; NE¼NW¼SE¼; S½NW¼SE¼	State of New Mexico/ James R. Byrd 2617 Northacres Drive Hobbs, NM 88240
NW¼SW¼; S½NW¼SW¼	State of New Mexico/ Climax Chemical Co. Box 1595 Hobbs, NM 88240
SW¼NW¼; NW¼SE¼NW¼; S½ of Lot 4 less 4.82 acres; SW¼ of Lot 3 less 2.87 acres	State of New Mexico/ Southern Union Refinery c/o Bob L. Caldwell, Agent No. 1701 First International Bldg. Dallas, TX 75521
1.87 acres out of Lot 3; 7.69 acres out of the S½NW¼NE¼	Southern Union Refinery c/o Bob L. Caldwell, Agent No. 1701 First International Bldg. Dallas, TX 75521
N½ of Lot 3 & N¼ of Lot 4	Warren Petroleum Company c/o Gulf Oil Co. Tax Dept. 1720 S. Bellaire St. Denver, Colo. 80222–0000

ponds. Table 1 shows analyses of composite samples taken from the evaporation ponds in 1981. No effluent is now being placed in any ponds, however. It is estimated that approximately 23 acre feet/year of wastewater were formerly discharged to the evaporation ponds.

The Plant had four ponds which were previously used for disposal of plant wastewater. These are referenced as ponds numbers 1, 2, 3 and 4 on Drawing No. 5007.19-1, sheets 1 and 2 (Figure 5) (Map Pocket). There were also two ponds used for domestic sewage effluent which are referenced as ponds number 5 and 6 on Figure 5, sheet 1 of 2. In addition, there was at one time a pond used for storage of fresh, untreated water.

The evaporation ponds covered a total of approximately 2.5 acres. The discharge pipes and ponds were constructed as the need arose with each pond embankment constructed using borrow material from the center of the pond and soils surrounding the pond site. The borrow material is generally a fine sandy loam over a caliche layer. There are no known contract specifications or drawings in existence describing the construction phase of the ponds.

Aerial Photo History of Ponds (Figures 6 through 13)

Ponds number two, four and five were installed prior to 1959 as shown on aerial photographs taken during that year. Because the Plant was constructed in 1950, it is probable that these three ponds were installed at approximately the same time.

Pond number one was installed prior to 1959 as shown on aerial photographs. Since this pond was used for the treating plant service, and the treating plant was installed in 1954, it is probable that pond number one was installed in 1954. Pond number six, the sewage effluent pond for the east camp houses, was also installed prior to 1959. Since these houses were built in 1954, it is probable that pond number six was installed in 1954. Aerial photographs indicate that pond number three was installed between 1959 and 1965.

There is no known failure of any ponds depicted in the aerial photo history.

Pond Closure

The four abandoned ponds previously used for plant wastewater and the two ponds used for domestic sewage have been pumped out and are all currently being allowed to dry by evaporation. These ponds will be closed in accordance with the pond closure plan, presented in Appendix A. Samples of sludges from similar ponds at another facility (Jal No. 4) have been analyzed for organic constitutents and the Monument Plant closure plan reflects the results of those analyses. Since processing and compression of gas is similar in many of El Paso's plants, the NMOCD agreed that the closure assumption from sludge sampling at Jal 4 could be applied at other Lea County Plants.

Table 1

Water Quality Analyses of Composite Samples from Evaporation Ponds
at El Paso Natural Gas Company's Monument Plant
Analysis: December 1980

Constituent	Sample Location 1/ #1	#2	#3	#4	#5
Sulfate (SO_4), mg/L	589	85	90	549	55.5
Chloride (Cl), mg/L	149	2822	347	156	78.1
Nitrate (NO_3 as N), mg/L	2	1	1	2	2
Specific Conductance, micro mhos/cm	1400	5900	1050	1240	660
pH	7.4	7.15	7.6	7.25	7.75
Total Dissolved Solids, mg/L	1584	6073	1418	1484	552
Chromium (Cr), mg/L	0.6	0.4	0.3	1.0	0
Copper (Cu), mg/L	0.1	0.05	0	0.18	0
Iron (Fe), mg/L	0.65	0.15	0.10	0.20	0.15
Manganese (Mn), mg/L	0.14	0.09	0.03	0.03	0.05
Zinc (Zn), mg/L	0.85	0.05	0	2.0	0.07

1/ Pond designations are shown on Figure 5B.

NOTE: SHOWS WARREN PETROLEUM TO THE NORTH AND CLIMAX CHEMICAL TO THE NORTHWEST.

El Paso Natural Gas Company

FIGURE 6

1951 AERIAL VIEW OF MONUMENT PLANT
LEA COUNTY, NEW MEXICO

N

NO SCALE

El Paso Natural Gas Company

FIGURE 7

1958 AERIAL VIEW OF
MONUMENT PLANT
LEA COUNTY, NEW MEXICO

NO SCALE

NOTE: SHOWS OVERFLOW AREA SOUTHEAST OF PRESENT POND NO. 2, DUE SOUTH OF CAMP. POND NO. 3 UNDER CONSTRUCTION. FRESH WATER STORAGE POND IN SOUTHWEST CORNER NEARLY DRY.

El Paso Natural Gas Company

FIGURE 8

1965 AERIAL VIEW OF MONUMENT PLANT
LEA COUNTY, NEW MEXICO

N

NO SCALE

NOTE: SHOWS CAMP AND CLIMAX CHEMICAL.

El Paso Natural Gas Company

FIGURE 9

1967 AERIAL VIEW OF
MONUMENT PLANT
LEA COUNTY, NEW MEXICO

N

NO SCALE

El Paso Natural Gas Company

FIGURE 10

1973 AERIAL VIEW OF MONUMENT PLANT
LEA COUNTY, NEW MEXICO

N

NO SCALE

NOTE: OVERFLOW AREA IN SAME AREA AS 1965 PHOTO.

El Paso Natural Gas Company

FIGURE 12

1976 AERIAL VIEW OF MONUMENT PLANT
LEA COUNTY, NEW MEXICO

N

NO SCALE

The one pond that has been used for fresh water storage is currently dry and is no longer being used. There are no other known abandoned ponds at the Plant, and there are no known depressions in which water has ever collected. All rainwater which collects in abandoned ponds prior to actual pond closure will be pumped out as is practicable.

The general approach to pond closure at Monument Plant will entail covering the pond with dirt fill and then mounding the fill dirt over the former pond areas to preclude the possibility of producing a hydraulic head by ponding water.

Research has shown that petroleum residues can be degraded in a soil environment (Cresswell, 1977). The process usually involves the mixing of contaminated soil with fresh soil and harrowing to improve aeration, addition of fertilization to facilitate bacterial breakdown of the residue and the establishment of vegetation (Gudin and Syratt, 1975). Cresswell (1977) reports that healthy crops of wheat were grown on test plots in Oklahoma containing four to eight percent of oil in the upper six inches of soil. It was found that the oil, including oily waste from the bottoms of wastewater treatment ponds, was held in the shallow soil zone in which it was originally applied and did not move vertically or horizontally in the soil. Such reclamation steps would improve the closure process and will be utilized where time allows or necessity dictates.

Other Disposal Practices

In the past, crankcase oil was often disposed of in pits on plant property, while other waste oil was collected by the drains and sent to the ponds. These practices have now ceased in accordance with provisions of this Plan.

Cooling tower basins (of which only one is now in use) have been cleaned approximately every three to five years. The sludge removed from the basins is composed primarily of blow sand captured by the cooling tower water on windy days and calcarious deposits of calcium and sodium salts left as water evaporates. These sludges were generally spread out on the plant property and allowed to dry. All other plant wastes were disposed of by putting liquids in ponds and solids in pits.

Sludge samples were taken from the presently operating cooling tower basin in April 1983 as well as from the gas processing cooling tower which is now idle. These samples were analyzed for the determination of chromium content by the extraction procedure outlined in Appendix II of 40 CFR part 261 (U.S. Environmental Protection Agency, 1980). Chromium was selected because it was the most likely possible hazardous waste constituent that could be present based on El Paso's knowledge of process wastes being generated. The results of the analysis show the chromium content for the operating tower to be 0.04 milligrams per liter and 0.07 milligrams per liter for the idle tower. By regulation this does not constitute a hazardous waste. The analysis report is found in Appendix B.

A fairly common past disposal practice at the Plant also involved the draining of an engine's closed cooling water system (oil and jacket) whenever repairs were required on engines in A or B Plant or the Auxiliary Building. Also,the back washing of side stream filters on the oil and jacket water cooling systems has been routinely performed. All of these activities have produced an effluent which contained chromium metal residual because chromium-based water treating chemicals have been used.

El Paso has accordingly evaluated wastewaters, waste products and pond and tower sludges for hazardous waste properties according to the referenced sampling and analytical procedures found at 40 CFR Part 261 (Analyses in Appendix C.). In addition, those processes which might use products that may be either listed hazardous wastes or characteristic hazardous waste have been evaluated. The results verify that under no circumstances can a chromium concentration in excess of 5 ppm be identified in Monument Plant wastewater.

El Paso has performed hazardous waste analyses because of the industry-wide recognized potential environmental impacts that come from the use of chromium-based water treating chemicals. These actions were taken in spite of the fact that the oil and gas industry is specifically exempt from the RCRA law.

The Plant is not involved in any hazardous waste activities. Nonetheless, El Paso has requested and received an EPA identification number pursuant to the Resource Conservation and Recovery Act, Section 3010. The identification number is NMT 360 010 243. El Paso has specifically requested interpretations from EPA and NMEID for confirmation of probable statutory exemptions. See Appendix D for a copy of the notification and request. Absent further clarification from EPA, El Paso remains convinced that the NMOCD has jurisdiction over Monument Plant and, pursuant to a recent resolution reaffirms that the NMOCD shall approve or disapprove all discharge plans from facilities under their jurisdiction (see May 12, 1983 Minutes of OCD Meeting in Appendix E).

III The Plan

The following is formatted such that each part of the NMWQCC Regulations are reproduced for ease in reference, followed by a response which is directed specifically to the requirement.

> § 3-106: Application for Discharge Plan approval.
> C. A proposed discharge plan shall set forth in detail the methods or techniques the discharger proposes to use or processes expected to naturally occur which will ensure compliance with these regulations. At least the following information shall be included in the plan:
> 1. Quantity, quality and flow characteristics of the discharge;

All wastewater resulting from Plant operations is now routed through a classifier to remove suspended solids and oil and the classified water is then pumped into a disposal well system operated by Rice Engineering, Inc. (Rice Engineering). This system was placed into operation on October 26, 1982.

The wastewater is delivered to the Rice Engineering Disposal System, Monument Branch, by means of two vertical, centrifugal-type pumps. The pumps are each sized for full flow and are operated with one running and one on standby. The filter is located downstream of the wastewater pumps and designed with an automatic backwash feature that is based on time or pressure drop and is controlled by a microprocessor system. The flow from the filters into the Rice Engineering Disposal System is measured utilizing a recording meter. The meter is a Brooks Model 10 propeller meter with a six digit totalizing register calibrated to register in barrels or gallons. A Foxboro Model 13A1 differential pressure transmitter is also employed with a Model 40 receiver-recorder. For further discussions of the wastewater collection and treatment system please see pages 29 thru 35 of this report.

The total measured wastewater disposed of into the Rice Engineering system during November and December of 1982 varied from 4,320 gallons per day to 28,800 gallons per day. The average disposal rate for this time period was approximately 12,100 gallons per day. The estimated yearly averge rate is 14,400 gallons per day. The classifier system is sized so that at a flow of 14,400 gpd, there is an 8 day contingency tank capacity.

Samples of the Plant's discharge water were collected by compositing samples from the waste stream as delivered to Rice Engineering. The composite samples included all industrial and domestic wastewater downstream of the classifier. For a more thorough discussion of the composite analyses and how they demonstrate a proportional-time weighted sampling, reflecting flow characteristics actually being experienced at the Plant, please see the "Characterization of the Wastestream" in Section 3-106(c)(5) page 38 of this report.

The waste characteristics of each stream are shown in Table 2. Chemical analyses of two composite wastewater samples are shown in Table 3.

2. Location of the discharge and of any bodies of water, watercourses and ground water discharge sites within one mile of the outside perimeter of the discharge site, and existing or proposed wells to be used for monitoring;

Rice Engineering uses El Paso's wastewater as a secondary recovery fluid by injecting it into the Hobbs field of the San Andres formation (Le Floic, 1983). This formation is located on the western edge of the central basin platform of the Permian Basin consisting of dolomite with anhydrite and shale streaks. The dolomite becomes sandy and oolitic in scattered areas within the field (West Texas Geological Society, 1966).

Table 2

Monument Plant
Characteristics of Wastewater Streams

Source	Primary Effluent	Estimated Flow (GPD*)	Additives to Stream	
			Materials Added	Purpose of Additive
Separators	Water and Hydrocarbon liquid	1,152	None	
Engine cooling water* (closed systems)	Water/oil hydrocarbon		Chromine-T	Corrosion Inhibitor
Water Treater	Water/high chloride water	576	Sodium Chloride	Zeolite Regeneration
Camp	Sewage	5,760	Chlorine	Biocide
Cooling Tower	High TDS water	6,624	Antipol-640	Anti-corrosion
			Hydrochem D-300	Dispersant
			Chlorine	Biocide
			Sulfuric Acid	pH control
			Toxsene 35	Biocide
			Toxsene 37	Biocide

*Closed systems containment system is being installed so that engine coolants are not disposed of in a waste stream.

Table 3

Characterization of Monument Wastewater
Two Sets of Two (2) 24-Hour
Composite Analyses

UNITS ?

Constituent	April 1983 26th thru 27th	April 1983 27th thru 28th	STAND	June 1983 21st thru 23rd*
Cyanide	0.0029	0.0032	.2	-
Fluoride	1.2	2.0	1.6	-
Nitrate as N	0.93	1.35	10	-
Aluminum	< .05	<0.05	5	-
Arsenic	0.005	0.005	.1	-
Selenium	<0.0025	<0.002	.05	-
Mercury	<0.002	<0.002	.002	<0.001
Iron	1.25	0.75	1.0	1.36
Zinc	0.39	0.46	10	-
Lead	<0.05	<0.05	.05	<0.01
Cadmium	0.003	0.003	.01	<0.002
Cobalt	0.02	0.02	.05	-
Chromium, Total	0.09	0.07	.05	<0.04
Molybdenum	<0.05	<0.05	1.0	-
Silver	<0.01	<0.01	.05	<0.01
Copper	0.003	0.004	1.0	-
Manganese	0.15	0.19	.2	-
Nickle	<0.05	<0.05	.2	-
Barium	1.52	1.17	1.0	<0.2
Boron	<0.5	<0.05	.75	-
Calcium	-	-		390
Magnesium	-	-		736
Sodium	-	-		889
Bicarbonate	-	-		142
Carbonate	-	-		0
Hydroxide	-	-		0
Sulfate	308	423	600	433
Chloride	1740	1190	250	1440
TDS (Conductivity)	4110	3060	1000	3530
COD	461	278		
Phenol	0.396	0.175	.005	
Benzene	1.78	0.748	.001	
Toluene	0.53	0.174	15	
Carbon Tetrachloride	<0.01	<0.01	.01	
1-1 Dichloroethane	<0.01	<0.01	.005	
PCE	<0.01	<0.01	.02	
TCE	<0.01	<0.01	.1	

* Analysis shown results from combining two 24-hr composites

The water is injected at a depth of from 4100 to 5300 feet enabling recovery of oil from wells near Section 8, T-20-S, R-37-E. The formation water is known to be a brine containing sulfate and chloride salts in concentrations in excess of 10,000 mg/L. The formation water has been described as salty sulfur water (West Texas Geological Society, 1966).

Rice Engineering operates its secondary recovery wells in accordance with permits issued by NMOCD (Le Floic, 1983). Hence, complying with those permits is the responsibility of Rice Engineering. El Paso respectfully refers further questions pertaining to the injection system to Rice Engineering (see Contract, Appendix F) or the permit section of the NMOCD responsible for secondary recovery wells.

There are no bodies of water or groundwater discharge sites within one mile of the plant site. Water courses in the area are generally ephemeral washes and are described in the section of this Plan concerning flooding potential.

3. Depth to and TDS concentration of the groundwater most likely to be affected by the discharge;

There are principally two separate aquifers to be considered when evaluating effect of wastewater discharges into the Permian formation. The most likely to be affected are the aquifers contained in the deeper Permian; secondarily, the shallow overlying Ogallala aquifer from which water is presently extracted for use may be affected (however unlikely).

The Plant is located in an area underlain by clastic and chemical sedimentary rocks ranging in age from Ordovician through Triassic, and by alluvial sediments of Quaternary age. The sedimentary rocks consist predominantly of shale, sandstone, siltstone, dolomite, gypsum, anhydrite and salt. The deeper Permian formation is an important source of oil and gas. The alluvial cover over the area consists of sand, gravel, silt and clay and is called the Ogallala formation which is the principal source of potable groundwater in the area for both domestic and industrial uses. The Ogallala overlies the relatively impermeable Chinle formation and slopes to the southeast, generally parallel to the underlying Pre-Ogallala and present clay subsurface (Table 4). The general hydraulic gradient of about 10-12 feet per mile imparts an easterly or southeasterly movement to the groundwater (Cronin, 1969). Pleistocene alluvium forms a continuous aquifer with the Ogallala formation. A general potentiometric surface map is shown on Figure 14. The lateral movement of groundwater in this aquifer has been estimated to range from two inches per day (Cronin, 1969) to no more than one foot per day (Minton, n.d.).

A water sample was taken on December 13, 1982, from a NMEID (1981) monitoring well partially penetrating the Ogllala and located on the plant property; the location of this well can be found on Figure 5.

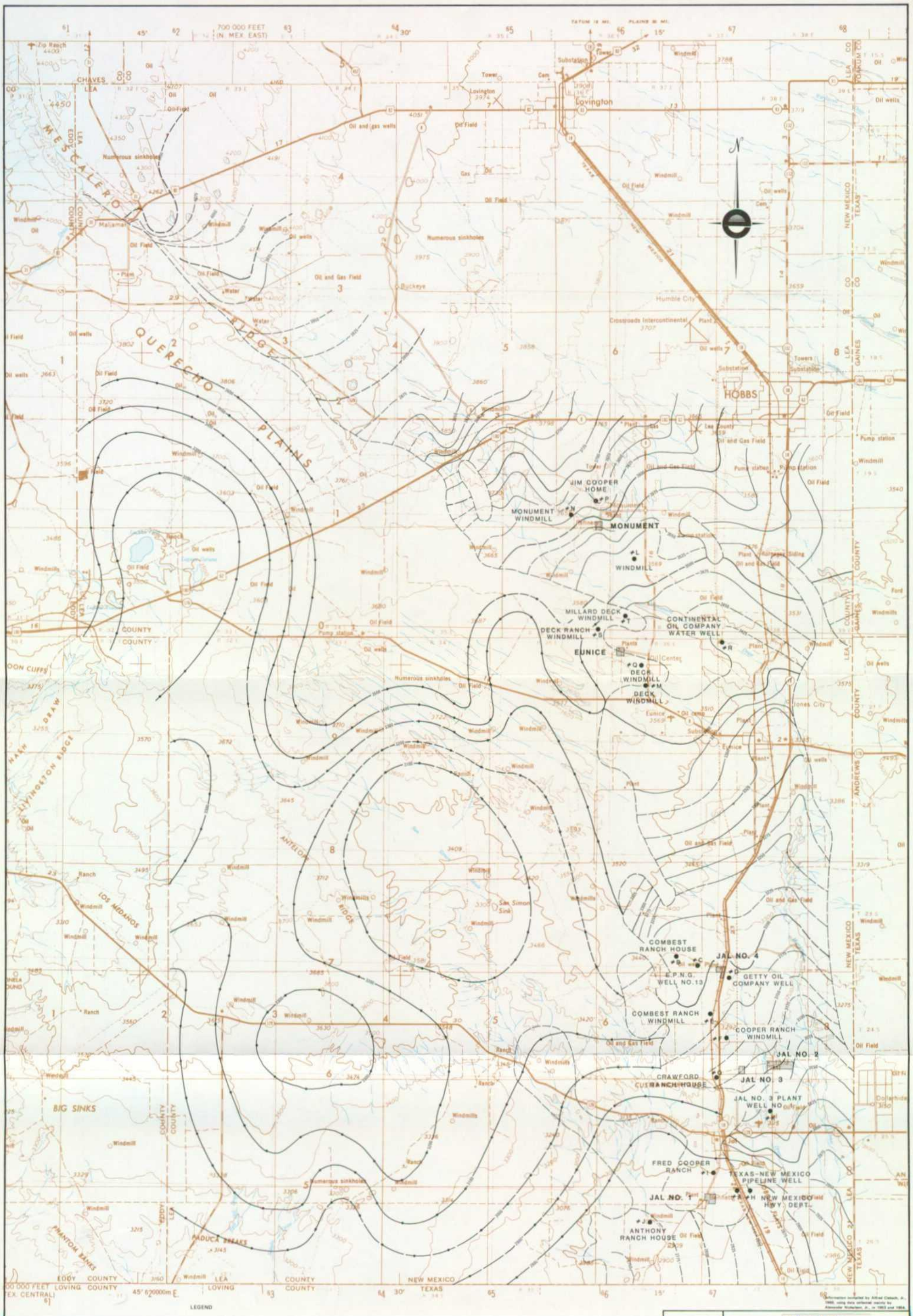
The monitoring well has a total depth of 59 feet, and a pump setting of 55 feet was used. For sampling, the well was pumped for 30

Table 4

Stratigraphic Units in
Southern Lea County, New Mexico

Geologic Age	Geologic Unit	Thickness (ft)	General Character	Water-Bearing Properties
Recent and Pleistocene	Sand	0-30±	Dune sand, unconsolidated stabilized to drifting, semiconsolidated at depth; fine-to medium-grained.	Above the zone of saturation, hence, does not yield water to wells. Aids recharge to underlying formations by permitting rapid infiltration of rainwater.
	Alluvium	0-400±	Channel and lake deposits; alternating thick bedded calcareous silt, fine sand, and clay; thickest in San Simon Swale; less than 100 feet thick in most places.	Saturated and highly permeable in places in east end of Laguna Valley. Forms continuous aquifer with Ogallala formation. Wells usually yield less than 30 gpm. Locally above the water table.
Pliocene	Ogallala	0-300±	Semiconsolidated fine-grained calcareous sand capped with thick layer of caliche; contains some clay, silt, and gravel.	Major water-bearing formation of the area. Unsaturated in many localities, such as north side of Grama Ridge, west side of Eunice Plain, Antelope Ridge area, and Rattlesnake Ridge. Greatest saturated thickness along east side of Eunice Plain, west of Monument Draw, where wells yield up to 30 gpm. Highest yields, up to 700 gpm, obtained from wells along south edge of Eunice Plain, east of Jal.
	Undifferentiated	35±	Small isolated and buried residual blocks of limestone, about 3 miles east of Eunice.	Possibly small isolated bodies of water locally.
	Chinle formation	0-1,270±	Claystone, red and green; minor fine-grained sandstones and siltstones; underlies all of eastern part of southern Lea County area; then westward; absent in extreme west.	Yields small quantities of water from sandstone beds. Yields are rarely over 10 gpm. Water has high sulfate content.
	Santa Rosa sandstone	140-300±	Sandstone, chiefly red but locally white, gray, or greenish-gray; fine-to coarse-grained; exposed in extreme west; underlies Cenozoic rocks in western part of area, and is present at depth in eastern part.	Yields small quantities of water over most of of the area. Some wells are reported to yield as much as 100 gpm. Water has high sulfate content.
	Undifferentiated	90-400+	Siltstone, red, shale, and sandstone; present at depth under all of southern Lea County.	No wells are known to be bottomed in the red beds. Probably can yield very small quantities of high-sulfate water.
		6,500-17,000±	Thick basin deposits ranging in character from evaporites to coarse clastics; thinnest on the east side of the area over the Central basin platform, thickest toward the southwest.	No presently usable water supply available from these rocks. Source of highly mineralized oil-field waters.
			Granite, granodioritic and other igneous and metamorphic rocks; complex structure.	Not hydrologically significant.

Information from Nicholson, A. and A. Clebsch, Geology and Ground-Water Conditions in Southern Lea County, New Mexico Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology, Socorro, NM 1961.


700 000 FEET (N. MEX. EAST)
CHAVES
LEA
EDDY
COUNTY
MESCALERO RIDGE
QUERECHO PLAINS
MARK DRAW
LIVINGSTON RIDGE
ANTELOPE RIDGE
LOS MEDANOS
BIG SINKS
PHANTOM BANKS
PADUCA BREAKS
Lovington
Maljamar
Eunice
HOBBS
Humble City
Buckeye
Monument
Jones City
Crossroads Intercontinental
Substation
Towers
Windmill
Oil Field
Oil and Gas Field
Oil wells
Numerous sinkholes
Pump station
Plant
Ranch
Tower
Gas
Water
JIM COOPER HOME
MONUMENT WINDMILL
WINDMILL
MILLARD DECK WINDMILL
DECK RANCH WINDMILL
DECK WINDMILL
CONTINENTAL OIL COMPANY WATER WELL
COMBEST RANCH HOUSE
COMBEST RANCH WINDMILL
E.P.N.G. WELL NO. 13
JAL NO. 4
GETTY OIL COMPANY WELL
COOPER RANCH WINDMILL
JAL NO. 2
JAL NO. 3
JAL NO. 3 PLANT WELL NO.
CRAWFORD RANCH HOUSE
FRED COOPER RANCH
TEXAS-NEW MEXICO PIPELINE WELL
JAL NO. 1
NEW MEXICO HWY. DEPT.
ANTHONY RANCH HOUSE
NEW MEXICO
TEXAS
EDDY COUNTY
LEA COUNTY
LOVING COUNTY
45' 62000m E.
63 30' 64 15' 65 66 67 68
LEGEND
3925 WATER-TABLE CONTOUR IN TERTIARY OR QUATERNARY ROCKS DASHED WHERE INFERRED OR UNCERTAIN.
3500 WATER-TABLE OR PIEZOMETRIC CONTOUR ON WATER BODY IN TRIASSIC AQUIFERS DASHED WHERE INFERRED OR UNCERTAIN.
APPROXIMATE POSITION OF BOUNDARY BETWEEN TRIASSIC ROCKS AND SATURATED TERTIARY AND QUATERNARY ROCKS
E.P.N.G. PLANTS
WATER WELLS
0 5 MILES
El Paso Natural Gas Company
FIGURE 14
POTENTOMETRIC SURFACE OF GROUNDWATER
SOUTHERN LEA COUNTY, NEW MEXICO
Prepared By Pipeline Services Division

minutes at 12-14 gpm until clear. A sample was then obtained and analyzed by the El Paso Permian and Southern Division laboratories, with the heavy metals analyses performed by the latter. The results (Table 5) show that the existing groundwater in the vicinity of the plant is high in TDS but low in various heavy metals concentration.

The quality of water in southern Lea County in general is shown in Figure 15. Water samples were also collected by El Paso in January 1981 from eight privately owned wells in the area of the Plant. To the best knowledge of the owner, these are shallow wells withdrawing water from the Ogallala. The results of analyses of these samples are shown in Table 6. The water quality of the Ogallala in the Plant area is brackish (defined as water ranging from 1,000 to 10,000 mg/l of total dissolved solids). According to the NM State Engineer, groundwater in this formation is deteriorating in quality (Boyer et al., 1980).

Groundwater from water bearing formations below the Ogallala contain higher concentrations of dissolved solids, primarily chloride and sulfate salts (Bureau of Reclamation, 1976). Triassic-age formations have also yielded acceptable potable water but in low to moderate quantities and of poorer quality than the Ogallala. The Permian formation contains water of saline to brine quality. Although these waters are generally not used for domestic purposes they may be used for injection into oil and gas fields for secondary recovery.

4. Flooding potential of the site;

The Plant is situated in the Pecos River Basin. The Basin in southern Lea County has no perennial streams, but there are a few ephemeral streams and broad shallow drainages that may flow following the thunderstorms which are common during July and August. Most precipitation quickly soaks into the soil or evaporates. The land surface in the Plant area has little relief, falling approximately 12 feet per mile. Runoff from the Plant flows south to southwest to provide water to Monument Draw, a north to south trending wash located to the south of the Plant. The Monument Draw drainage basin, ending at the Texas-New Mexico boundary, encompasses 1,320 square miles. The Basin boundaries are shown on Figure 1. San Simon Swale, a geologic sink, is also shown as a portion of the drainage basin; however, it is very unlikely that the swale area would contribute water to Monument Draw. The draw is partly filled, primarily by dune sand deposits, and is densely overgrown in many places with vegetation. Figure 5 shows the watershed and drainage system in and around the Plant (Map Pocket).

Monument Draw flows into west Texas near the southeastern corner of New Mexico. Here, Monument Draw enters a very irregular topographic area that does not have an integrated drainage. From available maps, it appears that the draw fans out and terminates a few miles south of the Texas state line. This area is essentially a closed subbasin, where surface flows are generally toward the center of the basin to a series of intermittent playas. The hydrologic characteristics of

Table 5

Groundwater Analysis of NMEID Monitoring Well on Monument Property [1/]

Constituent	Concentration in ppm ≡ mg/l
Fluoride	3.45
Nitrate as N	3.10
Arsenic	0.022
Selenium	0.004
Mercury	<0.001
Iron	0.3
Zinc	0.26
Cadmium	<0.001
Lead	<0.01
Chromium, Total	0.01
Chromium, Hexavalent	<0.01
Silver	<0.005
Manganese	<0.04
Barium	0.10
Calcium	696
Magnesium	72
Sodium	1285
Bicarbonate	224
Carbonate	0
Hydroxide	0
Sulfate	576
Chloride	2876
Total Alkalinity as $CaCO_3$	184
Silica	82
TDS (Conductivity)	9000 micro mhos
pH	7.2

[1/] Date: 12/13/82

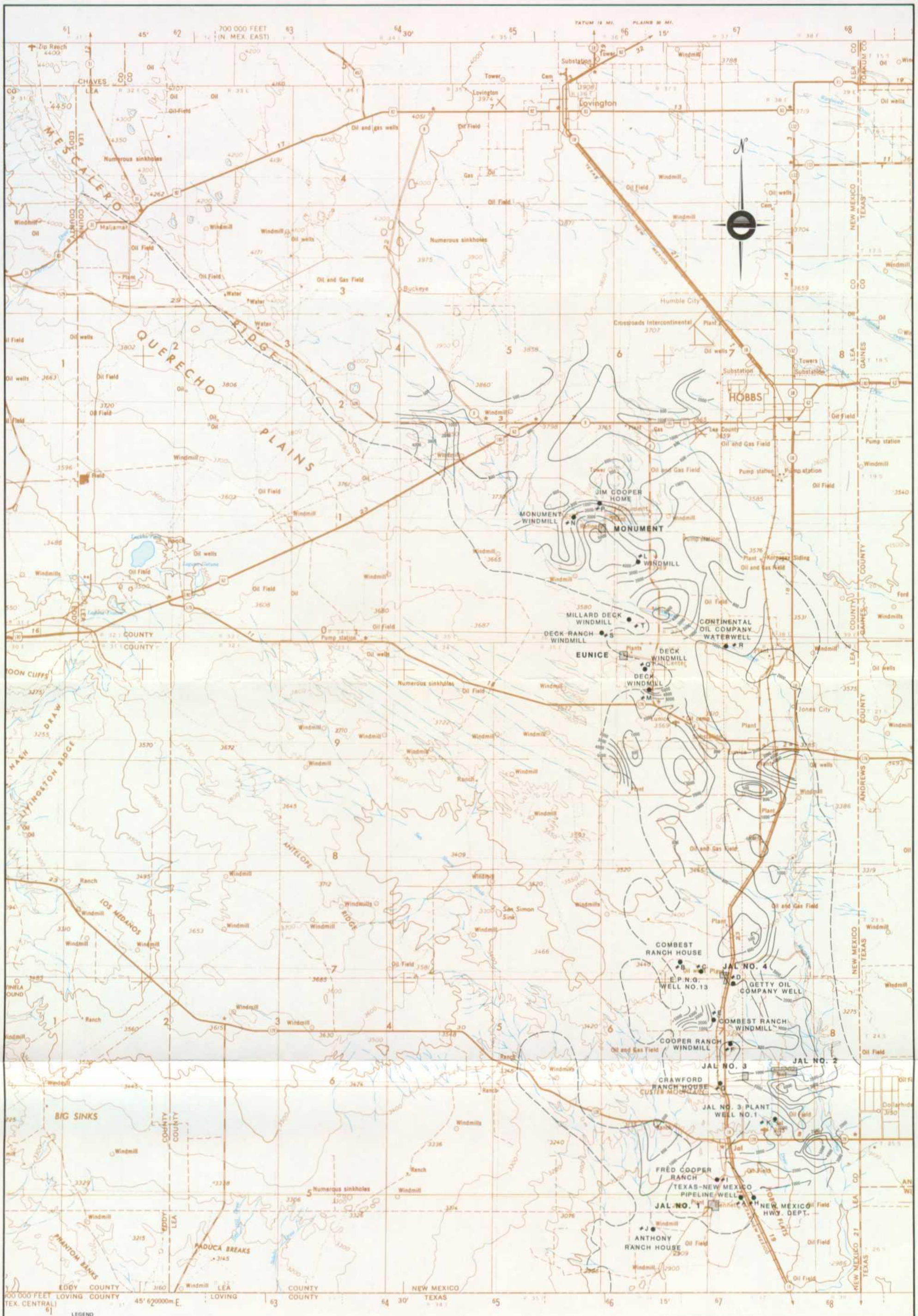

700 000 FEET (N. MEX. EAST)
Zip Ranch
CHAVES
LEA
EDDY
COUNTY
MESCALERO RIDGE
Maljamar
Oil and gas wells
Numerous sinkholes
Oil and Gas Field
Buckeye
Lovington
Tower
Substation
Windmill
Oil wells
Humble City
Crossroads Intercontinental
HOBBS
Towers
Substation
Pump station
QUERECHO PLAINS
JIM COOPER HOME
MONUMENT WINDMILL
MONUMENT
WINDMILL
MILLARD DECK WINDMILL
DECK RANCH WINDMILL
CONTINENTAL OIL COMPANY WATERWELL
EUNICE
DECK WINDMILL
Jones City
Plant
Railroad Siding
LEA COUNTY
GAINES COUNTY
ANDREWS COUNTY
NEW MEXICO
TEXAS
LIVINGSTON RIDGE
NASH DRAW
ANTELOPE RIDGE
LOS MEDANOS
COMBEST RANCH HOUSE
JAL NO. 4
E.P.N.G. WELL NO.13
GETTY OIL COMPANY WELL
COMBEST RANCH WINDMILL
COOPER RANCH WINDMILL
JAL NO. 3
JAL NO. 2
CRAWFORD RANCH HOUSE
JAL NO. 3 PLANT WELL NO.1
FRED COOPER RANCH
TEXAS-NEW MEXICO PIPELINE WELL
JAL NO. 1
NEW MEXICO HWY. DEPT.
ANTHONY RANCH HOUSE
BIG SINKS
PHANTOM BANKS
PADUCA BREAKS
EDDY COUNTY
LOVING COUNTY
LEA COUNTY
NEW MEXICO
TEXAS
700 000 FEET (TEX. CENTRAL)
LEGEND
APPROXIMATE POSITION OF BOUNDARY BETWEEN TRIASSIC ROCKS AND SATURATED TERTIARY AND QUATERNARY ROCKS
ELECTRICAL CONDUCTIVITY IN MILLIMHOS PER CENTIMETER
E.P.N.G. PLANTS
WATER WELLS
5 MILES
El Paso Natural Gas Company
FIGURE 15
ELECTRICAL CONDUCTIVITY ISOGRAMS FOR THE OGALLALA FORMATION
SOUTHERN LEA COUNTY, NEW MEXICO
Prepared By Pipeline Services Division

Table 6

Analyses of Well Water from the Ogallala Formation
Located near El Paso Natural Gas Company's Eunice and Monument Plants

Constituent	Well Designation[1]							
	L[1]	M[2]	N[3]	P[4]	Q[5]	R[6]	S[7]	T[8]
Sulfate (SO_4), mg/L	124	1780	145	72	480	140	380	1480
Chloride (Cl), mg/L	1383	1078	220	35	407	89	145	624
Nitrate (NO_3 as N), mg/L	0	0	4.5	3	5	9.5	0	0
Specific Conductance, mmhos/cm	4100	4800	1100	495	2010	850	1560	4000
pH	7.2	7.15	7.8	7.75	7.85	8.1	8.7	8.05
Total Dissolved Solids, mg/L	3801	4230	874	396	1684	707	1172	3162
Chromium (Cr), mg/L	.01	.01	0	0	.01	0	0	.01
Copper (Cu), mg/L	.05	.05	.05	0	.05	0	0	0
Iron (FE), mg/L	.03	.01	0	0	.01	.01	0	.01
Manganese (Mn), mg/L	.17	.10	0	0	.03	.02	0	.03
Zinc (Zn), mg/L	.10	.75	.10	.70	1.25	.10	0	.05

1/ Windmill 1/4 mile East of Monument Plant (East of Union Texas Britt Well #3).
2/ Windmill 1/2 to 3/4 miles SE of Eunice Plant.
3/ Windmill one mile NW of Monument Plant.
4/ Jim Cooper Ranch Home one mile NW of Monument Plant.
5/ Windmill 1/4 to 1/2 mile SE of Eunice Plant.
6/ Sam Hardy Home 1/4 mile East of Eunice Plant. (Continental Oil Company, East 1/2 mile of house).
7/ Deck Ranch windmill 1/4 mile NW of Eunice Plant.
8/ Millard Deck Ranch windmill 1/2 mile North of Eunice Plant.

the Plant site are shown in Table 7. Significant flooding of the Plant site should not occur due to the relatively small quantity of runoff produced by the largest calculated value for the 100-year, 24-hour storm.

5. Location and design of site(s) and method(s) to be available for sampling, and for measurement or calculation of flow;

Description of Plant Processes and Chemicals

To adequately address the sampling, measurement or calculation of representative flows a discussion of waste generating processes is appropriate. Table 8 summarizes the chemicals used and the plant processes involved at Monument Plant. Also please find Material Safety Data Sheets for all listed chemicals in Appendix G.

The Plant consists of two compressor stations housing gas fueled engines with a total of 10,500 horsepower having the capability of handling a design gas capacity of 102.81 million cubic feet of gas per day. In addition, the plant has an auxiliary generating station utilizing gas fueled engines with a total of 2625 horsepower. Oil and jacket water is used to cool the engines. The cooling tower is utilized to cool the compressed gas.

Water treatment for make-up to the plant process water consists of one zeolite water treater with an approximate minimum rate of 25 gallons per minute and an approximate maximum rate of 75 gallons per minute. The regeneration cycle for the treater generates approximately 576 gallons of water per day.

Description of Wastewater Collection and Treatment

All Plant industrial and domestic wastewater discharges have been connected and routed to an internally and externally epoxy-coated steel tank-type classifier. Figures 16 and 17 show the existing wastewater-producing processes and the collection system in schematic form. Actual construction drawings may be located in Figure 18 (Map Pocket).

The arrangement of the wastewater collection/classifier system precludes the possibility of stormwater run-off entering the system and appreciably changing the volume of discharge. No open drains which collect stormwater are connected to the system.

The classifier system includes a 118,764-gallon-capacity contingency tank. This contingency tank will handle the total plant wastewater effluent for eight days at the average discharge rate of 14,400 gallons per day. In the unlikely event that this storage contingency would be exceeded, wastewater will be transported by tank truck to one of Rice Engineering disposal facilities until normal operations resume.

Table 7
Hydrologic Characteristics of the Monument Plant Area
at Selected Prediction Points for the
2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour Storm

Prediction Point[1/]	Storm Year	Estimated Drainage Area (acres)	Slope (%)	Peak Flow (cfs)	Volume (acre-feet)
A	2	16.6	0.30	23.0	1.6
	5	16.6	0.30	38.0	2.6
	10	16.6	0.30	49.4	3.3
	25	16.6	0.30	65.0	4.4
	50	16.6	0.30	73.0	4.9
	100	16.6	0.30	90.5	6.1
B	2	7.5	0.18	10.9	0.7
	5	7.5	0.18	18.0	1.2
	10	7.5	0.18	23.4	1.5
	25	7.5	0.18	30.8	2.0
	50	7.5	0.18	34.6	2.2
	100	7.5	0.18	42.9	2.8
C	2	8.4	0.15	12.5	0.8
	5	8.4	0.15	16.3	1.0
	10	8.4	0.15	21.5	1.4
	25	8.4	0.15	29.3	1.9
	50	8.4	0.15	33.5	2.2
	100	8.4	0.15	42.2	2.7
D	2	1.8	0.12	0.9	0.1
	5	1.8	0.12	2.1	0.1
	10	1.8	0.12	2.9	0.2
	25	1.8	0.12	4.2	0.3
	50	1.8	0.12	5.0	0.3
	100	1.8	0.12	6.7	0.4
E	2	13.9	0.20	5.4	0.4
	5	13.9	0.20	11.7	0.8
	10	13.9	0.20	17.7	1.1
	25	13.9	0.20	27.1	1.7
	50	13.9	0.20	39.8	2.6
	100	13.9	0.20	43.7	2.8

[1/] See Figure 5B for Prediction Point Location.

Table 7
Hydrologic Characteristics of the Monument Plant Area
at Selected Prediction Points for the
2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour Storm

Prediction Point[1/]	Storm Year	Estimated Drainage Area (acres)	Slope (%)	Peak Flow (cfs)	Volume (acre-feet)
F	2	13.8	0.57	3.2	0.2
	5	13.8	0.57	8.1	0.5
	10	13.8	0.57	12.6	0.8
	25	13.8	0.57	21.2	1.4
	50	13.8	0.57	25.2	1.6
	100	13.8	0.57	36.0	2.3
G	2	26.3	0.58	33.5	2.5
	5	26.3	0.58	43.8	3.3
	10	26.3	0.58	57.8	4.3
	25	26.3	0.58	78.8	5.9
	50	26.3	0.58	89.8	6.7
	100	26.3	0.58	113.0	8.5
H	2	16.3	0.54	3.2	0.2
	5	16.3	0.54	8.1	0.6
	10	16.3	0.54	12.6	1.0
	25	16.3	0.54	21.2	1.6
	50	16.3	0.54	25.2	1.9
	100	16.3	0.54	36.0	2.7
I	2	2.8	0.53	0.7	0.1
	5	2.8	0.53	1.7	0.1
	10	2.8	0.53	2.6	0.2
	25	2.8	0.53	4.4	0.3
	50	2.8	0.53	5.2	0.3
	100	2.8	0.53	7.4	0.5

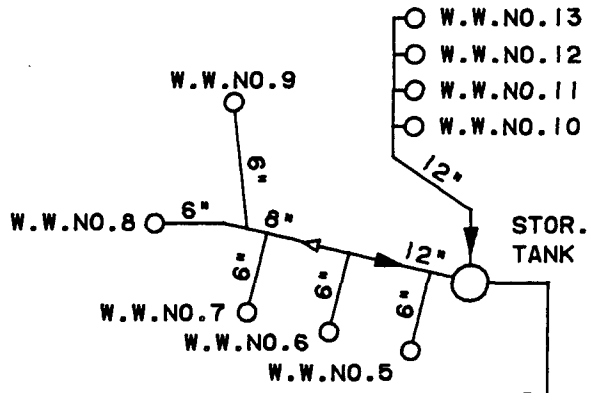
[1/] See Figure 5B for Prediction Point Location.

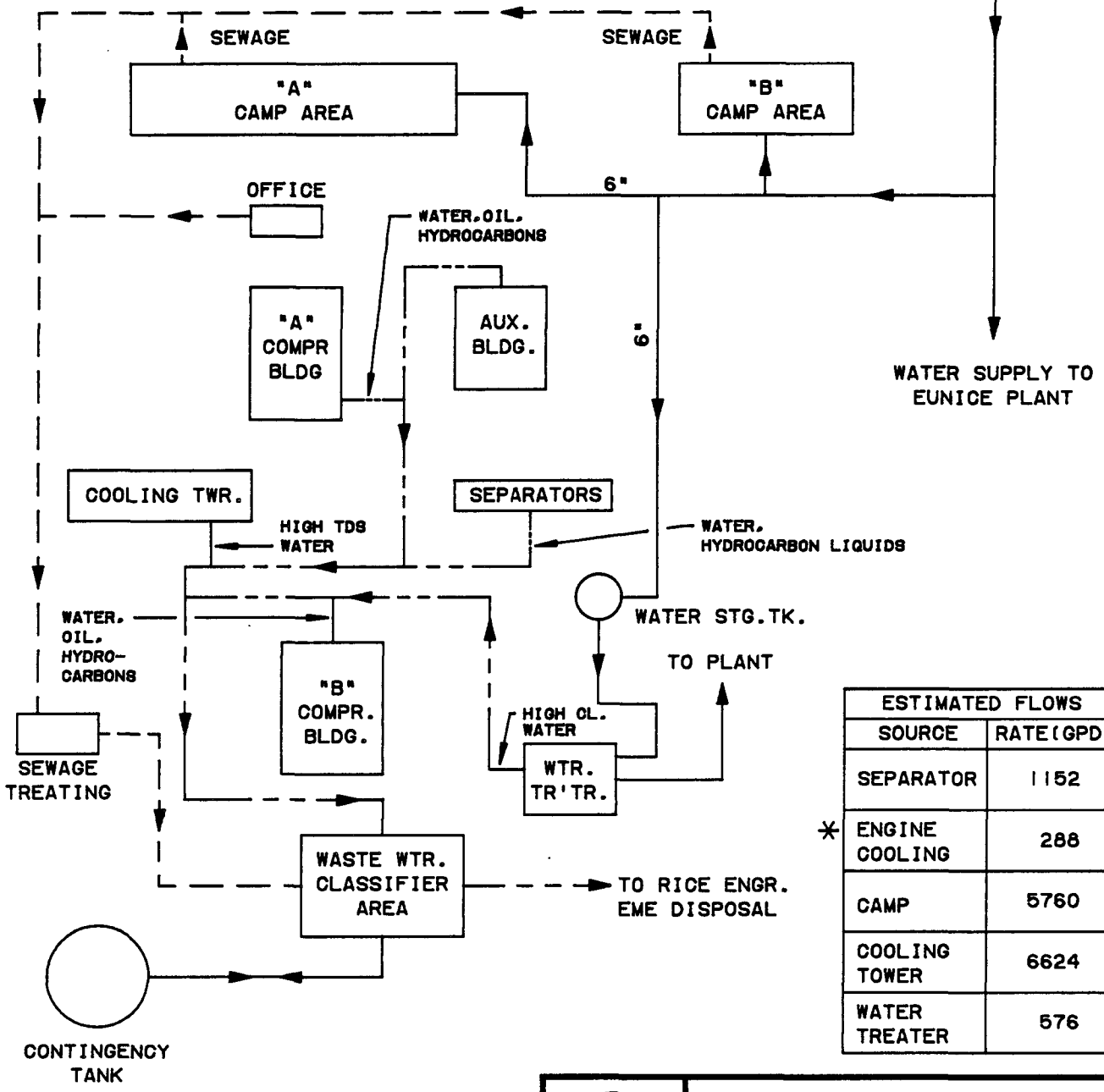
Table 8

Monument Plant
Chemicals Used in Plant Processes

Chemical	Location	Purpose	Quantity (per year)
Antipol-640	Cooling Tower	Scale Control	1,095 lb.
Chromine-T	Closed Systems	Corrosion Inhibitor	30 gal.
Brine (10#)	Water Treater	Zeolite Regeneration	22,050 gal.
Hydrochem D-300	Cooling Tower	Dispersant	548 gal.
HTH (Chlorine)	Cooling Tower	Biocide	30 lb.
Mark II Degreaser	Plant Floors	Cleaner	84 gal.
Molylube 890	Gear Boxes	Lubricant	42 gal.
Mysella 30 (oil)	Engine Crankcase	Lubricant	2,000 gal.
Shell 8122 (oil)	Engine Crankcase	Lubricant	7,500 gal.
Sulfuric Acid	Cooling Tower	pH Control	1,060 gal.
Toxsene 35	Cooling Tower	Biocide	60 gal.
Toxsene 37	Cooling Tower	Biocide	24 gal.
Varsol	General	Solvent	2,400 gal.
Hyvar	Plant Yard	Weed killer	Unknown
Karmex	Plant Yard	Weed killer	Unknown
Krovar II	Plant Yard	Weed killer	Unknown

NOTE:
IRRIGATION SYSTEMS:
LAWN SPRINKLERS &
GARDEN WATERING





ESTIMATED FLOWS	
SOURCE	RATE(GPD)
SEPARATOR	1152
* ENGINE COOLING	288
CAMP	5760
COOLING TOWER	6624
WATER TREATER	576

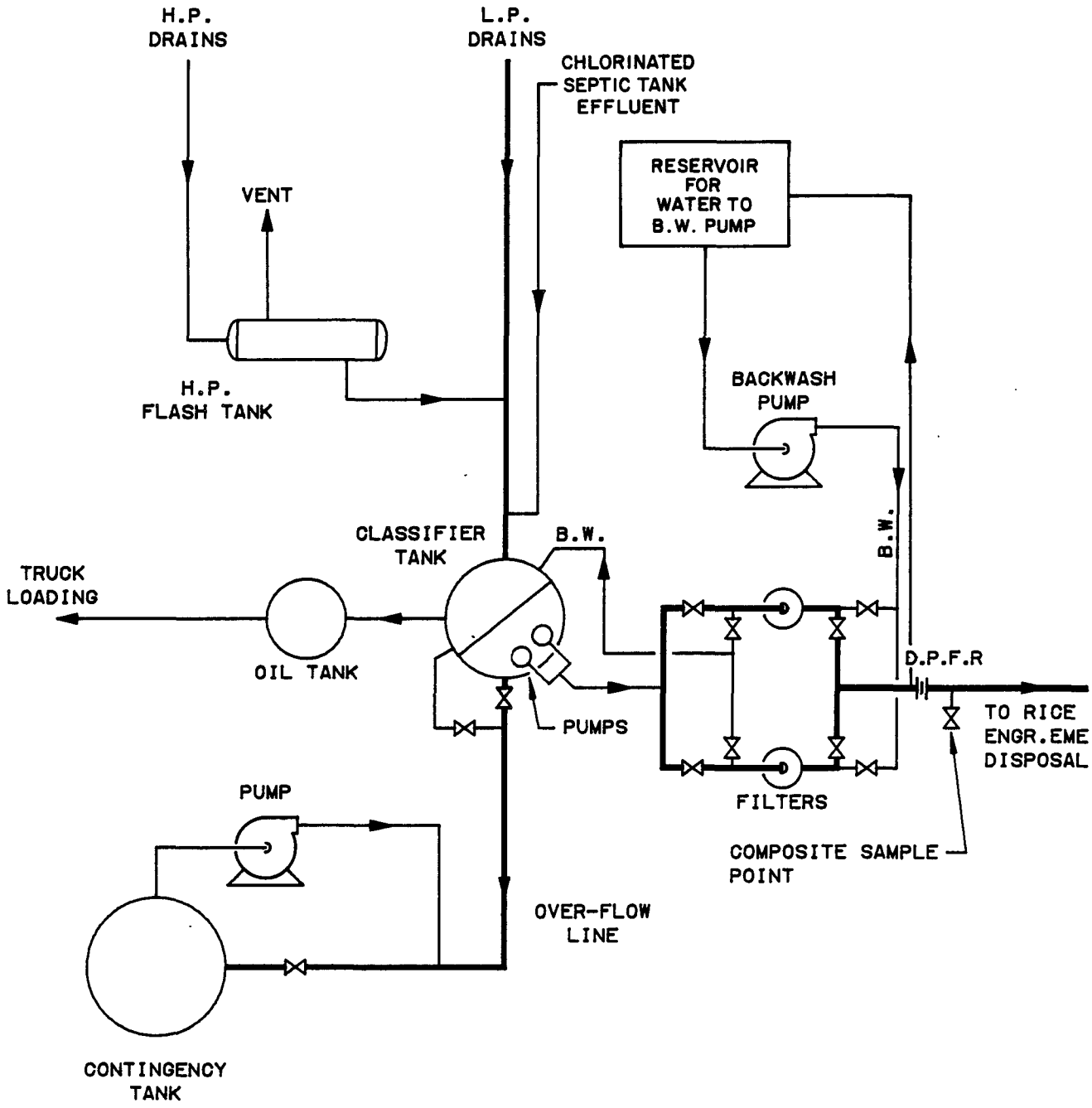
* CLOSED SYSTEM DRAINAGE BEING DISCONTINUED.

El Paso NATURAL GAS COMPANY

FIGURE 16

MONUMENT PLANT

WATER AND WASTEWATER FLOW SCHEMATIC



REF.DWG.NO. IMO-1-P15 REV.A

El Paso NATURAL GAS COMPANY

FIGURE 17

MONUMENT PLANT

WASTEWATER CLASSIFIER-AREA
FLOW DIAGRAM

The classifier is used to separate oil and solids from the wastewater stream. The separated oil is stored temporarily in an internally and externally coated steel underground tank. Periodically, the oil is pumped out and sold to a local oil refiner for reclamation and reuse. The domestic sewage effluent from the camp and plant area septic tanks is chlorinated and then piped to the classifier for disposal with the industrial wastewater.

A schedule for the removal of solids from the classifier has not yet been established because the relatively short time that the system has been in operation has not allowed a proper assessment of the rate at which solids accumulation occurs. Any solids which do accumulate in the classifier or cooling tower will be evaluated by the same hazardous waste procedure previously discussed to ensure El Paso non-hazardous waste generator status, analyzed and disposed of in a local state-approved landfall.

The wastewater from the classifier tank is being pumped through an anthracite/rock filter, then metered and disposed of in the Rice Engineering Disposal System, Monument Branch. El Paso began delivering wastewater to the Rice Engineering system on October 26, 1982.

Several changes have been or will soon be made in the procedures and equipment involved in wastewater collection that require special explanation.

First, effective March 31, 1983 the routine back washing of side-stream filters on the oil and jacket water cooling systems has been discontinued (see letter V. D. Rheay to Plant Supts.) (Appendix H). Also, El Paso has, effective March 31, ceased draining any closed systems containing chromium based chemicals. Any necessary drainings of such systems is now captured in temporary drums or other vessels and recycled back into the closed system for reuse. This recyling will continue until permanent capture and containment systems are installed. Plans are to complete the implementation of these permanent systems in 1983 (Figure 19).

El Paso is also vigorously investigating the substitution of chromium based water treating chemicals now used in the closed cooling systems with other chemicals. When and if a substitution is made, all systems containing chromium-bearing water will be flushed and the effluent captured and disposed of in an environmentally acceptable manner. The permanent capture and containment systems previously installed for the chromium-bearing cooling water used in the closed systems will be even more important given the greater costs of alternative treatments and the economic incentive to capture and reuse them when necessary.

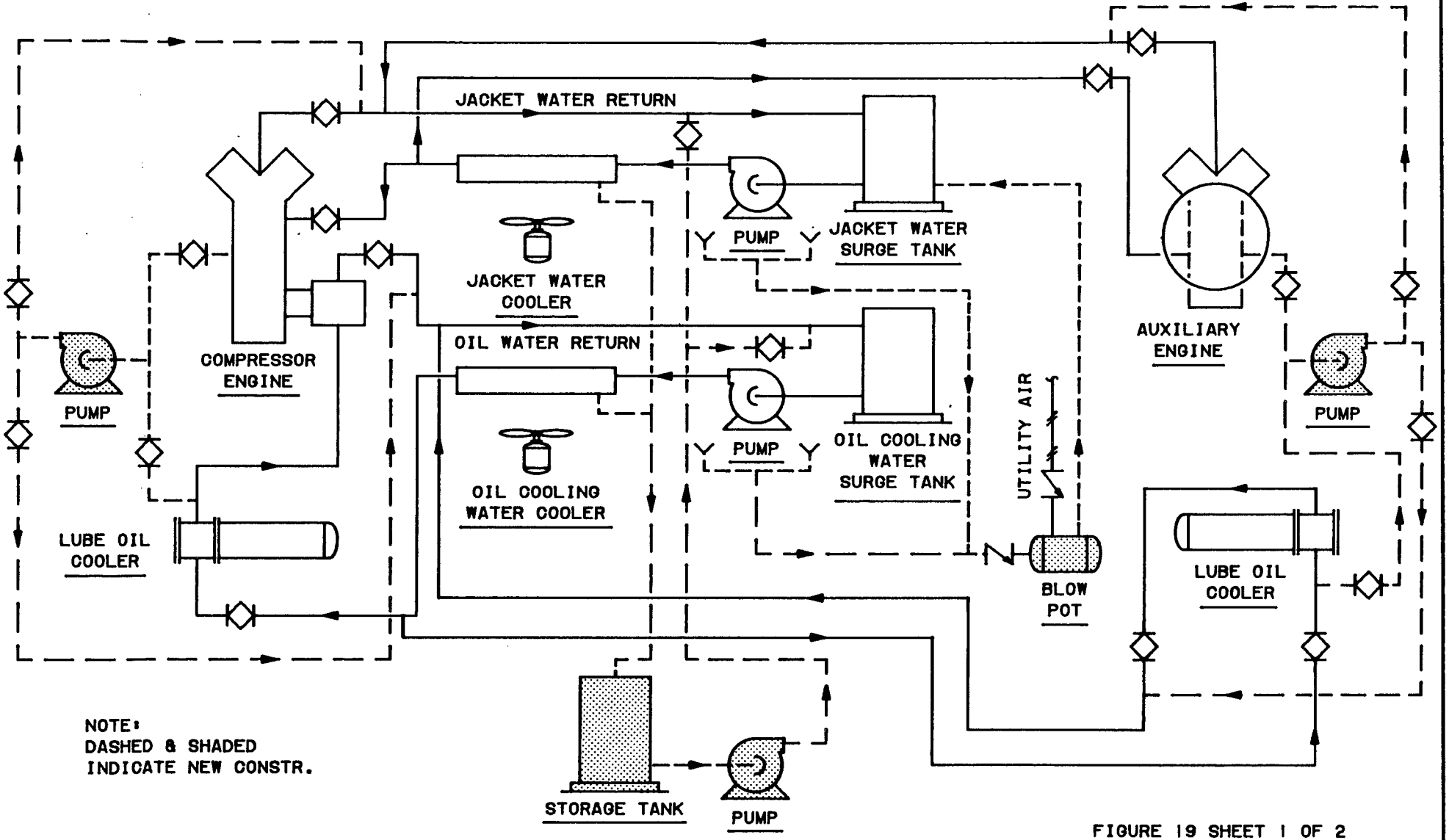


FIGURE 19 SHEET 1 OF 2

	PRT.	SEP.	DATE	TO	W.O.
	PRINT RECORD				

ENG. REC.		DATE
DRAWN	ISE	6/83
CHECKED		
CHECKED		
PROJ. APP.		
DESIGN		
W.O		

El Paso NATURAL GAS COMPANY

MONUMENT "A" COOLING WATER CONTAINMENT SCHEMATIC

SCALE.	NONE	DWG. NO.	JMO-L-20	REV.
CGC NO	MON4			

Form 7-381 (4-79)

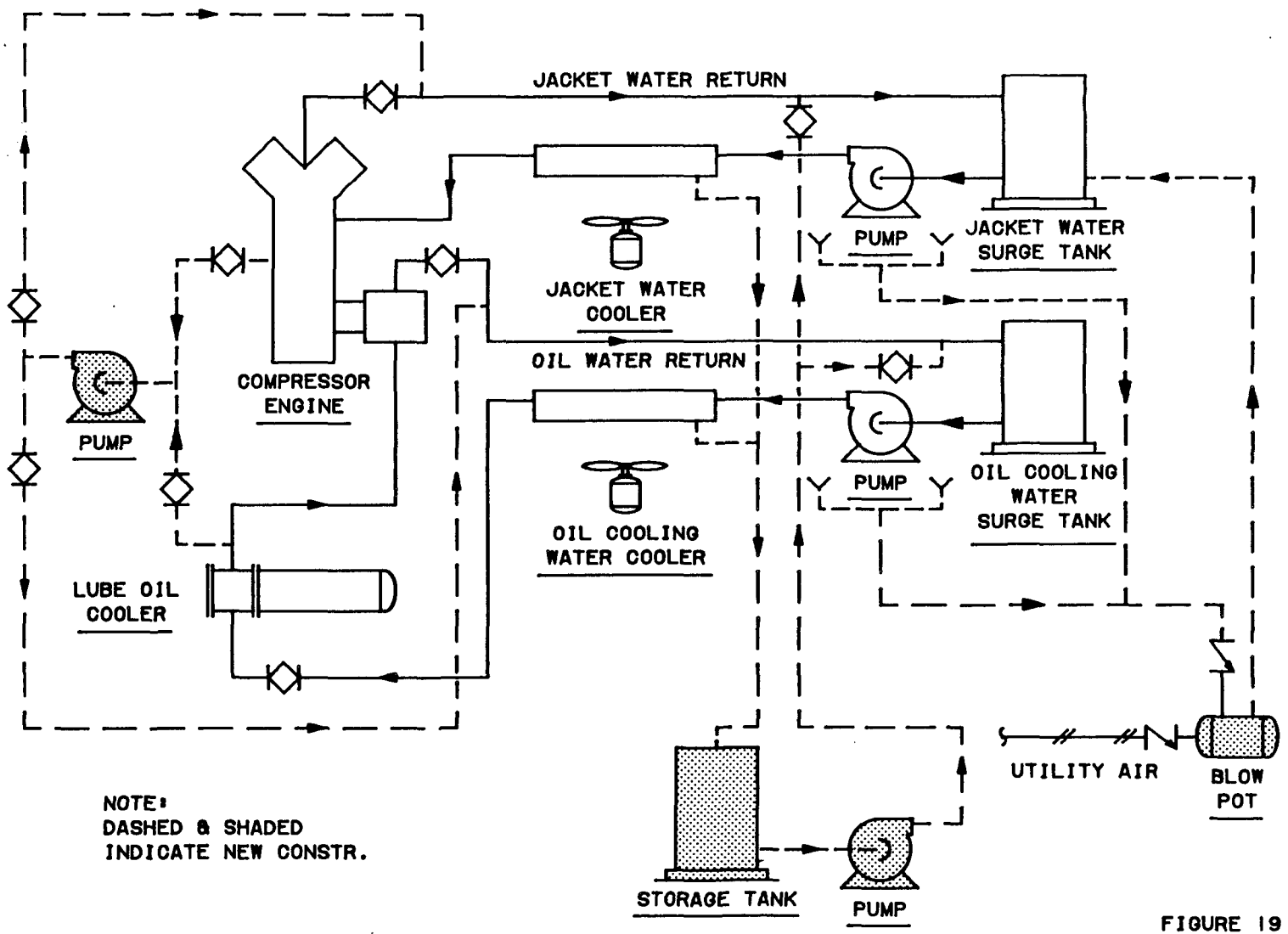


FIGURE 19 SHEET 2 OF 2

						ENG. REC.		DATE
						DRAWN	ISE	6/83
						CHECKED		
						CHECKED		
						PROJ. APP.		
	PRT.	SEP.	DATE	TO	W.O.	DESIGN	L.C.	6/83
	PRINT RECORD					W.O		

El Paso NATURAL GAS COMPANY

MONUMENT "B" COOLING WATER CONTAINMENT SCHEMATIC

SCALE:	NONE	DWG. NO.	JMO-L-21	REV.
CGC NO.	MON5			

Form 7-381 (4-79)

Characterization of the Wastestreams

As can be seen from Table 3, composite samples were collected on April 26 through 28, 1983 for analyses from the wastewater disposal system to characterize the water according to indicated NMOCD requirements and regulations. Composite samples were obtained by combining equal volumes (200 ml) of the effluent collected as weighted by the flow rate. The sampling interval never exceeded one hour. The two composite samples were analyzed for all the constituents listed in the New Mexico Water Quality Control Commission Regulations Part 3.103 with the exception of radioactivity.

Figure 17 shows, among other things, the sample collection point. Flow data used to flow weight the compositing was obtained using a strip chart flow recorder. Appendix I contains the flow charts 1 through 3 which indicate that the discharge was continuous during the entire sampling period. This appendix also contains a field log showing parameters which were analyzed for immediately upon collection.

There can be no doubt that the composite analysis taken in April, 1983 truly characterized the wastewater being discharged to Rice Engineering. The flow recorder strip charts show a constant flow rate which would be expected given that wastewater from the evaporation ponds was also being placed in the disposal system at this time.

Because of the possibility that the presence of the evaporation pond water in the overall Plant wastewater composite might either be overstating or understanding the Sec. 3-103 constituents, repeat composite sample were obtained on June 21 through 23 and spot check analyses were made on both heavy metals and inorganic constituents. Importantly, this time there was no water or other material from the evaporation ponds being placed in the system.

This repeat composite sampling utilized an automatic sampler that obtained a sample everytime the discharge pump from the classifier went on. The analyses were performed to conform to NMWQCC regulations, and were taken at the same sample point. Appendix I also contains Plant flow chart recordings and sampler chart recordings to document the June flow weighted sampling. A comparison of the April and June composites show that, using sulfate, chloride, and TDS as indicators of widely varying concentrations, the June composite analyses fall in the same range of values as the April composites. Such constituents are routinely used for this purpose in wastewater characterizations.

The significantly lower June barium analysis shows that, in all probability, the organics constituent values for April are also reduced in June. Barium is a common oil anti-oxidation additive and there can be no doubt that the April composites had some oil in them as a consequence of draining the evaporation ponds.

6. Depth to and lithological description of rock at base of alluvium below the discharge site if such information is available;

Because the "discharge site" is actually far below the alluvium, this regulatory request is not entirely applicable. The following is presented, however, to provide a clearer understanding of the geologic setting involved.

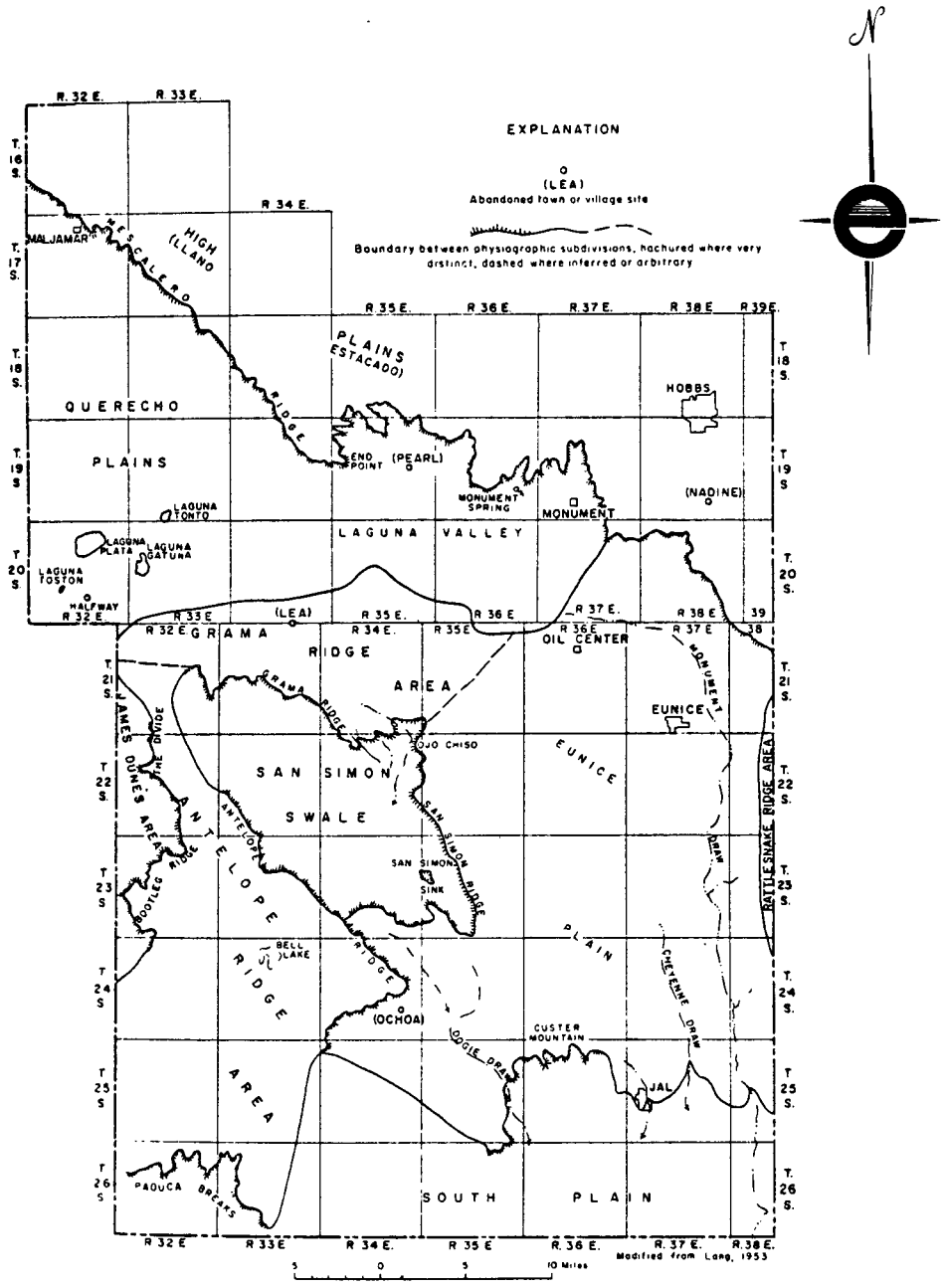
The San Andres dolomites where Rice injects the wastewater are of lower Guadalupe age (200 million years), range from 550 to 1600 feet in thickness and occur at a depth of 4100 feet to 5300 feet. A very substantial portion of the Permian oil of west Texas and southeastern New Mexico has been produced from these dolomites. After the initial formation pressure had been reduced to a point where it no longer could expel the oil and gas, secondary recovery operations began. Rice Engineering is injecting El Paso's wastewater as a technique in secondary recovery. The wastewater acts as a driving force to expel a portion of the remaining oil and gas to a collection well.

7. Any additional information that may be necessary to demonstrate that approval of the discharge plan will not result in concentrations in excess of the standards of Section 3-103 or the presence of any toxic pollutant at any place of withdrawal of water for present or reasonably foreseeable future use. Detailed information on site geologic and hydrologic conditions may be required for a technical evaluation of the applicant's proposed discharge plan;

Physiography

The Plant is located in the Pecos Valley section of the Great Plains Physiographic Province in southeastern New Mexico and more specifically within the Eunice Plain Subdivision. The plain is a practically flat and featureless alluvial plain which slopes eastward toward Monument Draw. The altitude of the Plant is 3,580 feet above mean sea level. The total relief of the county is about 1,300 feet with relief of no more than six feet in the Plant area.

The Eunice Plain is bounded on the north by the Llano Estacado and on the southwest by San Simon Ridge and Antelope Ridge. The westward extension of the Plain is the Grama Ridge area. On the south the Eunice Plain is bounded by an irregular, low, south-facing scarp which is most prominent at Custer Mountain, where it attains a height of 60 feet. Monument Draw, the major drainageway in the area, traverses the east side of the Eunice Plain from north to south. The physiographic subdivisions of southern Lea County are shown in Figure 20.



NOTE: FIGURE OBTAINED FROM NICHOLSON AND CLEBSCH, GEOLOGY AND GROUND-WATER CONDITIONS IN SOUTHERN LEA COUNTY, NEW MEXICO, GW REPORT NO. 6, STATE BUREAU OF MINES AND MINERAL RESOURCES, SOCORRO, N.M., 1961.

El Paso Natural Gas Company

FIGURE 20

PHYSIOGRAPHIC SUBDIVISION
SOUTHERN LEA COUNTY,
NEW MEXICO

Geomorphology

About 250 million years ago, during the Permian Period, a huge inland sea covered much of what is now Texas and southeastern New Mexico. Rising above the sea was a ridge approximately 150 miles long and 40 to 50 miles wide that divided the Permian Sea into two smaller basins, now known as the Midland Basin and the Delaware Basin. The ridge itself, which today is a subsurface feature underlying an area in southeastern New Mexico, extends from Hobbs south through Jal, New Mexico.

As millions of years passed, the sea gradually expanded to the north covering parts of present day Oklahoma, Kansas and Nebraska. The sea received huge quantities of sediments and organic matter which was the beginning of the formation of a great accumulation of oil and gas.

Toward the close of the Permian Period, the sea waters evaporated leaving various kinds of sediments. Thick layers of gypsum, salt, anhydrite and potash were formed, particularly in the area near Carlsbad, New Mexico, where the last remnant of the old Permian Basin Sea occurred.

By the end of Permian time, the basin received stream sediments from higher land areas surrounding the basin. These sediments accumulated in great thicknesses of non-marine sands and clays. Today, these layers are relatively shallow subsurface formations commonly referred to as the "Red Beds". Following the Permian Period, the Lea County area was emergent and subject to erosion during early Triassic time, then subject to deposition of sediments during late Triassic time. The deposits of this period are termed the Dockum Groups. In Jurassic time, the area was again subject to erosion. During Cretaceous time a large part of the interior of North America was submerged and southeast New Mexico was again the site of a large sea in which thick layers of rocks were deposited. These rocks, including some Triassic materials, were subsequently stripped off during the upthrusting of the Rocky Mountains. In Pliocene time terrestrial deposits of the Ogallala formation were laid down as a thick mantle which obliterated the irregular surface and replaced it with the even surface of the High Plains.

Subsequently, beginning in Quaternary time, a new cycle of erosion set in continuing to the present day. Monument Draw in early Quaternary time was probably a perennial stream fed by water from the Ogallala formation of the High Plains. Today, Monument Draw is ephemeral and does not have a throughgoing stream except during extreme floods. The climate became more arid in late Quaternary time, and the detrital materials were reworked by wind, creating vast deposits of dune sand that now cover large parts of Lea County.

Climate

Today, the climate of southern Lea County is semiarid; average annual precipitation varies from about 8 inches in the southwest corner to 14 inches in the northeast corner (Reynolds, 1956). Most of the precipitation is received during May through October as thundershowers.

Temperatures vary considerably, exceeding 100°F in summer and dropping below 0°F in the winter. The average monthly precipitation for Hobbs, New Mexico is shown on Figure 21 (NOAA, 1979).

Evaporation of water in southeastern New Mexico has been estimated using evaporation pan measurements. Due to differences between lake evaporation and experimental pan data, a reduction coefficient from 0.67 to 0.81 was selected to obtain an estimated lake evaporation value; an average coefficient of 0.75 usually provides an estimate of annual lake evaporation within about 15 percent. The average monthly pan evaporation is shown in Figure 21 for Lake McMillan, New Mexico (Reynolds, 1956). The average annual lake evaporation is 79 inches per year. This rate of evaporation is considered excellent for the use of evaporation ponds in typical wastewater disposal operations.

Drainage Basin Study

Stormwater runoff is that portion of precipitation which flows for a short time over the ground surface during and after a storm. In estimating storm water runoff in the Monument Plant area, the relationship of precipitation to the local vegetal, soil, geologic and topographic characteristics were taken into consideration. The U.S.D.A. Soil Conservation Service (SCS) method for estimating peak rates of discharge for small watersheds (McDougal and Jackson, 1973) was used in this plan due to its wide use and acceptance in the engineering community.

Recorded precipitation is a primary factor in estimating the surface runoff and peak discharge from ephemeral streams. The mean annual precipitation in the area is 11.67 inches (NOAA, 1980). Table 9 shows precipitation data for depth-frequency for the Plant area (Miller et al., 1973).

Hydrologic Conditions

The following analysis shows that the evaporation ponds, when closed according to plan, will not be sources of leachate. Materials remaining in the pond bottoms will not be subject to a hydraulic head and therefore will not move.

The antecedent moisture condition in the area (the amount of precipitation occurring in the five days preceding a major rainfall) is typical of arid soils. The SCS Engineering Field Manual for Conservation Practices (McDougal and Jackson, 1973) defines curve numbers (CN) which are used to describe the hydrologic soil groups as well as the vegetation cover in relation to potential runoff. A CN of 85 was generally used to represent the poor residue cover, Hydrologic Rating B, of the area which produces the maximum expected runoff rate and is considered to be conservatively high.

$$q = \frac{\left[P - 0.2\,\frac{(1000-10CN)}{CN}\right]^2}{P + 0.8\,\frac{(1000-10CN)}{CN}} \qquad (1)$$

Table 9

Precipitation Data for Depth-Frequency for
El Paso Natural Gas Company's Monument Plant
32° 37'N, 103° 19'W

Recurrence Interval In Years	Storm Duration in Hours				
	1	2	3	6	24
	(P, values in inches)				
2	1.49	1.65	1.80	2.10	2.45
5	2.00	2.25	2.45	2.70	3.30
10	2.45	2.60	2.85	3.10	3.90
25	2.88	3.15	3.30	3.70	4.75
50	3.06	3.60	3.85	4.15	5.20
100	3.27	4.15	4.35	4.80	6.10

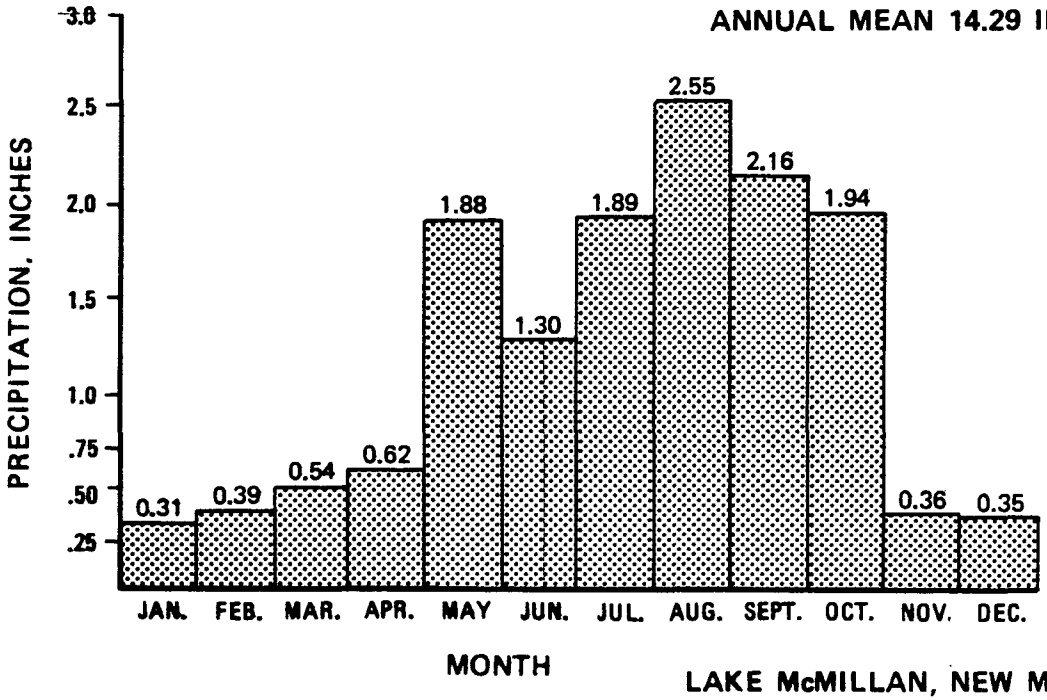
Equations used to estimate 1-hr values in EAstern New Mexico:

$$Y_2 = 0.218 + 0.709 \frac{(2.1 \times 2.1)}{(2.45)} = 1.49$$

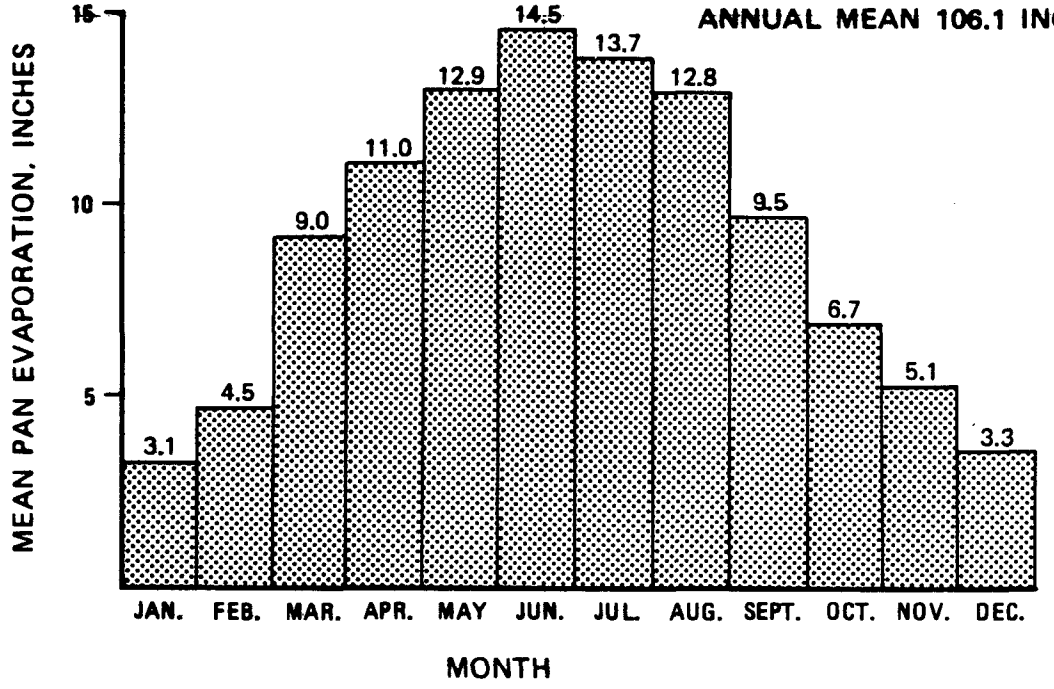
$$Y_{100} = 1.897 + 0.439 \frac{(4.8 \times 4.8)}{(6.1)} - 0.008\ (35.80)\ \underline{1/} = 3.27$$

1/ Elevation 3,580 feet mean sea level.

HOBBS, NEW MEXICO 1/
ELEVATION 3615 FEET
32°42'N–103°08'W
PRECIPITATION DATA FROM 1951–1974
ANNUAL MEAN 14.29 INCHES



LAKE McMILLAN, NEW MEXICO 2/
MEAN MONTHLY PAN EVAPORATION DATA
FROM 1912–1954
ANNUAL MEAN 106.1 INCHES



1/ NOAA, CLIMATOGRAPHY OF THE UNITED STATES NO. 60, CLIMATE OF NEW MEXICO, NATIONAL CLIMATE CENTER, ASHVILLE, N.C., 1977.

2/ REYNOLDS, S.E., CLIMATOLOGICAL SUMMARY NEW MEXICO, NEW MEXICO STATE ENGINEER, SANTA FE, N.M., 1956.

El Paso Natural Gas Company

FIGURE 21

MEAN PRECIPITATION AND EVAPORATION SUMMARY
SOUTHERN LEA COUNTY, NEW MEXICO

Using equation 1, q is estimated to equal an area-weighted average of 3.21 inches of rainfall-produced runoff for the Monument Plant area from the 100-yr, 24-hour storm (P = 6.10 inches; CN ranges from 60 to 85).

A summary of the expected runoff volumes from the Monument Plant area is presented in hydrologic data sheets in Appendix J.

Criteria for the selection of the prediction points were that they include all drainage from the plant site. The drainage sub-areas were defined using the 1" = 100' scale drawings shown in Figure 5 (Map Pocket).

The hydrologic soil grouping is generally determined by the surface texture. The grouping is a four step rating of how much of a given rain will enter the soil profile and not run off. A general guide for the hydrologic soils groups by texture is shown in Table 10.

Table 10
Hydrologic Soil Grouping Guide

Group	Description of the Soil
A	Sands - very little fines
B	Loamy sands and coarse sandy loams
C	Loams and fine sandy loams
D	Clays, silts and heavy clay and silt loams

The soils found on the Plant site consist of four soil series in two complexes. The engineering properties of the soil is shown in Table 11. The Midessa-Wink fine sandy loam complex is found on the northern half of the site, while the southern half consists of the Pyote-Maljamar fine sands complex. These are well drained soils formed in wind or water-deposited sandy loams or sands. All of these soils have moderate to rapid water intake and permeability. Figure 2 included in the text of the enclosed closure plan shows the soils of the Plant and adjoining areas.

A water balance prepared for the southern Lea County area is included in Table 3 and Figure 4 of the closure plan (Appendix A). This balance shows that, due to the low rainfall and high evaporation rate in southern Lea County, precipitation is not expected to infiltrate to the sludge layer in the closed ponds. Therefore, the likelihood of leaching of elements from the sludge is remote.

Table 11

Engineering Properties of Soils
Monument Plant Area [1/]

Soil Series	Degree of Limitation [2/] for Sewage Lagoons	Soil Features Affecting [3/] Use as Ponds	Hydrologic [4/] Rating
Monument Site			
Midessa	Moderate; moderate Permeability	Soft caliche at depth of 2-3 feet; requires compaction	B
Wink	Severe; moderately rapid permeability	High lime content; moderately rapid permeability	B
Pyote	Severe; moderately rapid permeability	Moderately rapid permeability	A
Maljamar	Moderate; moderate permeability	Moderate permeability below depth of 2 feet; moderate seepage	B

1/ From Soil Conservation Service (1974).

2/ Ratings for evaporation ponds based on soil permeability, slope, soil texture and depth to impervious material or groundwater.

3/ Features affecting use of soils for ponds are the amount of seepage expected and depth to inhibiting layer such as indurated caliche.

4/ McDougal, 1973.

§ 3-107: Monitoring, reporting, and other requirements.
A. 1-7
8. A system of monitoring and reporting to verify that the plan is achieving the expected results;
9. Procedures for detecting failure of the discharge system;

Monitoring Plans

Because the "discharge site" is under the care and control of Rice Engineering, El Paso will perform the following evaluation to ensure that the wastewater collection systems operated by El Paso in the Plant do not also become "discharge sites." The Plant underground drain systems (shown in Figure 22, Map Pocket) will be tested to ensure the integrity of the drain system. Test procedures are structured so that each line is pressure tested for a specified time period to verify that no line is leaking. Any leaks identified will be repaired. The drain line test procedure is found in Appendix K.

Annual sampling and analysis of the wastewater stream (classifier effluent) delivered to the disposal system will be conducted and a Plant file maintained. A monthly report to NMOCD on Form C 120-8, describing disposal volumes, is now being submitted.

Any records related to integrity testing and waste characteristics will be retained by El Paso for five years.

Sludge will be removed from the cooling tower basin and the classifier as needed and will be evaluated and disposed of in an approved landfill.

Bibliography

1. Ash, S. R., Ground-Water Conditions in Northern Lea County, New Mexico Mexico, Hydrologic Investigations Atlas HA-62, U.S. Geological Survey, Washington, DC, 1963.

2. Blaney, H. F. and E. G. Hanson, Consumptive Use and Water Requirements in New Mexico, Technical Report 32, New Mexico State Engineer Office Santa Fe, NM, 1965.

3. Boyer, D. G., D. McQuillan, and M. S. Goad, New Mexico Surface Impoundment Assessment, Water Pollution Control Bureau New Mexico Environmental Improvement Division, Santa Fe, NM, 1980.

4. Clark, J. W., W. Viessman, Jr., and M. J. Hammer, Water Supply and Pollution Control, Third Edition, Harper and Row, Publishers, New York, NY, 1977.

5. Cresswell, L. W., The Fate of Petroleum in a Soil Environment, 1977 Oil Spill Conference Proceedings, American Petroleum Institute Publication No. 4284, pp. 479-482, 1977.

6. Cronin, J. G., Ground Water in the Ogallala Formation in the Southern High Plains of Texas and New Mexico; Hydrologic Investigations, Atlas HA-330, U.S. Geological Survey, Washington, DC, 1969.

7. Gabin, V. L. and L. E. Lesperance, New Mexico Climatological Data - 1850-1975, W. K. Summers and Associates, Socorro, NM, 1977.

8. Gudin, C., and W. J. Syratt, Biological Aspects of Land Rehabilitation Following Hydrocarbon Contamination, Environmental Pollution, Volume 8: 107-117, 1975.

9. Hudson, J. D., Ground-Water Levels in New Mexico, 1977, New Mexico State Engineer, Santa Fe, NM, 1980.

10. Le Floic, John, Telephone Interview, May 4, 1983.

11. Mangan, F., The Pipeliners, Guynes Press, El Paso, TX, 1977.

12. McDougal, L. F. and C. M. Jackson, Peak Rates of Discharge for Small Watersheds, Chapter 2, Engineering Field Manual for Conservation Practices, U.S.D.A., Soil Conservation Service, Albuquerque, NM, 1973.

13. Miller, J. F., R. H. Frederick, and R. J. Tracey, NOAA Atlas 2, Precipitation-Frequency Atlas of the Western United States, Volume IV -New Mexico, U.S. Department of Commerce, National Weather Service, MD, 1973.

14. Minton, E. G., General Ground Water Supply on the High Plains of New Mexico, Lea County Ground Water Conservation, Lovington, NM, no date.

15. New Mexico Environmental Improvement Division, Progress Report on Climax Chemical Company Monument Plant Discharge Plan, 1981.

16. New Mexico Geological Society, Guidebook of Southeastern New Mexico, Fifth Field Conference, New Mexico Bureau of Mines and Mineral Resources, Socorro, NM, 1954.

17. New Mexico Water Quality Control Commission, Pecos River Basin Plan, Water Quality Control Commission, Santa Fe, NM, 1976.

18. NOAA, Climatography of the United States No. 60, Climate of New Mexico, National Climate Center, Ashville, N.C., 1977.

19. Nicholson, A. and A. Clebsch, Geology and Ground-Water Conditions in Southern Lea County, New Mexico, Ground Water Report No. 6, State Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology, Socorro, NM, 1961.

20. Reynolds, S. E., Climatological Summary New Mexico, Technical Report No. 5, New Mexico State Engineer, Santa Fe, NM, 1956.

21. Ruyan, J. W., Doom, Mathis and Owens Water Contamination Study, New Mexico Oil Conservation Division, Hobbs, NM, 1977.

22. Soil Conservation Service, Soil Survey Lea County, New Mexico, United States Department of Agriculture, Washington, DC, 1974.

23. State Engineer, Lea County - Water Resources Assessment for Planning Purposes, New Mexico State Engineer Office, Santa Fe, NM, 1975.

24. Todd, D. K., The Water Encyclopedia, Water Information Center, Port Washington, NY, 1970.

25. Tuan, Y., C. E. Everard, J. G. Widdison, and I. Bennett, The Climate Of New Mexico, State Planning Office, Santa Fe, NM, 1973.

26. U.S. Bureau of Reclamation, Eastern New Mexico Water Supply Project, New Mexico, Final Environmental Statement, Department of the Interior, Washington, DC, 1976.

27. U.S. Environmental Protection Agency, Test Methods for Evaluations Solid Waste, SW-846, 1980.

28. West Texas Geological Society, Symposium-Oil and Gas Fields in West Texas, WTGS, Midland, Texas, 1966.

A

CLOSURE PLAN FOR
EL PASO NATURAL GAS COMPANY
MONUMENT PLANT
LEA COUNTY, NEW MEXICO

El Paso
Natural Gas Company

PREPARED BY:
EL PASO NATURAL GAS COMPANY
EL PASO, TEXAS

JULY 1983

SUMMARY

This Closure Plan presents to the New Mexico Oil Conservation Division (NMOCD) the procedures chosen, and the justification for those procedures, for the closure of six wastewater evaporation ponds located within El Paso Natural Gas Company's Monument Plant. The ponds are being closed as a result of implementing the collection/separation system and disposal process detailed in the Discharge Plan for the Monument Plant, of which this Closure Plan is a part.

Chemical analyses conducted in 1981 on sludges collected from four of the ponds to be closed show that the wastes contained therein are not hazardous wastes as defined by EPA under RCRA. Therefore, the closure of the ponds is not subject to EPA regulations under RCRA for closure of disposal facilities containing hazardous wastes. Nevertheless, the closure of the ponds will be performed in such a way to protect human health and the environment in accordance with State and Federal guidelines.

TABLE OF CONTENTS

FIGURES

INTRODUCTION

Regulatory Background

The New Mexico Water Quality Control Commission Regulations delegate the regulation of discharges from facilities for the production, refinement and pipeline transmission of oil and gas to the Oil Conservation Commission (Sec 1-201A). The New Mexico Oil Conservation Division (NMOCD) can request any additional information that is necessary to demonstrate that approval of a discharge plan will not result in groundwater concentrations in excess of the standards of Section 3-103 for present or reasonable foreseeable future use (Sec. 3-106 C.7). In addition, the Agency may require an explanation of measures to prevent groundwater contamination after the cessation of operation (Sec. 3-107 A.11).

The Agency has exercised their delegated authority with regard to the Discharge Plan for Jal Nos. 1, 2, 3 and 4, Eunice and Monument Plants; likewise, this Closure Plan is therefore submitted in response to a request made by NMOCD.

In the case of facilities treating, storing or disposing of hazardous wastes identified at 40 CFR Part 261 Subparts C and D as promulgated by the Environmental Protection Agency (EPA), there are specific Federal regulatory requirements for submittal of closure plans; 40 CFR §265.112 calls for a detailed closure plan to be developed and kept at each such facility. While the waste material contained in abandoned wastewater evaporation ponds at Monument Plant qualify as solid wastes under the Resource Conservation and Recovery Act of 1976 (RCRA), no wastes were encountered that qualify as hazardous wastes as defined by applicable EPA regulations under RCRA or by standards as agreed to by the NMOCD.

Scope

The purpose of this document is to describe the proposed procedures for the closure of six ponds at El Paso Natural Gas Company's Monument

Plant, located in Lea County, New Mexico (see Figure 1). This document (the "Closure Plan") is presented as a companion document to the Discharge Plan for Monument Plant of which this Closure Plan is a part. Certain information contained in the Monument Plant Discharge Plan is either reproduced or incorporated by reference into this Closure Plan. As in the aforementioned Discharge Plan, much of the information included herein has been obtained from published sources. Chemical analyses of sludges were conducted by the Southern Division Laboratory of El Paso Natural Gas Company. Complete methodologies for sludge sampling and analyses are given.

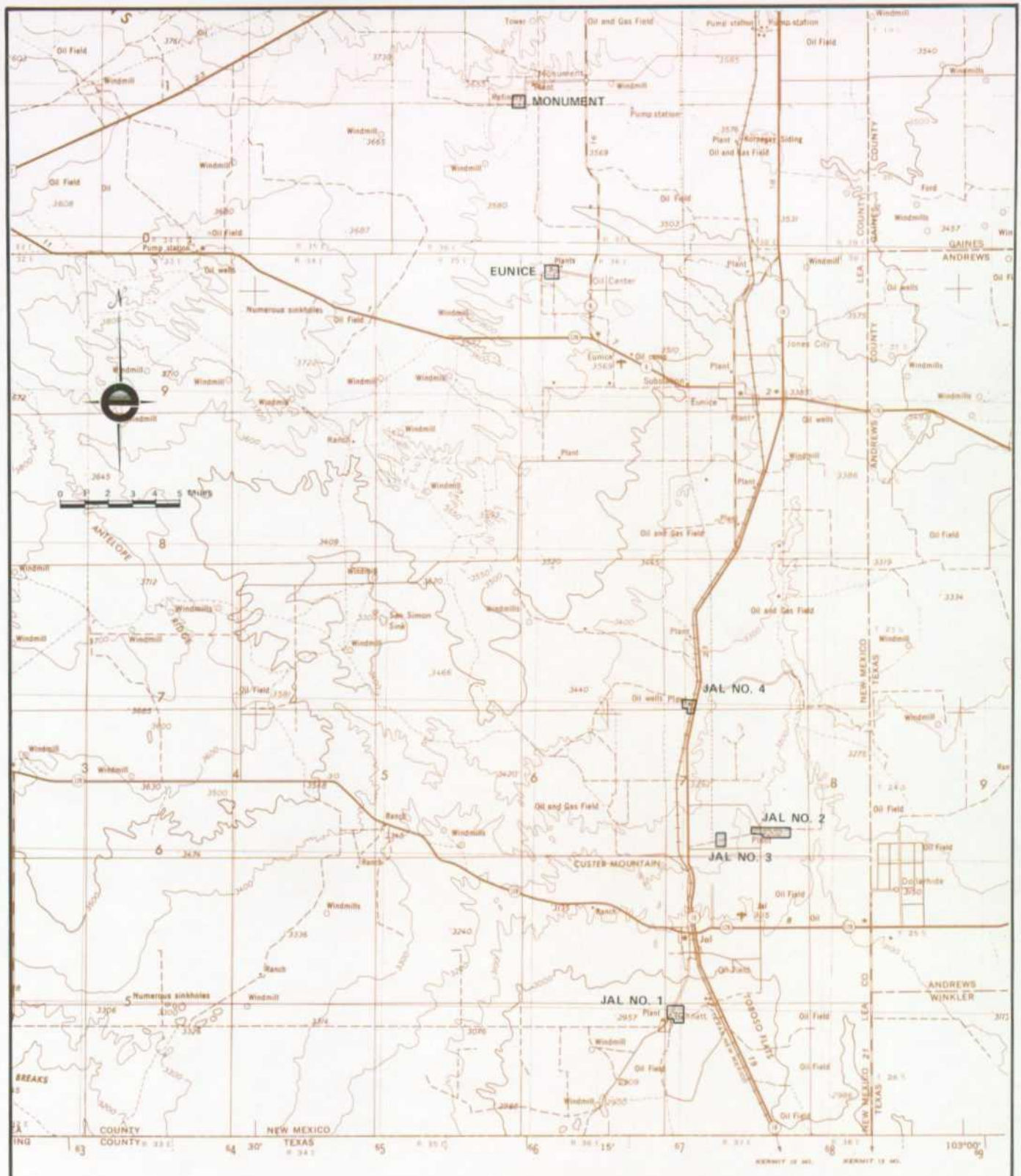
This Closure Plan has been prepared to set forth the procedures by which six ponds located at Monument Plant will be closed and the justification for those procedures. The reasoning for the methods proposed, including supportive analytical data, are presented and discussed in this report.

ENVIRONMENTAL FACTORS

A complete environmental description of the Monument Plant area is included in the Discharge Plan. That description will not be duplicated here; however, the environmental factors important to the development and execution of this Closure Plan are summarized below.

Climate

Long-term annual precipitation for Jal, New Mexico, located approximately 25 miles to the south of Monument Plant area, averages 11.67 inches (N.O.A.A. 1977), while evaporation averages approximately 79 inches per year (Reynolds 1956). The estimated precipitation received in a 100-year, 1-hour storm is 3.27 inches for the Monument Plant, while a 100-year, 24-hour storm is expected to produce 6.10 inches (Miller et al. 1973). Such a 100-year, 24-hour storm was estimated in the Discharge Plan to produce an area-weighted average of 3.21 inches of runoff for the Monument Plant area, with the remaining rainfall infiltrating the soil to either percolate to groundwater or return to the atmosphere via



El Paso Natural Gas Company

FIGURE 1

LOCATION OF EL PASO NATURAL GAS COMPANY PLANTS

SOUTHERN LEA COUNTY, NEW MEXICO

F283 17078124

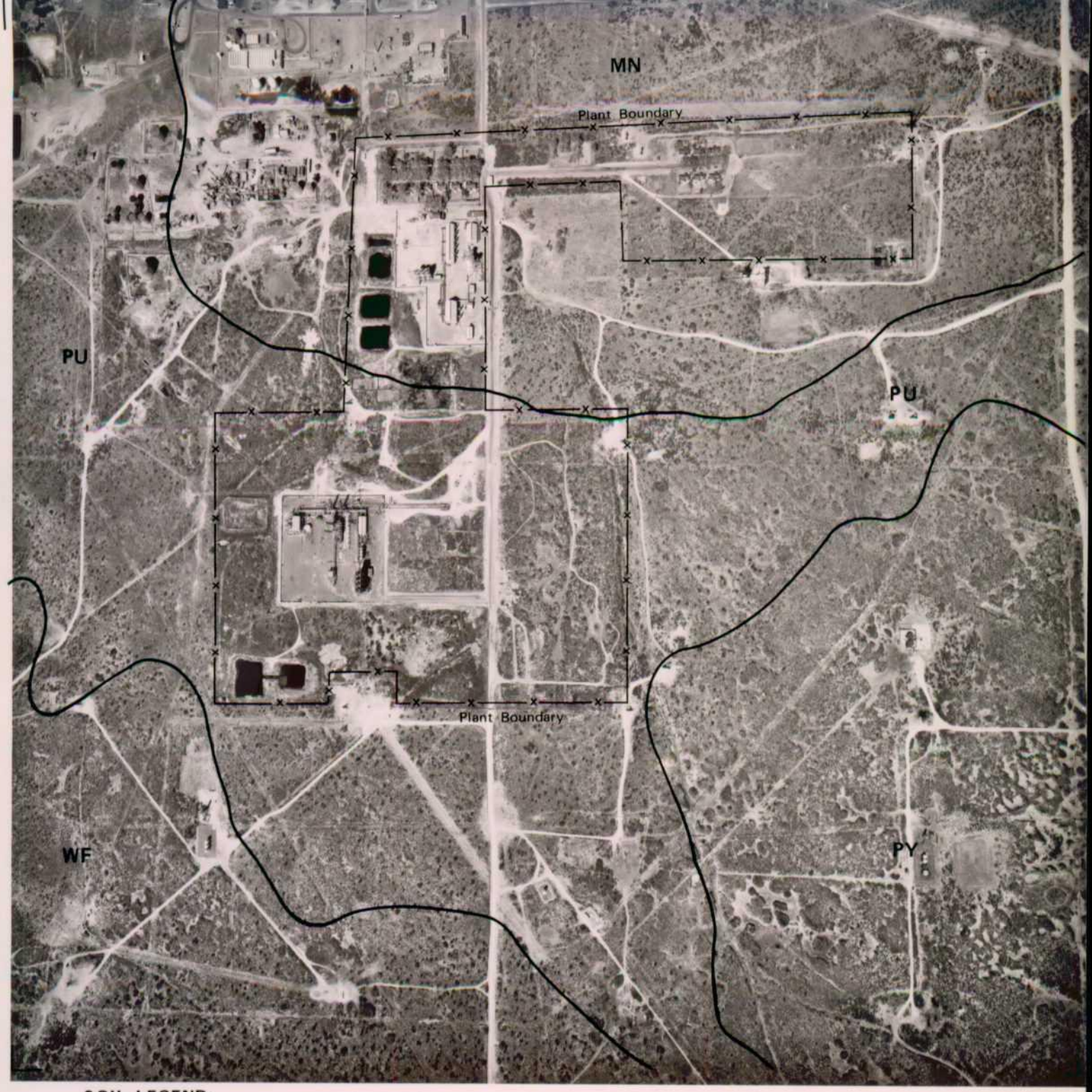
Prepared By
Pipeline Services Division

evapotranspiration (see Discharge Plan for runoff calculations). However, the likelihood of precipitation percolating to groundwater in the Monument Plant area is remote, as indicated by the water balance graphically presented in Table 3 and Figure 4 (this report) and discussed in a later section of this Closure Plan.

Hydrogeology

The Monument Plant is underlain by clastic and chemical sedimentary rocks of Ordovician through Triassic age, and by Quaternary alluvial sediments. The alluvial cover over the sedimentary rocks consisting of sand, gravel, silt and clay contains the Ogallala formation, the principal source of potable groundwater in the area. The Ogallala aquifer slopes to the southeast in the area of the Monument Plant and has a hydraulic gradient of 10 to 12 feet per mile toward the east or southeast (Cronin 1969). The soils of the Plant area are an integral component of the local hydrogeology due to the shallow nature of the Ogallala aquifer and the relatively high permeability of the predominant sandy soils present.

The soils found on the Monument Plant site consist of four soil series in two complexes. Existing evaporation ponds are found on both soil complexes. The Midessa-Wink fine sandy loam complex is found on the northern half of the site (ponds 2-6), while the southern half consists of the Pyote-Maljamar fine sands complex (pond 1). These are well drained soils formed in wind- or water-deposited sandy loams or sands. The Wink soil is formed from sandy alluvial deposits derived from the Tertiary-age Ogallala Formation. All of these soils have moderate to rapid water intake and permeability. Figure 2 shows the soils found on and adjacent to the Monument Plant as determined by the Soil Conservation Service (Turner, et al. 1974).



SOIL LEGEND:

MN – Midessa & Wink Fine Sandy Loams
PU – Pyote & Maljamar Fine Sands
PY – Pyote Soils & Dune Land
WF – Wink Fine Sand

El Paso Natural Gas Company

FIGURE 2

SOIL MAP OF MONUMENT PLANT AND ADJOINING AREAS

FROM: TURNER, ET.AL. (1974)

N

NO SCALE

SLUDGE SAMPLING AND ANALYSES

Sampling Methodology

Sampling Strategy. Sludge samples were collected for chemical analysis in April 1981 only from those ponds at Monument Plant known to have received industrial wastewater discharges (ponds 1-4) and, therefore, may have contained toxic wastes. Ponds 5 and 6 were used only for domestic sewage. The past and present use of the ponds was determined by reviewing construction drawings, interviewing plant personnel and conducting an onsite evaluation prior to initiating the sample collection program. The sludge samples collected at the Monument Plant therefore represent the entire spectrum of sludge types and characteristics for industrial wastewater discharge from that plant.

The sludge may be described as a non-randomly distributed, uniformly heterogeneous waste. That is, the waste is not randomly distributed either vertically or horizontally within the ponds because of the nature of the storage or disposal process. As the wastewater was discharged into the ponds the heavier particles settled out first; thus, stratifying the waste. If samples were collected near the wastewater entrance point, the sludge would be of different density than at the furthest point of the pond. Therefore, the pond was divided into sections, a sludge sample taken from each and a composite sample formed as described below. The greater the number of sections sampled and combined into a composite sample from each pond the greater the accuracy of determination of the sludge characteristics. Therefore, the discussion of analytical results contained herein assumes representative sampling.

Sampling Equipment and Methodology. At the time sludge samples were collected (May 1981) most of the ponds were either full or partially full of wastewater. Due to the unknown depth and composition of wastewater and sludge in each pond prior to sampling, the method of collection was designed to take into consideration the safety of the personnel collecting the sample. A number of sampling devices, including a dredge, auger and dipper, were tried. The sampling equipment and technique

finally selected for greatest safety and efficiency was a weighted, bottom-vented, five-gallon, steel bucket attached to a rope and dragged across the bottom of the ponds.

The bucket was cast from the bank of the pond as far toward the opposite side as possible. After allowing the bucket to sink, it was then dragged across the bottom accumulating wastewater and sludge. As much of the wastewater as possible was discarded and the sludge emptied into a plastic bucket.

This routine was followed at a minimum of one location on each of the four sides of each pond. The sludge amassed in the plastic bucket was then stirred to mix the sludge thoroughly in order to obtain a single composite sample for each pond. Prior to obtaining samples from another pond, the buckets were rinsed using the wastewater contained in the next pond to be sampled.

The temperature and pH of the sludge were taken immediately after collection and prior to transfer to sample containers. The temperature was obtained using a Fisher Scientific thermometer having a range of -50°C to 100°C. The pH of the sludge was obtained using a Cole-Parmer Digital pH meter, DigiSense LDE model 5986-10, calibrated prior to each test using standard pH buffer solutions. The measurements were noted on the sample bottle label and in a field notebook.

The composited sludge was then transferred to 500-milliliter (ml) sample bottles using a plastic funnel and steel dipper. Sample bottles were of either linear polyethylene (LPE) plastic or clear glass. These containers were selected because they offered the best chemical resistance and low cost compared to other container materials. The LPE screw-type lid was made of the same material as the bottle and the glass bottle screw-type lid was made of rigid plastic with a polyethylene liner.

The sludge placed in LPE bottles was preserved with approximately 10 ml of sulfuric acid. This sample was to be analyzed for oil and grease, phosphate and total phosphorous (EPA 1973). The sludge in glass containers was preserved with 10 ml of nitric acid. This sample was to be analyzed for heavy metals (EPA 1973) in accordance with 40 CFR §261.24.

Sludge samples were collected in November 1982 from wastewater evaporation ponds at Jal No. 4 Plant for determination of organic constituents to represent the worst-case situation for the presence of organics for El Paso plants in Lea County. Those samples were collected with a hand auger and shovel, with a backhoe used to access deeper layers. Samples were collected in the deepest sludge layers encountered at the interface with the *in situ* soil; this is believed to be the optimal environment for volatile organics. Samples were placed in glass bottles, sealed with aluminum foil and packed in ice to maintain a constant temperature. The samples were transported to the El Paso office of Raba-Kistner Consultants, Inc., who transferred them to their San Antonio laboratory for analysis.

Chain of Custody. Documentation and control necessary to identify and trace the Monument Plant sludge samples from collection to final analysis was accomplished in accordance with EPA recommendations (EPA 1980). This included labeling of sample containers, ensuring secure custody and completion of the necessary records to support potential litigation. A field log book was used to record sufficient information so that the samples could be reconstructed without reliance on the collector's memory. Chain of custody records were used and are presented in Enclosure 1 for all sludge samples discussed in this report.

Analytical Methodology

The sludge samples from Monument Plant were analyzed by El Paso Natural Gas Company's Southern Division Laboratory in El Paso, Texas. The laboratory is certified by the New Mexico Environmental Improvement Division for testing water and wastewater for inorganic and microbiological constitutents.

The samples were extracted and/or analyzed in accordance with procedures described in EPA's Test Methods for Evaluating Solid Waste, SW-846, dated August 8, 1980.

Results and Discussion

The results of the chemical determinations for the sludge samples from ponds Nos. 1 through 4 from Monument Plant are presented in Table 1. The results of the chemical analyses indicate that none of the sludges analyzed exhibit the characteristics of EP toxicity as defined in 40 CFR §261.24. Threshold values characteristic of EP toxicity for contaminants are also shown in Table 1 for purposes of comparison. These threshold values assume an attenuation factor of 100-fold as adopted by the EPA.

It is known that the pH of the wastewater affects solubility of metal salts. With regard to those heavy metals listed in 40 CFR Part 261, the lower the pH below a pH of 7 the more soluble those metals become. For example, the molar concentration of chromium (+3) is 10^{-8} at a pH of 6.5, $10^{-3.8}$ at a pH of 5.2 and 1 at a pH of 3.9. By preserving the samples in the manner previously described, the chemical analyses were more stringent than required by RCRA. The pH of all of the samples was lowered to or below 3.0 through the method of preservation. This caused the test results to show *total extractable* and not the *amount leachable* (or available) at a pH of 5.2 as required by RCRA (EPA 1980). Therefore, the method of preservation used in which pH was lowered below 5.2 caused essentially all of the chromium (+3) to be oxidized and go into solution.

The effect of pH on chromium solubility may be illustrated by examining results of a resample of ponds Nos. 3 and 6 at the nearby Eunice Plant. The original HNO_3-preserved samples collected in April 1981 had pH values of 3.0 for pond No. 3 and 2.0 for pond No. 6. These samples had chromium values of 5.2 and 8.6 mg/L, respectively. Subsequently, these two ponds were resampled in June 1981 and the unpreserved sludge samples were extracted at a pH of 5.0. This reanalysis gave chromium values of 0.05 and 0.1 mg/L for the respective ponds.

TABLE 1

Results of Chemical Analyses Conducted on Sludge Samples Collected from Ponds at Monument Plant; and Maximum Allowable Concentrations.

Constituent	Level of Constituents in Milligrams per Liter: Pond 1 Sludge	Pond 2 Sludge	Pond 3 Sludge	Pond 4 Sludge	Maximum Allowable Concentration[1] (mg/L)
Lead	<0.1	<0.1	<0.1	<0.1	5.0
Cadmium	<0.02	<0.02	<0.02	<0.02	1.0
Silver	<0.02	<0.02	<0.02	<0.02	5.0
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	0.2
Arsenic	<0.005	0.012	0.044	0.03	5.0
Selenium	<0.005	<0.005	<0.005	<0.005	1.0
Barium	0.7	1.6	0.9	0.4	100.0
Chromium	<0.03	0.40	1.0	1.0	5.0
Copper	<0.04	<0.04	<0.04	<0.04	
Zinc	2.3	2.6	9.2	15.8	
Nickel	<0.2	<0.2	<0.2	<0.2	
Phosphate	2.4	0.3	6.0	3.0	
Total Phosphate	2.4	0.6	6.0	3.0	
Nitrate	<0.01	0.04	0.29	0.10	
Boron	1.60	0.46	1.44	0.70	
Vanadium	<0.1	0.5	<0.1	<0.1	
pH	7.90	6.98	7.20	7.29	
% Oil and Grease	4.28	9.24	7.73	14.00	

[1] 40 CFR §261.24, 45 FR:33122.

Analyses of sludges from Jal No. 4 Plant for organics, selected as being the worst-case situation, showed no organic constituents present at levels exceeding standards agreed to by the NMOCD of 100 times the Human Health Standards as defined by New Mexico Water Quality Control Commission Regulation Part 3-103.A except for total phenols, which are believed will decompose as the sludge dries and becomes more aerated. The results of the organic analyses are presented in Enclosure 2.

Levels of oil and grease in the sludge were determined for sludge from ponds Nos. 1, 2, 3 and 4 from Monument Plant. These values are reported in Table 1.

CLOSURE PLAN

The ponds to be closed under this plan are all six ponds at the Monument Plant. The closure of those ponds is described herein in as much detail as currently possible.

Schedule

The procedures detailed in the Discharge Plan which have been incorporated entail the routing of all wastewater to an on-site classifier system to separate oil, settleable solids and some suspended solids from the wastewater. The wastewater from the separator is pumped through an anthracite/rock filter, metered and disposed via the Rice Engineering Disposal System, Monument Branch. This system has been in operation since October 1982 and is more fully described in the Discharge Plan. No further wastewater input has been introduced into the ponds to be closed since inception of the disposal program. Dikes have been constructed to prevent surface runoff from entering the ponds in order to allow drying. Rainwater which collects in the abandoned ponds will be pumped out as is practicable. As of late May 1983, all ponds at Monument Plant were either dry (ponds 5 and 6); had been pumped to the lowest possible level (ponds 2, 3 and 4); or were in the process of being pumped dry (pond No. 1) (May 31, 1983 letter from D. N. Bigbie to J. Ramey). The length of time necessary for drying of the ponds cannot be determined due to climatic vagaries, etc. The ponds will be inspected within six months after acceptance of the Discharge Plan to determine the progress of the drying of the ponds. The ability of the pond bottoms to support earthmoving equipment will be determined prior to beginning closure field activities.

Closure Procedures

After the ponds have dried to the extent that earthmoving equipment can be supported, closure activities can commence. The dried sludge will be leveled, if necessary, and fill material (soil) will be deposited to extend to the existing ground surface, with a slight convex shape

effected of approximately one-half to one foot at the apex. This slight dome shape will accommodate natural settling of the fill material and provide enough relief to allow runoff of rainfall and to prevent ponding on the fill material. This fill material is expected to consist of the soil material in the existing berm as well as commercially obtained local earthern material of sandy loam or similar texture. This fill material ranging from approximately two feet to six feet in depth over the sludge layer will serve as a buffer zone for intercepting and holding infiltrating soil moisture. The natural topography of the immediate area will be approximated with the exception that a gently sloping knoll will replace the present pond with surrounding berm. Approximately 26,678 cubic yards of fill material is expected to be used in the closure process (Table 2); of this amount, 17,127 cubic yards will be obtained elsewhere. Closure of the fresh water pond should require only berm materal. The Site Grading Plan (Figure 3, Map Pocket) shows the final surface configuration of the Plant after closure of the ponds.

The relatively small total acreage of the ponds to be closed (2.49 acres) and gentle slopes resulting from the knoll-like configuration of the closed ponds are not expected to appreciably increase runoff onto adjacent areas. The surface runoff originating from the closed ponds is expected to drain to discharge points for the Plant area as indicated in the Site Grading Plan (Figure 3, Map Pocket). No earthmoving activities are proposed for the interior of the plant perimeter which contains the plant facilities, nor in the employee camp area.

Rational for Closure Procedures

Meetings and correspondence with the NMOCD since the submittal of the original Discharge Plan in 1981, as well as results of additional sampling and analyses for priority pollutants have culminated in this Closure Plan.

The results of chemical analyses of sludges from ponds Nos. 1 through 4 at Monument Plant, as presented and discussed in this Closure Plan, show that the sludges present in the abandoned ponds to be closed

TABLE 2

Estimated Fill Material (cubic yards)[1/] Necessary to Close Ponds at Monument Plant.

Pond	Size (acres)	Fill Material Needed (yd^3)	Fill Material in Berms (yd^3)	Fill Material to be Obtained Elsewhere (yd^3)
1	0.88	9,102	4,236	4,866
2	0.34	3,912	1,261	2,651
3	0.39	4,250	1,481	2,768
4	0.30	4,804	927	3,877
5	0.12	1,562	202	1,360
6	0.46	3,048	1,443	1,605
Totals	2.49	26,678	9,551	17,127

[1/] Volumes assume material volume change (volume expansion during material handling and volume shrinkage due to compaction) is nil.

under this plan do not exhibit any of the characteristics of EP toxicity as defined in 40 CFR §261.24. The analysis of sludge from Jal No. 4 Plant indicates no organic constituents except total phenols in excess of standards agreed to by the NMOCD. Because the processing and compression of gas is similar in many of El Paso's plants, the assumptions underlying the closure of ponds at Jal No. 4 Plant may be safely applied to the Monument Plant; the NMOCD has agreed with this approach.

Infiltration of water is the principal mode of leachate generation from any disposal operation whether it is a landfill or disposal pond. The infiltration into the soil cover and any subsequent percolation down to the groundwater is determined by surface conditions and climatological characteristics of the area.

Specific retention of a soil is a measure of the water retaining capacity of the soil and is expressed quantitively as the percentage of the total volume of soil occupied by moisture that will be retained in interstices against the force of gravity (Walton 1970). Sand has a specific retention of 70-90 percent. Field capacity, analogous to specific retention of a typical fine sandy loam soil with grass cover, is approximately 2.45 inches of moisture per foot of soil depth (Lutton et al. 1979). Assuming the maximum root zone is within the uppermost four feet of soil (Weaver 1968), soil moisture storage would be 9.8 inches at field capacity. In the Jal, New Mexico area the soil has a low antecedent moisture content of about five percent. Therefore, the soil has the capability to retain an additional 65 to 85 percent more moisture (1.6-2.1 inches/foot) to equal its maximum specific retention of 2.45 inches of moisture per foot of soil depth.

The amount of water expected to infiltrate into the soil from a 100-year, 24-hour storm (6.10 inches of precipitation) was estimated at an area-weighted average of 2.89 inches (range = 1.7 to 4.1 inches) for the Monument Plant as shown in the Discharge Plan. Hence, most, if not all, of the moisture infiltrating the soil could conceivably be held in the first two feet of soil cover.

Until the field capacity of the soil is reached, the moisture in the soil is regarded as being a balance between what enters it as a result of precipitation and what leaves through evapotranspiration. Therefore, comparing the monthly moisture loss from the soil to monthly precipitation will obtain values that indicate either percolation of precipitation or water deficit. Evapotranspiration, representing total water loss from the soil to the atmosphere via evaporation and transpiration by plants, is an important factor in determining the feasibility of the proposed closure procedure. In order to quantitatively evaluate the leachate potential associated with the specific climate and proposed closure procedures, the method of Thornthwaite and Mather (1957) and Mather (1978) was used to determine the soil water balance for each month of the year using long-term precipitation data. This method also utilizes an annual heat index based on mean monthly temperature, mean daily duration of sunlight as related to latitude, the water-holding capacity of the soil root zone as related to vegetation type, as well as various tables developed by Thornthwaite and Mather (1957) for computing evapotranspiration and the water balance. The results of applying this method to southern Lea County, New Mexico are shown in Table 3 and in Figure 4; these results indicate that due to the fact that potential evaporation exceeds infiltration of precipitation by a total of 22.85 inches for the year the likelihood of percolation of precipitation causing leaching of the sludge layer is remote. Figure 4 shows that soil moisture recharge occurs in only two months, December and January, but the water holding capacity of the soil root zone is never exceeded. The Blaney and Criddle (1962) method for determining water loss from the soil by evaporation and plant use in response to climate and vegetation was also calculated as presented by Schulz (1976) for native vegetation receiving only precipitation. This method utilizes site-specific mean monthly values for temperature, precipitation and percent daylight as well as a monthly coefficient for water use by vegetation which reflects vegetation type and growth stage. While the monthly values are not presented for this method, the total yearly soil moisture deficit obtained by the Blaney and Criddle method correlates very well (within 10%) with the results of the soil water balance as determined by the Thornthwaite

TABLE 3
Water Balance Data for
Southern Lea County, New Mexico

Parameter [1]	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Potential Evapotranspiration [2]	0.32	0.51	1.22	2.43	4.22	5.85	6.57	5.84	4.02	2.31	0.83	0.31	34.43
Rainfall [3]	0.51	0.30	0.48	0.65	1.52	1.31	1.63	1.60	1.48	1.39	0.38	0.42	11.67
Surface Runoff Coefficient [4]	0.1	0	0	0	0	0	0	0	0	0	0	0.1	-
Surface Runoff	0.05	0	0	0	0	0	0	0	0	0	0	0.04	0.09
Infiltration	0.46	0.3	0.48	0.65	1.52	1.31	1.63	1.60	1.48	1.39	0.38	0.38	11.58
Infiltration-Potential Evapotranspiration	+0.14	-0.21	-0.74	-1.78	-2.70	-4.54	-4.94	-4.24	-2.54	-0.92	-0.45	+0.07	-22.85
Accumulated Potential Water Loss	(-0.08)	-0.29	-1.03	-2.81	-5.51	-10.05	-14.99	-19.23	-21.77	-22.69	-23.14		
Soil Moisture Storage [5]	0.25	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.11	
Change in Soil Moisture Storage	+0.14	-0.21	0	0	0	0	0	0	0	0	0	+0.07	0
Actual Evapotranspiration	0.32	0.51	0.48	0.65	1.52	1.32	1.63	1.60	1.48	1.39	0.38	0.31	11.58
Percolation	0	0	0	0	0	0	0	0	0	0	0	0	0

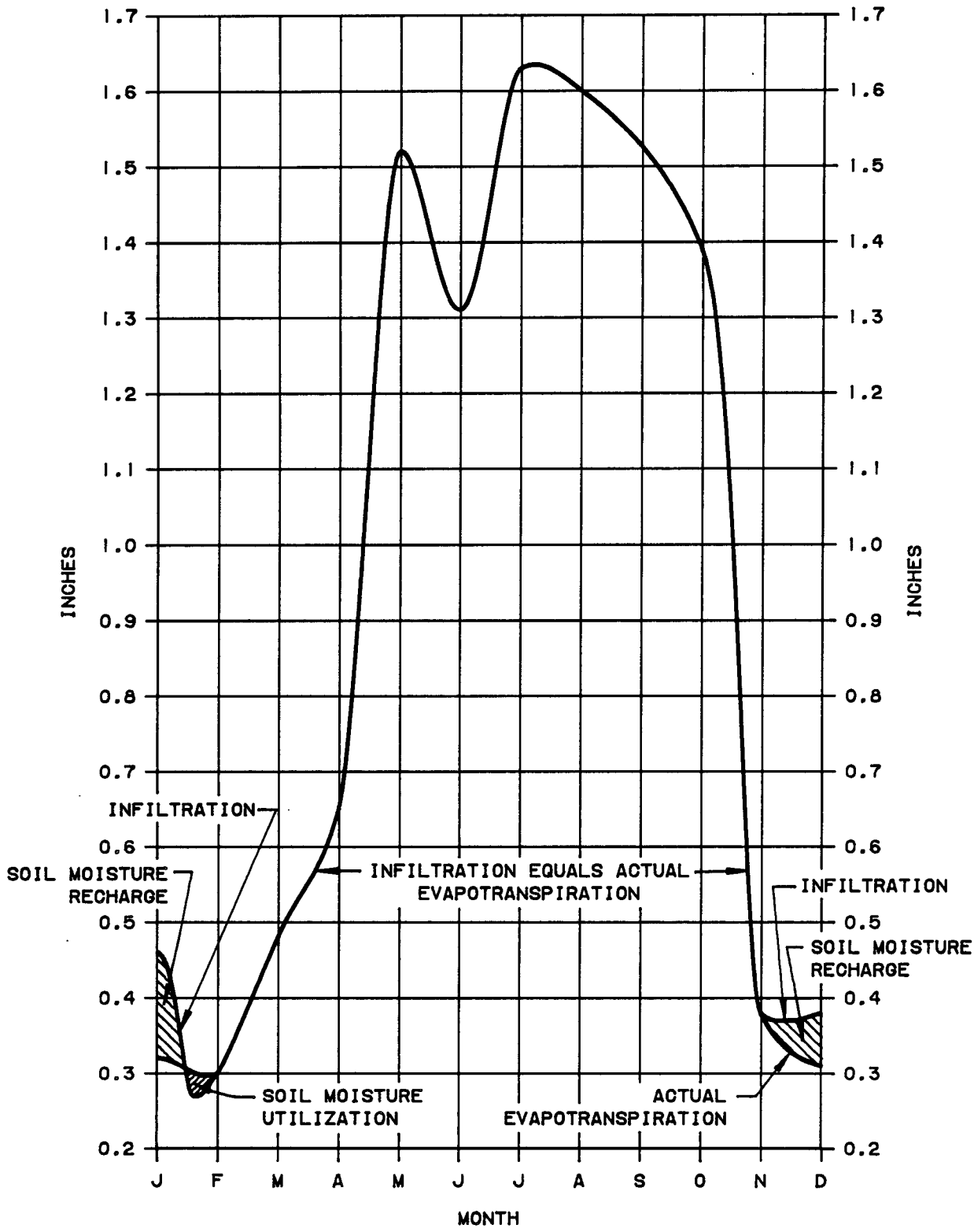
1/ All values in inches except surface runoff coefficient.

2/ As per Thornthwaite and Mather (1957).

3/ Period of record for Jal, New Mexico is 1937-1975 (NOAA 1977).

4/ Surface Runoff Coefficient is ∿0.1 if precipitation is greater than potential evapotranspiration, otherwise the value is zero.

5/ As per J. R. Mather (1978).



El Paso NATURAL GAS COMPANY

FIGURE 4
WATER BALANCE FOR SOUTHERN LEA COUNTY NEW MEXICO

and Mather (1957) method. The two methods used to compute the water balance are very conservative, assuming that 100% of the precipitation infiltrates the soil (except for two months with the Thornthwaite and Mather method). The percentage precipitation infiltrating the soil was calculated in the Discharge Plan to range from 27 to 67%. Therefore, the actual difference between precipitation and evapotranspiration is even greater than indicated here.

Based on the information presented in this report it is unlikely that the moisture holding capacity of the soil above the sludge layer will be exceeded by either low probability, high intensity precipitation events or normal precipitation during the year in most instances. These conclusions infer that the integrity of the sludge zone will not be significantly jeopardized due to infiltration of water through the soil profile.

Post-Closure Activities

Due to the location of the pond closure sites within the Plants, any problems such as excessive erosion, woody plant invasion, etc. will be readily observable and remedied. Nevertheless, El Paso proposes to institute an annual inspection of the closed ponds by a technical person qualified to evaluate the condition of the cover, whether it be vegetation or gravel. Also, inspections will be conducted immediately after severe storms. These inspections will be designed to detect erosion of the cover above allowable limits as well as such anomalies as piping or subsidence of the cover, etc. Repairs of such potential damage to the integrity of the cover will be made as soon as possible.

LITERATURE CITED

Blaney, H. F., and W. D. Criddle. 1962. Determining Consumptive Use and Irrigation Water Requirements. U.S. Department of Agriculture Tech. Bull. 1275.

Cronin, J. G. 1969. Ground Water in the Ogallala Formation in the Southern High Plains of Texas and New Mexico. Hydrologic Investigations Atlas HA-330, U.S. Geological Survey, Washington, D.C.

EPA. 1973. Handbook for Monitoring Industrial Wastewater. U.S. Environmental Protection Agency Office of Technology Transfer, Washington, D.C.

EPA. 1980. Test Methods for Evaluating Solid Wastes-Physical/Chemical Methods SW-846. U.S. Environmental Protection Agency Office of Water and Waste Management, Washington, D.C.

Gabin, V. L., and L. E. Lesperance. 1977. New Mexico Climatological Data-Precipitation, Temperature, Evaporation, and Wind-Monthly and Annual Means, 1850-1975. W. K. Sommers and Associates, Socorro, New Mexico.

Lutton, R. J., G. L. Regan, and W. L. Jones. 1979. Design and Construction of Covers for Solid Waste Landfills. U.S. Environmental Protection Agency, Cincinnati, Ohio.

Mather, J. R. 1978. The Climatic Water Budget in Environmental Analysis. Lexington Books, Lexington, Massachusetts.

Miller, J. F., R. H. Frederick and R. J. Tracey. 1973. Precipitation-Frequency Atlas of the Western United States, NOAA Atlas 2, Vol. IV-New Mexico. U.S. Department of Commerce, National Weather Service, Maryland.

N.O.A.A. 1977. Climatography of the United States No. 60, Climate of New Mexico. Dept. of Commerce, Asheville, North Carolina.

Reynolds, S. E. 1956. Climatological Summary-New Mexico. Tech. Rep. No. 5. New Mexico State Engineer, Santa Fe.

Schulz, E. F. 1976. Problems in Applied Hydrology. Water Resources Publications, Fort Collins, Colorado.

Thornthwaite, C. W., and J. R. Mather. 1957. Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance. Drexel Inst. of Technology, Publications in Climatology. Vol. X, No. 3. Centerton, New Jersey.

Turner, M. T., D. N. Cox, B. C. Mickelson, A. J. Roath and C. D. Wilson. 1974. Soil Survey of Lea County, New Mexico. U.S. Department of Agriculture, Soil Conservation Service, Washington, D.C.

Walton, W. C. 1970. Groundwater Resource Evaluation. McGraw-Hill Book Company, New York.

Weaver, J. E. 1968. Prairie Plants and Their Environment. University of Nebraska Press, Lincoln, Nebraska.

Enclosure 1

CHAIN OF CUSTODY RECORDS

No. Samples
1 - Glass HNO3
1 - Master Hi-Vol

2

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

Collector's Sample No. 81-24

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: _____

Shipper Name: El Paso Natural Gas Co (Sample)

Address: PO Box 1492 (number) El Paso (street) TX (city) 79978 (state, zip)

Collector's Name [signature] (signature) Telephone: (915) 543-8138

Date Sampled 29 April 1981 Time Sampled 1630 hours

Type of Process Producing Waste Natural Gas Processing

Field Information Point #1 - Monument Plant (Inlet Water at Monument plant dated 2-12-81). Composite sample collected with bucket

Sample Receiver: El Paso Natural Gas Co., Southern Div. Lab., P.O. Box 1492,

1. El Paso, Tx 79978
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	[signature]	Envr. Engr	Apr 29-May 1, 1981
2.	[signature]	Chief Env Chemist	5-1-81
3.			

Number Samples
1- Glass HNO3
1- Plastic H2SO4
2

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

Collector's Sample No. E1-20

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓Disposal Site

___Other: _____

Shipper Name: El Paso Natural Gas Co (Sample)

Address: PO Box 1492 (number) El Paso (street) TX (city) 79978 (state, zip)

Collector's Name Garnett W. Smith (signature) Telephone: (915) 543-6138

Date Sampled April 29, 1981 Time Sampled 1520 hours

Type of Process Producing Waste Natural Gas Processing

Field Information Pond #2 at Monument Plant - Composite sample collected with bucket (Aerial photo of Monument plant of 2-12-81)

Sample Receiver: Southern Div. Lab., El Paso Natural Gas Co.

1. P.O. Box 1492 El Paso Tx 79978 (name and address of organization receiving sample)

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	Garnett Smith	Env. Engr	Apr 29 - May 1, 1981
2.	Carol F Mowrey	Chief Div Chemist	5-1-81
3.			

Number Samples
1 - Glass HNO_3
1 - Plastic H_2SO_4
2

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

Collector's Sample No. EI-21

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓ Disposal Site

___Other: _____

Shipper Name: El Paso Natural Gas Co (Sample)

Address: PO Box 1492 (number) El Paso (street) TX (city) 79978 (state, zip)

Collector's Name Garrett R. Guest (signature) Telephone: (915) 543-6136

Date Sampled April 29, 1981 Time Sampled 15 30 hours

Type of Process Producing Waste Natural Gas Processing

Field Information Permit # 3 - Monument Plant (Aerial photo of Monument Plant dated 2-12-81). Composite sample collected with bucket auger.

Sample Receiver: Southern Division Laboratory, El Paso Natural Gas

1. Company P.O. Box 1492 El Paso, Tx 79978 (name and address of organization receiving sample)

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	Garrett R. Guest	Envir. Engr	Apr 29 - May 1, 1981
2.	Carl F. Murray	Chief Div. Chemist	5-1-81
3.			

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

Collector's Sample No. 81-23

CHAIN OF CUSTODY RECORD

Location of Sampling: ___Producer ___Hauler ✓ Disposal Site

___Other: _____
Sample

Shipper Name: EL PASO NATURAL GAS COMPANY

Address: P.O. Box 1492 EL PASO TEXAS 79978
number street city state zip

Collector's Name _____ Telephone: (915) 543-6138
signature

Date Sampled APRIL 29, 1981 Time Sampled 1600 hours

Type of Process Producing Waste NATURAL GAS PROCESSING

Field Information TEMP. 18°C PH 7.24

POND NO. 4 LOCATED AT EPNG MONUMENT PLANT, MONUMENT, N.M

(USED BUCKET ON A ROPE TO COLLECT COMPOSITE SAMPLE

Sample Receiver: Southern Division Laboratory, El Paso Natural
1. Gas Company. P.O. Box 1492, El Paso, Tx 79978
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	[signature]	Envr. Engr	Apr 29 - May 1, 1981
2.	Carl F. Murray	Chief Div Chemist	5-1-81
3.			

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

Collector's Sample No. 81-16

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: _____

Sample

Shipper Name: EL PASO NATURAL GAS COMPANY

Address: P.O. Box 1492 (number) EL PASO (street, city) TEXAS (state) 79978 (zip)

Collector's Name [signature] Telephone: (915) 543-6138

Date Sampled APRIL 29, 1981 Time Sampled 1230 hours _____

Type of Process Producing Waste NATURAL GAS PROCESSING

Field Information TEMP. 23°C, PH. 7.12

POND NO. 3 LOCATED AT EPNG EUNICE PLANT, EUNICE, N.M.

(USED BUCKET ON A ROPE TO COLLECT COMPOSITE SAMPLE)

Sample Receiver: Southern Division Laboratory, El Paso Natural Gas Co., P.O. Box 1492, El Paso, Tx 79975

1. _____
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

	signature	title	inclusive dates
1.	[signature]	Envr. Engr	Apr 29 - May 1, 1981
2.	[signature]	Chief Div Chemist	5-1-81
3.			

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

Collector's Sample No. 81-18

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: Sample

Shipper Name: EL PASO NATURAL GAS COMPANY

Address: P.O. Box 1492 (number) EL PASO (street) TEXAS (city) 79978 (state) (zip)

Collector's Name Ernest L. Smith (signature) Telephone: (915) 543-6135

Date Sampled APRIL 29, 1981 Time Sampled 1240 hours ____

Type of Process Producing Waste NATURAL GAS PROCESSING

Field Information TEMP. 30°C, PH 6.20

POND NO. 6 LOCATED AT EPNG EUNICE PLANT, EUNICE, N.M.

(USED BUCKET ON A ROPE TO COLLECT COMPOSITE SAMPLE)

Sample Receiver: Southern Division Lab, El Paso Natural Gas Co,

1. P.O. Box 1492 El Paso Tx 79978
name and address of organization receiving sample

2. ____

3. ____

Chain of Possession:

	signature	title	inclusive dates
1.	Ernest L. Smith	Env. Engr	Apr 29 - May 1, 1981
2.	Carol J. Murray	Clerk/Dispatcher	5-1-81
3.	____	____	____

CONFIRMATION TESTING
For Cr only

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

PRIORITY #1

Collector's Sample No. 81-25

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: EUNICE PLANT No. 5 PUMP
Sample

Shipper Name: EL PASO NATURAL GAS CO.

Address: P.O. Box 1492, EL PASO, TX 79978
number street city state zip

Collector's Name John A. Sproul, Jr. Telephone: (915) 543-2600
signature

Date Sampled 11 June 1981 Time Sampled _____ hours _____

Type of Process Producing Waste Natural gas processing

Field Information Temp. 26° C ; Confirmation testing rqd. for Cr and ignitability testing

Sample Receiver:

1. _____
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1. Robert N. Spurt	Env. Eng.	6-11-81 To 6-15-81
signature	title	inclusive dates
2. Carl Murray	S.D. Chief Chem.	6-15-81 to 7-17-81
signature	title	inclusive dates
3. _____	_____	_____
signature	title	inclusive dates

Confirmation Testing

For Cr. only

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

PRIORITY #1

Collector's Sample No. 81-26

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: EUNICE PLANT No. 6 Pond
Sample

Shipper Name: EL PASO NATURAL GAS CO.

Address: P.O. Box 1492, EL Paso, TX 79978
number street city state zip

Collector's Name John A. Sproul, Jr. Telephone: (915) 543-2600
signature

Date Sampled 11 June 1981 Time Sampled _____ hours _____

Type of Process Producing Waste Natural gas processing

Field Information Temp 26°C, oil noted on pond; sample Taken for confirmation Testing for Cr, and ignitability testing; 3 pints collected -- 1 preserved w/ HNO_3, others not preserved

Sample Receiver:

1. _____
name and address of organization receiving sample

2. _____

3. _____

Chain of Possession:

1.	Robert N. Sproul signature	Env. Eng. title	6-11-81 to 6-15-81 inclusive dates
2.	Carl Murray signature	Ch. Chem. S.D. title	6-15-81 to 7-17-81 inclusive dates
3.	_____ signature	_____ title	_____ inclusive dates

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

Collector's Sample No. 82-107

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: _____

Shipper Name: EL PASO NATURAL GAS COMPANY EAD

Address: P.O. Box 1492 (number) EL PASO (street) TEXAS (city) 79978 (state, zip)

Collector's Name F.R. SPRESTER / O. Ueibe (signature) Telephone: (915) 541-6138 2407

Date Sampled Nov. 17, 1982 Time Sampled 1330 hours

Type of Process Producing Waste OIL/WASTEWATER DISCHARGE FROM NATURAL GAS PROCESSING PLANT.

Field Information QUART SIZE MASON JAR, GLASS WITH ALUMINUM FOIL COVER. SAMPLE TAKEN ONE FOOT BELOW SURFACE. ORGANICS

Sample Receiver:

1. RABA-KISTNER CONSULTANTS INC. 406 CHELSEA, EL PASO, TE
name and address of organization receiving sample

2. _____

3. Raba-Kistner Consultants, Inc. 10526 Gulfdale, San Antonio

Chain of Possession:

	signature	title	inclusive dates
1.	Osiris Ueibe	ENVIRONMENTAL TECH.	Nov. 17-22, 1982
2.	[signature]	Lab Manager	November 22, 1982
3.	Francine Y. Huang	Manager, Chemical R&D	November 23, 1982 Tuesday December 21, 1982 - Tuesday (Marilyn Comple

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

Collector's Sample No. 82-107

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: _____

Sample

Shipper Name: EL PASO NATURAL GAS COMPANY EAD

Address: P.O. Box 1492 (number) EL PASO (street) TEXAS (city) 79978 (state) (zip)

Collector's Name F.R. SPRESTER / O. Ulle (signature) Telephone: (915) 541-6138 2407

Date Sampled Nov. 17, 1982 Time Sampled 1330 hours _____

Type of Process Producing Waste OIL/WASTEWATER DISCHARGE FROM NATURAL GAS PROCESSING PLANT

Field Information QUART SIZE MASON JAR, GLASS WITH ALUMINUM FOIL COVER. SAMPLE TAKEN ONE FOOT BELOW SURFACE. ORGANICS

Sample Receiver:

1. RABA-KISTNER CONSULTANTS INC. 406 CHELSEA, EL PASO, TE
name and address of organization receiving sample

2. _____

3. Raba-Kistner Consultants, Inc. 10526 Gulfdale, San Antonio

Chain of Possession:

1.	Ossie Ulle (signature)	Environmental Tech. (title)	Nov. 17-22, 1982 (inclusive dates)
2.	(signature)	Lab Manager (title)	November 22, 1982 (inclusive dates)
3.	Francis Y. Huang (signature)	Manager, Chemical R&D (title)	November 23, 1982 Tues. December 21, 1982 - Tues. (Analytical Comp.

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

Collector's Sample No. 82-092
THRU
82-106
TOTAL OF 15

CHAIN OF CUSTODY RECORD

Location of Sampling: ___ Producer ___ Hauler ✓ Disposal Site

___ Other: _____
Sample

Shipper Name: EL PASO NATURAL GAS COMPANY - ENVIRONMENTAL AFFAIRS DEPT.

Address: P.O. BOX 1492 EL PASO TEXAS 79978
number street city state zip

Collector's Name F.R. SPRESTER / O. Ueibe Telephone: (915) 541-6138
signature 541-2407

Date Sampled Nov. 16, 1982 Time Sampled _____ hours _____

Type of Process Producing Waste WASTEWATER FROM INDUSTRIAL PROCESS

Field Information SAMPLES OBTAINED USING BACKHOE, AUGER & SHOVEL FOR SURFACE COMPOSITES.

Sample Receiver:

1. RABA-KISTNER CONSULTANTS, INC. 106 CHELSEA
name and address of organization receiving sample

2. _____

3. Raba-Kistner Consultants, Inc. 10526 Gulfdale, San Antonio

Chain of Possession:

1.	Orias Ueibe signature	ENVIRONMENTAL TECH. title	NOV. 18, 1982 THURSDAY inclusive dates
2.	[illegible] signature	Raba-Kistner Laboratory Manager title	Nov 18, 1982 Thursday inclusive dates
3.	Francis J. Huang signature	Manager, Chemical R&D. title	NOV. 22, 1982 Monday DEC. 21, 1982 Tuesday inclusive dates

analysis complete

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

ANALYSIS REQUEST

PART I: FIELD SECTION

COLLECTOR Sprester/Uribe DATE SAMPLED 11-16-82 TIME _____ HOURS

LABORATORY SAMPLE NUMBER	COLLECTOR'S SAMPLE NO.	TYPE OF SAMPLE*	FIELD INFORMATION **
			BACK HOE
	82-092	Sludge	7'-1' Top Soil Sand, Brown; 2' Organic Black; 1.5' Brown Sand; 2.5' Lt. Bn Ca
	82-093	"	10'- 3.5'- Sand/Caliche Light Brown; 1.5'- Red Brown Sand, Some Caliche; 4.0 - Organics Black Mixed Soil; 1.0'- Stain Grey Caliche
	82-094	"	9'-1.5 Brown Brn. Sand; 7.5' Fill Material Mixed Organics; 7.5' Caliche with organic streaks.
	82-095	"	10'- Fill Material
	82-096	"	13'- All Mixed Fill Material with Organics
	82-097	"	9'- 1.0' layers/caliche material mixed soil; 2.0' Red Sand Mixed; 6.0' Organics Blk., streaks of red.
	82-098	"	" " " " "
	82-099	"	Sludge Sample at Two Feet Depth
	82-100	"	" " " " " "

ANALYSIS REQUESTED Organic Constituents

SPECIAL HANDLING AND/OR STORAGE Quart Size Mason Jar Glass, Aluminum Foil Covering Opening.

PART II: LABORATORY SECTION **

RECEIVED BY Francis G. Hwang TITLE Manager, Chemical R.&P. DATE Nov. 22, 1982

ANALYSIS REQUIRED _____

* Indicate whether sample is soil, sludge, etc.
** Use back of page for additional information relative to sample location

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

ANALYSIS REQUEST

PART I: FIELD SECTION

COLLECTOR SPRESTER/URIBE DATE SAMPLED 11-16-82 TIME _____ HOURS

LABORATORY SAMPLE NUMBER		COLLECTOR'S SAMPLE NO.	TYPE OF SAMPLE*	FIELD INFORMATION **
		82-101	SLUDGE	10' { 5' MIXED FILL MATERIAL WITH ORGANICS, BLK. 6" DARK BLK SOFT MATERIAL, STICKY LAYER 2.5' RED SOIL, STREAKS OF BLACK 2.0' LT. COLOR CALICHE, HARD, STREAKS OF BLK.
		82-102	"	8' - 6' RED SOIL SAND, SOME STREAKS BLK, ROOTS 8' - 2' GREY LT. ASH, VERY HARD
	*	82-103	"	COMPOSITE SURFACE SAMPLE - INORGANICS
		82-104	"	SLUDGE SAMPLE AT ONE FOOT DEPTH - ORGANICS
	*	82-105	"	COMPOSITE SURFACE SAMPLE - INORGANICS
		82-106	"	SLUDGE SAMPLE AT ONE FOOT DEPTH - ORGANI

ANALYSIS REQUESTED ORGANIC CONSTITUENTS, NOTE SAMPLES 82-103 & 82-105 ARE FOR INORGANICS.

SPECIAL HANDLING AND/OR STORAGE ALL SAMPLES GLASS QUART SIZE MASON JAR WITH ALUMINUM COVER.

PART II: LABORATORY SECTION **

RECEIVED BY Francis Y. Huang TITLE Manager, Chemical R.&D. DATE Nov. 22, 1982

ANALYSIS REQUIRED _____

* Indicate whether sample is soil, sludge, etc.
** Use back of page for additional information relative to sample location

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

ANALYSIS REQUEST

PART I: FIELD SECTION

COLLECTOR F.R. Sprester/O. Uribe DATE SAMPLED Nov. 16 & 17 TIME N/A HOURS

LABORATORY SAMPLE NUMBER	COLLECTOR'S SAMPLE NO.	TYPE OF SAMPLE*	FIELD INFORMATION **
	82-092	Sludge	N/A
	82-093	Sludge	N/A
	82-094	Sludge	N/A
	82-095	Sludge	N/A
	82-096	Sludge	N/A
	82-097	Sludge	N/A
	82-099	Sludge	N/A
	82-101	Sludge	N/A
	82-104	Sludge	N/A
	82-107	Sludge	N/A

ANALYSIS REQUESTED General component extraction for the following; Benzene, Polychlorinated Biphenyls (PCB's), Toluene, Carbon Tetrachloride, EDC, 1,1-DCE, PCE, TCE, Total Organic Carbon and Phenols.

SPECIAL HANDLING AND/OR STORAGE Quart size Mason Jars - Glass, with aluminum foil cover.

PART II: LABORATORY SECTION **

RECEIVED BY Francis G. Huang TITLE Manager, Chemical R. & P. DATE NOV. 22, 1982

ANALYSIS REQUIRED

* Indicate whether sample is soil, sludge, etc.
** Use back of page for additional information relative to sample location

EL PASO NATURAL GAS COMPANY
ENVIRONMENTAL AFFAIRS DEPARTMENT
EL PASO, TEXAS
(915) 543-2600

ANALYSIS REQUEST

PART I: FIELD SECTION

COLLECTOR F. R. Sprester/O. Uribe DATE SAMPLED Nov. 16 & 17 TIME N/A HOURS

LABORATORY SAMPLE NUMBER	COLLECTOR'S SAMPLE NO.	TYPE OF SAMPLE*	FIELD INFORMATION **
	82-100	Sludge	N/A
	82-106	Sludge	N/A
	82-098	Sludge	N/A

ANALYSIS REQUESTED EPA Leachate Extraction; Benzene, Polychlorinated Biphenyls (PCB's), Toluene, Carbon Tetrachloride, EDC, 1,1-DCE, PCE, TCE, Total Organic Carbon, and Phenols.

SPECIAL HANDLING AND/OR STORAGE Quart size Mason Jars, glass, with aluminum foil cover.

PART II: LABORATORY SECTION **

RECEIVED BY Francis J. Huang TITLE Manager, Chemical R.&D. DATE Nov. 22, 19[illegible]

ANALYSIS REQUIRED

* Indicate whether sample is soil, sludge, etc.
** Use back of page for additional information relative to sample location

Enclosure 2

RESULTS OF ORGANIC
CONSTITUENT TESTING OF
WASTEWATER POND SLUDGES

Results of Organic Constituent Testing
of Wastewater Pond Sludges

Sample	Plant	Pond No.	Unit	Benzene	PCB [1]	Toluene	Carbon Tetrachloride	EDC	1,1-DCE	PCE	TCE	TOC	Total Phenol	Sodium Pentachlorophenate
82-092	Jal No. 4	6	µg/g	<1.0	<0.1	<1.0	<0.07	<0.06	<0.04	<0.07	<0.05	0.19%wt	<0.25	
82-093	Jal No. 4	7	µg/g	<1.0	<0.1	<1.0	<0.07	<0.06	<0.04	<0.07	<0.05	0.22%wt	<0.25	
82-094	Jal No. 4	4	µg/g	<1.0	<0.1	<1.0	<0.07	<0.06	<0.04	<0.07	<0.05	0.19%wt	<0.25	
82-095	Jal No. 4	5	µg/g	<1.0	<0.1	<1.0	<0.07	<0.06	<0.04	<0.07	<0.05	0.27%wt	1.76	
82-096	Jal No. 4	7	µg/g	<1.0	<0.1	<1.0	<0.07	<0.06	<0.04	<0.07	<0.05	0.14%wt	<0.25	
82-097 [3]	Jal No. 4	8	µg/g	<1.0	<0.1	<1.79	<0.07	<0.06	<0.04	<0.07	<0.05	0.26%wt	<0.35	
82-098 [3]	Jal No. 4	8	µg/L	0.11	<5.0 [2]	<0.11	<0.007	<0.006	<0.004	<0.007	0.49	67 mg/L	91.3	<1.6
82-099 [3]	Jal No. 4	3	µg/g	378.4	0.16 [2]	15.70	<0.07	<0.06	<0.04	1.48	<0.05	7.98%wt	4.22	
82-100 [3]	Jal No. 4	3	µg/L	0.09	<5.0	<0.1	<0.007	<0.006	<0.004	<0.12	0.96	1830 mg/L	365	<1.6
82-101	Jal No. 4	14	µg/g	65.8	<0.1 [2]	<3.1	<0.07	<0.06	<0.04	<0.07	<0.05	6.53%wt	1.06	
82-104 [3]	Jal No. 3	A	µg/g	<1.0	3.6 [2]	<1.0	<0.07	<0.06	<0.04	<0.07	<0.05	25.26%wt	1.75	
82-106 [3]	Jal No. 3	B	µg/L	0.25	<5.0 [2]	<1.0	<0.007	<0.006	<0.004	<0.007	0.82	2050 mg/L	<0.91	
82-107	Jal No. 3	B	µg/g	260.7	4.1 [2]	7.4	<0.07	<0.06	<0.04	<0.44	<0.05	3.96%wt	<0.25	
OCD Standard	EPA Leachate [6]		µg/L	1,000	100	1,500,000	100	2,000	500	2,000	10,000	-	5	
	Total Extraction [6]		µg/g	20	2	30,000	20	40	10	40	200	-		
Detection Limit	EPA Leachate [4]		µg/L [4] [5]	0.1	5.0	0.1	0.007	0.006	0.004	0.007	0.005	1 mg/L	50	
	Total Extraction [5]		µg/g [5]	1.0	0.1	1.0	0.07	0.06	0.04	0.07	0.05	10µg/g	0.25	

1/ Analysis of PCB's included Arochlor Nos. 1016, 1221, 1232, 1242, 1248, 1254 and 1260.
2/ Value indicated is for Arochlor 1254 with the remaining Arochlor species <0.1 mg/L.
3/ One hundred (100) grams of the sludge were leached with 2 liters of deionized water in accordance with EPA-EP Toxicity Test Method.
4/ These limits are the lowest recognizable levels of each parameters leached in the water. They are determined by Purge/Trap GC/ED and GC/FID.
5/ The detection limits are based on the amount of individual parameter that can be detected per unit weight of dry sludge sample. These limits are determined by GC/EC and GC/FID.
6/ There is no standard established for constituents obtained using a total extraction method from sludge. The calculated values only indicate a concentration at which further testing using EPA leachate extraction should be accomplished.

PROPERTY LINE

PROPERTY LINE

PROPERTY LINE

PROPERTY LINE

POND No.1
0.12Ac.±

POND No.2
0.34Ac.±

POND No.3
0.39Ac.±

POND No.4
0.30Ac.±

POND No.5
0.48Ac.±

PROPOSED CONCRETE SLAB

PROPOSED CONCRETE SLAB

PROPOSED WASTEWATER CLASSIFIER AREA

PROPOSED CLASSIFIER

A

B

C

D

N

LEGEND

- PREDICTION POINT
- DRAINAGE DIVIDE FOR PLANT AREA
- EXISTING CONTOURS TO BE REGRADED
- PROPOSED CONTOURS
- DIRECTION OF FLOW
- PROPOSED CURBED CONCRETE SLABS WITH APRON DRAINS
- MONITORING WELL
- AREA TO BE REGRADED

REFERENCE DRAWING NO. IMC-11-P15 Rev. A

ENGINEERING RECORD	
DRAWN BY	Aero-Graphics
TRACED BY	
CHECKED BY	J.T.C.
APPROVED	F.S.
DATE	
PHOTO DATE	2-12-81
CONTOUR INTERVAL	2'

El Paso NATURAL GAS COMPANY

SITE GRADING PLAN FOR

MONUMENT PLANT

SEC. 1, TWS 20-S, RANGE 36-E
LEA COUNTY, NEW MEXICO

FIGURE 3

0 100 200 400
SCALE IN FEET

DWG. NO. 5007.19-1

SHEET 1 OF 2

REV. B

aero-graphics

Contour Lines have been Adjusted To Match Rectified Photo Base


PROPERTY LINE
PROPERTY LINE
PROPERTY LINE
PROPERTY LINE
PROPERTY LINE
N
3580
3570
3570
3570
3570
3570
FORMER FRESH WATER STORAGE POND
BOILER BLOW DOWN
POND No. II OBBAC
MONITORING WELL
PRESENT SOLID WASTE DISPOSAL AREA
F
G
H
I
LEGEND
A DRAINAGE AREA PREDICTION POINT
DRAINAGE DIVIDE FOR PLANT AREA
EXISTING CONTOURS TO BE REGRADED
PROPOSED CONTOURS
DIRECTION OF FLOW
PROPOSED CURBED CONCRETE SLABS WITH APRON DRAINS
MONITORING WELL
AREA TO BE REGRADED
REFERENCE DRAWING NO. IMO-I-PI5 Rev. A
ENGINEERING RECORD
DRAWN BY Aero-Graphics
TRACED BY
CHECKED BY J. T. C.
APPROVED F. S.
DATE
PHOTO DATE 2-12-81
CONTOUR INTERVAL 2'
0 100 200 400
SCALE IN FEET
El Paso NATURAL GAS COMPANY
SITE GRADING PLAN FOR
MONUMENT PLANT
SEC. I, TWS. 20-S, RANGE 36-E
LEA COUNTY, NEW MEXICO
FIGURE 3
DWG. NO. 500719-1
SHEET 2 OF 2
B
REV.

Contour Lines Have Been Adjusted To Match Rectified Photo Base

aero-graphics

B

Report of Chemical Analysis

Consulting Geotechnical, Materials and Environmental Engineers
Geologists, Scientists and Chemists

Raba-Kistner
Consultants, Inc.
10526 Gulfdale/P.O. Box 32217
San Antonio, Texas 78216
(512) 342-4216

To: El Paso Natural Gas Company
Environmental Affairs Department
P.O. Box 1492
El Paso, Texas 79978

Attn: Mr. Kenneth E. Beasley

Project No: 683-052
Date Received: 4-26-83
Date Reported: 5-17-83
Submitted By: Mr. Beasely

Sample Description/Code: Sludge, Monument Plant, 83-017, (R-KCI 6-1749)

SUMMARY OF ANALYSIS

Determination	Analytical Method	Results (mg/L)	Miscellaneous
Arsenic	EPA 206.3[1]	<0.05	EP Leachate[2]
Barium	EPA 208.1	0.20	EP Leachate
Cadmium	EPA 213.1	0.03	EP Leachate
Chromium	EPA 218.1	0.07	EP Leachate
Lead	EPA 239.1	0.02	EP Leachate
Mercury	EPA 245.1	<0.002	EP Leachate
Selenium	EPA 270.3	<0.01	EP Leachate
Silver	EPA 272.2	<0.01	EP Leachate

Special Comments:

1. Methods are documented in "Methods for Chemical Analysis of Water and Wastes", EPA 600/4-79-020, March 1979.
2. One hundred (100) grams of sample was leached with 2 liters of waster at pH=5 for 24 hours. Method used is in "Test Methods for Evaluating Solid Waste", EPA SW-846, 1980.

Raba-Kistner Consultants, Inc.
by Francis Y. Huang
Francis Y. Huang, Ph.D., CPC

Report of Chemical Analysis

Consulting Geotechnical, Materials and Environmental Engineers
Geologists, Scientists and Chemists

Raba-Kistner
Consultants, Inc.
10526 Gulfdale/P.O. Box 32217
San Antonio, Texas 78216
(512) 342-4216

To: El Paso Natural Gas Company
Environmental Affairs Department
P.O. Box 1492
El Paso, Texas 79978

Attn: Mr. Kenneth E. Beasley

Project No: 683-052
Date Received: 4-26-83
Date Reported: 5-17-83
Submitted By: Mr. Beasely

Sample Description/Code: Sludge, Monument Plant, 83-015, (R-KCI 6-1748)

SUMMARY OF ANALYSIS

Determination	Analytical Method	Results (mg/L)	Miscellaneous
Arsenic	EPA 206.3[1]	<0.05	EP Leachate[2]
Barium	EPA 208.1	0.12	EP Leachate
Cadmium	EPA 213.1	0.13	EP Leachate
Chromium	EPA 218.1	0.04	EP Leachate
Lead	EPA 239.1	0.01	EP Leachate
Mercury	EPA 245.1	<0.002	EP Leachate
Selenium	EPA 270.3	<0.01	EP Leachate
Silver	EPA 272.2	<0.01	EP Leachate

Special Comments:

1. Methods are documented in "Methods for Chemical Analysis of Water and Wastes", EPA 600/4-79-020, March 1979.
2. One hundred (100) grams of sample was leached with 2 liters of waster at pH=5 for 24 hours. Method used is in "Test Methods for Evaluating Solid Waste", EPA SW-846, 1980.

Raba-Kistner Consultants, Inc.
by Francis Y. Huang
Francis Y. Huang, Ph.D.

C

El Paso Natural Gas Company

MEMORANDUM

TO: Larry Anderson

DATE: March 18,1983

FROM: Greg Kardos ✓

PLACE: Permian Division - Laboratory

RE: Chromium Analyses on New Mexico Plant Wastewaters In January 1983.

The results of the analyses for chromium are as listed below. [redacted] because we had not received our automatic sampler as of the sampling date. The samples were taken from the classifier tanks at each respective plant. The samples were acidified with Nitric Acid and filtered through a 0.45/μm filter. The samples were then digested according to Section 200-4.1.3 of EPA's Methods for Chemical Analysis of Water and Wastes, March 1979.

Sample Number	Location	Date Sampled		Results mg/l Cr
83-8	Jal #1 Wastewater	1-28-83		0.05
83-9	Monument Wastewater	1-28-83	11:30am	0.45
83-10	[redacted]	[redacted]		[redacted]
83-11	Jal #4 Wastewater	1-28-83	10:20am	0.69
83-12	Jal #3 Wastewater	1-28-83	9:50am	0.23

Gregory C. Kardos

Gregory C. Kardos,
Chemist

GCK/af
cc: J. W. Cronenberg
R. T. Wright
File

FM 10-6001

El Paso Natural Gas Company

MEMORANDUM

TO: Larry Anderson

DATE: January 3, 1983

FROM: Gregory Kardos

PLACE: Permian Division Lab - Jal

RE: CHROMIUM ANALYSES ON COOLING TOWER SLUDGE EXTRACTS FROM NEW MEXICO

Chromium Analyses were run by a Direct Aspiration Atomic Absorption on the following Cooling Tower Sludge Extracts which were digested with Nitric Acid. The results are as follows:

Cooling Tower Sludge Extract	mg/l Cr
Jal #1 Refrigeration	0.12
Jal #1 Gasoline	0.10
Jal #1 Treating Plant	Less than 0.10
Jal #1 Compressor	Less than 0.10
Jal #3 Gasoline	Less than 0.10
Jal #3 "A" Tower	Less than 0.10
Monument	0.21
Eunice #1 Field	0.12
Eunice #2 Field	0.38
Eunice #3 Field	0.12
Eunice Mainline	0.42
Eunice 182 Field	0.10
Eunice Treating Plant	0.69

Gregory C Kardos

Gregory C Kardos,
Chemist

GCK/af
cc: R. T. Wright
File

...RAL GAS
COMPANY

FEB 1 5 1983

TO: Mike Keating

DATE: December 10, 1982

FROM: Greg Kardos

PLACE: Permian Division Lab

RE: CHROMIUM ANALYSIS ON MONUMENT WASTE WATER TO RICE ENGINEERING.

The following are the results obtained from the samples secured 12/7/82-12/8/82 on an hourly basis. The chromium content was obtained by direct aspiration atomic absorption.

Date	Time	Results mg/l Cr
12-7	9:45am	<0.1
12-7	10:45	<0.1
12-7	11:45	0.1
12-7	12:45pm	1.8
12-7	1:45	2.6
12-7	2:45	3.3
12-7	3:45	2.0
12-7	4:45	1.7
12-7	6:15	1.1
12-7	7:45	2.2
12-7	8:45	1.6
12-7	9:45	1.6
12-7	10:45	1.6
12-7	11:45	1.0
12-8	12:45am	0.8
12-8	1:45	0.6
12-8	2:45	0.5
12-8	3:45	0.5
12-8	4:45	0.3
12-8	5:45	0.4
12-8	6:45	0.4
12-8	7:45	0.7
12-8	8:45	0.5
12-8	9:45	0.4

Average 1.08 ppm Cr

Gregory C Kardos

Gregory Kardos,
Chemist

cc: R. T. Wright
Larry Anderson
File

Form 103

D

U. S. Environmental Protection Agency Region VI
1201 Elm Street
First International Bldg.
Dallas, TX 75720

Attention: 6AEP

NMD,000729277

Subject: § 3010 Notification
El Paso Natural Gas Company
Eunice Field and Mainline Compressor Station

Gentlemen:

This is to advise that the above referenced plant does not presently conduct any hazardous waste activity. In spite of that, El Paso desires that an identification number be assigned to the facility so that it will be available should the need for an EPA identification number arise at some future time. This method of requesting an EPA identification number for non-hazardous waste activity is purusant to verbal recommendations from your office, eventhough the regulations do not explicitly provide for the procedure. A formal request for a policy decision on notification of non-hazardouds waste activity in order to obtain an EPA identification number has been submitted to your office.

Very truly yours,

E. F. Smythe

E. F. Smythe, P.E.
Chief, Permits & Inventories
Environmental Affairs

EFS:gb

Please print or type with ELITE type (12 characters/inch) in the unshaded areas only.

Form Approved OMB No. 158-S79016
GSA No. 0[illegible]-EPA-OT

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

NOTIFICATION OF HAZARDOUS WASTE ACTIVITY

INSTALLATION'S EPA I.D. NO.

I. NAME OF INSTALLATION

II. INSTALLATION MAILING ADDRESS

III. LOCATION OF INSTALLATION

PLEASE PLACE LABEL IN THIS SPACE

INSTRUCTIONS: If you received a preprinted label, affix it in the space at left. If any of the information on the label is incorrect, draw a line through it and supply the correct information in the appropriate section below. If the label is complete and correct, leave Items I, II, and III below blank. If you did not receive a preprinted label, complete all items. "Installation" means a single site where hazardous waste is generated, treated, stored and/or disposed of, or a transporter's principal place of business. Please refer to the INSTRUCTIONS FOR FILING NOTIFICATION before completing this form. The information requested herein is required by law *(Section 3010 of the Resource Conservation and Recovery Act).*

DETACH A

FOR OFFICIAL USE ONLY

COMMENTS

INSTALLATION'S EPA I.D. NUMBER | APPROVED | DATE RECEIVED (yr., mo., & day)

I. NAME OF INSTALLATION

EUNICE FIELD AND MAINLINE COMPR STA.

II. INSTALLATION MAILING ADDRESS

STREET OR P.O. BOX

PO BOX 1492

CITY OR TOWN | ST. | ZIP CODE

EL PASO | TX | 79978

III. LOCATION OF INSTALLATION

STREET OR ROUTE NUMBER

1 MI N OF OIL CENTER, 1 MI

CITY OR TOWN | ST. | ZIP CODE

WEST OF STATE HWY #8 | NM

IV. INSTALLATION CONTACT

NAME AND TITLE (last, first, & job title) | PHONE NO. (area code & no.)

SMYTHE E F CHIEF-PERMITS | 915-543-2668

V. OWNERSHIP

A. NAME OF INSTALLATION'S LEGAL OWNER

EL PASO NATURAL GAS COMPANY

B. TYPE OF OWNERSHIP (enter the appropriate letter into box)

F = FEDERAL
M = NON-FEDERAL

M

VI. TYPE OF HAZARDOUS WASTE ACTIVITY (enter "X" in the appropriate box(es))

(X) A. GENERATION

B. TRANSPORTATION (complete Item VII)

C. TREAT/STORE/DISPOSE

D. UNDERGROUND INJECTION

VII. MODE OF TRANSPORTATION (transporters only – enter "X" in the appropriate box(es))

A. AIR | B. RAIL | C. HIGHWAY | D. WATER | E. OTHER (specify):

VIII. FIRST OR SUBSEQUENT NOTIFICATION

Mark "X" in the appropriate box to indicate whether this is your installation's first notification of hazardous waste activity or a subsequent notification. If this is not your first notification, enter your installation's EPA I.D. Number in the space provided below.

(X) A. FIRST NOTIFICATION

B. SUBSEQUENT NOTIFICATION (complete Item C)

C. INSTALLATION'S EPA I.D. NO.

IX. DESCRIPTION OF HAZARDOUS WASTES

Please go to the reverse of this form and provide the requested information.

I.D. – FOR OFFICIAL USE ONLY

W

IX. DESCRIPTION OF HAZARDOUS WASTES *(continued from front)*

A. HAZARDOUS WASTES FROM NON–SPECIFIC SOURCES. Enter the four–digit number from 40 CFR Part 261.31 for each listed hazardous waste from non–specific sources your installation handles. Use additional sheets if necessary.

(X)	1	2	3	4	5	6
	7	8	9	10	11	12

B. HAZARDOUS WASTES FROM SPECIFIC SOURCES. Enter the four–digit number from 40 CFR Part 261.32 for each listed hazardous waste from specific industrial sources your installation handles. Use additional sheets if necessary.

	13	14	15	16	17	18
(X)	19	20	21	22	23	24
	25	26	27	28	29	30

C. COMMERCIAL CHEMICAL PRODUCT HAZARDOUS WASTES. Enter the four–digit number from 40 CFR Part 261.33 for each chemical substance your installation handles which may be a hazardous waste. Use additional sheets if necessary.

	31	32	33	34	35	36
(X)	37	38	39	40	41	42
	43	44	45	46	47	48

D. LISTED INFECTIOUS WASTES. Enter the four–digit number from 40 CFR Part 261.34 for each listed hazardous waste from hospitals, veterinary hospitals, medical and research laboratories your installation handles. Use additional sheets if necessary.

(X)	49	50	51	52	53	54

E. CHARACTERISTICS OF NON–LISTED HAZARDOUS WASTES. Mark "X" in the boxes corresponding to the characteristics of non–listed hazardous wastes your installation handles. *(See 40 CFR Parts 261.21 – 261.24.)*

(X) ☐ 1. IGNITABLE (D001) ☐ 2. CORROSIVE (D002) ☐ 3. REACTIVE (D003) ☐ 4. TOXIC (D000)

X. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

SIGNATURE	NAME & OFFICIAL TITLE *(type or print)*	DATE SIGNED
Billy J. Matthews	Billy J. Matthews Vice President	8-12-80

EPA Form 8700-12 (6-80) REVERSE

(X) See Attached letter

DETACH

DETACH

U. S. Environmental Protection Agency Region VI
1201 Elm Street
First International Bldg.
Dallas, TX 75720

Attention: 6AEP

NMT x 360 x 010 x 243

Subject: § 3010 Notification
El Paso Natural Gas Company
Monument Field Plant

Gentlemen:

This is to advise that the above referenced plant does not presently conduct any hazardous waste activity. In spite of that, El Paso desires that an identification number be assigned to the facility so that it will be available should the need for an EPA identification number arise at some future time. This method of requesting an EPA identification number for non-hazardous waste activity is purusant to verbal recommendations from your office, eventhough the regulations do not explicitly provide for the procedure. A formal request for a policy decision on notification of non-hazardouds waste activity in order to obtain an EPA identification number has been submitted to your office.

Very truly yours,

E. F. Smythe

E. F. Smythe, P.E.
Chief, Permits & Inventories
Environmental Affairs

EFS:gb

Please print or type with ELITE type (12 characters/inch) in the unshaded areas only.

Form Approved OMB No. 158-S79016
GSA No. 0246-EPA-OT

U.S. ENVIRONMENTAL PROTECTION AGENCY

NOTIFICATION OF HAZARDOUS WASTE ACTIVITY

INSTALLATION'S EPA I.D. NO.

I. NAME OF INSTALLATION

II. INSTALLATION MAILING ADDRESS

III. LOCATION OF INSTALLATION

PLEASE PLACE LABEL IN THIS SPACE

INSTRUCTIONS: If you received a preprinted label, affix it in the space at left. If any of the information on the label is incorrect, draw a line through it and supply the correct information in the appropriate section below. If the label is complete and correct, leave items I, II, and III below blank. If you did not receive a preprinted label, complete all items. "Installation" means a single site where hazardous waste is generated, treated, stored and/or disposed of, or a transporter's principal place of business. Please refer to the INSTRUCTIONS FOR FILING NOTIFICATION before completing this form. The information requested herein is required by law *(Section 3010 of the Resource Conservation and Recovery Act).*

DETACH A

FOR OFFICIAL USE ONLY

COMMENTS: C

INSTALLATION'S EPA I.D. NUMBER: F | T/A: C | 1

APPROVED:

DATE RECEIVED (yr., mo., & day):

I. NAME OF INSTALLATION

MONUMENT FIELD PLANT

II. INSTALLATION MAILING ADDRESS

STREET OR P.O. BOX: 3 PO BOX 1492

CITY OR TOWN: 4 EL PASO

ST.: TX

ZIP CODE: 79978

III. LOCATION OF INSTALLATION

STREET OR ROUTE NUMBER: 5 5 MI SW OF MONUMENT

CITY OR TOWN: 6

ST.: NM

ZIP CODE:

IV. INSTALLATION CONTACT

NAME AND TITLE (last, first, & job title): 2 SMYTHE E F CHIEF-PERMITS

PHONE NO. (area code & no.): 915-543-2668

V. OWNERSHIP

DETACH A

A. NAME OF INSTALLATION'S LEGAL OWNER: 8 EL PASO NATURAL GAS COMPANY

B. TYPE OF OWNERSHIP (enter the appropriate letter into box): M

F = FEDERAL
M = NON-FEDERAL

VI. TYPE OF HAZARDOUS WASTE ACTIVITY (enter "X" in the appropriate box(es))

- [X] A. GENERATION
- [ ] B. TRANSPORTATION (complete item VII)
- [ ] C. TREAT/STORE/DISPOSE
- [ ] D. UNDERGROUND INJECTION

VII. MODE OF TRANSPORTATION (transporters only -- enter "X" in the appropriate box(es))

- [ ] A. AIR
- [ ] B. RAIL
- [ ] C. HIGHWAY
- [ ] D. WATER
- [ ] E. OTHER (specify):

VIII. FIRST OR SUBSEQUENT NOTIFICATION

Mark "X" in the appropriate box to indicate whether this is your installation's first notification of hazardous waste activity or a subsequent notification. If this is not your first notification, enter your installation's EPA I.D. Number in the space provided below.

- [X] A. FIRST NOTIFICATION
- [ ] B. SUBSEQUENT NOTIFICATION (complete item C)

C. INSTALLATION'S EPA I.D. NO.:

IX. DESCRIPTION OF HAZARDOUS WASTES

Please go to the reverse of this form and provide the requested information

I.D. – FOR OFFICIAL USE ONLY

W

IX. DESCRIPTION OF HAZARDOUS WASTES *(continued from front)*

A. HAZARDOUS WASTES FROM NON–SPECIFIC SOURCES. Enter the four–digit number from 40 CFR Part 261.31 for each listed hazardous waste from non–specific sources your installation handles. Use additional sheets if necessary.

(X)	1	2	3	4	5	6
	7	8	9	10	11	12

B. HAZARDOUS WASTES FROM SPECIFIC SOURCES. Enter the four–digit number from 40 CFR Part 261.32 for each listed hazardous waste from specific industrial sources your installation handles. Use additional sheets if necessary.

(X)	13	14	15	16	17	18
	19	20	21	22	23	24
	25	26	27	28	29	30

C. COMMERCIAL CHEMICAL PRODUCT HAZARDOUS WASTES. Enter the four–digit number from 40 CFR Part 261.33 for each chemical substance your installation handles which may be a hazardous waste. Use additional sheets if necessary.

(X)	31	32	33	34	35	36
	37	38	39	40	41	42
	43	44	45	46	47	48

D. LISTED INFECTIOUS WASTES. Enter the four–digit number from 40 CFR Part 261.34 for each listed hazardous waste from hospitals, veterinary hospitals, medical and research laboratories your installation handles. Use additional sheets if necessary.

(X)	49	50	51	52	53	54

E. CHARACTERISTICS OF NON–LISTED HAZARDOUS WASTES. Mark "X" in the boxes corresponding to the characteristics of non–listed hazardous wastes your installation handles. *(See 40 CFR Parts 261.21 – 261.24.)*

(X) ☐ 1. IGNITABLE (D001) ☐ 2. CORROSIVE (D002) ☐ 3. REACTIVE (D003) ☐ 4. TOXIC (D000)

X. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

SIGNATURE	NAME & OFFICIAL TITLE *(type or print)*	DATE SIGNED
Billy J. Matthews	Billy J. Matthews Vice President	6-12-80

EPA Form 8700-12 (6-80) REVERSE

(X) See Attached letter

DETACH A

DETACH A

CHEMICAL and PHYSICAL ANALYSES for WATER SAMPLES

Date received: 8-26-82

Lab: El Paso Natural Gas Co. Southern Division Lab

TYPE or PRINT with Ball Point Pen

CHEMICAL ANALYSES: *Check individual items for analysis (Mark appropriate box(es))*

INTERIM PRIMARY PARAMETER GROUP: [X] 1 [X] 2 [X] 3

TYPE of CHEMICAL ANALYSIS: [ ] Complete Secondary [ ] Organic [ ] Radiological

Water Supply System Name	Water Supply System Code No.	City or Location	County	Check one:
Monument Plant				[ ] TREATED WATER [ ] RAW WATER

Collection Date	Collection Time	Collection Point	Collector's remarks	Report to
-24-82				
Collected By: . Kardos		Owner		Address

TYPE of SYSTEM (Check one): [ ] PRIVATE PUBLIC: [X] Community [ ] Non-community

SOURCE: [ ] Spring [ ] Lake [ ] Well-Depth ..... [ ] Drain [ ] Stream [ ] Pool [ ] Other (specify) .....

LAT. ° ' " LONG ° ' "

CATIONS	mg/l	ANIONS	mg/l	PHYSICAL		HEAVY METALS	mg/l	PARAMETER		ORGANIC	mg/l
00930 Sodium (as Na)		00940 Chloride (as Cl)		70300 Total Filterable Residue	mg/l	01000 Arsenic	< 0.005			39390 Endrin	
00935 Potassium (as K)		00950 Fluoride (as F)	0.09	38260 Foaming Agents (as Las)		01005 Barium	< 0.20			39732 Lindane	
00900 Tot. Hardness (as $CaCO_3$)		00620 Nitrate (as N)	0.240	00095 Conductance Micromhos 25°C		01025 Cadmium	< 0.002			39370 Methoxychlor	
00915 Calcium (as Ca)		00430 Alkalinity (as $CaCO_3$)		00400 pH		01030 Chromium	< 0.01	RADIOLOGICAL pCi/l 01501 Gross Alpha		39400 Toxaphene	
00925 Magnesium (as Mg)		00440 Bicarbonate (as HCO_3)		01330 Odor		01049 Lead	< 0.02	03501 Gross Beta	pCi/l	39730 2, 4-D	
01045 Iron-Total (as Fe)		00445 Carbonate (as CO_3)		00080 Color	mg/l	07130 Mercury	< 0.005	09501 Radium-226	pCi/l	39740 2, 4, 5-TP (Silvex)	
01056 Manganese (as Mn)		00945 Sulfate (as SO_4)		00070 Turbidity		01145 Selenium	< 0.005	11501 Radium-228	pCi/l		
						01075 Silver	< 0.01				

LABORATORY REMARKS:

Reviewed by

Date reported

DISTRIBUTION:

MONTGOMERY & ANDREWS
PROFESSIONAL ASSOCIATION
ATTORNEYS AND COUNSELORS AT LAW

J. O. Seth (1883-1963)
Frank Andrews (1914-1981)

A. K. Montgomery
Seth D. Montgomery
Frank Andrews III
Victor R. Ortega
John E. Conway
Jack M. Morgan
Jeffrey R. Brennen
John B. Pound
Gary R. Kilpatric
Thomas W. Olson
William C. Madison
Walter J. Melendres
Bruce L. Herr
Michael W. Brennan
Robert P. Worcester
John B. Draper

Nancy M. Anderson
Rudolph B. Sacks, Jr.
R. Thomas Dailey
Janet McL. McKay
Edward F. Mitchell III
Carrie L. Parker
Maureen A. Sanders
Mark F. Sheridan
Joseph E. Earnest
Phyllis A. Dow
Wm. Alan Wright
Brad V. Coryell
Candice M. Will
Wesley B. Howard, Jr.
Thurman W. Moore III
Jack L. Fortner

REPLY TO SANTA FE OFFICE

May 25, 1983

SANTA FE OFFICE
325 Paseo de Peralta
Post Office Box 2307
Santa Fe, New Mexico 87504-2307

Telephone (505) 982-3873
Telecopy (505) 982-4289

ALBUQUERQUE OFFICE
Suite 325
500 Copper Avenue, N.W.
Post Office Box 1396
Albuquerque, New Mexico 87103-1396

Telephone (505) 242-9677

FARMINGTON OFFICE
Suite 325
First National Bank of Farmington
One First Place
Post Office Box 2700
Farmington, New Mexico 87499-2700

Telephone (505) 327-5074

Robert H. Lovell
El Paso Natural Gas Company
P. O. Box 1492
El Paso, Texas 79978

Re: Validity of Discharge Plan Approvals

Dear Bob:

As you know, there has been some concern whether the Oil Conservation Division has authority to approve discharge plans under the constituent agency status of the Oil Conservation Commission. I raised this question with the general counsel of the OCD, Perry Pearce. The result of this inquiry is the enclosed resolution of the Oil Conservation Commission ratifying previous approvals by the Division.

I understand from Perry that in the future all discharge plans will be formally approved by the Oil Conservation Commission.

Sincerely yours,

John B. Draper

JBD:dr
cc: D. A. Larson (w/enclosure)
J. Eichelmann (w/enclosure)

MINUTES OF THE MEETING
OF THE OIL CONSERVATION COMMISSION
HELD ON MAY 12, 1983

The Oil Conservation Commission met at 9:15 a.m. on May 12, 1983, in the Oil Conservation Commission Conference Room, State Land Office Building, Santa Fe, New Mexico.

PRESENT: ED KELLEY, Member
JOE D. RAMEY, Member

The following resolution was read:

RESOLUTION

WHEREAS The New Mexico Oil Conservation Commission is named by the New Mexico Water Quality Act, §74-6-1 et. seq. NMSA 1978, as a constituent agency; and

WHEREAS the reorganization of New Mexico State Government in 1978 transferred responsiblities for regulation of the oil and gas producing industry to the Oil Conservation Division of the Energy and Minerals Department; and

WHEREAS Section 70-2-6 NMSA 1978 assigns jurisdiction and authority over oil and gas operations to the Oil Conservation Division; and

WHEREAS Section 70-2-12(15) assigns the Oil Conservation Division the specific responsibility for regulating the disposition of water produced in conjunction with oil and gas operations in such a manner as to afford reasonable protection of fresh water supplies; and

WHEREAS the staff of the Oil Conservation Division of the Energy and Minerals Department has exercised functional responsibility for water quality matters assigned to the Commission because of its constituent agency status; and

WHEREAS all actions relating to Commission responsibilities have been performed by the Division under the direct supervision of a member of the Commission who is Director of the Oil Conservation Division; and

WHEREAS the Director of the Division has after extended review and consideration approved the following discharge plans:

Refinery or Gasoline Plants

GWR-1	Plateau Inc.
GWR-2	Phillips Petroleum
GWR-3	Getty Oil (Eunice 1)
GWR-4	Getty Oil (Eunice 2)
GWR-5	Warren Petroleum (Gulf)
GWR-6	El Paso Natural Gas (Washington Pla
GWR-7	El Paso Natural Gas (Jal 4)

Brine Extraction Facilities

GWB-1	Wasserhund, Inc.
GWB-2	Brunson & McKnight
GWB-3	Conoco, Inc.
GWB-4, 5, 6	Permian Brine Sales, Inc.
GWB-7	P & S Brine Sales
GWB-8	Salado Brine Sales
GWB-9, 10, 11, 12	Unichem International
GWB-13	Sims-McCasland Water Sales

WHEREAS in each of these cases there is a possibility that discharges are made which are not exclusively within the jurisdiction of the Oil Conservation Division under the terms of the Oil and Gas Act, Section 70-2-1 et. seq. NMSA, but instead are within the jurisdiction of the Oil Conservation Commission as a constituent agency of the Water Quality Act, Section 74-6-1 et. seq. NMSA, 1978; and

NOW THEREFORE, the Oil Conservation Commission meeting after proper notice to the public hereby adopts and ratifies the action taken by the Division in approving each of these plans on the dates such approval was given.

Mr. Kelley made a motion to elect Mr. Ramey as Chairman and Secretary of the Commission. The motion was seconded and it carried unanimously.

Mr. Ramey made a motion that the Oil Conservation Commission adopt the notice requirements set forth in the Oil and Gas Act as the appropriate notice procedures for all Oil Conservation Commission and Division hearings and meetings. The motion was seconded and passed unanimously.

The meeting was adjourned at 9:30 a.m.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

JOE D. RAMEY, Chairman and Secretary

May 24, 1983
TO BE PUBLISHED ON OR BEFORE JUNE 3, 1983

PUBLIC NOTICE
NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION
HEALTH AND ENVIRONMENT DEPARTMENT

Notice is hereby given that pursuant to New Mexico Water Quality Control Commission Regulations, the following proposed discharge plans have been submitted for approval to the Director of the New Mexico Environmental Improvement Division, P.O. Box968, Crown Bldg., 725 St. Michaels's Drive, Santa Fe, New Mexico 87504-0968; telephone (505) 984-0020.

(DP-156) ANGEL FIRE SERVICES CORPORATION, Russell Seymour, Drawer B, Angel Fire, New Mexico 87710, has requested renewal of their existing discharge plan DP-156 to continue discharging up to 60,000 gallons per day of treated domestic sewage from lined ponds to their existing land application area with derived sludge deposited unto existing sludge drying beds. They have also filed an application to amend their existing discharge plan to discharge 164,200 gallons per day of denitrified sewage effluent to their existing ponds and thence to 12.7 acres of land during the months of April through October. If there are periods of sewage treatment plant operation problems when nitrogen content in the effluent may be high, they anticipate discharging onto 139 acres of land until the operational problems are remedied. Also, 624 gallons per day of liquid sludge derived from the treatment plant will be applied onto sludge drying beds and following drying, the sludge will be hauled to their sanitary landfill. The land application areas are located proximal to the sewage treatment plant-lagoon complex which is approximately 1 mile west of the Angel Fire Ski area, Section 18, T25N, R16E, Colfax County, New Mexico. The ground water most likely to be impacted is estimated to be at a depth range of 6 to 50 feet and has an estimated total dissolved solid concentratin of approximately 625 mg/l.

(DP-10) ATCHISON, TOPEKA AND SANTA FE RAILWAY COMPANY, 900 Polk Street, Amarillo, Texas 79171, proposes to renew their current discharge plan for the disposal of approximately 140,000 gallons per day of wastewater from their railroad car washing facility and yard operations. The wastewater is to be discharged into an unlined impoundment ("Santa Fe Lake") in Section 19, T2N, R36E, south of the town of Clovis in Curry County, New Mexico. The plan contains provisions for monitoring ground water quality and for the construction of lined evaporation ponds to replace the unlined impoundment if exceedance of the ground-water standards is imminent due to seepage from the unlined impoundment. The depth to ground water is 250 to 270 feet with a regional total dissolved solids content of about 450 mg/l.

(DP-127) THE CITY OF ESPANOLA, Consuelo Thompson, Mayor, P.O. Drawer 37, Espanola, New Mexico 87532, proposes to amend their approved discharge plan DP-127, by constructing approximatley 18,600 square feet of additional unlined sludge drying beds located on the grounds of the Espanola Sewage Treatment Facility West Side Plant located in T20N, R8E, Section 3, Rio Arriba County, New Mexico. The proposed drying beds in conjunction with the existing beds are to dewater an average of 4,000 gallons per day of extended aerated sludge. Ground water most likely to be affected is at depth of approximately 10 feet with a total dissolved solid concentration below 1,000 mg/l.

(DP-285) DON GOODSON DAIRY, Don Goodson, Owner, P.O. Box 1352, Belen, New Mexico 87002, proposes to discharge 1,050 gallons per day of milking center wastes from a dairy of from 70 to 125 cows to a holding tank, after which the effluent is diluted with irrigation water and land applied either to a 4 acre field or a 70 acre field. The dairy will be located on Jarales Road two miles south of Belen, T5N, R2E, Section 29, Valencia County, New Mexico. The ground water most likely to be affected is at depth of approximtely 5 feet and has a total dissolved solids content of approximately 1,500 mg/l.

(DP-283) LAS VILLAS ENCANTADAS, Wallace G. Sharts, Developer, P.O. Box 90, Ranchos de Taos, New Mexico 87557, proposes to discharge a maximum of 21,600 gallons per day of domestic sewage from an advanced treatment plant, with nitrogen removal, into a lined landscaping pond approximtely 3.5 miles southwest of Ranchos de Taos in the SE¼ of Section 9 and the NE¼ of Section 16, T24N, R12E, N.M.P.M. (projected) Taos County, New Mexico. The ground water most likely to be affected is at a depth of approximately 400 feet and has a total dissolved solids concentration of approximately 230 mg/l.

(DP-284) LOS CABALLOS DE SANTA FE, John Melton, Director, One Hacienda Loop, Santa Fe, New Mexico 87501, proposes to discharge a total average daily flow of 8,744 gallons per day (with a maximum of 35,000 gpd) of domestic wastewater plus horse shampooing water. Domestic wastewater will be treated by an extended aeration package treatment plant, including advanced treatment for nitrogen removal, and chlorination. There will be chlorination of washwater from horse shampooing, groom showers and restroom washbasins. The treated effluent will be aplied to landscaping areas and leach fields. The discharge is located in Section 17 (projected), T15N, R10E, 10 miles southeast of Santa Fe, Santa Fe County, New Mexico. The ground water most likely to be affected is at a depth of approximately 175 feet and has a total dissolved solids concentration of approximatley 261 mg/l.

(DP-282) TEXACO INC., P.O. Box 52332, Houston, Texas 77052, proposes to discharge bulk fuel terminal effluent, including an estimated 300 gallons per year of fuel-contaminated water from tank-bottoms, to a double-lined evaporation pond with a leak detection system at the Texaco Albuquerque bulk storage terminal located at 3209 Broadway SE, Albuquerque in Section 32, T10N, R3E, Bernalillo County, New Mexico. The ground water most likely to be affected is at a depth of approximately 16 to 21 feet with a total dissolved solids concentration ranging from 500 to 1,500 mg/l.

(DP-112) TURLEY MINES, Lou Osmer, P.O. Bin R, Tyrone, New Mexico 88065, formerly Barite of America, has proposed to amend their previously approved discharge plan DP-112 by relocating their tailings pond unto the old Peruhill tailings area on which 200,000 gallons per day of floatation mill tailings effluent will be discharged and recycled for a gold extraction mill process. The old Peruhill mill is located approximately 3 miles northwest of Deming, Section 18, R9W, T24S, Luna County, New Mexico. The ground water most likely to be affected is at a depth of approximately 120 feet with a total dissolved solids concentration of approximately 800 mg/l.

Any interested person may obtain futher information from the Ground Water Section, Water Pollution Control Bureau, EID, and may submit written comments to the Director of the EID at the address given above. Prior to ruling on any proposed discharge plan or its modification, the Director of EID will allow thirty (30) days after the day of publication of this Notice during which comments may be submitted to him and a public hearing may be requested by any interested person. Requests for public hearing shall set forth the reasons why the hearing should be held. A hearing will be held if the Director determines that there is significant public interest.

NOTICE

A PUBLIC MEETING IS TO BE HELD ON JUNE 8, 1983 AT 10:00 A.M. IN THE N.M. HEALTH AND ENVIRONMENT DEPARTMENT CONFERENCE ROOM AT 725 ST. MICHAELS DRIVE IN SANTA FE, TO DISCUSS A PROPOSED AMENDMENT TO THE N.M. WATER QUALITY CONTROL COMMISSION REGULATIONS.

The proposed amendment would add the underlined language to the second paragraph of Section 3-103 and to Section 3-107.B. as follows:

"3-103. STANDARDS FOR GROUND WATER OF 10,000 mg/l TDS CONCENTRATION OR LESS. --

...

These standards shall apply to the dissolved portion of the contaminants specified with a definition of dissolved being that given in the publication 'Methods for Chemical Analysis of Water and Waste of the U.S. Environmental Protection Agency,' with the exception (~~of mercury, which shall be total~~) that standards for mercury and the organic compounds shall apply to the total unfiltered concentrations of the contaminants."

"3-107. MONITORING, REPORTING AND OTHER REQUIREMENTS.

A. ...
B. Sampling and analytical techniques shall conform with the following references unless otherwise specified by the director:

1. ...
2. ...
3. ...
4. Annual Book of ASTM Standards, Part 31, Water, latest edition, American Society For Testing and Materials; or
5. Federal Register, latest methods published for monitoring pursuant to Resource Conservation and Recovery Act regulations; or
6. National Handbook of Recommended Methods for Water-Data Acquisition, latest edition, prepared cooperatively by agencies of the United States Government under the sponsorship of the U.S. Geological Survey."

The purpose of this meeting is to explain the proposed amendment and solicit public comment, before a formal public hearing is held on the matter. It is not necessary to attend the meeting to comment on the proposed amendment. Written statements should be postmarked by June 8, 1983 and addressed to:

Dennis M. McQuillan
Water Pollution Control Bureau
Environmental Improvement Division
N.M. Health & Environment Department
P.O. Box 968
Santa Fe, N.M. 87504-0968

CALL FOR PAPERS

WATER QUALITY AND POLLUTION IN NEW MEXICO

A Special Conference on the Chemistry and Microbiology of Precipitation, Surface Water, Soil, Soil Water and Ground Water

Papers (case studies or summaries) specifically relating to New Mexico are hereby requested from a wide variety of scientists and professionals, for inclusion in a publication to be jointly sponsored by the New Mexico Bureau of Mines and Mineral Resources, the Geophysical Research Center of the New Mexico Institute of Mining and Mineral Technology, the Water Pollution Control Bureau of the New Mexico Environmental Improvement Division and the New Mexico Water Resources Research Institute. Topics on which papers are especially requested include, but are not necessarily limited to, the following:

1) EXISTING WATER-QUALITY CONDITIONS IN NEW MEXICO-
   a) Ambient Water Chemistry and Microbiology.
   b) Water Pollution - What actually happened? What should be done about it?

2) WASTE MANAGEMENT IN NEW MEXICO-
   Past and Present Practices, Suggestions for the Future.

3) IMPROVED ACCESSIBILITY OF INFORMATION-
   Between the files of numerous governmental and private parties, there is an enormous quantity of data pertinent to water quality in New Mexico. Unfortunately, a lot of this information is poorly accessible to the people who need to use it. Accessiblity should be improved, for example, by the following works:
   a) Bibliographies.
   b) Inventories of Aerial Photographs, Chemical Analyses etc.

Other acceptable topics include, but are not necessarily limited to, geochemistry and water chemistry (theory), water-quality laws and regulations (perspectives from both regulators and regulatees), water quality restoration (natural processes and human efforts), other technology (geophysical methods, drinking-water treatment, modelling etc.), toxicology and epidemiology, and history.

If you are interested in contributing a paper to this publication, please send an abstract of your paper to:

Dr. Daniel B. Stephens
Department of Geoscience
N.M. Institute of Mining and Mineral Technology
Socorro, New Mexico 87801

The deadline for abstracts is August 31, 1983. If the abstract is accepted, the complete paper must be submitted no later than by November 30, 1983. The publication will be distributed and the papers will be presented at a special conference in Socorro, tentatively scheduled for April 12 and 13, 1984.

F

RICE Engineering & Operating, Inc.

122 WEST TAYLOR TELEPHONE (505) 393-9174

HOBBS, NEW MEXICO 88240

May 4, 1981

El Paso Natural Gas Company
P. O. Box 1384
Jal, New Mexico 88212

Attention: L. E. Anderson

Re: E-M-E SWD System

Gentlemen:

As per our phone conversation this date, El Paso did execute Articles of Agreement for the E-M-E SWD System on September 24, 1969.

Therefore, it will not be necessary to execute an agreement to add your plant to the System. Attached is a copy of Articles for your file.

Yours very truly,

RICE ENGINEERING & OPERATING, INC.

L. B. Goodheart
Division Manager

LBG/jp

Attachment

ARTICLES OF AGREEMENT

For the construction and operation of EUNICE-MONUMENT-EUMONT SALT WATER DISPOSAL SYSTEM.

I.

ORGANIZATION OF SYSTEM

THIS AGREEMENT, made and entered into this _____ day of JUN _____, 1958, by and between the following listed parties:

Amerada Petroleum Corporation
Anderson-Prichard Oil Corp.
Atlantic Refining Co., The
Aztec Oil & Gas Co.
Cities Service Oil Company
Continental Oil Company
General Crude Oil Company
Getty Oil Company
Gulf Oil Corporation
Hudson & Hudson, Inc.
Humble Oil & Refining Co.
Hunt, Stuart, Trustee
Ohio Oil Co., The
Pan American Petroleum Corporation
Penrose, Neville G., Inc.
Phillips Petroleum Company
Shell Oil Company
Sinclair Oil & Gas Company
Skelly Oil Company
Standard Oil Company of Texas
Sun Oil Company
Sunray-Mid Continent Oil Company
Superior Oil Company, The
Texas Company, The
Tidewater Oil Company
Vem Oil Company

hereinafter referred to as "the parties", which term shall also include those subsequently becoming subject to this agreement unless the text indicates otherwise, and Rice Engineering & Operating, Inc., hereinafter sometimes called "Rice", for the purpose of creating, putting into operation and prescribing rules and regulations for the operation of a salt water disposal system to be known as EUNICE-MONUMENT-EUMONT SALT WATER DISPOSAL SYSTEM which shall hereinafter be referred to as the "System".

This agreement, the map attached hereto, marked "EXHIBIT A" and made a part hereof, the preliminary estimate for the construction of the System, a copy of which is attached hereto, marked "EXHIBIT B", and made a part hereof, the Accounting Procedure attached hereto, marked "EXHIBIT C", and made a part hereof and the list of wells committed hereto (and showing the location of such wells), a copy of which is attached hereto, marked "EXHIBIT D", and made a part hereof,

contain all of the terms, conditions and provisions as agreed to by the parties and Rice in the acceptance and execution of this agreement by them, and each of them, and shall be binding upon them as to all of the terms, conditions and provisions herein set forth, the mutual agreements and the benefits to be derived hereunder being consideration for the promises and obligations herein set forth.

1. Each of the parties represents that it is the owner of the well or wells such party has listed on "EXHIBIT D", or that it has the authority to commit and bind the owner or owners of any wells so listed to each and all of the obligations of this agreement.

2. It being desirable that a unified effort be made to control the disposition of the water produced from the wells listed on "EXHIBIT D", it is the purpose of this agreement to prescribe the manner in which a unified disposal control system for the water so produced is to be constructed, operated and maintained, to set forth the fees and charges that are to be assessed against the parties, to set out the duties and obligations of the parties and the duties and obligations of Rice and of the Operator of said system and also to provide for the cooperative and unified handling of claims and litigation arising from operation of the System and to provide a means for the settling of such claims and the assessment of the parties for their proportionate part of such settlements.

II.

OPERATOR AND THE COMMITTEE

1. The parties hereby agree to the selection of Rice as Operator of the System. Reference herein to the "Operator" shall include Rice as well as any subsequent Operator. The Operator shall be in direct charge of and have direct supervision over the actual construction and operation of the System, and may from time to time make capital expenditures for additions and betterments to the System, provided that, except as specified in Paragraph 6 of Section VIII hereof and except for the cost of adding wells under the provisions of Section IV hereof, no single capital expenditure so made shall exceed the sum of $2,500.00 without prior approval by the Committee.

2. The Operator selected, or any subsequent Operator for the System, may withdraw as such Operator and be relieved of all duties as such, by giving thirty (30) days written notice to the Committee of its intention to withdraw. The Committee

shall then select another Operator by its vote in the manner provided in this Section II. Any Operator may be removed as such Operator by the Committee by its vote in the manner provided in this Section II, and in the event of such removal the Committee shall then select another Operator by its vote in the manner provided in this Section II.

3. The operation of the System shall be governed by a committee, hereinafter called the "Committee", to which body each of the parties and the Operator shall designate one (1) representative. The Committee shall have general supervision, except as herein limited, over the construction, maintenance and operation of the System and over all other matters affecting the same.

4. The representative of the Operator on the Committee shall be its chairman.

5. The chairman of the Committee shall call its first meeting, at which regular meetings thereafter may be provided for. There shall be not less than one regular annual meeting of the Committee. Special meetings may be called by the chairman or by one-third (1/3) in number of the parties. Each representative on the Committee (excluding Rice Engineering & Operating, Inc.) shall have a vote in the proceedings and actions of the Committee. Except as may be otherwise specifically provided herein, no action shall be taken by the Committee at any time except on the affirmative vote of the members of the Committee as follows:

A. During such time as the Committee shall consist of two (2) members (excluding Rice Engineering & Operating, Inc.) the unanimous vote of the members of said Committee shall be required to authorize action.

B. When, as and if said Committee shall consist of three (3) members (excluding Rice Engineering & Operating, Inc.) then a majority vote in number of the members (excluding Rice Engineering & Operating, Inc.) of said Committee shall be required.

C. When, as and if the Committee shall consist of four (4) or more members (excluding Rice Engineering & Operating, Inc.), then

(a) The majority weighted vote of the Committee, and,

(b) The affirmative vote of at least one-third (1/3) in number of the members of the Committee (excluding Rice Engineering & Operating, Inc.) shall be required

for affirmative action. The term "weighted vote" used herein and hereinafter shall mean a vote which has the weight and effect that the undivided interest of the party in the total investment cost account (as defined in Paragraph 1 of Section VII hereof) bears to such total investment cost account.

6. The Committee may provide procedure for the submission of any question to representatives of the parties hereto and their voting thereon by mail, telegraph or telephone confirmed by written letter or telegram. Provision shall be made for the recording of the results of any such vote, and for advice to the parties of such results.

III.

THE SYSTEM

1. The parties acting together on the basis hereinabove set forth, agree that they will construct, place in operation and maintain a water disposal system of the well input type. The System shall consist of the gathering system, accumulation tanks and disposal wells, together with other equipment necessary to operate the System.

2. The details of design and specifications of the System are to be approved by the Committee, which shall also award the contract or contracts for the construction of the System or approve the construction of the System by the Operator. The actual construction work shall be controlled and directed by the Operator.

3. Each party hereto may at its own individual cost and expense and in a manner approved by the Committee provide storage facilities, when required, for water produced from its wells listed in "EXHIBIT D". The lease storage facilities of each of the parties for purposes hereof shall be deemed to terminate at the valve connection to the System.

4. The Operator, as agent for the parties hereto, shall in its own name, as Trustee, acquire any and all rights of way, disposal wells and other equipment and easements necessary for the installation and for the removal of any and all parts of the System and secure such licenses and permits as required by law. All reasonable cost and expense so incurred shall be charged to the parties as provided in Section V hereof. All right, title, and interest in all rights of way, easements, licenses, disposal wells, other equipment, and permits acquired by Operator in

connection with operations performed and to be performed under this agreement shall automatically pass to and vest in the successor to Operator in the event Operator resigns, is discharged or for any other reason ceases to perform its duties under this agreement, and in such event Operator shall execute and deliver to the successor Operator such documents and other evidences of title as may be reasonably appropriate to recognize such transfer of ownership.

IV.

ADDITION OF WELLS AND PARTIES

1. Owners or lease operators other than parties hereto may become parties hereto by agreeing in writing to be bound by each and all of the terms, provisions and conditions of this agreement and any amendments thereto, if such joinder is approved by those already parties hereto in accordance with the voting procedure set forth in Section II hereof.

2. The commitment of any additional well or wells to the System subsequent to the effective date of this agreement shall require approval of the Committee in accordance with the voting procedure set forth in Section II hereof, except for the commitment of wells under the provisions of Paragraph 3 of this Section IV and of Paragraph 2 of Section XII.

3. Any of the parties completing a new well or recompleting or restoring to production a temporarily abandoned well, subsequent to the effective date of agreement, shall commit such well to the System if such well is connected to a tank battery which is connected to the System, provided that the Committee may prevent the commitment of any well to the System if the effect of such addition is to overload the System.

4. The commitment of any well to the System shall be subject to the provisions of Section V hereof with respect to investment costs.

V.

INVESTMENT COSTS OF THE SYSTEM

1. It is understood that the estimated initial cost of the System as set forth in "EXHIBIT B" is an estimate only and that the actual initial cost of the System shall be prorated among the parties in the proportion that the number of committed producing wells of each of the parties hereto bears to the total number of committed producing wells of the parties hereto as of the effective date of this agreement.

2. For purposes of this agreement the following shall apply with respect to committed producing wells:

a. A committed producing well shall be any well producing oil and/or gas, not plugged or temporarily abandoned, which is committed to the System and listed on "EXHIBIT D".

b. A dually completed well shall be considered as a separate well in each zone in which it is completed.

c. All wells connected as of the effective date of this agreement to a tank battery which is connected to the System shall be deemed to be committed producing wells and shall be listed on "EXHIBIT D".

3. If any well is added to the list on "EXHIBIT D" as a committed producing well as of a date subsequent to the effective date hereof, the owner or operator thereof shall so notify the Operator within fifteen (15) days after the Committee has approved the commitment of such well to the System or within fifteen (15) days after such well is completed or recompleted or restored to production if the approval of the commitment of such well by the Committee is not required under this agreement, and the Operator shall bill such owner or operator for an amount equal to that proportion of the total investment costs which have been incurred as of the first day of the calendar month next following the calendar month in which such well is added or to be added to the System that the well so added or to be added to the System bears to the total number of committed producing wells as of the effective date hereof plus all producing wells subsequently committed to the System, without adjustment for the disconnection of any well. The amount for which an owner or operator is to be billed under this Paragraph 3 shall never be less than the actual cost to the System of adding such well to the System.

4. If any committed producing well is plugged or temporarily abandoned, for which a pro rata investment cost payment has been made, the same shall no longer be deemed a committed producing well. For each well thus no longer committed the party hereto which owned or operated the same shall, subject to Section IV hereof, thereafter be entitled to commit to the System one additional well thereafter completed or thereafter recompleted or restored to production without paying any pro rata investment for the well so added. A party adding a well without paying any pro rata investment cost, under this Paragraph 4, shall nevertheless pay the actual cost to the System of adding such well to the System.

VI.

FUTURE INVESTMENT COSTS

1. All future investment costs shall be apportioned among the parties in the ratio that the number of committed producing wells owned or operated by each party as of the first day of the month following the date of approval by the Committee of such expenditure bears to the total number of such committed producing wells then owned or operated by the parties hereto.

VII.

TOTAL INVESTMENT COSTS

1. The Operator shall keep a "total investment cost account" consisting of all sums received from the parties for the construction of the System and the making of any and all additions thereto, less all refunds resulting from sales described in Paragraph 3 of this Section. This account shall represent the total investment cost of the System, and each party shall have an undivided interest in the System and in such account in the proportion that it has contributed thereto, less any credits received by any such party. The Operator shall furnish to each of the parties hereto a statement showing the current status of the total investment cost account each time there is a change in the ownership of the System and in such account.

2. Upon the payment of any investment cost under the provisions of Paragraph 3 of Section V, the amount to be paid shall be paid to the Operator and said amount shall be distributed by the Operator to the parties (excluding the party making such payment) in the proportion that such parties have contributed to the "total investment cost account", less prior credits received by them.

3. When, in the opinion of the Committee, any part of the System should be discontinued, the Committee may direct the Operator to sell that part of the System for the best price obtainable therefor, and the proceeds from such sale or sales, less the cost and expense of retirement, shall be ratably disbursed to the parties in the proportion that their net contribution to the "total investment cost account" bears to the "total investment cost account". No tank battery shall be disconnected from the System without the consent of the owner of the wells producing into the battery, unless the owner is in default under this agreement, and, within fifteen (15) days after receipt from Operator of notice of such default, shall fail

to commence to remedy such default, or thereafter shall fail to prosecute with reasonable diligence measures reasonably calculated to remedy such default.

4. In making disbursement of any refunds of investment cost account, the Operator may deduct from the portion of any party any and all amounts due and owing under this agreement to the Operator from such party.

VIII.

OPERATION OF SYSTEM

1. The System shall be operated as herein provided by the Operator for the parties hereto under the direction of the Committee. The number of employees, the selection of such employees, the hours of labor and the compensation for services to be paid any and all employees, in connection with operations hereunder, shall be determined by Operator. All employees and contractors used in operations hereunder shall be the employees and contractors of Operator and not the employees or contractors of the other parties hereto. Operator shall make no single expenditure in the operation of the System in excess of $2,500.00 without prior approval of the Committee, except in case of recognized emergencies.

2. The parties agree that they will each dispose of water produced by them from participating wells in the subject area through the facilities of the System, subject, however, to the limitations hereinafter set out, and that they may equip each lease owned by them with such storage facilities as are reasonably necessary for water produced thereon; provided, however, that if a party should need and elect to utilize the entire output of water produced from one or more of its producing wells in the subject area, such party shall be entitled to do so upon giving thirty (30) days written notice to the Operator, and shall currently therewith be relieved of such current maintenance and operational charges as would normally be assessed such producing wells; but such party and such well or wells shall not be exempted from allocation of charges for investment expenditures as they are currently assessed, except in the event of withdrawal from the System or assignment of interests, as provided in Section XII, Paragraphs 4 and 5. The Operator at the expense of all the parties hereto shall lay all lines up to the present lease battery of each party located within the subject area and each party shall at its own risk, cost and expense connect its battery to said lines.

3. The parties agree that they will each take reasonable precautions on their respective leases to guard against the escape of water, either by seepage,

through pipe lines, or otherwise, and that only water reasonably free from solid matter, basic sediment and oil shall be delivered to the System. The parties further agree that the Operator, or its inspector, or other proper official, may at all times have access to their leases to inspect the condition of such leases as to control of water; they will immediately at their sole cost and expense conform to any reasonable request of the Operator or its inspector for correction of objectionable conditions regarding the delivery of water to the System. If such corrective request of the Operator, or its inspector, is not complied with within a reasonable time, the Operator, after notifying the owner thereof, shall have the right to disconnect such lease from the System until such time as the objectionable conditions have been remedied.

4. It is agreed that Operator will accept from the parties and dispose of all the water produced by them and delivered to each single connection to the System up to the daily volume determined by multiplying 700 barrels of water by the number of wells served by such connection, or up to the last determined capacity of the System, whichever is the larger.

5. In the event that the water so produced and tendered by the parties to the Operator at any time overloads the facilities of the System, the Operator shall set a temporary maximum amount of water which will be accepted from each well and shall immediately notify the Committee of that condition. The Committee shall then set a maximum amount of water which the Operator will accept from each well of the parties during any month. In setting such amount to be accepted from each well, the Committee shall apportion the amount of excess production of water among the wells producing excess water connected to the System (being those wells served by a single connection delivering more than 700 barrels of water daily, multiplied by the number of wells served by such connection) in the proportion of the amount of excess water produced from each such well as of the calendar month just prior to the action of the Committee so that the reduction of water taken into the System shall be allocated to each well producing such excess water in the ratio that its excess water production as of said calendar month bears to the total excess water production of all wells connected to the System as of such calendar month. Such amount shall be so determined that the facilities of the System will be utilized without overloading, and the Operator shall be under no obligation at any time to dispose of any water produced by the parties in excess of said maximum amount set by the Committee until such time as facilities to handle additional water are installed.

6. Notwithstanding any other provision of this agreement to the contrary, it is agreed that each of the parties hereto shall have the right to dispose of in the System at each connection that daily volume of water obtained by multiplying 700 barrels of water by the number of producing wells served by that connection, and that if the System now or hereafter is incapable of disposing of such volume of water, it shall be enlarged as the need arises to the capacity necessary to dispose of such amount of water, the cost of such enlargement to be borne by and apportioned among the parties hereto as an investment expense, as provided in Article VI hereof.

IX.

OPERATING COST OF THE SYSTEM

1. The Operator shall pay the operating cost of the System and shall bill each party on or before the last day of each calendar month for his or its proportionate part of such costs for the preceding calendar month, itemized statements to accompany each bill. Such operating costs shall be apportioned among and paid by the parties in the ratio that the number of committed producing wells owned or operated by each party and connected to the System on the first day of the month for which billing is rendered, bears to the total number of committed producing wells owned or operated by the parties and connected to the System on such date. A connected well is defined as any well producing into a tank battery which is connected to the System.

X.

INSURANCE

1. The Operator shall at all times carry for the protection of the parties hereto the following insurance:

(a) Workmen's compensation insurance, including employer's liability with a limit of not less than $100,000, in compliance with the workmen's compensation laws of the State of New Mexico, such insurance to include an endorsement waiving all rights of subrogation against the parties to this agreement;

(b) Comprehensive general liability insurance, excluding products, in amounts of $100,000 for injuries to any one person, $500,000 for injuries in any one accident, and for property damage in

the amounts of $100,000 for each accident and $250,000 aggregate;

(c) Automobile public liability and property damage insurance on automotive equipment owned, rented or used by the System in amounts of $100,000 for injuries to any one person, $300,000 for injuries in any one accident and $10,000 for property damage, except that if automotive equipment used is owned exclusively by the Operator, no charge will be made to the joint account for premiums for this coverage, except as provided in Section II, Paragraph 5, of the Accounting Procedure attached hereto.

Such comprehensive general liability insurance and automobile public liability and property damage insurance shall be written or endorsed so as to designate all parties to this agreement as insured parties. The Operator shall not carry fire, tornado or other insurance on the property of the System.

2. The Operator shall require all its contractors or subcontractors to carry for the protection of the parties hereto insurance of such kinds and in such amounts as in the opinion of Operator shall be adequate, except that such insurance shall never provide for less than the following coverage:

(a) Workmen's compensation insurance, including employee's liability with a limit of not less than $25,000, in compliance with the workmen's compensation laws of the State of New Mexico, such insurance to include an endorsement waiving all rights of subrogation against the parties to this agreement.

(b) Comprehensive general liability insurance, excluding products, in amounts of $100,000 for injuries to any one person, $100,000 for injuries in any one accident, and for property damage in the amounts of $100,000 for each accident and $100,000 aggregate.

(c) Automobile public liability and property damage insurance, in amounts of $100,000 for injuries to any one person, $100,000 for injuries in any one accident and $10,000 for property damage.

XI.

SETTLEMENT OF CLAIMS

1. For the purpose of investigating and disposing of all claims and suits arising by reason of the receipt and handling of water in the System, and arising from the construction, extension, maintenance, operation or removal of the System or any portion thereof, it is agreed that the Committee shall appoint a Claims Committee to consist of not more than five representatives, one of whom shall be in the employ of the Operator and shall be Chairman of such Committee, and on which Committee no party shall have more than one representative, to make investigations and recommendations concerning damage claims incident to the operation of the System, and to act under the procedure hereinafter outlined.

2. The Committee shall also appoint a Legal Committee to consist of not more than three attorneys, on which Legal Committee no party shall have more than one representative. The Legal Committee shall have control of litigation resulting from the operation of the System, and shall have power and authority, with the consent and approval of the Committee, to employ attorneys or otherwise provide for the defense of any suit or suits resulting from the operations of the System. No compensation shall be paid or obligation incurred to any attorney in the regular employment of any of the parties or Operator except the actual and necessary expenses of any such attorney incurred in connection with any such litigation when such services are rendered at the request and with the approval of the Legal Committee. Any party shall have the right to be represented by individual counsel at his own expense.

3. Upon receipt by any party hereto of a damage claim or the service of any summons in any action for damages resulting from the operations of the System, the party receiving such notice or summons shall immediately forward the same to the Operator, who shall promptly give notice of any such claims to the Chairman of the Claims Committee and shall forward any such summons to the Chairman of the Legal Committee. The Claims Committee shall immediately arrange for an investigation of any such claim and after investigation shall have power and authority by a majority vote of the membership of such Claims Committee to expend not to exceed the sum of $1,000.00 in the settlement of any such claim, provided such settlement is final and conclusive, and has the approval of the majority of the Membership of the Legal Committee in the settlement of any litigation. Settlements requiring the payment of more than $1,000.00 shall be made only with the approval of the Committee, and

if suit has been filed, with the approval of the majority of the Legal Committee; contributions to the amount so paid shall be made by the parties as hereinafter set forth.

4. When the settlement of any litigation or claim is made as above provided, the cost of such settlement shall be apportioned among and paid by the parties in the proportion that the greatest number of committed producing wells owned or operated by each party bears to the greatest number of committed producing wells owned or operated by all the parties during any part of the two year period immediately prior to the assertions of any claims or the filing of any suit for the satisfaction of any claim; provided that if a claim is asserted prior to two years after the effective date hereof, only committed producing wells owned or operated subsequent to the effective date hereof shall be considered in determining said proportion.

5. A claim asserted against any party or parties not arising from any of the operations of the System shall not be within the jurisdiction of the Claims Committee or Legal Committee.

6. All payments in settlement of claims or litigation authorized and approved by the Claims Committee, Legal Committee or the Committee, as hereinabove set forth, shall be made by the Operator and the Operator shall promptly after any such payment furnish each of the parties with a statement of the amount paid in settlement of any such claim or claims and showing their respective pro rata shares thereof and the parties agree that they will reimburse the Operator for such amount or amounts so paid on their respective behalf within thirty (30) days after the receipt of such statement or bills therefor and if not paid within said thirty (30) day period the same shall draw interest at the rate of six per cent per annum until paid.

7. It is recognized that the Operator may be subjected to certain claims in its individual capacity, which claims are in fact the result of its activities as the Operator of the System. It is agreed that any such claims shall be subject to handling and control by the respective Committees in the same manner as provided above.

8. No cost or expense incident to an appeal shall be paid on behalf of the parties hereto unless the appeal is approved by the Committee. Any party may appeal any such judgment at his sole cost and expense.

XII.

MISCELLANEOUS PROVISIONS

1. Except where herein otherwise specifically provided, the Operator shall pay and discharge all costs and expenses and charge and bill the parties with their proportionate share of such costs as provided in the Accounting Procedure attached hereto as "EXHIBIT C".

2. This agreement shall become binding upon each party who executes or ratifies the same as of the date of execution or ratification by such party, and shall become effective as of seven o'clock A. M. of the first day of the calendar month next following execution by the Operator and one or more parties committing a total of not less than 800 producing wells hereto, provided, however, that any of the parties named in Section I hereof may execute or ratify this agreement within 90 days from the date hereof, even though the same may have become effective, in which event such parties shall be deemed to have become bound hereby and their wells committed hereto as of the effective date of this agreement. If at least 800 wells are not thus committed on or before 90 days from the date of this agreement, appearing on page 1 hereof, this agreement shall ipso facto terminate on said date and thereafter be of no further force or effect. This agreement shall continue in force and effect for any and all of the purposes herein provided until it is determined by three-fourths (3/4) of the weighted vote of the Committee that the maintenance and operation of the System shall be discontinued. Upon such discontinuance the property shall be sold under the direction of the Committee for the best price obtainable therefor, and the proceeds from such sale or sales, less the cost and expense of retirement, and all unused sums in all accounts in the hands of the Operator shall be ratably disbursed to each of the parties in the proportion that their individual interest in total investment cost account bears to the total investment cost account; PROVIDED, that there may be deducted from the proportion of any party any and all accounts due and owing to the Operator under this agreement.

3. The Operator shall have a lien on the interest of each defaulting party or parties in the System and the oil and gas produced from any producing wells to secure the payment of the pro rata cost and expense of each such defaulting party for the cost of the construction, extension, maintenance and operation of the System and on account of the settlement of any claims or damages by the Operator as hereinabove provided and said lien may be foreclosed as provided by law at any time.

4. Any party may withdraw from this agreement by giving the Operator thirty (30) days written notice of his or its intention to withdraw and by executing and delivering to the other parties hereto an assignment of all his or its rights, title and interest to and under this agreement and in and to the System and any and all rights and easements in connection therewith and in and to the investment account hereinabove referred to, if any, by furnishing satisfactory evidence to the Committee that such withdrawing party has no interest in any well or wells within the subject area served by the System. Such withdrawing party shall not, however, be relieved from his or its obligations and liability under the terms and conditions of this agreement accruing prior to the effective date of such withdrawal, except for future investment costs assessed by the Committee within thirty-five (35) days prior to said effective withdrawal date. Such withdrawing party shall forfeit his or its undivided interest in the total investment cost account as of said date and thereafter shall be entitled to no credits or payments of any nature whatsoever from the Operator in its capacity as such.

5. Any party selling, assigning or otherwise conveying his or its leasehold estate, or estates, upon which are located committed producing wells, or any interest therein, whereby such party ceases to be the operator of any such lease or leases or interest therein, shall have the right to transfer and assign his or its interest in the System upon the assignee agreeing to assume obligations in proportion to the interest which is assigned to such assignee; and any such purchaser or assignee shall then have an undivided interest in the total investment cost account in the proportion that the assigning party, on account of the interest so sold, assigned or transferred has contributed thereto, less credits received.

6. The Operator at its election may require the parties to advance their respective proportions of the estimated initial investment costs, estimated future investment costs and estimated operating costs as approved and authorized by the Committee according to the following condition: On or before the 10th day of each calendar month the Operator may submit a statement of such estimated expenditures for the succeeding calendar month to all parties. Within thirty (30) days thereafter each of the parties shall pay to the Operator such party's proportionate part of such estimate. Should any party fail or refuse to pay his or its part of such estimate same shall bear interest at the rate of six per cent per annum from the date same became payable as above provided until paid. Should any party or parties fail to

pay his, its, or their proportionate part of such advance estimate within the thirty (30) days provided, the Operator shall have the right at its option at any time thereafter, such default continuing, to foreclose the lien provided for in this agreement upon the respective interests of such party or parties. Adjustments between advances on estimates and actual cost of each party shall be made by the Operator at the close of each calendar month and the accounts of the parties adjusted accordingly.

7. Each of the parties shall on or before the tenth (10th) day of each calendar month prepare and furnish the Operator with a written statement showing the number and status of its committed producing wells on the first (1st) day of such calendar month, which statements shall be the basis for billing the parties for their proportionate part of all operating costs and expenses incurred during such month. For purposes of this provision, a well or wells added to the System under the terms of Section IV hereof shall be deemed to have been added as of the first (1st) day of the month during which the well or wells are connected to the System.

8. In the event any leasehold estate upon which is located a committed producing well is owned in whole or in part by one party and such lease is operated by another party, such lease shall be considered for all the purposes of this agreement as the lease of only the one of such parties as may be agreed between them, and the wells thereon shall for all purposes hereof be considered as the wells of only the one of such parties as may be so designated in writing by them to the Operator.

9. The rights, duties, obligations and liabilities of the parties hereto shall be several and not joint or collective, it being the express purpose and intention of the parties hereto that their ownership in the System covered hereby shall be as tenants in common; and nothingherein contained shall ever be construed as creating a partnership of any kind, joint venture, and association or a trust or as imposing upon any or all of the parties hereto any partnership duty, obligation or liability. Each party hereto shall be individually responsible only for its obligations, as set out in this agreement.

10. While it is provided herein that the rights and liabilities of the parties hereunder are several and not joint or collective, and that this agreement and the operations hereunder shall not constitute a partnership, if for Federal tax

purposes this agreement, the relationship established thereby, and the operations hereunder are regarded as a partnership, then each of the parties hereto hereby elects not to be treated as a partnership and hereby elects that it and the operations covered by this agreement be excluded from the application of Subchapter K of Chapter A of the Internal Revenue Code of 1954, or such portion or portions thereof as the Secretary of the Treasury of the United States or his delegate shall permit by election to be excluded therefrom, insofar as all or any portion of said Subchapter K may be applicable to the parties hereto in respect of the operations covered by this Agreement. Each party hereto agrees to execute such additional or further evidence of said election as may be required by or under said Subchapter K. Each party hereto further agrees not to give any notices or take any other action inconsistent with the election made hereby.

11. Before or as soon as practical after the effective date hereof, Operator shall prepare a budget of estimated costs and expenses for the remainder of the calendar year and on or before the first day of each October thereafter shall prepare a budget of estimated costs and expenses for the ensuing year. Such budgets shall set forth the estimated costs and expenses by quarterly periods. Unless otherwise specified in the budget, it shall be presumed for the purpose of any advance billings that the estimated costs and expenses for each month of a quarterly period shall be one-third (1/3) of the estimate for the quarterly period. Budgets so prepared shall be estimates only and shall be subject to adjustment and correction by the Committee and Operator from time to time whenever it shall appear that an adjustment or correction is proper. A copy of each such budget and adjusted budget shall be promptly furnished each party.

12. When and if, and from time to time as additional producing wells are committed to the System, "EXHIBIT D" hereto shall be revised by Operator, and Operator shall furnish a copy of such revised "EXHIBIT D" to each of the parties hereto.

13. Operator shall render for ad valorem tax purposes, all physical property constituting the System or used in connection therewith or such part thereof as may be subject to ad valorem taxation under existing laws, or which may be made subjectto taxation under future laws, and shall pay, for the benefit of the joint account, all such ad valorem taxes at the time and in the manner required by law which may be assessed upon or against all or any portion of such rights and interests and the physical property located thereon or used in connection therewith. Operator shall bill each Non-Operator for its proportionate share of such tax payments as

provided by the Accounting Procedure hereto attached, which payments shall be deemed to be operating expenses.

14. The Committee shall have the right to order an audit of Operator's accounts and records relating to accounting hereunder, such audit to be at the joint expense of the parties and deemed an operating expense. There shall never be more than one such audit directed in any one calendar year.

15. In the event that any party hereto is rendered unable, wholly or in part, by force majeure to carry out its obligations under this agreement, other than the obligation to make payment of amounts due hereunder, upon such party's giving notice and reasonably full particulars of such force majeure in writing or by telegraph to the other parties hereto within a reasonable time after the occurrence of the cause relied upon, the obligations of the party giving said notice, so far as they are affected by such force majeure, shall be suspended during the continuance of any inability so caused, but for no longer period; and the cause of the force majeure as far as possible shall be remedied with all reasonable dispatch. The term "force majeure" as employed herein shall mean an act of God, strike, lockout or other industrial disturbance, act of the public enemy, war, blockade, riot, lightning, fire, storm, flood, explosion, governmental restraint, and any other cause, whether of the kind herein enumerated or otherwise, not reasonably within the control of the party claiming suspension. The above requirement that any force majeure shall be remedied with all reasonable dispatch shall not require the settlement of strikes, lockouts or other labor difficulty by acceding to the demands of opponents therein when such course is inadvisable in the discretion of the party having the difficulty.

16. This agreement and the previously mentioned "EXHIBIT A", "EXHIBIT B", "EXHIBIT C" and "EXHIBIT D" contain all the terms and provisions as agreed to by the parties in the creation of the System. In the event of conflict between the provisions of this agreement and any Exhibit the provisions of this agreement shall control.

17. Counterparts of this agreement may be executed by one or more parties with the same force and effect as if all parties had joined in the execution of the same instrument.

18. The terms, conditions and provisions hereof shall be covenants running with the lands and leasehold estates subject hereto and shall inure to the benefit of and be binding upon the parties hereto and their respective successors and assigns.

IN WITNESS WHEREOF, the parties hereto have executed this agreement as of the date first above written.

ATTEST:

_____
Secretary

RICE ENGINEERING & OPERATING, INC.

By _____
President

ATTEST:

_____
Assistant Secretary

AMERADA PETROLEUM CORPORATION

By _____
President

ATTEST:

_____
Secretary

ANDERSON-PRICHARD OIL CORP.

By _____
President

ATTEST:

_____
Secretary

THE ATLANTIC REFINING CO.

By _____
President

ATTEST:

_____
Secretary

AZTEC OIL & GAS CO.

By _____
President

ATTEST:

_____
Secretary

CITIES SERVICE OIL COMPANY

By _____
President

ATTEST:

_____
Secretary

CONTINENTAL OIL COMPANY

By _____
President

ATTEST:

_____
Secretary

GENERAL CRUDE OIL COMPANY

By _____
President

ATTEST:

_____
Secretary

GETTY OIL COMPANY

By _____
President

ATTEST:

_____
Secretary

GULF OIL CORPORATION

By _____
President

ATTEST:

_____
Secretary

HUDSON & HUDSON, INC.

By _____
President

ATTEST:

_____
Secretary

HUMBLE OIL & REFINING CO.

By _____
President

_____
Stuart Hunt, Trustee

ATTEST:

_____
Secretary

THE OHIO OIL CO.

By _____
President

ATTEST:

_____
Secretary

PAN AMERICAN PETROLEUM CORPORATION

By _____
President

ATTEST:

_____
Secretary

NEVILLE G. PENROSE, INC.

By _____
President

ATTEST:

_____
Secretary

PHILLIPS PETROLEUM COMPANY

By _____
President

ATTEST:

_____
Secretary

SHELL OIL COMPANY

By _____
President

ATTEST:

_____
Secretary

SINCLAIR OIL & GAS COMPANY

By _____
President

ATTEST:

_____
Secretary

SKELLY OIL COMPANY

By _____
President

ATTEST:

_____
Secretary

STANDARD OIL COMPANY OF TEXAS

By _____
President

ATTEST:

_____
Secretary

SUN OIL COMPANY

By _____
President

ATTEST:

_____
Secretary

SUNRAY-MID CONTINENT OIL COMPANY

By _____
President

ATTEST:

_____
Secretary

THE SUPERIOR OIL COMPANY

By _____
President

ATTEST:

_____
Secretary

THE TEXAS COMPANY

By _____
President

ATTEST:

_____
Secretary

TIDEWATER OIL COMPANY

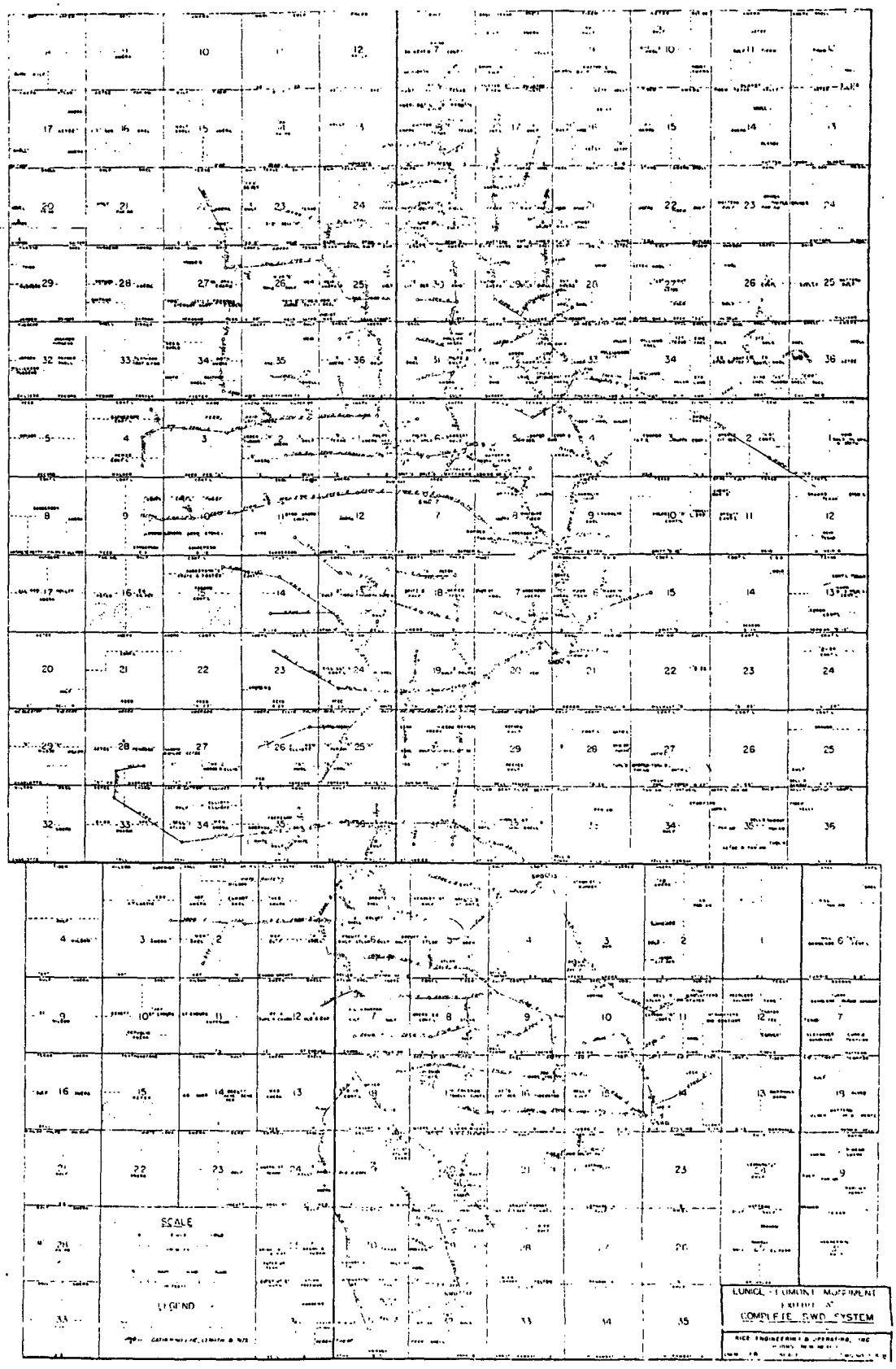
By _____
President

ATTEST:

_____
Secretary

VFM OIL COMPANY

By _____
President


SCALE
LEGEND
LONGLEY-LUMONT MOVEMENT
EXHIBIT "A"
COMPLETE SWD SYSTEM

"EXHIBIT B"

ATTACHED TO AND MADE A PART OF ARTICLES OF AGREEMENT FOR THE EUNICE-MONUMENT-EUMONT SALT WATER DISPOSAL SYSTEM

ESTIMATED COST OF INITIAL
EUNICE - MONUMENT - EUMONT SWD SYSTEM

Disposal Wells (6)				$ 291,044
Tanks & Well Cellars				86,412
Pumps & Tanks				12,290
Lines:				
Material	Size	Unit Price	Quantity	Cost
Coated Steel	2"	$0.60	124,100	74,460
Asbestos Cement	3"	0.83	110,200	91,466
Asbestos Cement	4"	1.00	146,100	146,100
Asbestos Cement	6"	1.51	177,600	268,176
Asbestos Cement	8"	2.05	111,200	227,960
Asbestos Cement	10"	2.59	9,000	23,310
Valves, fittings, road conduit and misc. material				184,667
Contract Labor				252,726
Right-of-way - 41,103 Rods @ 1.25/Rod				51,379
Damages - 41,103 Rods @ 1.25/Rod				51,379
Surveying - 678,200' @ .02/ft				13,564
Sales Tax				27,823
Engineering design, bill of material, material procurement, supervision of installation, and placing in operation 7% of contract labor & material				99,327
				$ 1,902,083

"EXHIBIT C"

ATTACHED TO AND MADE A PART OF ARTICLES OF AGREEMENT FOR THE EUNICE-MONUMENT-EUMONT SALT WATER DISPOSAL SYSTEM

ACCOUNTING PROCEDURE
(UNIT AND JOINT LEASE OPERATIONS)

I. GENERAL PROVISIONS

1. DEFINITIONS

"Joint property" and "subject area" as herein used shall be construed to mean the System covered by the agreement to which this "Accounting Procedure" is attached.
"Operator" as herein used shall be construed to mean the party designated to conduct the development and operation of the subject area for the joint account of the parties hereto.
"Non-Operator" as herein used shall be construed to mean any one or more of the non-operating parties.

2. STATEMENTS AND BILLINGS

Operator shall bill Non-Operator on or before the last day of each month for its proportionate share of costs and expenditures during the preceding month. Such bills will be accompanied by statements, reflecting the total costs and charges as set forth under Subparagraph A below:

A. Statement in detail of all charges and credits to the joint account.
B. Statement of all charges and credits to the joint account, summarized by appropriate classifications indicative of the nature thereof.
C. Statements as follows:
   (1) Detailed statement of material ordinarily considered controllable by operators of oil and gas properties;
   (2) Statement of ordinary charges and credits to the joint account summarized by appropriate classifications indicative of the nature thereof; and
   (3) Detailed statement of any other charges and credits.

3. PAYMENTS BY NON-OPERATOR

Each party shall pay its proportion of all such bills within fifteen (15) days after receipt thereof. If payment is not made within such time, the unpaid balance shall bear interest at the rate of six per cent (6%) per annum until paid.

4. ADJUSTMENTS

Payment of any such bills shall not prejudice the right of Non-Operator to protest or question the correctness thereof. Subject to the exception noted in Paragraph 5 of this section I, all statements rendered to Non-Operator by Operator during any calendar year shall conclusively be presumed to be true and correct after twenty-four (24) months following the end of any such calendar year, unless within the said twenty-four (24) month period Non-Operator takes written exception thereto and makes claim on Operator for adjustment. Failure on the part of Non-Operator to make claim on Operator for adjustment within such period shall establish the correctness thereof and preclude the filing of exceptions thereto or making of claims for adjustment thereon. The provisions of this paragraph shall not prevent adjustments resulting from physical inventory of property as provided for in Section VI, Inventories, hereof.

5. AUDITS

A Non-Operator, upon notice in writing to Operator and all other Non-Operators, shall have the right to audit Operator's accounts and records relating to the accounting hereunder for any calendar year within the twenty-four (24) month period following the end of such calendar year, provided, however, that Non-Operator must take written exception to and make claim upon the Operator

for all discrepancies disclosed by said audit within said twenty-four (24) month period. Where there are two or more Non-Operators, the Non-Operators shall make every reasonable effort to conduct joint or simultaneous audits in a manner which will result in a minimum of inconvenience to the Operator.

II. DEVELOPMENT AND OPERATING CHARGES

Subject to limitations hereinafter prescribed, Operator shall charge the joint account with the following items:

1. RENTALS AND ROYALTIES

   Deleted

2. LABOR

   A. Salaries and wages of Operator's employees directly engaged on the joint property in the maintenance and operation thereof (but not those engaged in the construction thereof), including salaries or wages paid to geologists and other employees who are temporarily assigned to and directly employed on the System.

   B. Operator's cost of holiday, vacation, sickness and disability benefits, and other customary allowances applicable to the salaries and wages chargeable under Subparagraph 2 A and Paragraph 11 of this Section II. Costs under this Subparagraph 2 B may be charged on a "when and as paid basis" or by "percentage assessment" on the amount of salaries and wages chargeable under Subparagraph 2 A and Paragraph 11 of this Section II. If percentage assessment is used, the rate shall be based on the Operator's cost experience.

   C. Costs of expenditures or contributions made pursuant to assessments imposed by governmental authority which are applicable to Operator's labor cost of salaries and wages as provided under Subparagraphs 2 A, 2 B, and Paragraph 11 of this Section II.

3. EMPLOYEE BENEFITS

   Operator's current cost of established plans for employees' group life insurance, hospitalization, pension, retirement, stock purchase, thrift, bonus and other benefit plans of a like nature, applicable to Operator's labor cost, provided that the total of such charges shall not exceed ten per cent (10%) of Operator's labor costs as provided in Subparagraphs A and B of Paragraph 2 of this Section II and in Paragraph 11 of this Section II.

4. MATERIAL

   Material, equipment and supplies purchased or furnished by Operator for use of the joint property. So far as it is reasonably practical and consistent with efficient and economical operation, only such material shall be purchased for or transferred to the joint property as may be required for immediate use; and the accumulation of surplus stocks shall be avoided.

5. TRANSPORTATION

   Transportation of employees, equipment, material, and supplies necessary for the development, maintenance, and operation of the joint property incurred subsequent to construction of the System, subject to the following limitations:

   A. If material is moved to the joint property from vendor's or from the Operator's warehouse or other properties, no charge shall be made to the joint account for a distance greater than the distance from the nearest reliable supply store or railway receiving point where such material is available, except by special agreement with Non-Operator.

   B. If surplus material is moved to Operator's warehouse or other storage point, no charge shall be made to the joint account for a distance greater than the distance from the nearest reliable supply store or railway receiving point, except by special agreement with Non-Operator. No charge shall be made to the joint account for moving material to other properties belonging to Operator, except by special agreement with Non-Operator.

*(but not those engaged in the construction thereof)

6. SERVICE.

A. Outside Services:
The cost of contract services and utilities procured from outside sources.

B. Use of Operator's Equipment and Facilities:
Use of and service by Operator's exclusively owned equipment and facilities as provided in Paragraph 5 of Section III entitled "Operator's Exclusively Owned Facilities."

7. DAMAGES AND LOSSES TO JOINT PROPERTY AND EQUIPMENT

All costs or expenses necessary to replace or repair damages or losses incurred by fire, flood, storm, theft, accident, or any other cause not controllable by Operator through the exercise of reasonable diligence. Operator shall furnish Non-Operator written notice of damages or losses incurred as soon as practicable after report of the same has been received by Operator.

8. LITIGATION EXPENSE

All costs and expenses of litigation, or legal services otherwise necessary or expedient for the protection of the joint interests, including attorneys' fees and expenses as hereinafter provided, together with all judgments obtained against the parties or any of them on account of the joint operations under this agreement, and actual expenses incurred by any party or parties hereto in securing evidence for the purpose of defending against any action or claim prosecuted or urged against the joint account or the subject matter of this agreement.

A. If a majority of the interests hereunder shall so agree, actions or claims affecting the joint interests hereunder may be handled by the legal staff of one or more of the parties hereto; and a charge commensurate with cost of providing and furnishing such services rendered may be made against the joint account; but no such charge shall be made until approved by the legal departments of or attorneys for the respective parties hereto.

B. Fees and expenses of outside attorneys shall not be charged to the joint account unless authorized by the majority of the interests hereunder.

9. TAXES

All taxes of every kind and nature assessed or levied upon or in connection with the properties which are the subject of this agreement, the production therefrom or the operation thereof, and which taxes have been paid by the Operator for the benefit of the parties hereto.

10. INSURANCE AND CLAIMS

A. Premiums paid for insurance required to be carried for the benefit of the joint account, together with all expenditures incurred and paid in settlement of any and all losses, claims, damages, judgments and other expenses, including legal services, not recovered from insurance carrier.

B. If no insurance is required to be carried, all actual expenditures incurred and paid by Operator in settlement of any and all losses, claims, damages, judgments, and any other expenses, including legal services, shall be charged to the joint account.

11. OVERHEAD, DISTRICT AND CAMP EXPENSES

In lieu of any charges for any part of the compensation and expenses of the officers and entire staff of any office of the Operator, together with the cost of operating and maintaining any such office, but not in lieu of direct costs of the Operator incurred in the operation of the System which may be charged under any of the preceding paragraphs of this Section, the Operator shall have the right to charge against the joint account the following charges:

A. Water Disposal Wells: At the rate of Four Hundred Dollars ($400.00) per month per well during the time a water disposal well is being drilled, equipped, and completed, or a previously drilled well is being converted for use as a water disposal well, beginning on the date that the drilling or conversion operations are commenced, and terminating when said well has been completed and equipped, to and including the well head connection, as a water disposal well or plugged, except that no charge shall be made during the suspension of drilling, conversion, equipping, or completion operations for fifteen (15) or more consecutive days. This overhead rate per well shall also apply after the completion of any disposal

well to any work thereon requiring the use of drilling tools. All assessments for overhead herein shall be apportioned to the parties hereto on the same basis as the costs of the work covered hereby are assessed.

B. During Construction Period 7% of the direct costs of the construction of the System (excluding, however, the cost of acquiring any producing or non-producing well or wells for the purpose of converting into a water input disposal well and also excluding any costs incurred in connection with the drilling or conversion of, or work requiring the use of drilling tools on, any disposal well for which a flat monthly rate of overhead is charged in the preceding paragraph), and shall be apportioned to the parties in the same manner as other construction costs. However, credit for the cost of the preliminary report based on 1% of the estimated cost will be credited against the 7% of the original construction cost for wells committed to the System.

C. During Operating Period: In addition to the direct expense incident to the operation of the System, there shall be assessed, each month, by Operator, a charge for overhead of 5% of the total monthly operating costs (excluding, however, any costs incurred on any disposal well in connection with work requiring the use of drilling tools for which a flat monthly rate of overhead is charged in paragraph A hereof), but in any event said monthly assessment shall not be less than $150.00 per month, or should the System require more than one input disposal well the minimum charge for all overhead first above referred to shall be $150.00 per month per disposal well. This charge shall be apportioned to the parties in the same manner as other operating costs.

12. ADMINISTRATIVE OVERHEAD

Deleted.

13. OPERATOR'S FULLY OWNED WAREHOUSE OPERATING AND MAINTENANCE EXPENSE
(Describe fully the agreed procedure to be followed by the Operator.)

None

14. OTHER EXPENDITURES

Any expenditure, other than expenditures which are covered and dealt with by the foregoing provisions of this Section II, incurred by the Operator for the necessary and proper development, maintenance, and operation of the joint property.

III. BASIS OF CHARGES TO JOINT ACCOUNT

1. PURCHASES

Material and equipment purchased and service procured shall be charged at price paid by Operator after deduction of all discounts actually received.

2. MATERIAL FURNISHED BY OPERATOR

Material required for operations shall be purchased for direct charge to joint account whenever practicable, except that Operator may furnish such material from Operator's stocks under the following conditions:

A. New Material (Condition "A")

(1) New material transferred from Operator's warehouse or other properties shall be priced f.o.b. the nearest reputable supply store or railway receiving point, where such material is available, at current replacement cost of the same kind of material. This will include material such as tanks, pumping units, sucker rods, engines, and other major equipment. Tubular goods, two-inch (2") and over, shall be priced

on carload basis effective at date of transfer and f.o.b. railway receiving point nearest the joint account operation, regardless of quantity transferred.

(2) Other material shall be priced on basis of a reputable supply company's preferential price list effective at date of transfer and f.o.b. the store or railway receiving point nearest the joint account operation where such material is available.

(3) Cash discount shall not be allowed.

B. Used Material (Condition "B" and "C")

(1) Material which is in sound and serviceable condition and is suitable for reuse without reconditioning shall be classed as Condition "B" and priced at seventy-five per cent (75%) of new price.

(2) Material which cannot be classified as Condition "B" but which,

(a) After reconditioning will be further serviceable for original function as good secondhand material (Condition "B"), or

(b) Is serviceable for original function but substantially not suitable for reconditioning, shall be classed as Condition "C" and priced at fifty per cent (50%) of new price.

(3) Material which cannot be classified as Condition "B" or Condition "C" shall be priced at a value commensurate with its use.

(4) Tanks, buildings, and other equipment involving erection costs shall be charged at applicable percentage of knocked-down new price.

3. PREMIUM PRICES

Whenever materials and equipment are not readily obtainable at the customary supply point and at prices specified in Paragraphs 1 and 2 of this Section III because of national emergencies, strikes or other unusual causes over which the Operator has no control, the Operator may charge the joint account for the required materials on the basis of the Operator's direct cost and expense incurred in procuring such materials, in making it suitable for use, and in moving it to the location, provided, however, that notice in writing is furnished to Non-Operator of the proposed charge prior to billing the Non-Operator for the material and/or equipment acquired pursuant to this provision, whereupon Non-Operator shall have the right, by so electing and notifying Operator within 10 days after receiving notice from the Operator, to furnish in kind, or in tonnage as the parties may agree, at the location, nearest railway receiving point, or Operator's storage point within a comparable distance, all or part of his share of material and/or equipment suitable for use and acceptable to the Operator. Transportation costs on any such material furnished by Non-Operator, at any point other than at the location, shall be borne by such Non-Operator. If, pursuant to the provisions of this paragraph, any Non-Operator furnishes material and/or equipment in kind, the Operator shall make appropriate credits therefor to the account of said Non-Operator.

4. WARRANTY OF MATERIAL FURNISHED BY OPERATOR

Operator does not warrant the material furnished beyond or back of the dealer's or manufacturer's guaranty; and in case of defective material, credit shall not be passed until adjustment has been received by Operator from the manufacturers or their agents.

5. OPERATOR'S EXCLUSIVELY OWNED FACILITIES

The following rates shall apply to service rendered to the joint account by facilities owned exclusively by Operator:

A. Water, fuel, power, compressor and other auxiliary services at rates commensurate with cost of providing and furnishing such service to the joint account but not exceeding rates currently prevailing in the field where the joint property is located.

B. Automotive equipment at rates commensurate with cost of ownership and operation. Such rates should generally be in line with the schedule of rates adopted by the Petroleum Motor Transport Association, or some other recognized organization, as recommended uniform charges against joint account operations and revised from time to time. Automotive rates shall include cost of oil, gas, repairs, insurance, and other operating expense and depreciation; and charges shall be based on use in actual service on, or in connection with, the joint account operations. Truck and tractor rates may include wages and expenses of driver.

C. A fair rate shall be charged for the use of drilling and cleaning out tools and any other items of Operator's fully owned machinery or equipment which shall be ample to cover maintenance, repairs, depreciation, and the service furnished the joint property; provided that such charges shall not exceed those currently prevailing in the field where the joint property is located. Pulling units shall be charged at hourly rates commensurate with the cost of ownership and operation, which shall include repairs and maintenance, operating supplies, insurance, depreciation, and taxes. Pulling unit rates may include wages and expenses of the operator.

D. A fair rate shall be charged for laboratory services performed by Operator for the benefit of the joint account, such as gas, water, core, and any other analyses and tests; provided such charges shall not exceed those currently prevailing if performed by outside service laboratories.

E. Whenever requested, Operator shall inform Non-Operator in advance of the rates it proposes to charge.

F. Rates shall be revised and adjusted from time to time when found to be either excessive or insufficient.

IV. DISPOSAL OF LEASE EQUIPMENT AND MATERIAL

The Operator shall be under no obligation to purchase interest of Non-Operator in surplus new or secondhand material. The disposition of major items of surplus material, such as derricks, tanks, engines, pumping units, and tubular goods, shall be subject to mutual determination by the parties hereto; provided Operator shall have the right to dispose of normal accumulations of junk and scrap material either by transfer or sale from the joint property.

1. MATERIAL PURCHASED BY THE OPERATOR OR NON-OPERATOR

Material purchased by either the Operator or Non-Operator shall be credited by the Operator to the joint account for the month in which the material is removed by the purchaser.

2. DIVISION IN KIND

Division of material in kind, if made between Operator and Non-Operator, shall be in proportion to their respective interests in such material. Each party will thereupon be charged individually with the value of the material received or receivable by each party, and corresponding credits will be made by the Operator to the joint account. Such credits shall appear in the monthly statement of operations.

3. SALES TO OUTSIDERS

Sales to outsiders of material from the joint property shall be credited by Operator to the joint account at the net amount collected by Operator from vendee. Any claims by vendee for defective material or otherwise shall be charged back to the joint account if and when paid by Operator.

V. BASIS OF PRICING MATERIAL TRANSFERRED FROM JOINT ACCOUNT

Material purchased by either Operator or Non-Operator or divided in kind, unless otherwise agreed, shall be valued on the following basis:

1. NEW PRICE DEFINED

New price as used in the following paragraphs shall have the same meaning and application as that used above in Section III, "Basis of Charges to Joint Account."

2. NEW MATERIAL

New material (Condition "A"), being new material procured for the joint account but never used thereon, at one hundred per cent (100%) of current new price (plus sales tax if any).

3. GOOD USED MATERIAL

Good used material (Condition "B"), being used material in sound and serviceable condition, suitable for reuse without reconditioning:

A. At seventy-five per cent (75%) of current new price if material was charged to joint account as new, or
B. At sixty-five per cent (65%) of current new price if material was originally charged to the joint property as secondhand at seventy-five per cent (75%) of new price.

4. OTHER USED MATERIAL

Used material (Condition "C"), at fifty per cent (50%) of current new price, being used material which:
A. After reconditioning will be further serviceable for original function as good secondhand material (Condition "B"), or
B. Is serviceable for original function but substantially not suitable for reconditioning.

5. BAD-ORDER MATERIAL

Material and equipment (Condition "D"), which is no longer usable for its original purpose without excessive repair cost but is further usable for some other purpose, shall be priced on a basis comparable with that of items normally used for that purpose.

6. JUNK

Junk (Condition "E"), being obsolete and scrap material, at prevailing prices.

7. TEMPORARILY USED MATERIAL

When the use of material is temporary and its service to the joint account does not justify the reduction in price as provided in Paragraph 3 B, above, such material shall be priced on a basis that will leave a net charge to the joint account consistent with the value of the service rendered.

VI. INVENTORIES

1. PERIODIC INVENTORIES, NOTICE AND REPRESENTATION

At reasonable intervals, inventories shall be taken by Operator of the joint account material, which shall include all such material as is ordinarily considered controllable by operators of oil and gas properties.
Written notice of intention to take inventory shall be given by Operator at least thirty (30) days before any inventory is to begin so that Non-Operator may be represented when any inventory is taken.
Failure of Non-Operator to be represented at an inventory shall bind Non-Operator to accept the inventory taken by Operator, who shall in that event furnish Non-Operator with a copy thereof.

2. RECONCILIATION AND ADJUSTMENT OF INVENTORIES

Reconciliation of inventory with charges to the joint account shall be made by each party at interest, and a list of overages and shortages shall be jointly determined by Operator and Non-Operator.
Inventory adjustments shall be made by Operator with the joint account for overages and shortages, but Operator shall be held accountable to Non-Operator only for shortages due to lack of reasonable diligence.

3. SPECIAL INVENTORIES

Special inventories may be taken, at the expense of the purchaser, whenever there is any sale or change of interest in the joint property; and it shall be the duty of the party selling to notify all other parties hereto as quickly as possible after the transfer of interest takes place. In such cases, both the seller and the purchaser shall be represented and shall be governed by the inventory so taken.

EXHIBIT "D"

ATTACHED TO AND MADE A PART OF ARTICLES OF AGREEMENT
FOR THE EUNICE-MONUMENT-EUMONT SALT WATER DISPOSAL SYSTEM

LIST OF COMMITTED WELLS
FOR
EUNICE-MONUMENT-EUMONT
SALT WATER DISPOSAL SYSTEM

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
Amerada Hess Corporation	Adkins	SW/4 SW/4 5-20-37	1 & 3	
	Anderson	E/2 SW/4 8-20-37	1, 2 & 4	
"	Andrews	E/2 NE/4 11-20-36	2 & 3	
"	Andrews	W/2 W/2 12-20-36	4, 5, 6 & 8	
"	Andrews	NW/4, N/2 SW/4 23-20-36	7, 9 & 11	
"	Byrd	W/2 E/2, E/2 NW/4 12-20-36	1, 2, 3, 4, 5 & 6	
"	Byrd "A"	E/2 SW/4 12-20-36	1 & 2	
"	Culp	SW/4 SE/4 31-19-37	1	
"	Gaither	N/2 SE/4, SE/4 NW/4, NE/4 SW/4 34-19-36	1, 2 & 4	
"	Houston	NE/4 7-21-36	1, 2, 3 & 4	
"	Lambert	NE/4 6-20-37	3, 4, 5, 6, 7, 8, 9, 10 & 11	
"	Larsen	E/2 NW/4, W/2 NE/4 32-19-37	1, 2, 3 & 4	
"	Laughlin	N/2 N/2 9-20-37	1, 2, 3 & 4	
"	Love	NW/4 SE/4 32-19-37	1	
"	J. R. Phillips	NE/4 1-20-36	1, 2, 4, 6, 8 & 9	
"	J. R. Phillips "A"	S/2 NE/4 31-19-37	2 & 3	
"	S. Phillips	E/2 SW/4 33-19-37	1	
"	St. "D"	NW/4 1-20-36	1, 2, 3, 4, 5 & 6	
"	St. "F"	SW/4 36-19-36	1, 2, 3 & 4	
"	St. "G"	W/2 SW/4 18-19-37	1 & 2	
"	St. "H"	W/2 SE/4 1-20-36	1, 2 & 3	
"	St. "I"	NE/4 NW/4 2-20-36	1	
"	St. "J"	W/2 SE/4, NE/4 SW/4 2-20-36	1, 2 & 3	

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
Amerada Hess Corp. Contd.	St. "K"	E/2 NW/4 29-19-37	1 & 2	
"	St. "L"	S/2 NW/4 20-19-37	1 & 2	
"	St. "M"	SE/4 NW/4 2-20-36	1	
"	St. "M"	NW/4 SE/4 13-20-36	2	
"	St. "O"	NE/4 30-19-37	1, 2, 3 & 4	
"	St. "P"	W/2 SW/4 29-19-37	1 & 2	
"	St. "Q"	SE/4 16-20-37	1 (Dual), 2 & 4	
"	St. "R"	E/2 SW/4 29-19-37	1 & 2	
"	St. "S"	S/2 SW/4 2-20-36	1 & 2	
"	St. "T"	E/2 W/2 25-19-36	1 & 2	
"	St. "T"	W/2 NE/4 20-19-37	5 & 6	
"	St. "U"	W/2 NW/4 32-19-37	1 & 2	
"	St. "V"	NE/4 36-19-36	1, 2, 3 & 4	
"	St. "WEB"	Lots 3, 5 & 6 1-21-35	3 & 4	
"	St. "WEF"	Lots 11, 12, 13 & 14 1-21-35	1, 2 & 3	
"	St. "WMB"	NW/4 SW/4 27-19-36	1	
"	St. "Z"	E/2 NE/4 13-20-36	1 & 2	
"	Weir	W/2 W/2, E/2 NW/4 35-19-36	4, 5 & 8	
"	Weir	NW/4 NW/4 2-20-36	2	
"	Weir "B"	W/2 NE/4, E/2 NW/4 26-19-36	1 & 2	
		COMMITTED WELLS	119	12.81
Amoco Production Company	Gillully "A"-Fed.	W/2 SE/4, S/2 N/2, NE/4 NW/4, NW/4 NE/4 24-20-36	7, 8, 10, 11 & 14	
"	Gillully "A"-Fed.	NE/4 SW/4, W/2 NE/4 25-20-36	3, 5 & 6	
" (operated by John H. Hendrix)	Gillully "A"-Fed.	SW/4 SW/4 8-20-37	1	
"	Gillully "A"-Fed. "A"	NW/4 NW/4, NE/4 NE/4 24-20-36	2 & 12	
"	Gillully "B"-Fed. "A"	N/2 NW/4, NW/4 NE/4 22-20-37	8, 9 & 10	
"	McQuatters	N/2 NE/4 11-21-36	2	

[illegible]	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT [illegible] IN SYSTEM
Amoco Prod. Company Contd.	St. "C" Tract 11	Lots 9, 10, 15 & 16 & SE/4 2-21-36	3 & 4	
"	St. "I"	N/2 NW/4 22-21-36	1 & 2	
"	St. "J"	SW/4 NW/4 22-21-36	1	
		COMMITTED WELLS	20	2.15
Apollo Oil Company	J. A. Akens "B"	SW/4 SW/4 3-21-36	1	
		COMMITTED WELLS	1	.11
ARCO Oil and Gas Company	Adkins	E/2 9-21-36	2, 3, 4, 6, 7, 10 & 11	
"	Barber	E/2 E/2 7-20-37	9, 12, 14, 18, 19 & 20	
"	Barber	W/2 NW/4, NW/4 SW/4 8-20-37	8, 10, 11, 13A & 16	
"	Bordages	SW/4 SW/4 28-19-37	1	
"	M. J. Byrd	W/2 NE/4 11-20-36	1 & 3	
"	W. P. Byrd	NW/4, N/2 SW/4 11-20-36	1, 2, 3, 4 & 6	
"	Coleman	NE/4 NW/4 17-21-36	2	
"	Endura-St. (DE)	SE/4 12-21-35	1, 2 & 3	
"	Houston	W/2 NW/4 7-21-36	1 & 2	
"	Lea-St. "373"	NW/4 NE/4, SE/4 NE/4 34-19-37	2	
"	Lea-St. "373"	NW/4 NE/4 35-19-37	1	
"	Lea-St. "6010"	SW/4 NW/4, SE/4 SW/4 36-19-37	2	
"	Phillips "A"	SW/4 31-19-37	1, 3, 4, 5 & 7	
"	Phillips "B"	NW/4 31-19-37	1, 2, 3 & 4	
"	Roach	W/2 21-20-37	1, 2, 3 & 5	
"	St. "B"	N/2 SE/4 8-21-36	1 & 2	
"	St. "C"	S/2 SE/4 5-21-36	1 & 2	
"	St. "E"	N/2 SW/4 5-21-36	1 & 2	
"	St. "F" (DE)	SW/4, SW/4 NW/4 19-21-36	2, 3 & 5	
"	St. "G"	S/2 SW/4 5-21-36	2 & 3	
"	St. "h"	Lots 9, 10, 15 & 16 5-21-36	2 & 4	

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
ARCO Oil and Gas Company Contd.	St. "K"	E/2 SW/4 6-21-36	1	
	St. "L"	Lots 4 & 5 6-21-36	3 & 4	
"	St. "L"	SW/4 NW/4 11-21-36	1 & 6	
	St. "L"	SE/4 NW/4 22-21-36	2	
"	St. "M"	N/2 SE/4 36-20-36	1 & 2	
"	St. "P"	E/2 NW/4 25-20-36	1 & 2	
"	St. 157 "B"	NW/4 7-22-36	3	
"	St. "176"	W/2 E/2, NW/4 NW/4, E/2 NW/4 19-21-36	5 & 7	
"	St. "196"	W/2 SW/4 32-20-37	1	
"	St. "6847" (SP)	E/2 NW/4, SW/4 SE/4 35-19-37	1	
"	I. White	N/2 SE/4 35-20-36	1 & 2	
"	W. W. White	E/2 SE/4 24-20-36	1	
		COMMITTED WELLS	79	8.50
B.W.P., Inc.	St. "A-20"	SE/4 20-20-37	1, 2 & 3	
		COMMITTED WELLS	3	.32
W. K. Byrom	Cooper "A"	NE/4 NW/4 3-20-37	1	
"	Cooper "C"	NW/4 NE/4 3-20-37	1 & 2	
"	Cooper "F"	NW/4 NW/4 3-20-37	2 & 4	
"	Shell-St. "E"	NE/4 NE/4 4-20-37	1	
"	Shell-St."GA"	SW/4 SW/4 16-20-37	1	
"	Williams	S/2 SE/4 34-19-37	1 & 2	
"	Williams "A"	S/2 SW/4 34-19-37	1	
"	Williams "B"	N/2 SE/4, SE/4 SE/4 33-19-37	1 & 2	
		COMMITTED WELLS	12	1.29
Chevron U.S.A., Inc.	Meredith	E/2 SE/4, SE/4 NE/4 19-21-36	1 & 3	
		COMMITTED WELLS	2	.22
Cities Service Company	Persons	SE/4 SE/4 27-19-36	1	
"	St. "C"	SW/4 16-21-36	1 & 4	
"	St. "D"	N/2 32-21-36	1, 2, 4, 6, 7 & 8	

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
Cities Service Co. Contd.	St. "E"	SW/4 30-19-37	1, 2, 3 & 4	
	St. "F"	NE/4 SE/4, S/2 SE/4 30-20-37	1	
		COMMITTED WELLS	14	1.51
Conoco Inc.	Britt "A-6"	W/2 SW/4 6-20-37	1, 2, 3 & 5	
"	Britt "B"	NE/4 SW/4 3-20-37	23	
"	Britt "B"	S/2 10-20-37	18, 18 (Dual), 20, 20 (Dual), 21, 21 (Dual) & 22	
"	Britt "B"	N/2 SW/4, SW/4 SW/4 11-20-37	24	
"	Britt "B"	W/2, W/2 E/2 15-20-37	2, 5, 8, 9, 9 (Dual), 10, 10 (Dual), 11, 12, 12 (Dual), 13, 13 (Dual), 19 & 19 (Dual)	
"	Britt "B-18"	NW/4 NW/4, S/2 NW/4, SE/4 18-20-37	1, 4 & 5	
"	Lockhart "A-18"	SW/4, S/2 SE/4 18-21-36	1, 4 & 6	
"	Lockhart "A-30"	N/2, N/2 SW/4 30-21-36	7, 8, 9 & 10	
"	Lockhart "B"	E/2 E/2, W/2 W/2 14-21-36	3 & 6	
"	Lockhart "B-28"	SW/4, W/2 NW/4, N/2 NE/4 28-21-36	1, 2 & 6	
"	Lockhart "B-30"	S/2 SW/4 30-21-36	2	
"	Lockhart "B-31"	SE/4, E/2 SW/4, NW/4 31-21-36	1, 3, 5, 6 & 7	
"	Meyer "A-1"	SW/4 8-21-36	1, 2, 4 & 7	
"	Meyer "A-1"	SW/4, S/2 NW/4 17-21-36	9, 10, 11, 12, 15 & 17	
"	Meyer "A-1"	NE/4, N/2 SE/4 18-21-36	5, 8 & 13	
"	Meyer "B-4"	E/2, E/2 W/2 4-21-36	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 13, 19, 20, 21, 22, 23, 24, 25, 26, 27 & 28	

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
Conoco Inc. Contd.	Meyer "B-8"	NW/4 8-21-36	1, 2, 3, 4 & 5	
"	Meyer "B-9"	E/2 W/2 9-21-36	1, 2 & 4	
"	Reed "A-3"	W/2, E/2 E/2, W/2 SE/4, SW/4 NE/4 3-20-36	1, 2 & 4	
"	Reed "B"	E/2, S/2 SW/4 23-20-36	1, 2, 3, 4, 5, 7, 8, 9 & 10	
"	Reed "B"	SW/4 24-20-36	11, 12, 13 & 14	
"	Reed Sanderson Unit	SE/4 NW/4 10-20-36; S/2 N/2, N/2 S/2 4-20-36; W/2, E/2 E/2, W/2 SE/4, SW/4 NE/4 3-20-36; N/2 N/2, S/2 SE/4, SE/4 SW/4, SE/4 NE/4, NE/4 SE/4 10-20-36; S/2 S/2 4-20-36	2, 5, 7, 9, 11, 13, 15, 17, 19 & 21	
"	Sanderson "A"	SE/4, S/2 SW/4 11-20-36	1, 2, 3, 4 & 6	
"	Sanderson "A"	NE/4, E/2 NW/4, N/2 SE/4, SE/4 SE/4 14-20-36	7, 8, 9, 10, 11, 12, 13, 14, 15 & 16	
"	Sanderson "AB-14"	NW/4 NW/4 14-20-36	1	
"	Sanderson "B-1"	N/2 N/2, S/2 SE/4, SE/4 SW/4, SE/4 NE/4, NE/4 SE/4 10-20-36	1, 3 & 4	
"	Sanderson "B-1"	N/2 N/2 15-20-36	8	
"	Sanderson "B-14"	SW/4 NW/4, SW/4, SW/4 SE/4 14-20-36	1, 2, 3, 4 & 5	
"	SEMU "D-T"	NE/4 SE/4 15-20-37	70 & 70 (Dual)	
"	Skaggs "B" Acct. 1	SE/4 SW/4 11-20-37	6	
"	Skaggs "B"	N/2 NW/4, NW/4 NE/4 12-20-37	1, 4, 5, 5 (Dual) & 5 (Triple)	
"	St. "A-2-A"	SE/4 2-20-37	1 & 4	
"	St. "A-17"	NE/4, SW/4 17-19-37	2, 3, 4, 6 & 7	
"	St. "A-26"	W/2 W/2 26-19-36	2 & 4	
"	St. "A-35"	NW/4 SE/4 35-19-37	1	

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
Conoco Inc. Contd.	St. "AC"	NW/4 SW/4 19-19-37	1	
"	St. "AC"	NW/4 30-19-37	2, 3, 5 & 6	
"	St. "C-16"	SW/4 NW/4 16-20-37	2	
"	St. "C-20"	W/2 20-21-36	1, 2 & 8	
"	St. "D"	SW/4 11-21-36	2, 3, 4 & 13	
"	St. "D"	E/2 15-21-36	6, 7, 8, 9 & 10	
"	St. "KN-12"	SE/4 12-19-36	1 & 2	
		COMMITTED WELLS	179	19.27
El Paso Natural Gas Company	Lateral L-6 East	N/2 N/2 S/2 4-20-37	Tanks 44 & 49 (Considered one well)	
		COMMITTED WELLS	1	.11
Exxon Company, U.S.A.	Adkins	SW/4, W/2 NW/4, SE/4 NW/4 10-21-36	2	
"	Adkins (Blinebry)	SW/4, W/2 NW/4, SE/4 NW/4 10-21-36	8	
"	Blinebry Oil Unit	NE/4 NW/4 10-21-36	1	
"	Fopeano-Fed.	NE/4 35-20-36	2 & 8	
"	Exxon-Aggies-St.	N/2, SW/4 31-20-37	1, 2, 3, 5, 6, 8, 9, 10 & 11	
"	Knox	E/2 10-21-36	3, 4, 5, 6 & 8	
"	Knox (Blinebry)	E/2 10-21-36	9, 10, 11 & 12	
"	St. "B"	W/2 NE/4, S/2 NW/4, S/2 SE/4, NW/4 SE/4, NE/4 SW/4, S/2 SW/4 29-21-36	1 & 4	
"	St. "C"	NE/4 NE/4 29-21-36	1	
		COMMITTED WELLS	26	2.80
Getty Oil Company	Anderson	N/2 SE/4 8-20-37	1, 2, 3 & 4	
"	Coleman	NE/4 17-21-36	1, 2, 4 & 5	
"	Coleman	NW/4 NW/4 17-21-36	1	
"	Laughlin	SE/4 NW/4, NE/4 SW/4 4-20-37	2	
"	Mexico "W"	Lots 9, 10, 15, 16 & SE/4 2-21-35	2, 3, 4 & 5	
"	Monstate	S/2, NE/4 13-19-36	1	

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
Getty Oil Company	St. "A"	NE/4 8-21-36	1, 2, 3 & 5	
Contd.	St. "AV"	NE/4 NE/4 19-21-36	1	
"	St. "AW"	NE/4 NE/4 16-21-36	1	
"	St. "AX"	SE/4 NE/4 16-21-36	1	
"	St. "B"	NW/4 NE/4, NW/4 16-21-36	1, 2, 3, 4 & 6	
"	St. "D"	E/2 SE/4 1-20-36	1 & 2	
"	St. "D"	W/2 SE/4 16-21-36	1 & 2	
"	St. "E"	E/2 SE/4 16-21-36	1 & 3	
"	St. "E"	E/2 NE/4 29-19-37	1 & 2	
"	St. "F"	S/2 SE/4 17-20-37	1	
"	St. "F"	N/2 NW/4 20-19-37	1 & 2	
"	St. "G"	SE/4 NE/4 21-21-36	1	
"	St. "H"	W/2 NW/4 25-20-36	1 & 2	
"	St. "H"	N/2 SW/4 32-19-37	1	
"	St. "I"	E/2 SW/4 16-20-37	1 & 2	
"	St. "J"	NW/4 17-19-37	3	
"	Van Etten	S/2 9-20-37	2, 3, 4, 5, 6, 7, 8, 9, 11 & 12	
		COMMITTED WELLS	55	5.92
Grace Petroleum Corporation	St. "D"	E/2 NE/4 20-19-37	1 & 2	
	St. "E"	W/2 NW/4, NW/4 SW/4 21-19-37	1, 2 & 3	
		COMMITTED WELLS	5	.54
Gulf Oil Corporation	Bell "A"	S/2 SE/4 8-21-36	1	
"	Bell "B"	E/2 SE/4 6-21-36	1 & 2	
"	Bell "C"	NW/4 15-21-36	1, 2, 3 & 4	
"	Bell "D"	W/2 SW/4 6-21-36	1 & 2	
"	Bell "E"	N/2 NW/4 11-21-36	1 & 2	
"	Bell "F"	W/2 36-20-36	1, 3, 4, 5, 6 & 8	
"	Bell "G"	S/2 SE/4 13-20-36	1 & 2	
"	Bell-Ramsay "A"	Lots 4, 5, 12, 13 & W/2 SW/4 4-21-36	6, 7, 9, 10, 11, 12 & 13	
"	Bell-Ramsay "A"	W/2 W/2 9-21-36	1, 2 & 4	

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
Gulf Oil Corporation Contd.	Blair Steel-Foster	NW/4 SE/4 33-19-36	4	
"	Blair Steel-Foster	SE/4 SE/4 33-19-36	1	
"	Butler	W/2 SE/4 19-20-37	2	
"	Campbell	SW/4 7-21-36	4	
"	Culp "A"	NE/4, E/2 NW/4, SW/4 NW/4 19-19-37	1, 2, 3, 4, 5, 6 & 7	
"	Culp "B"	E/2 SE/4, NW/4 SE/4 31-19-37	2, 3 & 4	
"	Day	S/2 NW/4, E/2 SW/4 6-22-36	1 & 2	
"	Evans-St.	Lots 1, 2, 7, 8, 9, 10, 15 & 16 3-21-36	4	
"	Graham-St. "B"	E/2 SE/4 2-20-36	1 & 2	
"	Graham-St. "C"	W/2 E/2 24-19-36	2, 3 & 4	
"	Graham-St. "C"	W/2 E/2 25-19-36	5, 6, 7 & 8	
"	Graham-St. "D"	S/2 SE/4 19-19-37	1	
"	Graham-St. "E"	W/2 SE/4 6-21-36	1	
"	Graham-St. "F"	SE/4 36-19-36	1, 2, 3, 5, 6, 7 & 8	
"	Graham-St. "G"	SE/4 17-19-37	1, 2, 3 & 4	
"	Graham-St. "H"	W/2 SW/4 13-20-36	1	
"	Heasley-St.	Lots 1, 2, 3, 4, 5 & 6 5-21-36	1, 2, 3, 4, 5, 6 & 8	
"	Houston	SE/4 7-21-36	2	
"	Janda "C"	SW/4 15-21-36	1, 3 & 4	
"	Kutter "A"	W/2 SE/4 20-19-37	1 & 2	
"	Kutter "B"	SW/4 SW/4 21-19-37	1	
"	Kutter "B"	W/2 NW/4, SE/4 NW/4 28-19-37	2 & 4	
"	Kutter "C"	S/2 N/2 18-19-37	1, 2, 3 & 4	
"	Kyte	S/2 SE/4 7-19-37	1 & 2	
"	Love	S/2 SE/4 32-19-37	1 & 2	
"	Luthy-St.	W/2 NW/4 29-19-37	1 & 2	

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
Gulf Oil Corporation Contd.	Martin	E/2 SE/4 25-19-36	1 & 2	
	Matthews	SE/4 6-20-37	1, 5, 7, 9, 10, 11 & 11 (Dual)	
"	Orcutt "A"	NW/4 5-21-36	2 & 5	
"	Orcutt "A"	S/2 NE/4 6-21-36	4 & 6	
"	Orcutt "B"	Lots 7 & 8 5-21-36	2	
"	Orcutt "C"	S/2 SE/4 36-20-36	5 & 7	
"	Orcutt "C"	Lots 1, 2, 3, 6, 7 & 8 6-21-36	1, 2, 4, 6 & 8	
"	Orcutt "D"	W/2 NE/4 13-20-36	1 & 2	
"	Orcutt "F"	E/2 NE/4 25-21-35	1 & 2	
"	Phillips	N/2 NE/4 31-19-37	1 & 2	
"	Smith	N/2 N/2, S/2 NE/4 34-19-36	4 & 5	
"	White "A"	SE/4, E/2 NE/4 25-20-36	1, 2, 3 & 5	
"	White "B"	S/2 S/2 35-20-36	1 & 3	
"	White "B"	Lot 4 1-21-35	2	
"	Whitmire	W/2 NE/4, SE/4 NE/4, SE/4 NW/4 8-20-37	1, 3, 5, 6, 8 & 9	
"	Williams	SE/4 SE/4, W/2 SE/4 29-19-37	1 & 2	
		COMMITTED WELLS	139	14.96
John H. Hendrix Corporation	Barber	E/2 E/2 7-20-37	1 & 2	
	Haney	SW/4 SW/4 33-19-37	1	
"	Wood-St. "A"	E/2 NW/4 16-20-37	1	
"	St. "X"	NW/4 SW/4 16-20-37	1	
"	St. "Y"	N/2 SE/4 17-20-37	1	
		COMMITTED WELLS	6	.64
Hudson & Hudson	St. "A"	SE/4 SE/4 35-19-37	1	
		COMMITTED WELLS	1	.11
C. E. Long	Huston	NE/4 SW/4 21-19-37	1	
"	J. K. Rector	S/2 NE/4 31-21-36	1	
"	Sinclair-Fed.	SE/4 SW/4 21-19-37	2	
		COMMITTED WELLS	3	.32
Marathon Oil Company	Barber	S/2 SW/4 32-19-37	1 & 3	

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
Marathon Oil Company Contd.	Barber	NW/4, N/2 SW/4 5-20-37	2, 4, 5, 7, 8, 10 & 12	
"	Elliott-St.	SE/4 30-19-37	1, 2, 3 & 5	
"	Hansen-St.	NE/4 16-20-37	1 & 5	
"	Laughlin	S/2 N/2 9-20-37	1, 2 & 3	
"	McGrail-St.	NE/4 27-19-36	3 & 6	
		COMMITTED WELLS	20	2.15
Dallas McCasland	Closson	E/2 6-22-36	3, 5 & 6	
"	J. H. Day	SW/4 SW/4 6-22-36	2	
		COMMITTED WELLS	4	.43
Me-Tex Supply Company	Wallace State	Lots 5, 6, 11, 12, 13 & 14 3-21-36	5, 6 & 7	
		COMMITTED WELLS	3	.32
MKA Oil Properties	Laughlin	S/2 SW/4, W/2 SE/4, SW/4 NE/4 4-20-37	1, 2, 3, 4 & 5	
"	St. "F"	SW/4 17-20-37	2, 3 & 4	
		COMMITTED WELLS	8	.86
Mobil Prod. Tex. & N.M. Inc.	General "G" State	NW/4 NW/4 16-20-37	1	
		COMMITTED WELLS	1	.11
Nichols & Brady Production Co.	Adkins	NE/4 NW/4 10-21-36	1	
		COMMITTED WELLS	1	.11
Oil Processing	Recovery Plant	N/2, SE/4 8-20-37	Considered one well	
		COMMITTED WELLS	1	.11
Pearson-Sibert Oil Company of Texas	Persons	SE/4 NW/4, NE/4 SW/4, S/2 SW/4 SW/4 SE/4 27-19-36	2 & 4	
		COMMITTED WELLS	2	.22
Petro-Lewis Corporation	Cooper	NE/4 SE/4, SE/4 NE/4 12-20-36	5 & 11	
"	Cooper	SW/4 SW/4, NW/4 SW/4, NW/4 NW/4 7-20-37	6, 7, 10 & 12	
"	Laughlin "A"	S/2 SE/4 5-20-37	3 & 4	
"	Patsy	NW/4 NE/4 18-20-37	1	
"	St. "H-17"	W/2 NW/4 17-20-37	2	
"	St. "T"	NW/4 SE/4 28-19-37	2	
		COMMITTED WELLS	11	1.18

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
Phillips Petroleum Company	Culp	NW/4 NW/4 19-19-37	1	
	Edna	NW/4 NW/4 30-20-37	1	
"	Flanagan "A"	SE/4 NE/4 33-19-36	1	
"	Hobbs	SW/4 18-20-37	1, 2, 3 & 4	
"	Land Office	NE/4 SW/4 19-19-37	1	
"	Mexico	E/2 NE/4, SW/4 NE/4 18-20-37	1, 2 & 3	
"	New	E/2 NE/4 26-20-36	1	
"	Quapaw	E/2 SE/4 19-20-37	1	
		COMMITTED WELLS	13	1.40
Shell Oil Company	Coleman	W/2 SE/4 17-21-36	1Y & 2	
"	Cooper "B"	W/2 NW/4, NE/4 NW/4 4-20-37	1, 2Y & 3	
"	Devonian-St.	NE/4 20-21-36	1Y, 2, 3 & 4	
"	Foster	S/2 S/2 34-19-36	1, 2 & 3	
"	St. "A"	SE/4 SE/4 35-19-36	1	
"	St. "A"	NE/4 12-21-35	1, 2Y, 3 & 4	
"	St. "B"	NW/4 36-19-36	1, 2, 3 & 4	
"	St. "C"	E/2 NE/4 24-19-36	1Y & 2Y	
"	St. "C"	NE/4 24-21-35	1Y, 2Y, 3 & 4	
"	St. "D"	N/2 SE/4 19-19-37	1 & 2	
"	St. "E"	NW/4 13-20-36	1 & 4	
"	St. "E"	Lots 9 & 10 6-21-36	1	
"	St. "H"	NE/4 SE/4 20-19-37	1	
"	St. "H"	E/2 13-21-35	1Y, 3Y, 4Y, 5, 6, 7 & 8	
"	St. "J"	SE/4, E/2 SW/4 32-20-37	1, 2, 3, 4 & 6	
"	St. "K"	NE/4 36-20-36	1, 2, 3 & 4	
"	St. "L"	SE/4 1-21-35	2Y, 3 & 4	
"	St. "M"	Lots 1, 2, 7, 8, 9, 10, 15 & 16 1-21-35	1, 2, 3, 5, 6, 7 & 8	
"	St. "N"	NE/4 SE/4 24-21-35	1 & 1Y	
"	St. "R"	S/2 SE/4 22-19-36	1	
		COMMITTED WELLS	62	6.67

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
Sohio Petroleum Co.	Magruder-St.	SE/4 28-20-36	1, 2, 3 & 4	
		COMMITTED WELLS	4	.43
Southland Royalty Company	St. "E-28"	SW/4 28-20-36	1	
		COMMITTED WELLS	1	.11
Sun Oil Company	Akens	SE/4, N/2 SW/4, SE/4 SW/4 3-21-36	3, 5, 7, 8, 9 & 10	
"	Akens "A" Oil Unit	SW/4 SW/4 3-21-36	1 & 2	
"	Laughlin	NW/4 SW/4 4-20-37	1	
"	Laughlin	NE/4 SE/4 5-20-37	2	
"	Maveety	W/2 E/2, SE/4 NE/4, NE/4 SE/4 35-19-36	1, 2, 3, 4, 6 & 7	
"	Reeves	N/2 N/2 29-20-37	1, 3 & 4	
"	State	E/2 NE/4 25-19-36	1 & 2	
		COMMITTED WELLS	21	2.26
The Superior Oil Company	St. "A"	NE/4 2-20-36	1, 2, 3 & 4	
"	St. "A"	NE/4 SE/4 13-20-36	5	
		COMMITTED WELLS	5	.54
Texaco Inc.	American Nat. Ins. Co.	NE/4 NW/4 18-19-37	1	
"	Cook	NE/4 NE/4 32-19-37	1	
"	Cooper	NE/4 5-20-37	1, 2 & 4	
"	Keohane "A"	NE/4 NE/4 18-19-37	1	
"	Keohane "B"	NW/4 NE/4 18-19-37	1	
"	Mattern	SW/4 20-19-37	1, 2, 3 & 4	
"	E. H. B. Phillips "B"	NW/4 NW/4, E/2 NW/4, W/2 NE/4 10-20-37	1, 2 & 2 (Dual)	
"	J. R. Phillips	NW/4 6-20-37	3, 4, 6, 7, 8, 9, 11 & 12	
"	Rector	N/2 NE/4 31-21-36 & SE/4 30-21-36	2 & 3	
"	Saunders	E/2 SW/4, W/2 SE/4 18-19-37	1, 2, 3 & 4	
"	St. "C" (Univ.) NCT-2	NE/4 19-20-37	5, 6 & 8	
"	St. "C" (DD&B) NCT-5	NE/4, W/2 22-19-36	1, 3 & 5	

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
Texaco Inc. Contd.	St. "E" NCT-1	SW/4 1-20-36	1, 3 & 4	
"	St. "E" NCT-2	E/2 NW/4, NE/4 SW/4 23-19-36	1, 2 & 3	
"	St. "F"	E/2 SE/4 24-19-36	1 & 2	
"	St. "G"	S/2 SW/4 19-19-37	1 & 2	
"	St. "H" (Aggies)NCT-1	SE/4 31-20-37	4 & 5	
"	St. "H" (Lieu) NCT-2	W/2, NE/4 20-20-37	3, 6, 7, 8, 11, 15, 16, 20, 23 & 29	
"	St. "H" (Univ.)NCT-3	NW/4 19-20-37	10, 14 & 18	
"	St. "H" (Lieu) NCT-4	SW/4 19-20-37	9, 13 & 17	
"	St. "J"	E/2 SW/4 24-19-36	1 & 2	
"	St. "K"	E/2 SE/4 18-19-37	1 & 2	
"	Weir	W/2 NW/4 25-19-36	1 & 3	
		COMMITTED WELLS	68	7.32
Trio Oil Company	Persons	N/2 SE/4 27-19-36	1 & 2	
		COMMITTED WELLS	2	.22
Estate of Fred Turner, Jr.	St. "A"	NW/4 SW/4 2-20-36	1	
		COMMITTED WELLS	1	.11
Two States Oil Company	Etcheverry	SW/4 NE/4, NW/4 SE/4 10-20-36	1 & 2	
"	State "B-2527"	SE/4 NW/4 11-21-36	1	
		COMMITTED WELLS	3	.32
Union Texas Petroleum	Britt	E/2 W/2, W/2 E/2 7-20-37	10	
"	Britt "A"	E/2 SW/4 6-20-37	3 & 5	
"	St. "A"	SW/4 NW/4 2-20-36	2	
		COMMITTED WELLS	4	.43
Warrior, Inc.	Federal "D"	W/2 26-20-36	1, 2, 4, 5, 6, 7, 8 & 9	
"	Federal "D"	N/2 27-20-36	3	
"	Lea-St. "407"	Lots 4, 5, 6 & SW/4 2-21-35	1	
"	Seale-Fed.	SW/4 34-20-36	1, 3 & 4	
"	St. "AK"	Lots 9, 10, 15 & 16 3-21-35	1, 2 & 3	

PARTY	NAME OF LEASE	DESCRIPTION OF LAND	WELL NUMBERS	PERCENT OWNERSHIP IN SYSTEM
Warrior, Inc. Contd.	St. "WEB"	NW/4 13-21-35	1 & 2	
"	White	N/2 SW/4 35-20-36	1 & 2	
		COMMITTED WELLS	20	2.15
The Wiser Oil Company	Klingsmith-St.	SE/4 SE/4 20-19-37	1	
"	McQuatters Com.	S/2 NE/4 & NW/4 SE/4 11-21-36	1	
"	St. "A"	W/2 NE/4 29-19-37	1 & 2	
"	St. "SPX"	NE/4 33-20-36	1, 2, 3 & 4	
		COMMITTED WELLS	8	.86
Yarbrough Oil Company	Elliott-St.	SE/4 SE/4 27-20-36	1	
		COMMITTED WELLS	1	.11
	TOTAL NUMBER OF COMMITTED WELLS		929	100.00

Revised April 1980

G

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
IMPERIAL OIL & GREASE COMPANY	213 478-3577

ADDRESS (Number, Street, City, State, and ZIP Code)
10960 Wilshire Blvd., Los Angeles, CA 90024

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
N/A	MOLUB-ALLOY A 890 HEAVY
CHEMICAL FAMILY: N/A	FORMULA: N/A

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
This is a diester synthetic base lubricating fluid which has		
no TLV under normal conditions and is considered non-hazardous		
by the U. S. Department of Labor definition.		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	Above 600° F		SPECIFIC GRAVITY (H_2O=1)	0.952
VAPOR PRESSURE (mm Hg.)	Less than 0.05		PERCENT, VOLATILE BY VOLUME (%)	Trace
VAPOR DENSITY (AIR=1)	N/A		EVAPORATION RATE (_____=1)	N/A except at
SOLUBILITY IN WATER	Slight		temperatures above 600° F	
APPEARANCE AND ODOR	Light yellow fluid, mild odor			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
ASTM D 92 490°F)		N/A	N/A

EXTINGUISHING MEDIA
CO_2 dry chemical or foam

SPECIAL FIRE FIGHTING PROCEDURES
Do not use water - normal for petroleum fire

UNUSUAL FIRE AND EXPLOSION HAZARDS
None

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
N/A

EFFECTS OF OVEREXPOSURE
Oral - Slightly toxic; Eye - Slightly irritating;

Skin - May be slightly irritating

EMERGENCY AND FIRST AID PROCEDURES
Oral ingestion - Do not induce vomiting, consult physician.

Eye - Flush with warm water, treat with proprietary eye wash solution

Skin - Remove by wiping followed by washing with soap water.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID: Exposure to metallic red heat and open flame
	STABLE	X	

INCOMPATABILITY (Materials to avoid)
Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
None in normal use

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	None

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Clean up promptly with proprietary oil drying compound.

WASTE DISPOSAL METHOD
Mixing with No. 5 or No. 6 fuel oil, use as road oil, dust and weed control.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
N/A

VENTILATION	LOCAL EXHAUST: N/A	SPECIAL
	MECHANICAL (General)	OTHER

PROTECTIVE GLOVES
For highly sensitive skin only

EYE PROTECTION
Only if fluid is misted or sprayed

OTHER PROTECTIVE EQUIPMENT
None

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Maintain storage arrangement so that container leakage is readily detected.

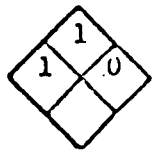
OTHER PRECAUTIONS
Keep container dry and clean when handling in order to minimize slippage and possible injuries.

GPO 934-190

ADAPTED FROM USDL
FORM NO L38-005-4-MAY 1968

SHELL OIL COMPANY
SHELL CHEMICAL COMPANY MSDS 60,970
SHELL DEVELOPMENT COMPANY
SHELL PIPE LINE CORPORATION

HAZARD RATING



MATERIAL SAFETY DATA SHEET

Information on this form is furnished solely for the purpose of compliance with the Occupational Safety and Health Act of 1970 and shall not be used for any other purpose. Use or dissemination of all or any part of this information for any other purpose may result in a violation of law or constitute grounds for legal action.

SECTION I

MANUFACTURER'S NAME: Shell Oil Company	EMERGENCY TELEPHONE NO: 713-473-9461
ADDRESS (Number, Street, City, State, and ZIP Code): P. O. Box 2463, One Shell Plaza, Houston, TX 77001	
CHEMICAL NAME AND SYNONYMS: Lubricating Oil	TRADE NAME: Shell MYSELLA® Oil 40
CHEMICAL FAMILY: Hydrocarbon	FORMULA: Code 67184

SECTION II HAZARDOUS INGREDIENTS*

COMPOSITION	Approx. %	SPECIES	LD_{50} ORAL	LD_{50} DERMAL	LC_{50} CONCENTRATION	LC_{50} HOURS
Petroleum Hydrocarbons	99	Rat	>5 g/kg			
		Rabbit		>2 g/kg		
Hindered Phenol	1		>24 g/kg			
Oxidation & Corrosion Inhibitor Containing P and S	0.5		>10 g/kg			
Polymethacrylate Additive	<.5					
This formulation calls for special precautions						
SEE ATTACHED PAGE						

SECTION III PHYSICAL DATA

BOILING POINT (°F)	N.A.	SPECIFIC GRAVITY (H_2O=1)	0.88
VAPOR PRESSURE (mmHg)	N.A.	PERCENT VOLATILE BY VOLUME (%)	N.A.
VAPOR DENSITY (AIR=1)	N.A.	EVAPORATION RATE (_____=1)	N.A.
SOLUBILITY IN WATER	Insoluble		
APPEARANCE AND ODOR: Dark liquid. Slight odor.			

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used): 455°F, PMCC	FLAMMABLE LIMITS: N.A.	LEL	UEL

EXTINGUISHING MEDIA: Dry chemical type preferred.

SPECIAL FIRE FIGHTING PROCEDURES: None special.

UNUSUAL FIRE AND EXPLOSION HAZARDS: CO, SO_x, PO_x, and oxygenates may be formed during combustion.

*Identified by Shell Oil Co.

MSDS 60,970

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
Vapor - not established, Oil mist - 5 mg/m^3

EFFECTS OF OVEREXPOSURE Pulmonary irritation possible. Defatting action on skin. Prolonged or repeated contact may cause skin disorders such as dermatitis, folliculitis, oil acne or even skin cancer.

EMERGENCY AND FIRST AID PROCEDURES Eyes-flush with water for at least 15 minutes. Skin-remove oil by wiping or applying waterless hand cleaner, followed by washing with soap & water. Remove all contaminated clothing. Ingestion-induce vomiting if conscious & consult medical personnel.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID: Mist formation.
	STABLE	X	

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb with clay, diatomaceous earth, or other inert material.

WASTE DISPOSAL METHOD Controlled burning in compliance with local regulations or bury in approved landfill.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
NIOSH approved respirator to avoid exposure to hot vapors or mist.

VENTILATION
LOCAL EXHAUST: As required if mist is being generated.
MECHANICAL (General)
SPECIAL
OTHER

PROTECTIVE GLOVES Oil resistant (rubber)

OTHER PROTECTIVE EQUIPMENT Appropriate clothing to avoid skin contact.

EYE PROTECTION
Goggles if oil is being sprayed or splashed.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Avoid breathing oil mist & vapors. Avoid skin contact. Airborne mist should be kept substantially below the nuisance TLV for oil mist.

OTHER PRECAUTIONS Launder contaminated clothing before using. Discard leather goods when contaminated. Wash before eating or smoking.

Shell Oil Company
Product Safety & Compliance
Oil & Chemical Products

DATE March, 1979

EXXON COMPANY, U.S.A.
A DIVISION OF EXXON CORPORATION

VARSOL 1
Form No. OSHA-20
9/25/79
Supersedes issue of 8/10/79
DG-1P

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
EXXON COMPANY, U.S.A.	(713) 656-3424

ADDRESS (Number, Street, City, State and ZIP Code)
P. O. Box 2180 Houston, Texas 77001

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Petroleum Solvent	VARSOL 1A
CHEMICAL FAMILY	**FORMULA**
Petroleum Hydrocarbon	Complex mixture of petroleum hydrocarbons

SECTION II HAZARDOUS INGREDIENTS

	%	TLV (UNITS)
VARSOL 1	100	SEE NOTE

NOTE:
The Threshold Limit Value (TLV) of 100 ppm vapor in air has been established by the American Conference of Governmental Industrial Hygienists for Stoddard solvent, and is thus applicable to VARSOL 1. In a recent study by Exxon Corporation Medical Research with laboratory animals (rats) exposed to vapors in air of a solvent similar to VARSOL 1, kidney damage was noted in male rats at this concentration. The recent study suggests that this occupational exposure limit may have to be lowered for this product. Work is continuing to validate these findings and determine whether a revised occupational exposure limit should be recommended for VARSOL 1.

SECTION III PHYSICAL DATA

BOILING RANGE IBP-Dry Pt. (313-400°F)	156-204°C	SPECIFIC GRAVITY (H_2O=1) 15.6°/15.6°C	0.79
VAPOR PRESSURE (mm Hg.) @ 25°C	< 10	PERCENT VOLATILE BY VOLUME (%)	100
VAPOR DENSITY (AIR=1)	4.8	EVAPORATION RATE (n-BUTYL ACETATE=1)	< 0.1
SOLUBILITY IN WATER	Negligible		

APPEARANCE AND ODOR
Water-white liquid. Mineral spirits odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used)	FLAMMABLE OR EXPLOSIVE LIMITS Approximate (PERCENT BY VOLUME IN AIR)	LOWER LIMIT	UPPER LIMIT
Tag Closed Cup 42°C (108°F)		0.9%	6.0%

EXTINGUISHING MEDIA
Foam, dry chemical, CO_2, or water fog or spray.

SPECIAL FIRE FIGHTING PROCEDURES
Use air-supplied breathing equipment for enclosed areas.
Cool exposed containers with water spray. Avoid breathing vapor or fumes.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Do not mix or store with strong oxidants like liquid chlorine or concentrated oxygen.

COMBUSTIBLE LIQUID.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

(ppm for 8 hour workday recommended by ACGIH for Stoddard solvent. See also Section J

EFFECTS OF OVEREXPOSURE

Inhalation of high vapor concentrations may have results ranging from dizziness and headaches to unconsciousness. Prolonged or repeated liquid contact with the skin will dry and defat the skin, leading to irritation and dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

If overcome by vapor, remove from exposure immediately; call a Physician. If breathing is irregular or stopped, start resuscitation, administer oxygen. If ingested, DO NOT induce vomiting; call a Physician. In case of skin contact, remove any contaminated clothing, and wash skin with soap and warm water. If splashed into the eyes, flush eyes with clear water for 15 minutes or until irritation subsides.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*

Strong oxidants like: liquid chlorine, concentrated oxygen, sodium or calcium hypochlorite.

HAZARDOUS DECOMPOSITION PRODUCTS

Fumes, smoke and carbon monoxide, in the case of incomplete combustion.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

(. TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Remove all ignition sources. Keep people aw
Recover free liquid. Add absorbent (sand, earth, sawdust, etc.) to spill area. Avoid breathing vapors. Ventilate confined spaces. Open all windows and doors. Keep petroleum products out of sewers and watercourses by diking or impounding. Advise authorities if product has entered or may enter sewers, watercourses, or extensive land areas.

WASTE DISPOSAL METHOD

Assure conformity with applicable disposal regulations. Dispose of absorbed material at an approved disposal site or facility.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* Use hydrocarbon vapor canister or supplied-air respiratory protection in confined or enclosed spaces if needed.

VENTILATION	LOCAL EXHAUST Face velocity > 60 fpm	SPECIAL Use only with adequate* ventilation.
	MECHANICAL *(General)* Use explosion-proof equipment	OTHER No smoking or open lights.

PROTECTIVE GLOVES Use chemical-resistant gloves, if needed to avoid repeated or prolonged skin contact

EYE PROTECTION Use splash goggles or face shield when eye contact may occur.

OTHER PROTECTIVE EQUIPMENT Use chemical-resistant apron or other clothing if needed to avoid repeated or prolonged skin contact.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING & STORING

Keep containers closed when not in use. Do not handle or store near heat, sparks, flame or strong oxidants. Adequate* ventilation required.

(dequate means equivalent to outdoors.

C ER PRECAUTIONS Avoid breathing vapors. Avoid prolonged or repeated contact with skin. Remove contaminated clothing and launder before reuse. Remove contaminated shoes and thoroughly dry before reuse. Wash skin thoroughly with soap and water after contact.

FOR ADDITIONAL INFORMATION ON HEALTH EFFECTS CONTACT:

Director of Industrial Hygiene
(713) 666-2441

FOR OTHER PRODUCT INFORMATION CONTACT:

Manager, Marketing Technical Services
(713) 666-4929

SHIELD, INC.
337-1571 - P. O. BOX 1708
ODESSA, TEXAS 79760

MATERIAL SAFETY DATA SHEET

"CAL NAME: [redacted]

SYNONYMS: CHEMICAL FAMILY: Synthetic Detergent

FORMULA: Blended detergent, liquid MOLECULAR WEIGHT:

TRADE NAME AND SYNONYMS: MARK II

I. PHYSICAL DATA

BOILING POINT, 760 mm. Hg	285	FREEZING POINT	32°F
SPECIFIC GRAVITY ($H_2O = 1$)	1.1	VAPOR PRESSURE at 20°C.	
VAPOR DENSITY (air = 1)		SOLUBILITY IN WATER, % by wt. at 20°C.	Completely
PER CENT VOLATILES BY VOLUME	None	EVAPORATION RATE (Butyl Acetate = 1)	None
APPEARANCE AND ODOR	Clear Yellow - None		

II. HAZARDOUS INGREDIENTS

MATERIAL	%	TLV (Units)
Not Applicable		

III. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method)	None CC	AUTOIGNITION TEMPERATURE			
FLAMMABLE LIMITS IN AIR, % by volume		LOWER	1.1	UPPER	

EXTINGUISHING MEDIA	[redacted]er NONE
SPECIAL FIRE FIGHTING PROCEDURES	None
UNUSUAL FIRE AND EXPLOSION HAZARDS	None

EMERGENCY PHONE NUMBERS

Paul Woltz, 915/362-3021 (night)

IV. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	None
EFFECTS OF OVEREXPOSURE	
EMERGENCY AND FIRST AID PROCEDURES	Flush with water

V. REACTIVITY DATA

STABILITY			
UNSTABLE	STABLE	CONDITIONS TO AVOID	
--	✓		

INCOMPATIBILITY (materials to avoid)	Oxidizing Agents
HAZARDOUS DECOMPOSITION PRODUCTS	None

HAZARDOUS POLYMERIZATION			
May Occur	Will not Occur	CONDITIONS TO AVOID	
			--

VI. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	Flush area with water
WASTE DISPOSAL METHOD	Sewage drain disposal - No Special Precautions

VII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)		None		
VENTILATION	LOCAL EXHAUST		SPECIAL --	
	MECHANICAL (general)		OTHER --	
PROTECTIVE GLOVES		If Desired	EYE PROTECTION	If Desired
OTHER PROTECTIVE EQUIPMENT		None		

VIII. SPECIAL PRECAUTIONS

PRECAUTIONARY LABELING	On Label
OTHER HANDLING AND STORAGE CONDITIONS	None

Printed in U.S.A.

SHIELD, INC.
337-1571
P O BOX 1708
ODESSA, TEXAS 79760

TECHNICAL BULLETIN

MARK II
HEAVY DUTY GENERAL PURPOSE

Nomenclature: Concentrated Blend Detergent
Nonionic/Anionic Blend

Physical Properties:

% Solids	26%
% Active	26%
pH	10.4 - 10.9
Flammability	None
Foam	Medium
Evaporation Rate	None
Solubility	Complete
Freezing Point	32°F
Boiling Point	285°F
Skin Irritation	None at 4% use dilution
Eye Irritation Dilute	None
Concentrate	Severe redness goes away in 4 to 6 hours
Oral Toxicity	Causes buring of mucus membranes

Chemical Properties: Sodium linear alkylbenzenesulfonate, linear secondary alcohols, diethanolamide of coconut fatty acids, phosphates and silicates.

Control: Quality control and batch records are kept on each lot number at all times. Product has USDA approval for meat and food products.

MATERIAL SAFETY DATA SHEET
FOR

ED. MATHIS

KROVAR® II WEED KILLER

MANUFACTURER: E. I. DU PONT DE NEMOURS & CO. (INC.)
BIOCHEMICALS DEPARTMENT
WILMINGTON, DE 19898

EMERGENCY TELEPHONE: Phone CHEMTREC toll free, day or night (800)424-9300 or call Du Pont (302)774-1000

DATE: August 1977

CHEMICAL NAME: 5-bromo-3-sec-butyl-6-methyluracil (bromacil) 3-(3,4-dichlorophenyl)-1,1-dimethylurea (diuron) + inerts

TRADE NAME: "[redacted]"

SECTION I - PHYSICAL DATA

PHYSICAL FORM: Light brown powder

VAPOR PRESSURE: Negligible SOL. IN WATER: Dispersible

SPECIFIC GRAVITY:

SECTION II - HAZARDOUS INGREDIENT(S)

	WT %	Acute Oral LD_{50} (Rats)	TLV
Bromacil	53	5200 mg/kg	10 mg/m^3
Diuron	27	3400 mg/kg	10 mg/m^3

SECTION III - HEALTH HAZARDS

STATEMENT OF HAZARDS: Caution! May irritate eyes, nose, throat and skin.

PRECAUTIONARY MEASURES: Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing.

SPILL OR LEAK PROCEDURE: Clean up promptly. Do not flush with water, pick up dry by sweeping or other effective means. If spill area is on ground near trees or other valuable plants, remove top 2 inches of soil after initial cleanup.

Material Safety Data Sheet
For
Krovar® II Weed Killer

SECTION IV - FIRE HAZARDS

Statement of Hazard: May be ignited by heat or open flame. Fine dust dispersed in air (particularly in confined spaces) may ignite if exposed to high temperature ignition source. These conditions are unlikely to occur in normal, outdoor use of this product.

FIRE FIGHTING/EXTINGUISHING MEDIA: On small fire use dry chemical, CO_2, foam or water spray. If area is heavily exposed to fire and if conditions permit, let fire burn itself out since water amy increase the contamination hazard. If conditions do not permit, extinguish with water spray. If conditions permit, cool containers with water if exposed to fire. Wear self-contained breathing apparatus.

SECTION V - REACTIVITY

UNDER NORMAL CONDITIONS: Stable

SECTION VI - TRANSPORTATION, STORAGE AND DISPOSAL

SUGGESTED DISPOSAL METHOD: Dispose of in accordance with applicable (LOCAL, STATE and/or FEDERAL) regulations. If buried, use area away from roots, trees, turf or other desirable plants; disposal site should be on level ground and not close to streams, ponds, lakes, wells or ditches. Do not re-use container. Bury when empty.

SPECIAL PRECAUTIONS: Keep from contact with fertilizers, insecticides, fungicides and seeds. Keep out of reach of children.

SECTION VII - SPECIAL PROTECTION INFORMATION

None required

ED mathis

MATERIAL SAFETY DATA SHEET
FOR
KARMEX® WEED KILLER

MANUFACTURER: E. I. DU PONT DE NEMOURS & CO. (INC.)
BIOCHEMICALS DEPARTMENT
WILMINGTON, DE 19898

EMERGENCY TELEPHONE: Phone CHEMTREC toll free day or night (800)424-9300 or call Du Pont (302)774-1000

DATE: June 1977

CHEMICAL NAME: 3-(3,4-dichlorophenyl)-1,1-dimethylurea (diuron)
TRADE NAME: [redacted]r

SECTION I - PHYSICAL DATA

PHYSICAL FORM: Tan powder
VAPOR PRESSURE: Negligible SOL. IN WATER: Dispersible
SPECIFIC GRAVITY: 28-30 lbs/ft^3 (loose); 31-33 lbs./ft^3 (packed)

SECTION II - HAZARDOUS INGREDIENT(S)

	WT %	Acute Oral LD_{50} (Rats)	TLV
Diuron	80	3400 mg/kg	10 mg/m^3

$C_9H_{10}Cl_2N_2O$

SECTION III - HEALTH HAZARDS

STATEMENT OF HAZARDS: May irritate eyes, nose, throat and skin.
PRECAUTIONARY MEASURES: Avoid breathing dust or spray mist. Avoid contact with skin, eyes and clothing.
SPILL OR LEAK PROCEDURE: Clean up promptly. Do not flush with water, pick up dry by sweeping or other effective means.

Material Safety Data Sheet
For
Karmex® Weed Killer

SECTION IV - FIRE HAZARDS

FLASH POINT: Not found AUTO DECOMPOSITION TEMPERATURE: 180-190°C
AUTO IGNITION TEMPERATURE: 380°C
MIN. IGNITION ENERGY: 0.075±0.01 joule MAX. PRESSURE RISE: 2750 psi/sec @ 0.41 g/l
LOWER EXPLOSIVE LIMIT: 0.07 g/liter
UPPER EXPLOSIVE LIMIT: Not found
STATEMENT OF HAZARD: May be ignited by heat or open flame. Fine dust dispersed in air (particularly in confined spaces) may ignite if exposed to high temperature ignition source. These conditions are unlikely to occur in normal, outdoor use of this product.
FIRE FIGHTING/EXTINGUISHING MEDIA: On small fire use dry chemical, CO_2, foam or water spray. If area is heavily exposed to fire and if conditions permit, let fire burn itself out since water may increase the contamination hazard. If conditions do not permit, extinguish with water spray. If conditions permit, cool containers with water if exposed to fire. Wear self-contained breathing apparatus.

SECTION V - REACTIVITY

UNDER NORMAL CONDITIONS: Stable

SECTION VI - TRANSPORTATION, STORAGE AND DISPOSAL

SUGGESTED DISPOSAL METHOD: Dispose of in accordance with applicable (LOCAL, STATE and/or FEDERAL) regulations. If buried, use area away from roots, trees, turf or other desirable plants; disposal site should be on level ground and not close to streams, ponds, lakes, wells or ditches. Do not re-use container. Bury when empty.
SPECIAL PRECAUTIONS: Do not apply (except as recommended for crop use) or drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots. Do not contaminate any body of water. Keep from contact with fertilizers, insecticides, fungicides and seeds. Keep out of reach of children.

SECTION VII - SPECIAL PROTECTION INFORMATION

None indicated

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
IMPERIAL OIL & GREASE COMPANY	213 478-3577

ADDRESS (Number, Street, City, State, and ZIP Code)
10960 Wilshire Blvd., Los Angeles, CA 90024

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
N/A	[redacted]

CHEMICAL FAMILY	FORMULA
N/A	N/A

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
This is a diester synthetic base lubricating fluid which has		
no TLV under normal conditions and is considered non-hazardous		
by the U. S. Department of Labor definition.		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	Above 600° F		SPECIFIC GRAVITY (H_2O=1)	0.952
VAPOR PRESSURE (mm Hg.)	Less than 0.05		PERCENT, VOLATILE BY VOLUME (%)	Trace
VAPOR DENSITY (AIR=1)	N/A		EVAPORATION RATE (_____ =1)	N/A except at
SOLUBILITY IN WATER	Slight		temperatures above 600° F	
APPEARANCE AND ODOR	Light yellow fluid, mild odor			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
ASTM D 92 490°F		N/A	N/A

EXTINGUISHING MEDIA
CO_2 dry chemical or foam

SPECIAL FIRE FIGHTING PROCEDURES
Do not use water - normal for petroleum fire

UNUSUAL FIRE AND EXPLOSION HAZARDS
None

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
N/A

EFFECTS OF OVEREXPOSURE
Oral - Slightly toxic; Eye - Slightly irritating;
Skin - May be slightly irritating

EMERGENCY AND FIRST AID PROCEDURES
Oral ingestion - Do not induce vomiting, consult physician.
Eye - Flush with warm water, treat with proprietary eye wash solution
Skin - Remove by wiping followed by washing with soap water.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID: Exposure to metallic red heat and open flame
	STABLE	X	

INCOMPATABILITY (Materials to avoid)
Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
None in normal use

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	None

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Clean up promptly with proprietary oil drying compound.

WASTE DISPOSAL METHOD
Mixing with No. 5 or No. 6 fuel oil, use as road oil, dust and weed control.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
N/A

VENTILATION	LOCAL EXHAUST: N/A	SPECIAL
	MECHANICAL (General)	OTHER

PROTECTIVE GLOVES: For highly sensitive skin only	EYE PROTECTION: Only if fluid is misted or sprayed

OTHER PROTECTIVE EQUIPMENT
None

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Maintain storage arrangement so that container leakage is readily detected.

OTHER PRECAUTIONS
Keep container dry and clean when handling in order to minimize slippage and possible injuries.

GPO 934-110

ADAPTED FROM USDL
FORM NO L39-005-4-MAY 1969

SHELL OIL COMPANY
SHELL CHEMICAL COMPANY MSDS 60,970
SHELL DEVELOPMENT COMPANY
SHELL PIPE LINE CORPORATION

HAZARD RATING

MATERIAL SAFETY DATA SHEET

Information on this form is furnished solely for the purpose of compliance with the Occupational Safety and Health Act of 1970 and shall not be used for any other purpose. Use or dissemination of all or any part of this information for any other purpose may result in a violation of law or constitute grounds for legal action.

SECTION I

MANUFACTURER'S NAME: Shell Oil Company	EMERGENCY TELEPHONE NO: 713-473-9461
ADDRESS (Number, Street, City, State, and ZIP Code): P. O. Box 2463, One Shell Plaza, Houston, TX 77001	
CHEMICAL NAME AND SYNONYMS: Lubricating Oil	TRADE NAME: Shell [redacted]40
CHEMICAL FAMILY: Hydrocarbon	FORMULA: Code 67184

SECTION II HAZARDOUS INGREDIENTS*

COMPOSITION	Approx. %	SPECIES	LD_{50} ORAL	LD_{50} DERMAL	LC_{50} CONCENTRATION	LC_{50} HOURS
Petroleum Hydrocarbons	99	Rat	>5 g/kg			
		Rabbit		>2 g/kg		
Hindered Phenol	1		>24 g/kg			
Oxidation & Corrosion Inhibitor Containing P and S	0.5		>10 g/kg			
Polymethacrylate Additive	<.5					
This formulation calls for special precautions						
SEE ATTACHED PAGE						

SECTION III PHYSICAL DATA

BOILING POINT (°F)	N.A.	SPECIFIC GRAVITY (H_2O=1)	0.88
VAPOR PRESSURE (mmHg)	N.A.	PERCENT VOLATILE BY VOLUME (%)	N.A.
VAPOR DENSITY (AIR=1)	N.A.	EVAPORATION RATE (_____=1)	N.A.
SOLUBILITY IN WATER	Insoluble		
APPEARANCE AND ODOR	Dark liquid. Slight odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	LEL	UEL
455°F, PMCC	N.A.		

EXTINGUISHING MEDIA
Dry chemical type preferred.

SPECIAL FIRE FIGHTING PROCEDURES
None special.

UNUSUAL FIRE AND EXPLOSION HAZARDS
CO, SO_x, PO_x, and oxygenates may be formed during combustion.

*Modified by Shell Oil Co.

MSDS 60,970

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
Vapor - not established. Oil mist - 5 mg/m^3

EFFECTS OF OVEREXPOSURE Pulmonary irritation possible. Defatting action on skin. Prolonged or repeated contact may cause skin disorders such as dermatitis, folliculitis, oil acne or even skin cancer.

EMERGENCY AND FIRST AID PROCEDURES Eyes-flush with water for at least 15 minutes. Skin-remove oil by wiping or applying waterless hand cleaner, followed by washing with soap & water. Remove all contaminated clothing. Ingestion-induce vomiting if conscious & consult medical personnel.

SECTION VI REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		Mist formation.
	STABLE	X	

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Absorb with clay, diatomaceous earth, or other inert material.

WASTE DISPOSAL METHOD Controlled burning in compliance with local regulations or bury in approved landfill.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
NIOSH approved respirator to avoid exposure to hot vapors or mist.

VENTILATION		
	LOCAL EXHAUST: As required if mist is being generated.	SPECIAL
	MECHANICAL (General)	OTHER

PROTECTIVE GLOVES Oil resistant (rubber)

EYE PROTECTION: Goggles if oil is being sprayed or splashed.

OTHER PROTECTIVE EQUIPMENT Appropriate clothing to avoid skin contact.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Avoid breathing oil mist & vapors. Avoid skin contact. Airborne mist should be kept substantially below the nuisance TLV for oil mist.

OTHER PRECAUTIONS Launder contaminated clothing before using. Discard leather goods when contaminated. Wash before eating or smoking.

Shell Oil Company
Product Safety & Compliance
Oil & Chemical Products

DATE March, 1979

The petroleum hydrocarbons in this product contain a mixture of paraffinic, naphthenic, aromatic, and small amounts of heterocyclic hydrocarbons. As with other petroleum oils, the aromatics contain polycyclic compounds of various concentrations and structures. Some of these polycyclics may be those which have been shown to induce cancer in animals under laboratory conditions. Epidemiologic studies have suggested the possibility of skin cancer induction in man after prolonged and repeated contact with oils containing these materials under conditions of poor personal hygiene. Inhalation of mists arising from oils containing these materials may also present a cancer hazard.

EXXON COMPANY, U.S.A.
A DIVISION OF EXXON CORPORATION

VARSOL 1
Form No. OSHA-20
091-0004C
9/25/79
Supersedes issue of 8/10/79
DG-1P

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
EXXON COMPANY, U.S.A.	(713) 656-3424

ADDRESS (Number, Street, City, State and ZIP Code)
P. O. Box 2180 Houston, Texas 77001

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Petroleum Solvent	[redacted]
CHEMICAL FAMILY	**FORMULA**
Petroleum Hydrocarbon	Complex mixture of petroleum hydrocarbons

SECTION II HAZARDOUS INGREDIENTS

	%	TLV (UNITS)
VARSOL 1	100	SEE NOTE

NOTE:
The Threshold Limit Value (TLV) of 100 ppm vapor in air has been established by the American Conference of Governmental Industrial Hygienists for Stoddard solvent, and is thus applicable to VARSOL 1. In a recent study by Exxon Corporation Medical Research with laboratory animals (rats) exposed to vapors in air of a solvent similar to VARSOL 1, kidney damage was noted in male rats at this concentration. The recent [illegible]y suggests that this occupational exposure limit may have to be [illegible]ered for this product. Work is continuing to validate these findings and determine whether a revised occupational exposure limit should be recommended for VARSOL 1.

SECTION III PHYSICAL DATA

BOILING RANGE		SPECIFIC GRAVITY (H_2O=1)	
IBP-Dry Pt. (313-400°F)	156-204°C	15.6°/15.6°C	0.79
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
@ 25°C	< 10		100
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (n-BUTYL ACETATE=1)	
	4.8		< 0.1
SOLUBILITY IN WATER			
	Negligible		

APPEARANCE AND ODOR
Water-white liquid. Mineral spirits odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used)	FLAMMABLE OR EXPLOSIVE LIMITS (PERCENT BY VOLUME IN AIR)	LOWER LIMIT	UPPER LIMIT
Tag Closed Cup 42°C (108°F)	Approximate	0.9%	6.0%

EXTINGUISHING MEDIA
Foam, dry chemical, CO_2, or water fog or spray.

SPECIAL FIRE FIGHTING PROCEDURES
Use air-supplied breathing equipment for enclosed areas.
Cool exposed containers with water spray. Avoid breathing vapor or fumes.

[illegible]AL FIRE AND EXPLOSION HAZARDS
Do not mix or store with strong oxidants like liquid chlorine or concentrated oxygen.

COMBUSTIBLE LIQUID.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

(ppm for 8 hour workday recommended by ACGIH for Stoddard solvent. See also Section J)

EFFECTS OF OVEREXPOSURE

Inhalation of high vapor concentrations may have results ranging from dizziness and headaches to unconsciousness. Prolonged or repeated liquid contact with the skin will dry and defat the skin, leading to irritation and dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

If overcome by vapor, remove from exposure immediately; call a Physician. If breathing is irregular or stopped, start resuscitation, administer oxygen. If ingested, DO NOT induce vomiting; call a Physician. In case of skin contact, remove any contaminated clothing, and wash skin with soap and warm water. If splashed into the eyes, flush eyes with clear water for 15 minutes or until irritation subsides.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*

Strong oxidants like: liquid chlorine, concentrated oxygen, sodium or calcium hypochlorite.

HAZARDOUS DECOMPOSITION PRODUCTS

Fumes, smoke and carbon monoxide, in the case of incomplete combustion.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

S(TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Remove all ignition sources. Keep people aw
Recover free liquid. Add absorbent (sand, earth, sawdust, etc.) to spill area. Avoid breathing vapors. Ventilate confined spaces. Open all windows and doors. Keep petroleum products out of sewers and watercourses by diking or impounding. Advise authorities if product has entered or may enter sewers, watercourses, or extensive land areas.

WASTE DISPOSAL METHOD

Assure conformity with applicable disposal regulations. Dispose of absorbed material at an approved disposal site or facility.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* Use hydrocarbon vapor canister or supplied-air respiratory protection in confined or enclosed spaces if needed.

VENTILATION	LOCAL EXHAUST Face velocity > 60 fpm	SPECIAL Use only with adequate* ventilation.
	MECHANICAL *(General)* Use explosion-proof equipment	OTHER No smoking or open lights.

PROTECTIVE GLOVES Use chemical-resistant gloves, if needed to avoid repeated or prolonged skin contact

EYE PROTECTION Use splash goggles or face shield when eye contact may occur.

OTHER PROTECTIVE EQUIPMENT Use chemical-resistant apron or other clothing if needed to avoid repeated or prolonged skin contact.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING & STORING

Keep containers closed when not in use. Do not handle or store near heat, sparks, flame or strong oxidants. Adequate* ventilation required.

(dequate means equivalent to outdoors.

C ER PRECAUTIONS Avoid breathing vapors. Avoid prolonged or repeated contact with skin. Remove contaminated clothing and launder before reuse. Remove contaminated shoes and thoroughly dry before reuse. Wash skin thoroughly with soap and water after contact.

FOR ADDITIONAL INFORMATION ON HEALTH EFFECTS CONTACT:

Director of Industrial Hygiene
(713) 656 2443

FOR OTHER PRODUCT INFORMATION CONTACT:

Manager, Marketing Technical Services
(713) 656 4929

TOXSENE-35

ACTIVE INGREDIENTS:	
Alkyl (C_{12}, 61%; C_{14}, 23%; C_{16}, 11%; C_8 & C_{10}, 2.5%; C_{18}, 2.5%) dimethyl benzyl ammonium chloride	9.0%
Tributyltin neodecanoate	5.0%
Alkyl (C_{14}, 58%; C_{16} 28%; C_{12}, 14%) dimethyl benzyl ammonium chloride	4.5%
Alkyl (C_{14}, 90%; C_{16}, 5%; C_{12}, 5%) dimethyl ethyl ammonium bromide	1.5%
Total Active Ingredients	20.0%
INERT INGREDIENTS	80.0%
Total Ingredients	100.0%

TOXSENE 35 is a product formulated to provide control of the growth of algae in recirculating water cooling towers and evaporative condensers.

DIRECTIONS

If heavy algae slime growths are present, clean the system before initial treatment. If algae growth is absent or just noticeable, proceed with the initial dose. Add all treatments directly to the sump.

INITIAL DOSE: When the system is fouled, apply a dose of 4 fluid ounces per 100 gallons water in the system. Repeat daily until control is achieved.

SUBSEQUENT DOSE: When algae control is evident, add 2 fluid ounces per 100 gallons water in the system every 7 days (weekly), or as needed to to maintain control. Badly fouled systems may be manually or chemically cleaned before treatment is begun.

CAUTION

Do not allow water that contains this algicide to come in contact with grass or plants. Do not use in drinking water or in swimming pools.

DANGER

KEEP OUT OF REACH OF CHILDREN

Corrosive. Causes eye damage and skin irritation. Do not get in eyes, on skin or on clothing. Wear goggles or face shield and rubber gloves when handling. Harmful or fatal if swallowed. Avoid contamination of food.

FIRST AID

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before re-use. If swallowed, drink promptly a large quantity of milk, egg whites, gelatin solution or if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

NOTE TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed. This product is toxic to fish. Keep out of lakes, streams or ponds. Treated effluent should not be discharged where it will drain into lakes, streams, ponds or public water. Do not contaminate water by cleaning of equipment or disposal of wastes. Apply this product only as specified on this label. Rinse empty container **thoroughly** with water and discard it.

EPA REG. NO. 5185—168—12471

PACKAGED FOR:

EPA ESTABLISHMENT NO. 14805-TX-1

Continental Products Of Texas

1100 INDUSTRIAL — ODESSA, TEXAS 79761

TOXSENE 35

PRECAUTIONARY STATEMENTS

KEEP OUT OF REACH OF CHILDREN

WARNING

TOXSENE-37 IS HARMFUL OR FATAL IF SWALLOWED OR ABSORBED THROUGH THE SKIN. CAUSES EYE DAMAGE AND SKIN IRRITATION. In case of contact remove contaminated clothing and immediately wash skin with soap and water. If irritation persists get medical attention. In case of contact with the eyes, immediately flush with water and get medical attention. Wash contaminated clothing before reuse. The use of goggles or face shield and rubber gloves is recommended.

DO NOT USE OR STORE NEAR HEAT OR OPEN FLAME

TOXSENE-37

(FOR INDUSTRIAL USE ONLY)

ACTIVE INGREDIENT:
Methylene bis (thiocyanate) .....10 %
INERT INGREDIENTS: 90%
TOTAL 100%

8.3 lbs. per gallon

manufactured for

CONTINENTAL PRODUCTS OF TEXAS

100 Industrial Ave., Odessa, Texas 79760
Phone: 915/337-4681

E.P.A. Establishment No. 14805-Tx-1
E.P.A. Registration No. 9386-4

Net Contents: Liquid
See Markings on Top of Drum for Net Weight

SEE SIDE PANELS FOR PRECAUTIONARY STATEMENTS

PRECAUTIONARY STATEMENTS

FISH AND WILDLIFE ENVIRONMENTAL WARNING:

This pesticide is toxic to fish. Do not apply in marine and/or estuarine oil fields. Do not discharge treated effluent into lakes, streams, ponds or public waters unless in accordance with NPDES permit. For guidelines contact your regional office of the Environmental Protection Agency.

STORAGE AND DISPOSAL

PROHIBITIONS: Do not contaminate water, food, or feed by storage or disposal. Open dumpings prohibited.

CONTAINER DISPOSAL: Reseal container and offer for reconditioning, or triple rinse (or equivalent) and offer for recycling, reconditioning, or disposal in approved landfill, or bury in a safe place.

GENERAL: Consult Federal, State or Local Disposal Authorities for approved alternative procedures.

DIRECTIONS FOR USE - It is a violation of Federal Law to Use the product in a manner inconsistent with its labeling.

FOR THE CONTROL OF SLIME-FORMING AND/OR SPOILAGE BACTERIA: Toxsene-37 is added at a point in the system (raw stock chest; beater and/or refiner chest or machine chest-wirepit) where it will be uniformly mixed. Application may be continuous or intermittent for a certain number of hours/day or per shift, depending upon system characteristics. Add 2 to 5 fluid ounces of Toxsene-37 per ton of paperboard produced. INTERMITTENT FEED METHOD: Apply 3.5 to 5 fluid ounces of Toxsene-37 per ton (dry basis) of pump or paper for 2 hours every 8 hours. Badly fouled process systems must be cleaned before initial treatment. CONTINUOUS FEED METHOD: Apply 2 to 4 fluid ounces of Toxsene-37 per ton (dry basis) of pump or paper produced on a continuous basis. Badly fouled process systems must be cleaned before initial treatment. Consult your CONTINENTAL PRODUCTS representative for technical advice concerning certain site problems. **RECIRCULATING COOLING WATER SYSTEM: FOR CONTROL OF SLIME-FORMING BACTERIA (COOLING TOWERS, EVAPORATIVE CONDENSERS) BACTERIAL CONTROL:** Use of 1.6 to 7.9 fluid ounces per 1000 gallons water (1.25 to 6.20 ppm), actual, of Toxsene-37 as a continuous treatment, one to three times a week or as required to maintain control. When the system is just noticeable fouled, use 5.8 to 12.5 fluid ounces per 1000 gallons water (4.5 to 9.8 ppm), actual, of Toxsene 37 as a continuous treatment daily or as required to obtain control. Badly fouled systems must be cleaned before treatment is begun. Apply at a point in the system where uniform mixing and even distribution will occur, such as the cooling tower basin or sump.

OILFIELD DRILLING MUDS AND WORKOVER OR COMPLETION FLUIDS: FOR CONTROL OF SLIME-FORMING AND/OR SPOILAGE BACTERIA: Determine the total volume of the circulating system. Calculate the number of gallons of Toxsene-37 needed to produce a concentration of 5000 ppm (1.75 lb/bbl) of Toxsene-37 in the drilling mud circulating system. For example, 211 gallons of Toxsene-37 per 1000 barrels of drilling fluid will produce the proper concentration. For best results add Toxsene-37 in a thin stream to the mud pit while the drilling fluid is circulating. As the total volume increases, due to greater well depth, add additional Toxsene-37 to maintain the proper concentration. **OILFIELD WATER TREATMENT AND WATER FLOODS: FOR CONTROL OF SLIME-FORMING AND/OR SPOILAGE BACTERIA:** Calculate the total volume of water to be treated. Using this volume, calculate the number of gallons of Toxsene-37 needed to produce concentration of approximately 750 ppm Toxsene-37. For Example, 0.75 Gallons of Toxsene-37 per each 1000 gallons of total volume will produce this dilution. 50 ppm Toxsene-37, added each week, is recommended to maintain bacterial control. This may be accomplished by adding 0.05 gallons of Toxsene-37 to each 1000 gallons of total volume.

MATERIAL SAFETY DATA SHEET

CORPORATE RESEARCH & DEVELOPMENT

SCHENECTADY, N. Y. 12305

Phone: (518) 385-4085 DIAL COMM 8*235-4085

MATERIALS INFORMATION SERVICES

No. 9

SULFURIC ACID, CONCENTRATED

REVISION B

Date October 1980

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: [redacted] CONCENTRATED
OTHER DESIGNATIONS: Oil of Vitriol, Hydrogen Sulfate, H_2SO_4, GE Material D4A2, CAS #007 664 939
DESCRIPTION: Material consists of about 93-98% H_2SO_4 with water and traces of impurities.
MANUFACTURER: Available from many suppliers.

SECTION II. INGREDIENTS AND HAZARDS	%	HAZARD DATA
Hydrogen Sulfate (H_2SO_4) Water	93-98 Balance*	TLV 1 mg/m^3 for sulfuric acid† Human, mist inhal. TCLo 3 mg/m^3, 24 wk (Toxic Mouth Effects) Rat, Oral LD_{50} 2140 mg/kg

*Material is obtained by the reaction of SO_3 and water. Can contain low impurity levels, such as 0.02% max of iron as Fe. Properties vary with H_2SO_4 content.

†Current OSHA standard and ACGIH (1980) TLV. NIOSH has a 10-hr-TWA, 40 hr work week, of 1 mg/m^3.

SECTION III. PHYSICAL DATA

	93.19% H_2SO_4	98.33% H_2SO_4	100% H_2SO_4
Boiling point, 1 atm, deg C	ca 281	ca 338	ca 330 (dc)
Specific gravity (60/60 F)	1.8354	1.84	1.84
Deg. Baume	66	--	--
Volatiles, % at 340 C	ca 100	ca 100	ca 100
Melting point, deg C	ca -34	ca 3	10.4
Vapor press, mm Hg @ 100 F	<1	--	--

Water solubility: Completely miscible.
Appearance & Odor: Clear, colorless, hygroscopic oily liquid with no odor.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
None - nonflammable	N/A	N/A	N/A	N/A

Even though sulfuric acid is nonflammable, it is hazardous when present in a fire area. Small fires may be smothered with suitable dry chemical. Cool exterior of storage tanks of H_2SO_4 with water to avoid rupture if exposed to fire. Do not add water or other liquid to the acid! The acid, especially when diluted with water, can react with metals to liberate flammable hydrogen gas.
Sulfuric acid mists and vapors from a fire area are corrosive. (See Sect. V.)
Firefighters to wear self-contained breathing equipment and full protective clothing.

SECTION V. REACTIVITY DATA

Sulfuric acid is stable under normal conditions of use and storage. It does not undergo hazardous polymerization.
It is a strong mineral acid reacting with bases and metals. The concentrated acid is a strong oxidizing agent and can cause ignition of combustible materials on contact. The concentrated aid is also a dehydrating agent, picking up moisture readily from the air or other materials.
Reacts exothermically with water. (Acid should always be added slowly to water. Water added to acid can cause boiling and uncontrolled splashing of the acid.)
Sulfur oxides can result from decomposition and from oxidizing reactions of sulfuric acid.

GENERAL ELECTRIC

SECTION VI. HEALTH HAZARD INFORMATION

TLV 1 mg/m^3

Concentrated sulfuric acid is a strong mineral acid, an oxidizing agent, and a dehydrating agent that is rapidly damaging to all human tissue with which it comes in contact. Ingestion may cause severe injury or death. Eye contact gives severe or permanent injury. Inhalation of mists can damage both the upper respiratory tract and the lungs.

FIRST AID:

Eye Contact: Immediately flush eyes with plenty of running water for at least 15 minutes (including under the eyelids). Speed in diluting and rinsing out acid with water is extremely important if permananet eye damage is to be avoided. Obtain medical help as soon as possible.

Skin Contact: Immediately flush affected areas with water, removing contaminated clothing under the safety shower. Continue washing with water and get medical attention.

Inhalation: Remove to fresh air. Restore breathing. Call a physician immediately.

Ingestion: Dilute acid immediately with large amounts of milk or water, then give milk of magnesia to neutralize. Do not induce vomiting; if it occurs spontaneously, continue to administer fluid. Obtain medical attention as soon as possible.

Maintain observation of patient for possible delayed onset of pulmonary edema.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Prevent contact with the acid. Provide adequate ventilation to control workplace concentrations. Minor leaks or spills can be diluted with plenty of water and neutralized with soda ash or lime. If water is not available, cover contaminated area with sand, ashes, or gravel and neutralize with soda ash or lime.

Major spills must be handled by a predetermined plan. Contact supplier for assistance in this planning and to meet local requirements and disposing of large amounts.

DISPOSAL: Follow Federal, State, and Local regulations.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general ventilation to meet current TLV requirements in the workplace. Where mists are up to 50 mg/m^3, a high efficiency particulate respirator with full facepiece is warranted; a Type C supplied air respirator with full facepiece operated in pressure demand mode is used to 100 mg/m^3. Avoid eye contact by use of chemical safety goggles or face shield where splashing may occur. Imperious protective clothing, such as rubber gloves, aprons, boots, and suits are recommended to avoid body contact with this acid.

Eyewash fountain and safety showers with deluge type heads should be readily available where this material is handled or stored.

Comprehensive preplacement and annual medical examinations with emphasis on dental erosion, cardiopulmonary system, and mucous membrane irritation and cough.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Sulfuric acid in carboys or drums should be stored in clean ventilated storage areas having acid resistant floors with good drainage. Keep out of direct sunlight, do not store above 32 C. Storage facilities to be separate from metallic powders, chromates, chlorates, nitrates, carbides, oxidizables, etc. Soda ash, sand or lime should be kept in general storage or work areas for emergency use. Protect containers against physical damage. Glass bottlesneed extra protection. Sulfuric acid is highly corrosive to most metals especially below 77% H_2SO_4. Avoid breathing mist or vapors. Avoid contact with skin or eyes. Do not ingest. Do not add water to concentrated acid. Do not smoke. Use nonsparking tools and vapor-proof type electrical fixtures.

DATA SOURCE(S) CODE: 2-12,19,20,24,26,31, 37-39

APPROVALS: MIS CRD J.M. Nielsen

Industrial Hygiene and Safety 10-14-80

MEDICAL REVIEW: Oct. 26, 1980

GENERAL ELECTRIC

MATERIAL SAFETY DATA SHEET
FOR
HYVAR® X WEED KILLER

Ed mathis

MANUFACTURER: E. I. DU PONT DE NEMOURS & CO. (INC.)
BIOCHEMICALS DEPARTMENT
WILMINGTON, DE 19898

EMERGENCY TELEPHONE: Phone CHEMTREC toll free day or night (800)424-9300 or call Du Pont (302)774-1000

DATE: June 1977

CHEMICAL NAME: 5-bromo-3-sec-butyl-6-methyluracil (bromacil) + inerts

TRADE NAME: [redacted]

SECTION I - PHYSICAL DATA

PHYSICAL FORM: Beige powder

VAPOR PRESSURE: Negligible SOL. IN WATER: Water Suspendable

SPECIFIC GRAVITY:

SECTION II - HAZARDOUS INGREDIENT(S)

	WT %	Acute Oral LD_{50} (Rats)	TLV
Bromacil	80	5200 mg/kg	10 mg/m^3

TLV - 1ppm
STEL - 2ppm

SECTION III - HEALTH HAZARDS

STATEMENT OF HAZARDS: Caution: May irritate eyes, nose, throat and skin.

PRECAUTIONARY MEASURES: Avoid breathing dust or spray mist. Avoid contact with skin, eyes and clothing.

Material Safety Data Sheet
For
Hyvar® X Weed Killer

SPILL OR LEAK PROCEDURE: Clean up promptly. Do not flush with water, pick up dry by sweeping or other effective means. If spill area is on ground near trees or other valuable plants, remove top 2 inches of soil after initial cleanup.

SECTION IV - FIRE HAZARDS

MIN. IGNITION ENERGY: 4.25 joule MAX. PRESSURE RISE: 1450 psi/sec

LOWER EXPLOSIVE LIMIT: 0.91 g/liter

STATEMENT OF HAZARD: May be ignited by heat or open flame. Fine dust dispersed in air (particularly in confined spaces) may ignite if exposed to high temperature ignition source. These conditions are unlikely to occur in normal, outdoor use of this product.

FIRE FIGHTING/EXTINGUISHING MEDIA: On small fire use dry chemical, CO_2, foam or water spray. If area is heavily exposed to fire and if conditions permit, let fire burn itself out since water may increase the contamination hazard. If conditions do not permit, extinguish with water spray. If conditions permit, cool containers with water if exposed to fire. Wear self-contained breathing apparatus.

SECTION V - REACTIVITY

UNDER NORMAL CONDITIONS: Stable

SECTION VI - TRANSPORTATION, STORAGE AND DISPOSAL

SUGGESTED DISPOSAL METHOD: Bury in area away from roots, trees, turf or other desirable plants. Disposal site should be on level ground and not close to streams, ponds, lakes, wells or ditches.

SPECIAL PRECAUTIONS: Do not apply (except as recommended for crop use) or drain or flush equipment on or near desirable trees or other plants, or on areas where the chemical may be washed or moved into contact with their roots. Do not contaminate domestic waters. Keep from contact with fertilizer, insecticides, fungicides, and seeds. Do not re-use container. Bury when empty. Keep out of reach of children.

SECTION VII - SPECIAL PROTECTION INFORMATION

None Indicated

MATERIAL SAFETY DATA SHEET

U. S. DEPARTMENT OF LABOR "ESSENTIALLY SIMILAR " TO FORM LSB-005-4

SECTION I

MANUFACTURER'S NAME	CONTINENTAL PRODUCTS OF TEXAS	EMERGENCY TELEPHONE NO.
ADDRESS	Box 3627, Odessa, Texas 79760	(915) 337-4681
CHEMICAL NAME AND SYNONYMS	Sodium Acrylamide	TRADE NAME AND SYNONYMS [redacted]0
CHEMICAL FAMILY	Acrylic Polymer	FORMULA Not applicable

SECTIONS II HAZARDOUS INGREDIENTS

INGREDIENT	%	SPECIES	LD_{50} ORAL	LD_{50} DERMAL	LC_{50} CONCENTRATION	LC_{50} HOURS
Acrylamide		Rat	170			
		Rabbit		LDLo 1000		

POTENTIALLY TOXIC INGREDIENTS	%	TLV (UNITS)
None		

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	215	SPECIFIC GRAVITY (H_2O=1)	1.1
VAPOR PRESSURE (MM HG.) 275°F	260	PERCENT VOLATILE BY VOLUME (%)	75%
VAPOR DENSITY (AIR = 1)	1	EVAPORATION RATE (water = 1)	1
SOLUBILITY IN WATER	100%		
APPEARANCE AND ODOR	Light amber, odorless		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) SOS None	FLAMMABLE LIMITS	LEL	UEL
EXTINGUISHING MEDIA	None		
SPECIAL FIRE FIGHTING PROCEDURES	None		
UNUSUAL FIRE AND EXPLOSION HAZARDS	None		

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	Acrylamide Air: 0.3 mg/m3 (skin)
EFFECTS OF OVEREXPOSURE	None
EMERGENCY AND FIRST AID PROCEDURES	None

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	None

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	None

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Wash with water.

WASTE DISPOSAL METHOD Dispose as waste water

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE) None

VENTILATION	LOCAL EXHAUST	None	SPECIAL	None
	MECHANICAL (GENERAL)	None	OTHER	None

PROTECTIVE GLOVES	None	EYE PROTECTION	Safety glasses or goggles

OTHER PROTECTIVE EQUIPMENT None

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

None

OTHER PRECAUTIONS None

DATE ISSUED: R-6-30-82

Continental Products of Texas

J. D. Crawford

J. D. CRAWFORD, VICE PRESIDENT

MATERIAL SAFETY DATA SHEET

CORPORATE RESEARCH & DEVELOPMENT

SCHENECTADY, N. Y. 12305

Phone: (518) 385-4085 DIAL COMM 8*235-4085

MATERIALS INFORMATION SERVICES

NO. 68

CALCIUM HYPOCHLORITE (Dry)

Date July 1980

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: CALCIUM HYPOCHLORITE (Dry)
OTHER DESIGNATIONS: Calcium Oxychloride, $Ca(OCl)_2$, CAS #007 778 543, [redacted] (Trade name)
MANUFACTURER: Available from several sources, including:

Canadian Industries Limited
Chemicals
Box 10
Montreal, Quebec, Canada H3C 2R3

Olin Corporation
120 Long Ridge Road
Stamford, CT 06904
Phone: (203) 356-2345

SECTION II. INGREDIENTS AND HAZARDS	%	HAZARD DATA
Calcium Hypochlorite	*	No TLV Established
*Concentration usually stated in terms of weight % of available chlorine. (See ASTM D2022) HTH (high-test hypochlorite) contains about 70% available chlorine. Solid materials with less than 39% available chlorine include chloride of lime and bleaching powder; these contain much chloride ion and water and possibly other impurities, for example: $Ca(OCl)Cl \cdot 2H_2O$. The presence of magnesium hypochlorite in material of high available chlorine level may reduce its stability.		Rat, Oral LD_{50} 850 mg/kg

SECTION III. PHYSICAL DATA

Boiling point, deg C	N/A	Specific gravity	2.35
Vapor pressure, mm Hg	N/A	Melting point, deg C	decomposes @ 100
Solubility in water, 20 C, % by wt	14	Molecular weight	142.98

Appearance and Odor: White non-hygroscopic granules or tablets having a strong chlorine odor.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
N/A	N/A	N/A		

Use a water spray to cool fire-exposed containers of this material and drench area with large amounts of water from a safe position. When containers are heated in a fire situation, they are subject to violent rupture! Contamination or mixing with foreign materials (combustibles, grease, chemicals, etc.) can cause fires of great intensity.

Firefighters need to use self-contained breathing apparatus and full protective clothing for fires involving this material, especially in enclosed areas.

SECTION V. REACTIVITY DATA

Calcium hypochlorite is stable at room temperature in suitable closed containers when kept dry and free from contamination. It does not polymerize.

It is a powerful oxidizing agent which can readily ignite combustibles. Violent reactions or explosions can occur, for example with amines, carbon tetrachloride, charcoal, ethyl alcohol, metal oxides, mercaptans, organic sulfides, sulfur, turpentine, and strong reducing agents. A mixture with glycerine can ignite spontaneously. Material containing over 60% available chlorine will ignite on contact with lubricating oil (addition of about 20% or more of water will prevent this).

In the absence of combustibles and other chemicals, when heated above 100 C, it can undergo exothermic decomposition, evolving oxygen. On contact with acids it forms hypochlorous acid and liberates Cl_2.

GENERAL ELECTRIC

SECTION VI. HEALTH HAZARD INFORMATION

TLV None Established

All tissue contacted can be irritated and/or damaged by this strong oxidizing agent, the degree of injury depending on the dose, available chlorine level, and exposure time. Skin contact can produce vesicular eruptions and eczematoid dermatitis. Eye contact can result in severe eye damage. Inhalation of dust irritates the respiratory tract and may cause pulmonary edema. Ingestion irritates mouth, throat and stomach, and gastric acid will liberate hypochlorous acid. Fatalities can result from severe complications of local injury, shock, toxemia, hemorrhage, wall perforation & obstruction.

FIRST AID:

Eye Contact: Immediately flush with lots of running water for 15 minutes. Call physician.

Skin Contact: Immediately remove contaminated clothing. Flush affected area with water. Get medical help if contact area was large or if symptoms persist.

Inhalation: Remove to fresh air. Support breathing if needed. Get medical help.

Ingestion: Promptly rinse mouth with water and then give large amounts of milk or water to drink, followed by milk of magnesia. Contact physician or hospital. Do not induce vomiting unless instructed by physician.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel of spills. Remove combustibles and ignition sources. Those involved in clean up need protection against contact with solid or inhalation of dust. Prevent generation of dust. Prevent direct discharge into sewers or waterways.

Recover uncontaminated solid material in clean, dry containers. Other spilled material is covered with weak reducing agent, slurried with water, and then flushed with water to a suitable holding tank. Wash spill site well with soap solution containing a weak reducing agent.

DISPOSAL: Use reducing agents to destroy "available chlorine." Adjust pH of reduced liquid to neutral and decant. Discharge neutral liquid, diluting with much water. Dispose of neutral sludge (if any) in a landfill. Follow Federal, State, and Local regulations. (Contact supplier for detailed procedures.)

SECTION VIII. SPECIAL PROTECTION INFORMATION

Suppliers indicate no ventilation requirements in handling this material, but do suggest a dust mask be used for respiratory protection.

It is recommended that sufficient ventilation be provided to prevent any irritation from dust inhalation and to disperse any hypochlorite decomposition products. An approved respirator with a dust filter and cartridge or canister for chlorine absorption should be available.

Use neoprene rubber gloves, chemical goggles, and protective outer wear to prevent contact with the eyes, skin or clothing.

Eyewash stations, safety showers and washing facilities should be available to handling and use areas.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in closed containers in a cool, dry, well-ventilated low fire-risk area, away from combustible and incompatible materials (see Sect. V). Prevent contamination of material. Protect containers from physical damage. Do not drop, roll, or skid containers.

This material is a powerful oxidizing agent; use with caution! Mix only with water.

Water solutions are not stable, but undergo a slow decomposition.

Prevent contact with eyes, skin, mucous membranes, and clothing. Do not ingest.'

DOT Classification (for over 39% available chlorine) - OXIDIZER

DATA SOURCE(S) CODE: 1,4-11,20,25,26,34

APPROVALS: MIS J.M. Nielsen

Industrial Hygiene and Safety 7-25-80

MEDICAL REVIEW: 5 August 1980

MATERIAL SAFETY DATA SHEET

U. S. DEPARTMENT OF LABOR "ESSENTIALLY SIMILAR" TO FORM LSB-OOS-4

SECTION I

MANUFACTURER'S NAME	Continental Products of Texas	EMERGENCY TELEPHONE NO.	(915) 337-4681
ADDRESS	Box 3627 - Odessa, Texas 79760		
CHEMICAL NAME AND SYNONYMS	Sodium Bichromate	TRADE NAME AND SYNONYMS	[redacted]
CHEMICAL FAMILY	Organic Chromates	FORMULA	$Na_2Cr_2O_7$ + water

SECTIONS II HAZARDOUS INGREDIENTS

INGREDIENT	%	SPECIES	LD_{50} ORAL	LD_{50} DERMAL	LC_{50} CONCENTRATION	LC_{50} HOURS
		Human	LDLo 50 mg/Kg			
		Guinea Pig		LDLO 335		
Sodium Bichromate	40					

POTENTIALLY TOXIC INGREDIENTS	%	TLV (UNITS)
None		

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	212	SPECIFIC GRAVITY (H_2O=1)	1.4
VAPOR PRESSURE (MM HG.) 212°F	760	PERCENT VOLATILE BY VOLUME (%)	60
VAPOR DENSITY (AIR = 1)		EVAPORATION RATE (water = 1)	1
SOLUBILITY IN WATER	100%		
APPEARANCE AND ODOR	Dark amber - no odor		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED)	COC None	FLAMMABLE LIMITS	LEL	UEL
EXTINGUISHING MEDIA	None			
SPECIAL FIRE FIGHTING PROCEDURES	None			
UNUSUAL FIRE AND EXPLOSION HAZARDS	None			

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	
EFFECTS OF OVEREXPOSURE	Corrosive action on skin and mucous membranes.
EMERGENCY AND FIRST AID PROCEDURES	Wash with water.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Wash with water.

WASTE DISPOSAL METHOD As water.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE) None

VENTILATION	LOCAL EXHAUST None	SPECIAL
	MECHANICAL (GENERAL) None	OTHER

PROTECTIVE GLOVES None	EYE PROTECTION Glasses

OTHER PROTECTIVE EQUIPMENT None

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Prevent prolonged skin contact.

OTHER PRECAUTIONS

DATE ISSUED: R-6-30-82

Continental Products of Texas

J. D. Crawford

J. D. CRAWFORD, VICE PRESIDENT

MATERIAL SAFETY DATA SHEET

U. S. DEPARTMENT OF LABOR "ESSENTIALLY SIMILAR " TO FORM LSB-005-4

SECTION I

MANUFACTURER'S NAME	Continental Products of Texas	EMERGENCY TELEPHONE NO.	(915) 337-4681
ADDRESS	Box 3627 - Odessa, Texas 79760		
CHEMICAL NAME AND SYNONYMS	Zinc sulfate	TRADE NAME AND SYNONYMS	[redacted]
CHEMICAL FAMILY	Metal organic Combination	FORMULA	Not applicable compounded.

SECTIONS II HAZARDOUS INGREDIENTS

INGREDIENT	%	SPECIES	LD_{50} ORAL	LD_{50} DERMAL	LC_{50} CONCENTRATION	LC_{50} HOURS
		Human	LDLo 50			
		Rat	LDLo 2200			

POTENTIALLY TOXIC INGREDIENTS	%	TLV (UNITS)

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	None	SPECIFIC GRAVITY (H_2O=1)	No
VAPOR PRESSURE (MM HG.)	None	PERCENT VOLATILE BY VOLUME (%)	No
VAPOR DENSITY (AIR = 1)	None	EVAPORATION RATE (_____ = 1)	No
SOLUBILITY IN WATER	100		
APPEARANCE AND ODOR	White powder		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED)	COC None	FLAMMABLE LIMITS	LEL	UEL
EXTINGUISHING MEDIA	None			
SPECIAL FIRE FIGHTING PROCEDURES	None			
UNUSUAL FIRE AND EXPLOSION HAZARDS	None			

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	
EFFECTS OF OVEREXPOSURE	None
EMERGENCY AND FIRST AID PROCEDURES	None

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATABILITY (MATERIALS TO AVOID)			
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
None
WASTE DISPOSAL METHOD Regular Waste

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)		
VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (GENERAL)	OTHER
PROTECTIVE GLOVES No	EYE PROTECTION	Safety Glasses
OTHER PROTECTIVE EQUIPMENT	Dust Respirator	

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING None
OTHER PRECAUTIONS None

DATE ISSUED: R-6-30-82

Continental Products of Texas

J. D. Crawford

J. D. CRAWFORD, VICE PRESIDENT

MATERIAL SAFETY DATA SHEET

CORPORATE RESEARCH & DEVELOPMENT

SCHENECTADY, N. Y. 12305

Phone: (518) 385-4085 DIAL COMM 8*235-4085

MATERIALS INFORMATION SERVICES

NO. 53

CHLORINE

Date July 1979

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: C[redacted]

OTHER DESIGNATIONS: Cl_2, CAS # 007 782 505

DESCRIPTION: A[redacted] shipped in steel cylinders as a liquid under its own vapor pressure.

MANUFACTURER: Available from many suppliers.

SECTION II. INGREDIENTS AND HAZARDS	%	HAZARD DATA
Chlorine *Current OSHA ceiling limit. ACGIH TLV (1978) is 1 ppm with a STEL of 3 ppm for up to 15 minutes exposure. NIOSH (1976) proposed a ceiling limit of 0.5 ppm (15 minute sampling time). (Controversy going on whether OSHA standard should include ceiling limit or not.)	> 99	8-hr TWA 1 ppm (C) or 3 mg/m^3 *

SECTION III. PHYSICAL DATA

Boiling point at 1 atm, deg C	-34	Density at 0°C:	
Vapor pressure at 20 C, mm Hg	4800	Gas at 1 atm, g/liter	3.214
Vapor density (Air=1)	2.49	Liquid at 3.65 atm, g/cc	1.47
Water solubility at 20 C, 1 atm, g/l	7.3	Molecular weight	70.91

Appearance & Odor: A greenish-yellow gas or clear, amber-colored liquid with a suffocating, pungent, irritating odor. The odor recognition threshold (100% of test panel, unfatigued) is reported at 0.314 ppm. The odor is easily noticed at 1.9-3.5 ppm and has been reported as intolerable at 2.6-41 ppm, depending on the observer.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
Non-flammable				

Use extinguishing media that is appropriate for the surrounding fire. Use water spray to cool intact, fire-exposed containers (one ton tanks and cylinders will release chlorine when a fusible metal safety plug melts at 158-165F.) If possible, have specially trained personnel remove intact cylinders from fire area.

Chlorine will support the burning of most combustible materials, just as oxygen does. Flammable gases and vapors can form explosive mixtures with chlorine.

Firefighters must use self-contained breathing equipment, eye protection, and full protective clothing when fighting fires in which chlorine is involved.

SECTION V. REACTIVITY DATA

Chlorine is stable in steel containers at room temperature when dry. [Intense local heat (above 215°C) on steel walls can cause steel to ignite in chlorine.]

It is a powerful oxidizing agent which reacts violently with reducing agents and combustible materials. Materials such as acetylene, turpentine, other hydrocarbons, ammonia, hydrogen, ether, powdered metals, etc. must be kept away from chlorine.

It reacts with H_2S and H_2O forming HCl; it combines with CO and SO_2 to form phosgene and sulfuryl chloride (toxic and corrosive materials).

Wet chlorine (150 ppm water) corrosively attacks most common metals. Handling chlorine requires special materials technology.

GENERAL ELECTRIC

No. 53

SECTION VI. HEALTH HAZARD INFORMATION

TLV 1 ppm or 3 mg/m^3 (C)

Chlorine believed to damage the body by local corrosive effects only; no systemic effects. 5-8 ppm in air will be severely irritating to eyes, nose, and respiratory tract of most individuals in a few minutes (10 ppm intolerable for avg. person). Higher level exposures produce coughing, dyspnea, burns of the skin, conjunctivitis, pulmonary edema (may be delayed) and death, depending on concentration and time of exposure (35-51 ppm, lethal in an hour; a few deep breaths fatal at 1000 ppm). Reduced respiratory capacity (especially among smokers) and dental erosion can result from chronic low level exposure. Any contact with liquid chlorine causes burns, blistering and tissue destruction.

FIRST AID: Call physician IMMEDIATELY for any person overexposed to chlorine!

Eye Contact: Flush eyes with water for at least 15 minutes, holding eyelids open. If medical help is not readily available, continue flushing with water.

Skin Contact: (Treat for inhalation exposure first!) Remove contaminated clothing under a safety shower. Wash exposed skin areas thoroughly with water.

Inhalation: Remove to fresh air. Restore breathing when required. Have trained person administer oxygen until victim breathes easily on his own. Keep warm and at rest! In mild cases, give milk to relieve throat irritation.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Establish written emergency plans and special training of personnel where chlorine is used.

Notify safety personnel. Provide ventilation. Exclude from area all except specially trained, assigned personnel with approved self-contained breathing equipment and appropriate protective clothing. Find and stop leak. (Large uncontrollable leaks require environmental consideration and possible evacuation of surrounding area.)

Move leaking container to isolated area. Position to release gas not liquid.

When possible draw off chlorine to process or to disposal system.

DISPOSAL: Bubble through a large volume of 15% aqueous NaOH or other alkali. Suitably dispose of resulting solution. Follow Federal, State and local regulations.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general and local exhaust ventilation to meet TLV requirements. Provide suitable venting for low lying areas. Use enclosed, isolated processing and handling whenever possible. Full face-piece respirators must be available for non-routine and emergency use: canister gas mask below 5000 ppm in air and self-contained breathing equipment for other conditions.

Workers should be provided with chemical safety goggles and impervious gloves. Full protective clothing must be used when needed to prevent exposure to chlorine, liquid or gas. Daily change of work clothes and showering after work shift are recommended.

Eyewash stations and chemical safety showers must be available in areas of handling and storage of chlorine.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store chlorine containers in well-ventilated areas of low fire potential, away from incompatible materials (see Sec. V) and away from sources of heat and ignition. Protect containers from weather and physical damage; follow standard safety procedures for containers of compressed, corrosive gases. Provide special training to workers handling chlorine. Regularly inspect (and test) piping and containment used for chlorine service. Liquid levels should be less than 85% of tank or cylinder capacity.

Use preplacement and periodic medical exams; preclude from workplace exposure to chlorine those with cardiac, pulmonary or chronic respiratory problems.

Special Ref: "Chlorine and Hydrogen Chloride", Chapter 5, National Academy of Science, Washington, DC (1976).

DATA SOURCE(S) CODE: 2-12, 17, 19, 24, 26

APPROVALS: MIS, CRD J. M. Nielsen

Industrial Hygiene and Safety O. G. White

MEDICAL REVIEW: 12/79

SHIELD, INC.
337-1571 - P. O. BOX 1703
ODESSA, TEXAS 79760

MATERIAL SAFETY DATA SHEET

"CAL NAME: MARK II

SYNONYMS: CHEMICAL FAMILY: Synthetic Detergent

FORMULA: Blended detergent, liquid MOLECULAR WEIGHT:

TRADE NAME AND SYNONYMS: MARK II

I. PHYSICAL DATA

BOILING POINT, 760 mm. Hg	285	FREEZING POINT	32°F
SPECIFIC GRAVITY ($H_2O = 1$)	1.1	VAPOR PRESSURE at 20°C.	
VAPOR DENSITY (air = 1)		SOLUBILITY IN WATER, % by wt. at 20°C.	Completely
PER CENT VOLATILES BY VOLUME	None	EVAPORATION RATE (Butyl Acetate = 1)	None
APPEARANCE AND ODOR	Clear Yellow - None		

II. HAZARDOUS INGREDIENTS

MATERIAL	%	TLV (Units)
Not Applicable		

III. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method)	None CC	AUTOIGNITION TEMPERATURE			
FLAMMABLE LIMITS IN AIR, % by volume		LOWER	1.1	UPPER	

EXTINGUISHING MEDIA	~~Water~~ NONE
SPECIAL FIRE FIGHTING PROCEDURES	None
UNUSUAL FIRE AND EXPLOSION HAZARDS	None

EMERGENCY PHONE NUMBERS

Paul Woltz, 915/362-3021 (night)

IV. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	None
EFFECTS OF OVEREXPOSURE	
EMERGENCY AND FIRST AID PROCEDURES	Flush with water

V. REACTIVITY DATA

STABILITY			
UNSTABLE	STABLE	CONDITIONS TO AVOID	
—	✓		
INCOMPATIBILITY (Materials to avoid)		Oxidizing Agents	
HAZARDOUS DECOMPOSITION PRODUCTS		None	
HAZARDOUS POLYMERIZATION			
May Occur	Will not Occur	CONDITIONS TO AVOID	

VI. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	Flush area with water
WASTE DISPOSAL METHOD	Sewage drain disposal - No Special Precautions

VII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)		None			
VENTILATION	LOCAL EXHAUST		SPECIAL —		
	MECHANICAL (general)		OTHER —		
PROTECTIVE GLOVES		If Desired	EYE PROTECTION	If Desired	
OTHER PROTECTIVE EQUIPMENT		None			

VIII. SPECIAL PRECAUTIONS

PRECAUTIONARY LABELING	On Label
OTHER HANDLING AND STORAGE CONDITIONS	None

SHIELD, INC.
337 1571
P O BOX 1708
ODESSA, TEXAS 79760

TECHNICAL BULLETIN

MARK II
HEAVY DUTY GENERAL PURPOSE

Nomenclature: Concentrated Blend Detergent
Nonionic/Anionic Blend

Physical Properties:

% Solids	26%
% Active	26%
pH	10.4 - 10.9
Flammability	None
Foam	Medium
Evaporation Rate	None
Solubility	Complete
Freezing Point	32°F
Boiling Point	285°F
Skin Irritation	None at 4% use dilution
Eye Irritation Dilute	None
Concentrate	Severe redness goes away in 4 to 6 hours
Oral Toxicity	Causes buring of mucus membranes

Chemical Properties: Sodium linear alkylbenzenesulfonate, linear secondary alcohols, diethanolamide of coconut fatty acids, phosphates and silicates.

Control: Quality control and batch records are kept on each lot number at all times. Product has USDA approval for meat and food products.

Ed. mathis

MATERIAL SAFETY DATA SHEET
FOR

KROVAR® II WEED KILLER

MANUFACTURER: E. I. DU PONT DE NEMOURS & CO. (INC.)
BIOCHEMICALS DEPARTMENT
WILMINGTON, DE 19898

EMERGENCY TELEPHONE: Phone CHEMTREC toll free, day or night (800)424-9300 or call Du Pont (302)774-1000

DATE: August 1977

CHEMICAL NAME:	5-bromo-3-sec-butyl-6-methyluracil (bromacil) 3-(3,4-dichlorophenyl)-1,1-dimethylurea (diuron) + inerts
TRADE NAME:	"Krovar" II Weed Killer

SECTION I - PHYSICAL DATA

PHYSICAL FORM:	Light brown powder
VAPOR PRESSURE:	Negligible
SOL. IN WATER:	Dispersible
SPECIFIC GRAVITY:	

SECTION II - HAZARDOUS INGREDIENT(S)

	WT %	Acute Oral LD_{50} (Rats)	TLV
Bromacil	53	5200 mg/kg	10 mg/m^3
Diuron	27	3400 mg/kg	10 mg/m^3

SECTION III - HEALTH HAZARDS

STATEMENT OF HAZARDS: Caution! May irritate eyes, nose, throat and skin.

PRECAUTIONARY MEASURES: Avoid breathing dust or spray mist. Avoid contact with skin, eyes, and clothing.

SPILL OR LEAK PROCEDURE: Clean up promptly. Do not flush with water, pick up dry by sweeping or other effective means. If spill area is on ground near trees or other valuable plants, remove top 2 inches of soil after initial cleanup.

Material Safety Data Sheet
For
Krovar® II Weed Killer

SECTION IV - FIRE HAZARDS

Statement of Hazard: May be ignited by heat or open flame. Fine dust dispersed in air (particularly in confined spaces) may ignite if exposed to high temperature ignition source. These conditions are unlikely to occur in normal, outdoor use of this product.

FIRE FIGHTING/EXTINGUISHING MEDIA: On small fire use dry chemical, CO_2, foam or water spray. If area is heavily exposed to fire and if conditions permit, let fire burn itself out since water amy increase the contamination hazard. If conditions do not permit, extinguish with water spray. If conditions permit, cool containers with water if exposed to fire. Wear self-contained breathing apparatus.

SECTION V - REACTIVITY

UNDER NORMAL CONDITIONS: Stable

SECTION VI - TRANSPORTATION, STORAGE AND DISPOSAL

SUGGESTED DISPOSAL METHOD: Dispose of in accordance with applicable (LOCAL, STATE and/or FEDERAL) regulations. If buried, use area away from roots, trees, turf or other desirable plants; disposal site should be on level ground and not close to streams, ponds, lakes, wells or ditches. Do not re-use container. Bury when empty.

SPECIAL PRECAUTIONS: Keep from contact with fertilizers, insecticides, fungicides and seeds. Keep out of reach of children.

SECTION VII - SPECIAL PROTECTION INFORMATION

None required

ED mathis

MATERIAL SAFETY DATA SHEET
FOR
KARMEX® WEED KILLER

MANUFACTURER: E. I. DU PONT DE NEMOURS & CO. (INC.)
BIOCHEMICALS DEPARTMENT
WILMINGTON, DE 19898

EMERGENCY TELEPHONE: Phone CHEMTREC toll free day or night (800)424-9300 or call Du Pont (302)774-1000

DATE: June 1977

CHEMICAL NAME: 3-(3,4-dichlorophenyl)-1,1-dimethylurea (diuron)
TRADE NAME: Karmex® weed killer

SECTION I - PHYSICAL DATA

PHYSICAL FORM: Tan powder
VAPOR PRESSURE: Negligible SOL. IN WATER: Dispersible
SPECIFIC GRAVITY: 28-30 lbs/ft^3 (loose); 31-33 lbs./ft^3 (packed)

SECTION II - HAZARDOUS INGREDIENT(S)

	WT %	Acute Oral LD_{50} (Rats)	TLV
Diuron	80	3400 mg/kg	10 mg/m^3

$C_9H_{10}Cl_2N_2O$

SECTION III - HEALTH HAZARDS

STATEMENT OF HAZARDS: May irritate eyes, nose, throat and skin.
PRECAUTIONARY MEASURES: Avoid breathing dust or spray mist. Avoid contact with skin, eyes and clothing.
SPILL OR LEAK PROCEDURE: Clean up promptly. Do not flush with water, pick up dry by sweeping or other effective means.

Material Safety Data Sheet
For
Karmex® Weed Killer

SECTION IV - FIRE HAZARDS

FLASH POINT: Not found	AUTO DECOMPOSITION TEMPERATURE: 180-190°C
AUTO IGNITION TEMPERATURE: 380°C	
MIN. IGNITION ENERGY: 0.075±0.01 joule	MAX. PRESSURE RISE: 2750 psi/sec @ 0.41 g/l
LOWER EXPLOSIVE LIMIT: 0.07 g/liter	
UPPER EXPLOSIVE LIMIT: Not found	

STATEMENT OF HAZARD: May be ignited by heat or open flame. Fine dust dispersed in air (particularly in confined spaces) may ignite if exposed to high temperature ignition source. These conditions are unlikely to occur in normal, outdoor use of this product.

FIRE FIGHTING/EXTINGUISHING MEDIA: On small fire use dry chemical, CO_2, foam or water spray. If area is heavily exposed to fire and if conditions permit, let fire burn itself out since water may increase the contamination hazard. If conditions do not permit, extinguish with water spray. If conditions permit, cool containers with water if exposed to fire. Wear self-contained breathing apparatus.

SECTION V - REACTIVITY

UNDER NORMAL CONDITIONS: Stable

SECTION VI - TRANSPORTATION, STORAGE AND DISPOSAL

SUGGESTED DISPOSAL METHOD: Dispose of in accordance with applicable (LOCAL, STATE and/or FEDERAL) regulations. If buried, use area away from roots, trees, turf or other desirable plants; disposal site should be on level ground and not close to streams, ponds, lakes, wells or ditches. Do not re-use container. Bury when empty.

SPECIAL PRECAUTIONS: Do not apply (except as recommended for crop use) or drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots. Do not contaminate any body of water. Keep from contact with fertilizers, insecticides, fungicides and seeds. Keep out of reach of children.

SECTION VII - SPECIAL PROTECTION INFORMATION

None indicated

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
IMPERIAL OIL & GREASE COMPANY	213 478-3577

ADDRESS (Number, Street, City, State, and ZIP Code)
10960 Wilshire Blvd., Los Angeles, CA 90024

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
N/A	MOLUB-ALLOY A 890 HEAVY
CHEMICAL FAMILY: N/A	FORMULA: N/A

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
This is a diester synthetic base lubricating fluid which has no TLV under normal conditions and is considered non-hazardous by the U. S. Department of Labor definition.		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.) Above	600° F	SPECIFIC GRAVITY (H_2O=1)	0.952
VAPOR PRESSURE (mm Hg.) Less than	0.05	PERCENT, VOLATILE BY VOLUME (%)	Trace
VAPOR DENSITY (AIR=1)	N/A	EVAPORATION RATE (_____ =1) N/A except at	
SOLUBILITY IN WATER	Slight	temperatures above 600° F	
APPEARANCE AND ODOR	Light yellow fluid, mild odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
ASTM D 92 490°F)		N/A	N/A

EXTINGUISHING MEDIA
CO_2 dry chemical or foam

SPECIAL FIRE FIGHTING PROCEDURES
Do not use water - normal for petroleum fire

UNUSUAL FIRE AND EXPLOSION HAZARDS
None

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
N/A

EFFECTS OF OVEREXPOSURE
Oral - Slightly toxic; Eye - Slightly irritating;
Skin - May be slightly irritating

EMERGENCY AND FIRST AID PROCEDURES
Oral ingestion - Do not induce vomiting, consult physician.
Eye - Flush with warm water, treat with proprietary eye wash solution
Skin - Remove by wiping followed by washing with soap water.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID: Exposure to metallic red heat and open flame
	STABLE	X	

INCOMPATABILITY (*Materials to avoid*)
Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
None in normal use

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	None

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Clean up promptly with proprietary oil drying compound.

WASTE DISPOSAL METHOD
Mixing with No. 5 or No. 6 fuel oil, use as road oil, dust and weed control.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (*Specify type*)
N/A

VENTILATION	LOCAL EXHAUST: N/A	SPECIAL
	MECHANICAL (*General*)	OTHER

PROTECTIVE GLOVES
For highly sensitive skin only

EYE PROTECTION
Only if fluid is misted or sprayed

OTHER PROTECTIVE EQUIPMENT
None

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Maintain storage arrangement so that container leakage is readily detected.

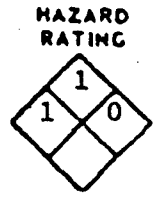
OTHER PRECAUTIONS
Keep container dry and clean when handling in order to minimize slippage and possible injuries.

GPO 934-(10

ADAPTED FROM USDL
FORM NO L39-005-4-MAY 1969

SHELL OIL COMPANY
SHELL CHEMICAL COMPANY MSDS 60,970
SHELL DEVELOPMENT COMPANY
SHELL PIPE LINE CORPORATION

HAZARD RATING



MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME: Shell Oil Company	EMERGENCY TELEPHONE NO: 713-473-9461
ADDRESS (Number, Street, City, State, and ZIP Code): P. O. Box 2463, One Shell Plaza, Houston, TX 77001	
CHEMICAL NAME AND SYNONYMS: Lubricating Oil	TRADE NAME: Shell MYSELLA® Oil 40
CHEMICAL FAMILY: Hydrocarbon	FORMULA: Code 67184

SECTION II HAZARDOUS INGREDIENTS*

COMPOSITION	Approx. %	SPECIES	LD_{50} ORAL	LD_{50} DERMAL	LC_{50} CONCENTRATION	LC_{50} HOURS
Petroleum Hydrocarbons	99	Rat	>5 g/kg			
		Rabbit		>2 g/kg		
Hindered Phenol	1		>24 g/kg			
Oxidation & Corrosion Inhibitor Containing P and S	0.5		>10 g/kg			
Polymethacrylate Additive	<.5					
This formulation calls for special precautions						
SEE ATTACHED PAGE						

SECTION III PHYSICAL DATA

BOILING POINT (°F)	N.A.	SPECIFIC GRAVITY (H_2O=1)	0.88
VAPOR PRESSURE (mmHg)	N.A.	PERCENT VOLATILE BY VOLUME (%)	N.A.
VAPOR DENSITY (AIR=1)	N.A.	EVAPORATION RATE (_____=1)	N.A.
SOLUBILITY IN WATER	Insoluble		
APPEARANCE AND ODOR	Dark liquid. Slight odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	LEL	UEL
455°F, PMCC	N.A.		

EXTINGUISHING MEDIA
Dry chemical type preferred.

SPECIAL FIRE FIGHTING PROCEDURES
None special.

UNUSUAL FIRE AND EXPLOSION HAZARDS
CO, SO_x, PO_x, and oxygenates may be formed during combustion.

*Mandatory

MSDS 60,970

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
Vapor - not established. Oil mist - 5 mg/m^3

EFFECTS OF OVEREXPOSURE Pulmonary irritation possible. Defatting action on skin. Prolonged or repeated contact may cause skin disorders such as dermatitis, folliculitis, oil acne or even skin cancer.

EMERGENCY AND FIRST AID PROCEDURES Eyes-flush with water for at least 15 minutes. Skin-remove oil by wiping or applying waterless hand cleaner, followed by washing with soap & water. Remove all contaminated clothing. Ingestion-induce vomiting if conscious & consult medical personnel.

SECTION VI REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		Mist formation.
	STABLE	X	

INCOMPATIBILITY (Materials to avoid)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

bsorb with clay, diatomaceous earth, or other inert material.

WASTE DISPOSAL METHOD Controlled burning in compliance with local regulations or bury in approved landfill.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
IOSH approved respirator to avoid exposure to hot vapors or mist.

VENTILATION		
	LOCAL EXHAUST: As required if mist is being generated	SPECIAL
	MECHANICAL (General)	OTHER

PROTECTIVE GLOVES Oil resistant (rubber)

EYE PROTECTION: Goggles if oil is being sprayed or splashed.

OTHER PROTECTIVE EQUIPMENT Appropriate othing to avoid skin contact.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Avoid breathing oil mist & vapors. Avoid skin ntact. Airborne mist should be kept substantially below the nuisance TLV for oil st.

OTHER PRECAUTIONS Launder contaminated clothing before using. Discard leather oods when contaminated. Wash before eating or smoking.

hell Oil Company
roduct Safety & Compliance
il & Chemical Products

DATE March, 1979

The petroleum hydrocarbons in this product contain a mixture of paraffinic, naphthenic, aromatic, and small amounts of heterocyclic hydrocarbons. As with other petroleum oils, the aromatics contain polycyclic compounds of various concentrations and structures. Some of these polycyclics may be those which have been shown to induce cancer in animals under laboratory conditions. Epidemiologic studies have suggested the possibility of skin cancer induction in man after prolonged and repeated contact with oils containing these materials under conditions of poor personal hygiene. Inhalation of mists arising from oils containing these materials may also present a cancer hazard.

EXXON COMPANY, U.S.A.
A DIVISION OF EXXON CORPORATION

VARSOL 1
Form No. OSHA-20
001-0004C
9/25/79
Supersedes issue of 8/10/79
DG-1P

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
EXXON COMPANY, U.S.A.	(713) 656-3424

ADDRESS (Number, Street, City, State and ZIP Code)
P. O. Box 2180 Houston, Texas 77001

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Petroleum Solvent	VARSOL-1
CHEMICAL FAMILY	**FORMULA**
Petroleum Hydrocarbon	Complex mixture of petroleum hydrocarbons

SECTION II HAZARDOUS INGREDIENTS

	%	TLV (UNITS)
VARSOL 1	100	SEE NOTE

NOTE:
The Threshold Limit Value (TLV) of 100 ppm vapor in air has been established by the American Conference of Governmental Industrial Hygienists for Stoddard solvent, and is thus applicable to VARSOL 1. In a recent study by Exxon Corporation Medical Research with laboratory animals (rats) exposed to vapors in air of a solvent similar to VARSOL 1, kidney damage was noted in male rats at this concentration. The recent study suggests that this occupational exposure limit may have to be lowered for this product. Work is continuing to validate these findings and determine whether a revised occupational exposure limit should be recommended for VARSOL 1.

SECTION III PHYSICAL DATA

BOILING RANGE		SPECIFIC GRAVITY (H_2O=1)	
IBP-Dry Pt. (313-400°F)	156-204°C	15.6°/15.6°C	0.79
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
@ 25°C	< 10		100
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (n-BUTYL ACETATE=1)	
	4.8		< 0.1
SOLUBILITY IN WATER			
	Negligible		

APPEARANCE AND ODOR
Water-white liquid. Mineral spirits odor.

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method Used)	FLAMMABLE OR EXPLOSIVE LIMITS Approximate (PERCENT BY VOLUME IN AIR)	LOWER LIMIT	UPPER LIMIT
Tag Closed Cup 42°C (108°F)		0.9%	6.0%

EXTINGUISHING MEDIA
Foam, dry chemical, CO_2, or water fog or spray.

SPECIAL FIRE FIGHTING PROCEDURES
Use air-supplied breathing equipment for enclosed areas.
Cool exposed containers with water spray. Avoid breathing vapor or fumes.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Do not mix or store with strong oxidants like liquid chlorine or concentrated oxygen.

COMBUSTIBLE LIQUID.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

(ppm for 8 hour workday recommended by ACGIH for Stoddard solvent. See also Section J.

EFFECTS OF OVEREXPOSURE

Inhalation of high vapor concentrations may have results ranging from dizziness and headaches to unconsciousness. Prolonged or repeated liquid contact with the skin will dry and defat the skin, leading to irritation and dermatitis.

EMERGENCY AND FIRST AID PROCEDURES

If overcome by vapor, remove from exposure immediately; call a Physician. If breathing is irregular or stopped, start resuscitation, administer oxygen. If ingested, DO NOT induce vomiting; call a Physician. In case of skin contact, remove any contaminated clothing, and wash skin with soap and warm water. If splashed into the eyes, flush eyes with clear water for 15 minutes or until irritation subsides.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		**CONDITIONS TO AVOID**
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*

Strong oxidants like: liquid chlorine, concentrated oxygen, sodium or calcium hypochlorite.

HAZARDOUS DECOMPOSITION PRODUCTS

Fumes, smoke and carbon monoxide, in the case of incomplete combustion.

HAZARDOUS POLYMERIZATION	MAY OCCUR		**CONDITIONS TO AVOID**
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Remove all ignition sources. Keep people aw[illegible] Recover free liquid. Add absorbent (sand, earth, sawdust, etc.) to spill area. Avoid breathing vapors. Ventilate confined spaces. Open all windows and doors. Keep petroleum products out of sewers and watercourses by diking or impounding. Advise authorities if product has entered or may enter sewers, watercourses, or extensive land areas.

WASTE DISPOSAL METHOD

Assure conformity with applicable disposal regulations. Dispose of absorbed material at an approved disposal site or facility.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* Use hydrocarbon vapor canister or supplied-air respiratory protection in confined or enclosed spaces if needed.

VENTILATION	**LOCAL EXHAUST**	**SPECIAL**
	Face velocity > 60 fpm	Use only with adequate* ventilation.
	MECHANICAL *(General)*	**OTHER**
	Use explosion-proof equipment	No smoking or open lights.

PROTECTIVE GLOVES Use chemical-resistant gloves, if needed to avoid repeated or prolonged skin contact

EYE PROTECTION Use splash goggles or face shield when eye contact may occur.

OTHER PROTECTIVE EQUIPMENT Use chemical-resistant apron or other clothing if needed to avoid repeated or prolonged skin contact.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING & STORING

Keep containers closed when not in use. Do not handle or store near heat, sparks, flame or strong oxidants. Adequate* ventilation required.

(dequate means equivalent to outdoors.

OTHER PRECAUTIONS Avoid breathing vapors. Avoid prolonged or repeated contact with skin. Remove contaminated clothing and launder before reuse. Remove contaminated shoes and thoroughly dry before reuse. Wash skin thoroughly with soap and water after contact.

FOR ADDITIONAL INFORMATION ON HEALTH EFFECTS CONTACT:

Director of Industrial Hygiene
(713) 656 2443

FOR OTHER PRODUCT INFORMATION CONTACT:

Manager, Marketing Technical Services
(713) 656 4020

TOXSENE 35

ACTIVE INGREDIENTS:	
Alkyl (C_{12}, 61%; C_{14}, 23%; C_{16}, 11%; C_8 & C_{10}, 2.5%; C_{18}, 2.5%) dimethyl benzyl ammonium chloride	9.0%
Tributyltin neodecanoate	5.0%
Alkyl (C_{14}, 58%; C_{16} 28%; C_{12}, 14%) dimethyl benzyl ammonium chloride	4.5%
Alkyl (C_{14}, 90%; C_{16}, 5%; C_{12}, 5%) dimethyl ethyl ammonium bromide	1.5%
Total Active Ingredients	20.0%
INERT INGREDIENTS	80.0%
Total Ingredients	100.0%

TOXSENE 35 is a product formulated to provide control of the growth of algae in recirculating water cooling towers and evaporative condensers.

DIRECTIONS

If heavy algae slime growths are present, clean the system before initial treatment. If algae growth is absent or just noticeable, proceed with the initial dose. Add all treatments directly to the sump.

INITIAL DOSE: When the system is fouled, apply a dose of 4 fluid ounces per 100 gallons water in the system. Repeat daily until control is achieved.

SUBSEQUENT DOSE: When algae control is evident, add 2 fluid ounces per 100 gallons water in the system every 7 days (weekly), or as needed to to maintain control. Badly fouled systems may be manually or chemically cleaned before treatment is begun.

CAUTION

Do not allow water that contains this algicide to come in contact with grass or plants. Do not use in drinking water or in swimming pools.

DANGER

KEEP OUT OF REACH OF CHILDREN

Corrosive. Causes eye damage and skin irritation. Do not get in eyes, on skin or on clothing. Wear goggles or face shield and rubber gloves when handling. Harmful or fatal if swallowed. Avoid contamination of food.

FIRST AID

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. For eyes, call a physician. Remove and wash contaminated clothing before re-use. If swallowed, drink promptly a large quantity of milk, egg whites, gelatin solution or if these are not available, drink large quantities of water. Avoid alcohol. Call a physician immediately.

NOTE TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsion may be needed. This product is toxic to fish. Keep out of lakes, streams or ponds. Treated effluent should not be discharged where it will drain into lakes, streams, ponds or public water. Do not contaminate water by cleaning of equipment or disposal of wastes. Apply this product only as specified on this label. Rinse empty container thoroughly with water and discard it.

EPA REG. NO. 5185—168—12471

PACKAGED FOR:

EPA ESTABLISHMENT NO. 14805-TX-1

Continental Products Of Texas

100 INDUSTRIAL — ODESSA, TEXAS 79761

TOXSENE 35

PRECAUTIONARY STATEMENTS

KEEP OUT OF REACH OF CHILDREN

WARNING

TOXSENE-37 IS HARMFUL OR FATAL IF SWALLOWED OR ABSORBED THROUGH THE SKIN. CAUSES EYE DAMAGE AND SKIN IRRITATION. In case of contact remove contaminated clothing and immediately wash skin with soap and water. If irritation persists get medical attention. In case of contact with the eyes, immediately flush with water and get medical attention. Wash contaminated clothing before reuse. The use of goggles or face shield and rubber gloves is recommended.

DO NOT USE OR STORE NEAR HEAT OR OPEN FLAME

TOXSENE 37

(FOR INDUSTRIAL USE ONLY)

ACTIVE INGREDIENT:
Methylene bis (thiocyanate) .....10 %
INERT INGREDIENTS: 90%
TOTAL 100%

8.3 lbs. per gallon

manufactured for

CONTINENTAL PRODUCTS OF TEXAS

100 Industrial Ave., Odessa, Texas 79760
Phone: 915/337-4681

E.P.A. Establishment No. 14805-Tx-1
E.P.A. Registration No. 9386-4

Net Contents: Liquid
See Markings on Top of Drum for Net Weight

SEE SIDE PANELS FOR PRECAUTIONARY STATEMENTS

PRECAUTIONARY STATEMENTS

FISH AND WILDLIFE ENVIRONMENTAL WARNING:

This pesticide is toxic to fish. Do not apply in marine and/or estuarine oil fields. Do not discharge treated effluent into lakes, streams, ponds or public waters unless in accordance with NPDES permit. For guidelines contact your regional office of the Environmental Protection Agency.

STORAGE AND DISPOSAL

PROHIBITIONS: Do not contaminate water, food, or feed by storage or disposal. Open dumpings prohibited.

CONTAINER DISPOSAL: Reseal container and offer for reconditioning, or triple rinse (or equivalent) and offer for recycling, reconditioning, or disposal in approved landfill, or bury in a safe place.

GENERAL: Consult Federal, State or Local Disposal Authorities for approved alternative procedures.

DIRECTIONS FOR USE - It is a violation of Federal Law to Use the product in a manner inconsistent with its labeling.

FOR THE CONTROL OF SLIME-FORMING AND/OR SPOILAGE BACTERIA: Toxsene-37 is added at a point in the system (raw stock chest; beater and/or refiner chest or machine chest-wirepit) where it will be uniformly mixed. Application may be continuous or intermittent for a certain number of hours/day or per shift, depending upon system characteristics. Add 2 to 5 fluid ounces of Toxsene-37 per ton of paperboard produced. INTERMITTENT FEED METHOD: Apply 3.5 to 5 fluid ounces of Toxsene-37 per ton (dry basis) of pump or paper for 2 hours every 8 hours. Badly fouled process systems must be cleaned before initial treatment. CONTINUOUS FEED METHOD: Apply 2 to 4 fluid ounces of Toxsene-37 per ton (dry basis) of pump or paper produced on a continuous basis. Badly fouled process systems must be cleaned before initial treatment. Consult your CONTINENTAL PRODUCTS representative for technical advice concerning certain site problems. **RECIRCULATING COOLING WATER SYSTEM: FOR CONTROL OF SLIME-FORMING BACTERIA (COOLING TOWERS, EVAPORATIVE CONDENSERS) BACTERIAL CONTROL: Use of 1.6 to 7.9 fluid ounces per 1000 gallons water (1.25 to 6.20 ppm), actual, of Toxsene-37 as a continuous treatment, one to three times a week or as required to maintain control. When the system is just noticeable fouled, use 5.8 to 12.5 fluid ounces per 1000 gallons water (4.5 to 9.8 ppm), actual, of** Toxsene 37 as a continuous treatment daily or as required to obtain control. Badly fouled systems must be cleaned before treatment is begun. Apply at a point in the system where uniform mixing and even distribution will occur, such as the cooling tower basin or sump.

OILFIELD DRILLING MUDS AND WORKOVER OR COMPLETION FLUIDS: FOR CONTROL OF SLIME-FORMING AND/OR SPOILAGE BACTERIA: Determine the total volume of the circulating system. Calculate the number of gallons of Toxsene-37 needed to produce a concentration of 5000 ppm (1.75 lb/bbl) of Toxsene-37 in the drilling mud circulating system. For example, 211 gallons of Toxsene-37 per 1000 barrels of drilling fluid will produce the proper concentration. For best results add Toxsene-37 in a thin stream to the mud pit while the drilling fluid is circulating. As the total volume increases, due to greater well depth, add additional Toxsene-37 to maintain the proper concentration. **OILFIELD WATER TREATMENT AND WATER FLOODS: FOR CONTROL OF SLIME-FORMING AND/OR SPOILAGE BACTERIA:** Calculate the total volume of water to be treated. Using this volume, calculate the number of gallons of Toxsene-37 needed to produce concentration of approximately 750 ppm Toxsene-37. For Example, 0.75 Gallons of Toxsene-37 per each 1000 gallons of total volume will produce this dilution. 50 ppm Toxsene-37, added each week, is recommended to maintain bacterial control. This may be accomplished by adding 0.05 gallons of Toxsene-37 to each 1000 gallons of total volume.

MATERIAL SAFETY DATA SHEET

CORPORATE RESEARCH & DEVELOPMENT

SCHENECTADY, N. Y. 12305

Phone: (518) 385-4085 DIAL COMM 8*235-4085

MATERIALS INFORMATION SERVICES

No. 9

SULFURIC ACID, CONCENTRATED

REVISION B

Date October 1980

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: SULFURIC ACID, CONCENTRATED
OTHER DESIGNATIONS: Oil of Vitriol, Hydrogen Sulfate, H_2SO_4, GE Material D4A2, CAS #007 664 939
DESCRIPTION: Material consists of about 93-98% H_2SO_4 with water and traces of impurities.
MANUFACTURER: Available from many suppliers.

SECTION II. INGREDIENTS AND HAZARDS	%	HAZARD DATA
Hydrogen Sulfate (H_2SO_4) Water	93-98 Balance*	TLV 1 mg/m^3 for sulfuric acid† Human, mist inhal. TCLo 3 mg/m^3, 24 wk (Toxic Mouth Effects) Rat, Oral LD_{50} 2140 mg/kg

*Material is obtained by the reaction of SO_3 and water. Can contain low impurity levels, such as 0.02% max of iron as Fe. Properties vary with H_2SO_4 content.

†Current OSHA standard and ACGIH (1980) TLV. NIOSH has a 10-hr-TWA, 40 hr work week, of 1 mg/m^3.

SECTION III. PHYSICAL DATA

	93.19% H_2SO_4	98.33% H_2SO_4	100% H_2SO_4
Boiling point, 1 atm, deg C	ca 281	ca 338	ca 330 (dc)
Specific gravity (60/60 F)	1.8354	1.84	1.84
Deg. Baume	66	—	—
Volatiles, % at 340 C	ca 100	ca 100	ca 100
Melting point, deg C	ca -34	ca 3	10.4
Vapor press, mm Hg @ 100 F	<1	—	—

Water solubility: Completely miscible.
Appearance & Odor: Clear, colorless, hygroscopic oily liquid with no odor.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
None - nonflammable	N/A	N/A	N/A	N/A

Even though sulfuric acid is nonflammable, it is hazardous when present in a fire area. Small fires may be smothered with suitable dry chemical. Cool exterior of storage tanks of H_2SO_4 with water to avoid rupture if exposed to fire. Do not add water or other liquid to the acid! The acid, especially when diluted with water, can react with metals to liberate flammable hydrogen gas.
Sulfuric acid mists and vapors from a fire area are corrosive. (See Sect. V.)
Firefighters to wear self-contained breathing equipment and full protective clothing.

SECTION V. REACTIVITY DATA

Sulfuric acid is stable under normal conditions of use and storage. It does not undergo hazardous polymerization.
It is a strong mineral acid reacting with bases and metals. The concentrated acid is a strong oxidizing agent and can cause ignition of combustible materials on contact. The concentrated aid is also a dehydrating agent, picking up moisture readily from the air or other materials.
Reacts exothermically with water. (Acid should always be added slowly to water. Water added to acid can cause boiling and uncontrolled splashing of the acid.)
Sulfur oxides can result from decomposition and from oxidizing reactions of sulfuric acid.

GENERAL ELECTRIC

SECTION VI. HEALTH HAZARD INFORMATION

TLV 1 mg/m^3

Concentrated sulfuric acid is a strong mineral acid, an oxidizing agent, and a dehydrating agent that is rapidly damaging to all human tissue with which it comes in contact. Ingestion may cause severe injury or death. Eye contact gives severe or permanent injury. Inhalation of mists can damage both the upper respiratory tract and the lungs.

FIRST AID:

Eye Contact: Immediately flush eyes with plenty of running water for at least 15 minutes (including under the eyelids). Speed in diluting and rinsing out acid with water is extremely important if permananet eye damage is to be avoided. Obtain medical help as soon as possible.

Skin Contact: Immediately flush affected areas with water, removing contaminated clothing under the safety shower. Continue washing with water and get medical attention.

Inhalation: Remove to fresh air. Restore breathing. Call a physician immediately.

Ingestion: Dilute acid immediately with large amounts of milk or water, then give milk of magnesia to neutralize. Do not induce vomiting; if it occurs spontaneously, continue to administer fluid. Obtain medical attention as soon as possible.

Maintain observation of patient for possible delayed onset of pulmonary edema.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Prevent contact with the acid. Provide adequate ventilation to control workplace concentrations. Minor leaks or spills can be diluted with plenty of water and neutralized with soda ash or lime. If water is not available, cover contaminated area with sand, ashes, or gravel and neutralize with soda ash or lime.

Major spills must be handled by a predetermined plan. Contact supplier for assistance in this planning and to meet local requirements and disposing of large amounts.

DISPOSAL: Follow Federal, State, and Local regulations.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general ventilation to meet current TLV requirements in the workplace. Where mists are up to 50 mg/m^3, a high efficiency particulate respirator with full facepiece is warranted; a Type C supplied air respirator with full facepiece operated in pressure demand mode is used to 100 mg/m^3. Avoid eye contact by use of chemical safety goggles or face shield where splashing may occur. Imperious protective clothing, such as rubber gloves, aprons, boots, and suits are recommended to avoid body contact with this acid.

Eyewash fountain and safety showers with deluge type heads should be readily available where this material is handled or stored.

Comprehensive preplacement and annual medical examinations with emphasis on dental erosion, cardiopulmonary system, and mucous membrane irritation and cough.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Sulfuric acid in carboys or drums should be stored in clean ventilated storage areas having acid resistant floors with good drainage. Keep out of direct sunlight, do not store above 32 C. Storage facilities to be separate from metallic powders, chromates, chlorates, nitrates, carbides, oxidizables, etc. Soda ash, sand or lime should be kept in general storage or work areas for emergency use. Protect containers against physical damage. Glass bottles need extra protection. Sulfuric acid is highly corrosive to most metals especially below 77% H_2SO_4. Avoid breathing mist or vapors. Avoid contact with skin or eyes. Do not ingest. Do not add water to concentrated acid. Do not smoke. Use nonsparking tools and vapor-proof type electrical fixtures.

DATA SOURCE(S) CODE: 2-12, 19, 20, 24, 26, 31, 37-39

APPROVALS: MIS CRD J.M. Nielsen

Industrial Hygiene and Safety 10-14-80

MEDICAL REVIEW: Oct. 26, 1980

MATERIAL SAFETY DATA SHEET
FOR
HYVAR® X WEED KILLER

Ed Mathis

MANUFACTURER: E. I. DU PONT DE NEMOURS & CO. (INC.)
BIOCHEMICALS DEPARTMENT
WILMINGTON, DE 19898

EMERGENCY TELEPHONE: Phone CHEMTREC toll free day or night (800)424-9300 or call Du Pont (302)774-1000

DATE: June 1977

CHEMICAL NAME: 5-bromo-3-sec-butyl-6-methyluracil (bromacil) + inerts

TRADE NAME: Hyvar® X weed killer

SECTION I - PHYSICAL DATA

PHYSICAL FORM: Beige powder

VAPOR PRESSURE: Negligible SOL. IN WATER: Water Suspendable

SPECIFIC GRAVITY:

SECTION II - HAZARDOUS INGREDIENT(S)

	WT %	Acute Oral LD_{50} (Rats)	TLV
Bromacil	80	5200 mg/kg	10 mg/m^3

TLV - 1ppm
STEL - 2ppm

SECTION III - HEALTH HAZARDS

STATEMENT OF HAZARDS: Caution: May irritate eyes, nose, throat and skin.

PRECAUTIONARY MEASURES: Avoid breathing dust or spray mist. Avoid contact with skin, eyes and clothing.

Material Safety Data Sheet
For
Hyvar® X Weed Killer

SPILL OR LEAK PROCEDURE: Clean up promptly. Do not flush with water, pick up dry by sweeping or other effective means. If spill area is on ground near trees or other valuable plants, remove top 2 inches of soil after initial cleanup.

SECTION IV - FIRE HAZARDS

MIN. IGNITION ENERGY: 4.25 joule MAX. PRESSURE RISE: 1450 psi/sec

LOWER EXPLOSIVE LIMIT: 0.91 g/liter

STATEMENT OF HAZARD: May be ignited by heat or open flame. Fine dust dispersed in air (particularly in confined spaces) may ignite if exposed to high temperature ignition source. These conditions are unlikely to occur in normal, outdoor use of this product.

FIRE FIGHTING/EXTINGUISHING MEDIA: On small fire use dry chemical, CO_2, foam or water spray. If area is heavily exposed to fire and if conditions permit, let fire burn itself out since water may increase the contamination hazard. If conditions do not permit, extinguish with water spray. If conditions permit, cool containers with water if exposed to fire. Wear self-contained breathing apparatus.

SECTION V - REACTIVITY

UNDER NORMAL CONDITIONS: Stable

SECTION VI - TRANSPORTATION, STORAGE AND DISPOSAL

SUGGESTED DISPOSAL METHOD: Bury in area away from roots, trees, turf or other desirable plants. Disposal site should be on level ground and not close to streams, ponds, lakes, wells or ditches.

SPECIAL PRECAUTIONS: Do not apply (except as recommended for crop use) or drain or flush equipment on or near desirable trees or other plants, or on areas where the chemical may be washed or moved into contact with their roots. Do not contaminate domestic waters. Keep from contact with fertilizer, insecticides, fungicides, and seeds. Do not re-use container. Bury when empty. Keep out of reach of children.

SECTION VII - SPECIAL PROTECTION INFORMATION

None Indicated

MATERIAL SAFETY DATA SHEET

U. S. DEPARTMENT OF LABOR "ESSENTIALLY SIMILAR " TO FORM LSB-005-4

SECTION I

MANUFACTURER'S NAME	CONTINENTAL PRODUCTS OF TEXAS	EMERGENCY TELEPHONE NO.	
ADDRESS	Box 3627, Odessa, Texas 79760		(915) 337-4681
CHEMICAL NAME AND SYNONYMS	Sodium Acrylamide	TRADE NAME AND SYNONYMS	HYDROCHEM D-300
CHEMICAL FAMILY	Acrylic Polymer	FORMULA	Not applicable

SECTIONS II HAZARDOUS INGREDIENTS

INGREDIENT	%	SPECIES	LD_{50} ORAL	LD_{50} DERMAL	LC_{50} CONCENTRATION	LC_{50} HOURS
Acrylamide		Rat	170			
		Rabbit		LDLo 1000		

POTENTIALLY TOXIC INGREDIENTS	%	TLV (UNITS)
None		

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	215	SPECIFIC GRAVITY (H_2O=1)	1.1
VAPOR PRESSURE (MM HG.) 275°F	260	PERCENT VOLATILE BY VOLUME (%)	75%
VAPOR DENSITY (AIR = 1)	1	EVAPORATION RATE (water = 1)	1
SOLUBILITY IN WATER	100%		
APPEARANCE AND ODOR	Light amber, odorless		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) SOS None	FLAMMABLE LIMITS	LEL	UEL
EXTINGUISHING MEDIA	None		
SPECIAL FIRE FIGHTING PROCEDURES	None		
UNUSUAL FIRE AND EXPLOSION HAZARDS	None		

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	Acrylamide Air: 0.3 mg/m3 (skin)
EFFECTS OF OVEREXPOSURE	None
EMERGENCY AND FIRST AID PROCEDURES	None

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	None

INCOMPATABILITY (MATERIALS TO AVOID)

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	None

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Wash with water.

WASTE DISPOSAL METHOD Dispose as waste water

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE) None

VENTILATION	LOCAL EXHAUST	None	SPECIAL	None
	MECHANICAL (GENERAL)	None	OTHER	None

PROTECTIVE GLOVES	None	EYE PROTECTION	Safety glasses or goggles

OTHER PROTECTIVE EQUIPMENT None

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

None

OTHER PRECAUTIONS None

DATE ISSUED: R-6-30-82

Continental Products of Texas

J. D. Crawford

J. D. CRAWFORD, VICE PRESIDENT

MATERIAL SAFETY DATA SHEET

CORPORATE RESEARCH & DEVELOPMENT

SCHENECTADY, N. Y. 12305

Phone: (518) 385-4085 DIAL COMM 8*235-4085

MATERIALS INFORMATION SERVICES

No. 68

CALCIUM HYPOCHLORITE (Dry)

Date July 1980

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: CALCIUM HYPOCHLORITE (Dry)
OTHER DESIGNATIONS: Calcium Oxychloride, $Ca(OCl)_2$, CAS #007 778 543, HTH (Trade name)
MANUFACTURER: Available from several sources, including:

Canadian Industries Limited
Chemicals
Box 10
Montreal, Quebec, Canada H3C 2R3

Olin Corporation
120 Long Ridge Road
Stamford, CT 06904
Phone: (203) 356-2345

SECTION II. INGREDIENTS AND HAZARDS	%	HAZARD DATA
Calcium Hypochlorite	*	No TLV Established
*Concentration usually stated in terms of weight % of available chlorine. (See ASTM D2022) HTH (high-test hypochlorite) contains about 70% available chlorine. Solid materials with less than 39% available chlorine include chloride of lime and bleaching powder; these contain much chloride ion and water and possibly other impurities, for example: $Ca(OCl)Cl \cdot 2H_2O$. The presence of magnesium hypochlorite in material of high available chlorine level may reduce its stability.		Rat, Oral LD_{50} 850 mg/kg

SECTION III. PHYSICAL DATA

Boiling point, deg C	N/A	Specific gravity	2.35
Vapor pressure, mm Hg	N/A	Melting point, deg C	decomposes @ 100
Solubility in water, 20 C, % by wt	14	Molecular weight	142.98

Appearance and Odor: White non-hygroscopic granules or tablets having a strong chlorine odor.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
N/A	N/A	N/A		

Use a water spray to cool fire-exposed containers of this material and drench area with large amounts of water from a safe position. When containers are heated in a fire situation, they are subject to violent rupture! Contamination or mixing with foreign materials (combustibles, grease, chemicals, etc.) can cause fires of great intensity.

Firefighters need to use self-contained breathing apparatus and full protective clothing for fires involving this material, especially in enclosed areas.

SECTION V. REACTIVITY DATA

Calcium hypochlorite is stable at room temperature in suitable closed containers when kept dry and free from contamination. It does not polymerize.

It is a powerful oxidizing agent which can readily ignite combustibles. Violent reactions or explosions can occur, for example with amines, carbon tetrachloride, charcoal, ethyl alcohol, metal oxides, mercaptans, organic sulfides, sulfur, turpentine, and strong reducing agents. A mixture with glycerine can ignite spontaneously. Material containing over 60% available chlorine will ignite on contact with lubricating oil (addition of about 20% or more of water will prevent this).

In the absence of combustibles and other chemicals, when heated above 100 C, it can undergo exothermic decomposition, evolving oxygen. On contact with acids it forms hypochlorous acid and liberates Cl_2.

GENERAL ELECTRIC

NO. 68

SECTION VI. HEALTH HAZARD INFORMATION

TLV None Established

All tissue contacted can be irritated and/or damaged by this strong oxidizing agent, the degree of injury depending on the dose, available chlorine level, and exposure time. Skin contact can produce vesicular eruptions and eczematoid dermatitis. Eye contact can result in severe eye damage. Inhalation of dust irritates the respiratory tract and may cause pulmonary edema. Ingestion irritates mouth, throat and stomach, and gastric acid will liberate hypochlorous acid. Fatalities can result from severe complications of local injury, shock, toxemia, hemorrhage, wall perforation & obstruction.

FIRST AID:

Eye Contact: Immediately flush with lots of running water for 15 minutes. Call physician.

Skin Contact: Immediately remove contaminated clothing. Flush affected area with water. Get medical help if contact area was large or if symptoms persist.

Inhalation: Remove to fresh air. Support breathing if needed. Get medical help.

Ingestion: Promptly rinse mouth with water and then give large amounts of milk or water to drink, followed by milk of magnesia. Contact physician or hospital. Do not induce vomiting unless instructed by physician.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Notify safety personnel of spills. Remove combustibles and ignition sources. Those involved in clean up need protection against contact with solid or inhalation of dust. Prevent generation of dust. Prevent direct discharge into sewers or waterways.

Recover uncontaminated solid material in clean, dry containers. Other spilled material is covered with weak reducing agent, slurried with water, and then flushed with water to a suitable holding tank. Wash spill site well with soap solution containing a weak reducing agent.

DISPOSAL: Use reducing agents to destroy "available chlorine." Adjust pH of reduced liquid to neutral and decant. Discharge neutral liquid, diluting with much water. Dispose of neutral sludge (if any) in a landfill. Follow Federal, State, and Local regulations. (Contact supplier for detailed procedures.)

SECTION VIII. SPECIAL PROTECTION INFORMATION

Suppliers indicate no ventilation requirements in handling this material, but do suggest a dust mask be used for respiratory protection.

It is recommended that sufficient ventilation be provided to prevent any irritation from dust inhalation and to disperse any hypochlorite decomposition products. An approved respirator with a dust filter and cartridge or canister for chlorine absorption should be available.

Use neoprene rubber gloves, chemical goggles, and protective outer wear to prevent contact with the eyes, skin or clothing.

Eyewash stations, safety showers and washing facilities should be available to handling and use areas.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store in closed containers in a cool, dry, well-ventilated low fire-risk area, away from combustible and incompatible materials (see Sect. V). Prevent contamination of material. Protect containers from physical damage. Do not drop, roll, or skid containers.

This material is a powerful oxidizing agent; use with caution! Mix only with water.

Water solutions are not stable, but undergo a slow decomposition.

Prevent contact with eyes, skin, mucous membranes, and clothing. Do not ingest.'

DOT Classification (for over 39% available chlorine) - OXIDIZER

DATA SOURCE(S) CODE: 1,4-11,20,25,26,34

APPROVALS: MIS J.M. Nielsen

Industrial Hygiene and Safety 7-25-80

MEDICAL REVIEW: 5 August 1980

GENERAL ELECTRIC

MATERIAL SAFETY DATA SHEET

U. S. DEPARTMENT OF LABOR "ESSENTIALLY SIMILAR " TO FORM LSB-005-4

SECTION I

MANUFACTURER'S NAME	Continental Products of Texas	EMERGENCY TELEPHONE NO.	(915) 337-4681
ADDRESS	Box 3627 - Odessa, Texas 79760		
CHEMICAL NAME AND SYNONYMS	Sodium Bichromate	TRADE NAME AND SYNONYMS	CHROMINE-T
CHEMICAL FAMILY	Organic Chromates	FORMULA	$Na_2Cr_2O_7$ + water

SECTIONS II HAZARDOUS INGREDIENTS

INGREDIENT	%	SPECIES	LD_{50} ORAL	LD_{50} DERMAL	LC_{50} CONCENTRATION	LC_{50} HOURS
		Human	LDLo 50 mg/Kg			
		Guinea Pig		LDLO 335		
Sodium Bichromate	40					

POTENTIALLY TOXIC INGREDIENTS	%	TLV (UNITS)
None		

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	212	SPECIFIC GRAVITY (H_2O=1)	1.4
VAPOR PRESSURE (MM HG.) 212°F	760	PERCENT VOLATILE BY VOLUME (%)	60
VAPOR DENSITY (AIR = 1)		EVAPORATION RATE (water = 1)	1
SOLUBILITY IN WATER	100%		
APPEARANCE AND ODOR	Dark amber - no odor		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED)	COC None	FLAMMABLE LIMITS	LEL	UEL
EXTINGUISHING MEDIA	None			
SPECIAL FIRE FIGHTING PROCEDURES	None			
UNUSUAL FIRE AND EXPLOSION HAZARDS	None			

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	
EFFECTS OF OVEREXPOSURE	Corrosive action on skin and mucous membranes.
EMERGENCY AND FIRST AID PROCEDURES	Wash with water.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY (MATERIALS TO AVOID)
HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Wash with water.
WASTE DISPOSAL METHOD As water.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE) None		
VENTILATION	LOCAL EXHAUST None	SPECIAL
	MECHANICAL (GENERAL) None	OTHER
PROTECTIVE GLOVES None	EYE PROTECTION Glasses	
OTHER PROTECTIVE EQUIPMENT None		

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Prevent prolonged skin contact.
OTHER PRECAUTIONS

DATE ISSUED: R-6-30-82

Continental Products of Texas

J. D. Crawford

J. D. CRAWFORD, VICE PRESIDENT

MATERIAL SAFETY DATA SHEET

U. S. DEPARTMENT OF LABOR "ESSENTIALLY SIMILAR " TO FORM LSB-005-4

SECTION I

MANUFACTURER'S NAME	Continental Products of Texas	EMERGENCY TELEPHONE NO.	(915) 337-4681
ADDRESS	Box 3627 - Odessa, Texas 79760		
CHEMICAL NAME AND SYNONYMS	Zinc sulfate	TRADE NAME AND SYNONYMS	ANTIPOL-640
CHEMICAL FAMILY	Metal organic Combination	FORMULA	Not applicable compounded.

SECTIONS II HAZARDOUS INGREDIENTS

INGREDIENT	%	SPECIES	LD_{50} ORAL	LD_{50} DERMAL	LC_{50} CONCENTRATION	LC_{50} HOURS
		Human	LDLo 50			
		Rat	LDLo 2200			

POTENTIALLY TOXIC INGREDIENTS	%	TLV (UNITS)

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	None	SPECIFIC GRAVITY (H_2O=1)	No
VAPOR PRESSURE (MM HG.)	None	PERCENT VOLATILE BY VOLUME (%)	No
VAPOR DENSITY (AIR = 1)	None	EVAPORATION RATE (_____ = 1)	No
SOLUBILITY IN WATER	100		
APPEARANCE AND ODOR	White powder		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED)	COC	None	FLAMMABLE LIMITS	LEL	UEL
EXTINGUISHING MEDIA		None			
SPECIAL FIRE FIGHTING PROCEDURES		None			
UNUSUAL FIRE AND EXPLOSION HAZARDS		None			

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	
EFFECTS OF OVEREXPOSURE	None
EMERGENCY AND FIRST AID PROCEDURES	None

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATABILITY (MATERIALS TO AVOID)			
HAZARDOUS DECOMPOSITION PRODUCTS			
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
None
WASTE DISPOSAL METHOD Regular Waste

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)		
VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (GENERAL)	OTHER
PROTECTIVE GLOVES No	EYE PROTECTION	Safety Glasses
OTHER PROTECTIVE EQUIPMENT	Dust Respirator	

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	None
OTHER PRECAUTIONS	None

DATE ISSUED: R-6-30-82

Continental Products of Texas

J. D. Crawford

J. D. CRAWFORD, VICE PRESIDENT

MATERIAL SAFETY DATA SHEET

CORPORATE RESEARCH & DEVELOPMENT

SCHENECTADY, N. Y. 12305

Phone: (518) 385-4085 DIAL COMM 8*235-4085

MATERIALS INFORMATION SERVICES

No. 53

CHLORINE

Date July 1979

SECTION I. MATERIAL IDENTIFICATION

MATERIAL NAME: CHLORINE
OTHER DESIGNATIONS: Cl_2, CAS # 007 782 505
DESCRIPTION: A gas shipped in steel cylinders as a liquid under its own vapor pressure.
MANUFACTURER: Available from many suppliers.

SECTION II. INGREDIENTS AND HAZARDS	%	HAZARD DATA
Chlorine	> 99	8-hr TWA 1 ppm (C) or 3 mg/m^3 *

*Current OSHA ceiling limit. ACGIH TLV (1978) is 1 ppm with a STEL of 3 ppm for up to 15 minutes exposure. NIOSH (1976) proposed a ceiling limit of 0.5 ppm (15 minute sampling time).

(Controversy going on whether OSHA standard should include ceiling limit or not.)

SECTION III. PHYSICAL DATA

Boiling point at 1 atm, deg C	-34	Density at 0°C: Gas at 1 atm, g/liter	3.214
Vapor pressure at 20 C, mm Hg	4800	Liquid at 3.65 atm, g/cc	1.47
Vapor density (Air=1)	2.49	Molecular weight	70.91
Water solubility at 20 C, 1 atm, g/l	7.3		

Appearance & Odor: A greenish-yellow gas or clear, amber-colored liquid with a suffocating, pungent, irritating odor. The odor recognition threshold (100% of test panel, unfatigued) is reported at 0.314 ppm. The odor is easily noticed at 1.9-3.5 ppm and has been reported as intolerable at 2.6-41 ppm, depending on the observer.

SECTION IV. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
Non-flammable				

Use extinguishing media that is appropriate for the surrounding fire. Use water spray to cool intact, fire-exposed containers (one ton tanks and cylinders will release chlorine when a fusible metal safety plug melts at 158-165F.) If possible, have specially trained personnel remove intact cylinders from fire area.

Chlorine will support the burning of most combustible materials, just as oxygen does. Flammable gases and vapors can form explosive mixtures with chlorine.

Firefighters must use self-contained breathing equipment, eye protection, and full protective clothing when fighting fires in which chlorine is involved.

SECTION V. REACTIVITY DATA

Chlorine is stable in steel containers at room temperature when dry. [Intense local heat (above 215°C) on steel walls can cause steel to ignite in chlorine.]

It is a powerful oxidizing agent which reacts violently with reducing agents and combustible materials. Materials such as acetylene, turpentine, other hydrocarbons, ammonia, hydrogen, ether, powdered metals, etc. must be kept away from chlorine.

It reacts with H_2S and H_2O forming HCl; it combines with CO and SO_2 to form phosgene and sulfuryl chloride (toxic and corrosive materials).

Wet chlorine (150 ppm water) corrosively attacks most common metals. Handling chlorine requires special materials technology.

GENERAL ELECTRIC

NO. 53

SECTION VI. HEALTH HAZARD INFORMATION

TLV 1 ppm or 3 mg/m^3 (C)

Chlorine believed to damage the body by local corrosive effects only; no systemic effects. 5-8 ppm in air will be severely irritating to eyes, nose, and respiratory tract of most individuals in a few minutes (10 ppm intolerable for avg. person). Higher level exposures produce coughing, dyspnea, burns of the skin, conjunctivitis, pulmonary edema (may be delayed) and death, depending on concentration and time of exposure (35-51 ppm, lethal in an hour; a few deep breaths fatal at 1000 ppm). Reduced respiratory capacity (especially among smokers) and dental erosion can result from chronic low level exposure. Any contact with liquid chlorine causes burns, blistering and tissue destruction.

FIRST AID: Call physician IMMEDIATELY for any person overexposed to chlorine!

Eye Contact: Flush eyes with water for at least 15 minutes, holding eyelids open. If medical help is not readily available, continue flushing with water.

Skin Contact: (Treat for inhalation exposure first!) Remove contaminated clothing under a safety shower. Wash exposed skin areas thoroughly with water.

Inhalation: Remove to fresh air. Restore breathing when required. Have trained person administer oxygen until victim breathes easily on his own. Keep warm and at rest! In mild cases, give milk to relieve throat irritation.

SECTION VII. SPILL, LEAK, AND DISPOSAL PROCEDURES

Establish written emergency plans and special training of personnel where chlorine is used.

Notify safety personnel. Provide ventilation. Exclude from area all except specially trained, assigned personnel with approved self-contained breathing equipment and appropriate protective clothing. Find and stop leak. (Large uncontrollable leaks require environmental consideration and possible evacuation of surrounding area.)

Move leaking container to isolated area. Position to release gas not liquid.

When possible draw off chlorine to process or to disposal system.

DISPOSAL: Bubble through a large volume of 15% aqueous NaOH or other alkali. Suitably dispose of resulting solution. Follow Federal, State and local regulations.

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general and local exhaust ventilation to meet TLV requirements. Provide suitable venting for low lying areas. Use enclosed, isolated processing and handling whenever possible. Full face-piece respirators must be available for non-routine and emergency use: canister gas mask below 5000 ppm in air and self-contained breathing equipment for other conditions.

Workers should be provided with chemical safety goggles and impervious gloves. Full protective clothing must be used when needed to prevent exposure to chlorine, liquid or gas. Daily change of work clothes and showering after work shift are recommended.

Eyewash stations and chemical safety showers must be available in areas of handling and storage of chlorine.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

Store chlorine containers in well-ventilated areas of low fire potential, away from incompatible materials (see Sec. V) and away from sources of heat and ignition. Protect containers from weather and physical damage; follow standard safety procedures for containers of compressed, corrosive gases. Provide special training to workers handling chlorine. Regularly inspect (and test) piping and containment used for chlorine service. Liquid levels should be less than 85% of tank or cylinder capacity.

Use preplacement and periodic medical exams; preclude from workplace exposure to chlorine those with cardiac, pulmonary or chronic respiratory problems.

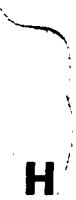
Special Ref: "Chlorine and Hydrogen Chloride", Chapter 5, National Academy of Science, Washington, DC (1976).

DATA SOURCE(S) CODE: 2-12, 17, 19, 24, 26

APPROVALS: MIS, CRD J.M. Nielsen

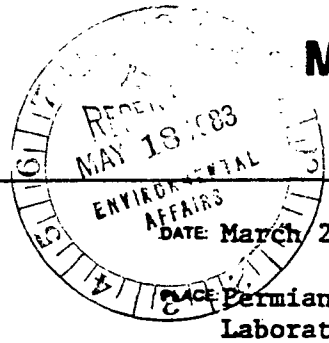
Industrial Hygiene and Safety

MEDICAL REVIEW: 12/79


H

El Paso Natural Gas Company

MEMORANDUM



TO: New Mexico Plants Listed Below

FROM: Vernon D. Rheay

DATE: March 24, 1983

PLACE: Permian Division - Laboratory

RE: Discontinuance Of Side-Stream Filter Backwashing On Closed Systems.

To further improve our efforts to eliminate any discharging of waste water containing hazardous metals and to comply with New Mexico environmental standards, we recommend that the following steps be taken immediately to bring this about:

1. Discontinue any scheduled or occasional backwashing of side-stream filters on the engine jacket and oil cooling systems. These systems contain Chromium which is listed as a hazardous waste when consumed in drinking water. This does not include cooling tower side-stream filters.
2. Should the draining of an engine become necessary because of work-over, this water must no longer be allowed to go to drain. A suitable tank or an accumulation of drums should be arranged for to store this water. Following the repairs this water, of course, should be added back into the system.
3. An inspection for possible leaking valves into the drain system should be undertaken and repaired if necessary. We are looking for zero loss of Chromium containing water to the waste water system.
4. Extra care should be taken to avoid any spillage of chemicals during addition to the systems or during transfer of coolant for engine workover reasons.

We are already monitoring the Chromium content of the wastewater and should be able to advise you of an improvement in this area.

We do not anticipate serious problems from this change, but close observation of the systems should be maintained and detected sour gas leaks and/or leaks should be repaired as soon as possible.

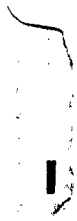
Please advise if you would like to dicuss this change or if there are questions.

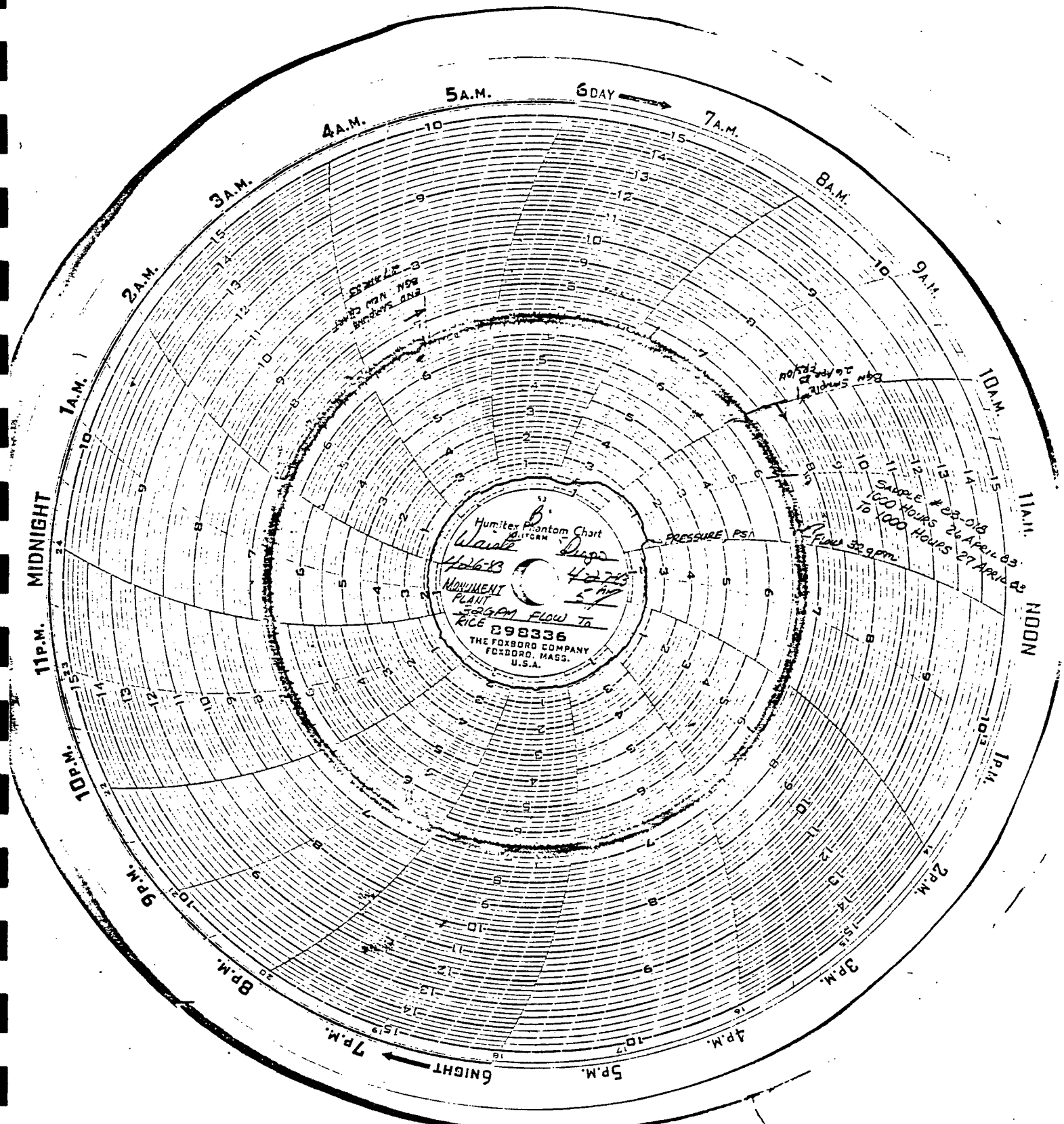
Vernon D. Rheay,
Chief Chemist

VDR/sf

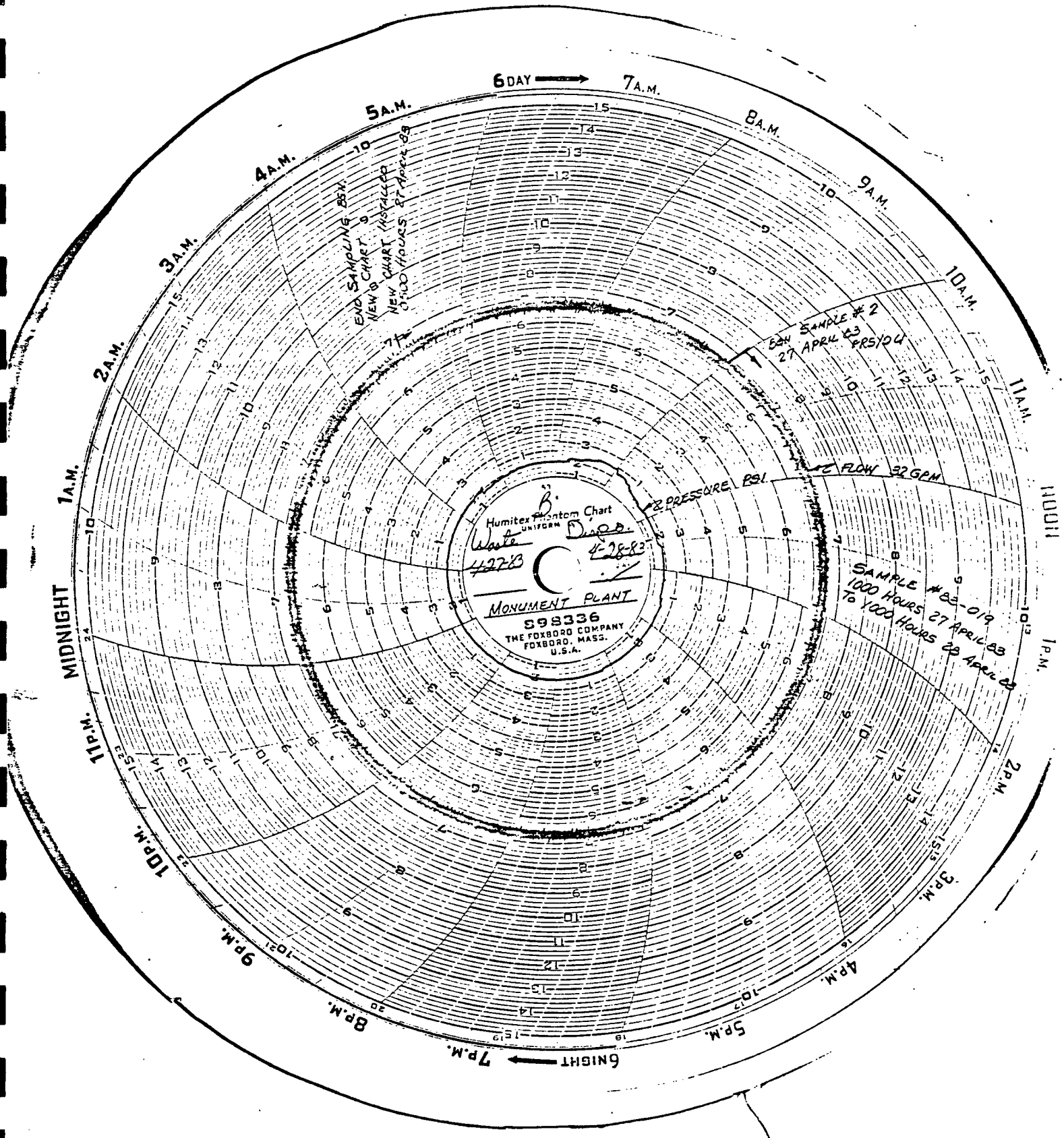
cc: J. W. Cronenberg
Ken Corder
R. T. Wright
Charlie Mathis
C. E. Goin
L. T. McRae - Eunice
Bill Kemper - Eunice
M. E. Webb - Monument
Willie Harbin - Jal #3
Elmo Daniels - Jal #3
Loyd McWhorter - Jal #1
Bill Tuttle - Jal #4 Roy Hess Jal #4

FM 10-0003

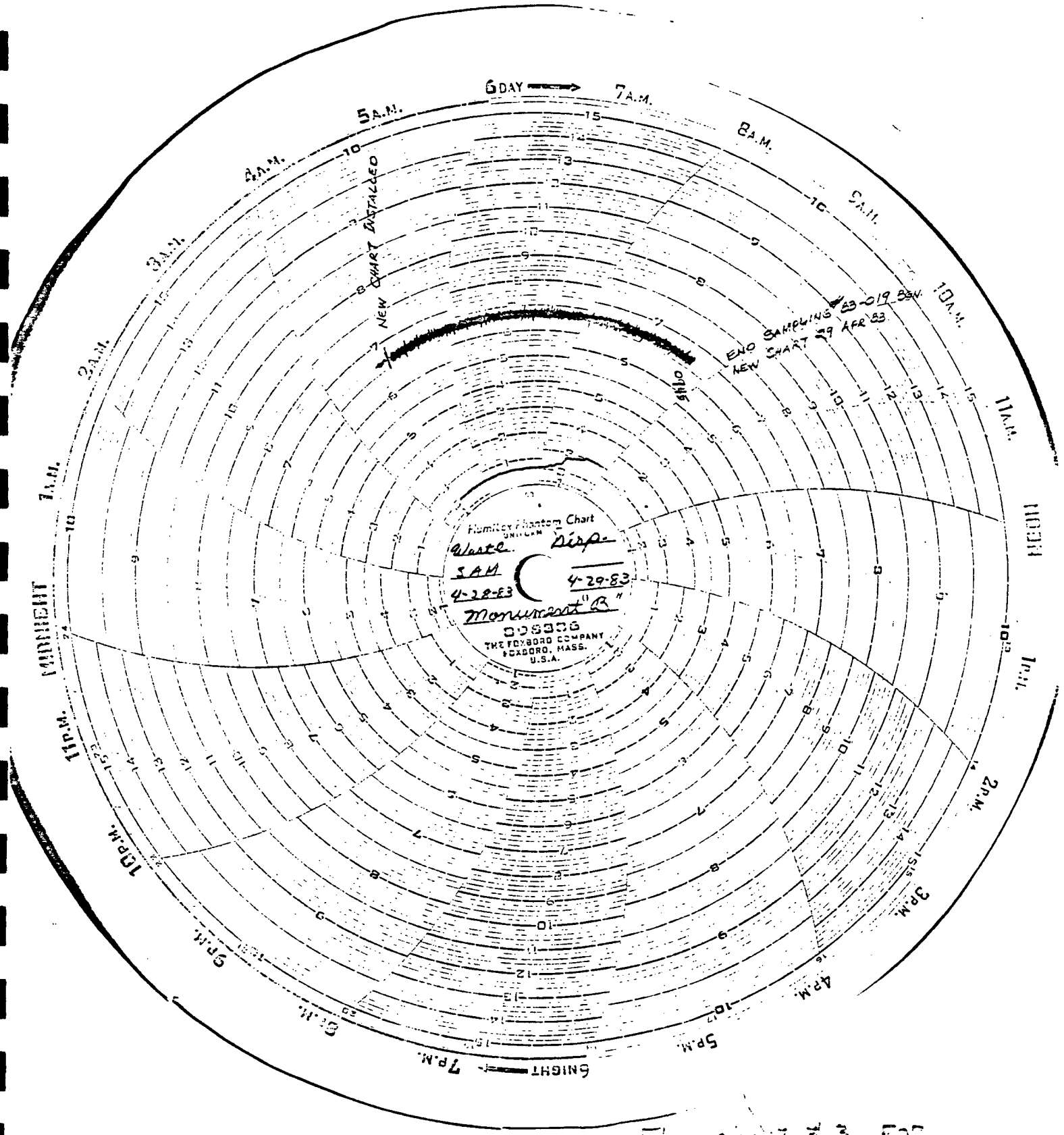




Flow Chart #1 for Monument Plant during sampling of wastewater stream to Rice Engineering.



FLOW CHART #2 FOR
MONUMENT PLANT DURING
SAMPLING OF WASTE WATER
STREAM TO BCE ENGINEERING



FLOW CHART # 3 FOR
MONUMENT PLANT DURING
SAMPLING OF WASTEWATER
STREAM TO RICE ENGINEERING

PRELIMINARY ANALYSIS

MONUMENT PLANT
Elevation 3600 Feet

DATE 26 April 1983

SAMPLE LOCATION	SAMPLE NUMBER	pH	TEMP.	E.C.	D.O.	TURBIDITY F.T.U.	C.O.D.	TIME
Monument	83-018	6.65	20°C	3900	5.0 1/	150		1000
Plant		6.67	20°C	3200	2.2	140		1100
After		6.35	20°C	3000	1.5	140		1200
Filter		6.80	21°C	2400	1.6	110		1300
(Strong		6.44	22°C	2500	1.05	120		1400
H_2S		6.65	22°C	2500	1.30	120		1500
Odor)		6.56	22°C	2400	1.1	110		1600
		6.82	21°C	2400	1.9	400		1700
		6.72	21°C	2500	2.0	320		1800
		6.45	21°C	2400	1.5	120		1900
		6.66	20°C	2800	1.6	120		2000
		6.80	20°C	3200	2.0	140		2100
		6.32	20°C	2700	1.2	130		2200
		6.50	20°C	2500	1.5	120		2300
		6.46	20°C	2400	1.7	120		2400
		6.78	20°C	2600	1.9	130		0100
		6.57	20°C	2700	1.6	120		0200
		6.85	20°C	2400	1.65	110		0300
		6.40	20°C	2600	1.9	120		0400
		6.73	20°C	2500	1.8	110		0500
		6.36	20°C	2400	1.3	100		0600
		6.85	20°C	2500	1.8	110		0700
		7.28	20°C	2500	1.9	80		0800
		7.00	20°C	2500	1.6	80		0900
Average for 26 Apr '83		6.60	20°C	2650	1.8	140		

1/ D.O. Reading taken 30-45 minutes after collection.
Strong sulfide odors were evident in each hourly sample.
Flow measured at 32gpm continuous for 24-hour period.

PRELIMINARY ANALYSIS

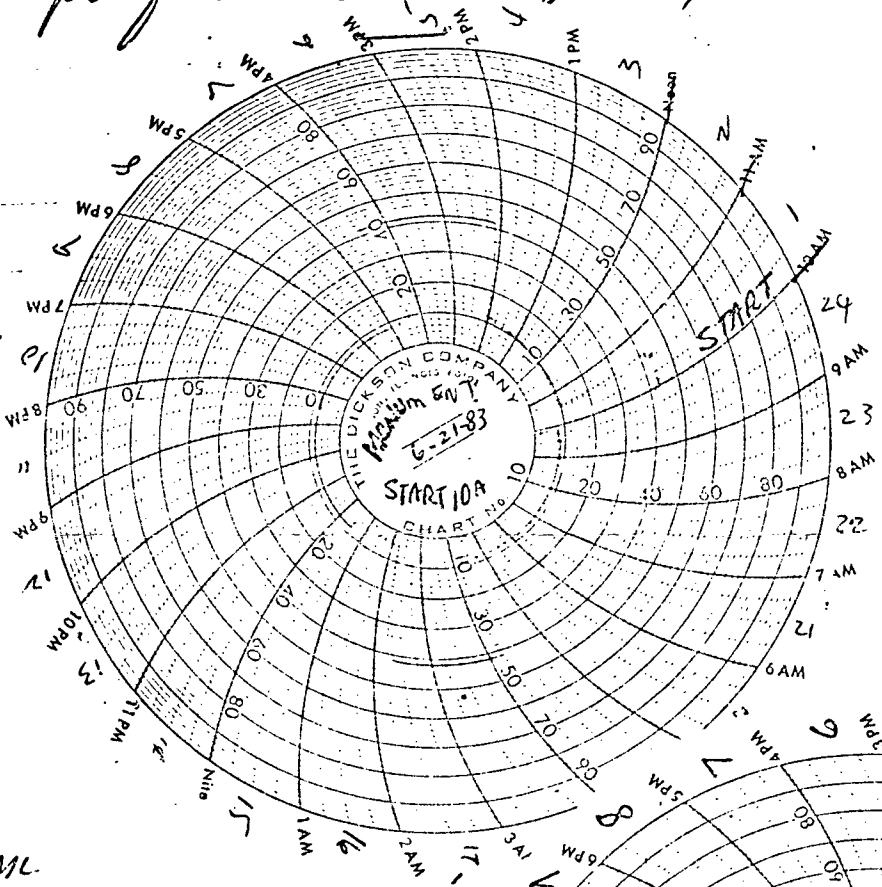
MONUMENT PLANT
Elevation 3600 Feet

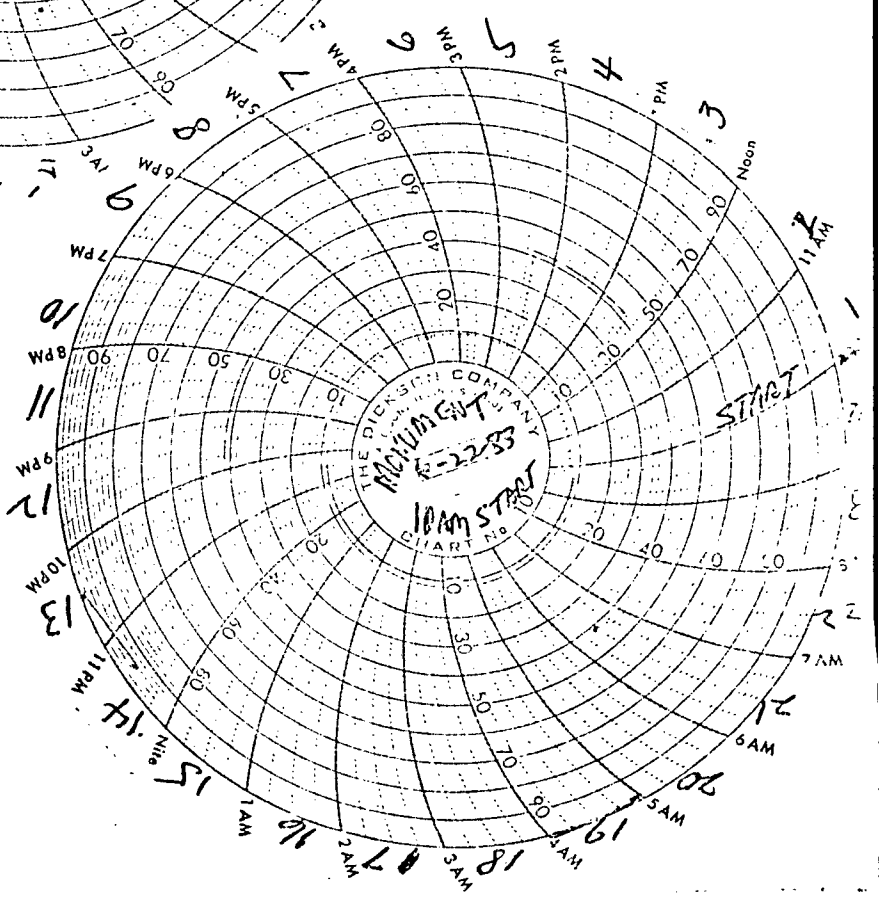
DATE 27 April 1983

SAMPLE LOCATION	SAMPLE NUMBER	pH	TEMP.	E.C.	D.O.	TURBIDITY F.T.U.	C.O.D.	TIME
	83-019	5.78	20°C	2500	1.5	80		1000
		7.12	20°C	2100	1.5	70		1100
		7.21	20°C	2200	1.3	65		1200
		7.24	21°C	2300	1.5	75		1300
		6.75	21°C	2300	1.2	75		1400
		6.90	22°C	2400	1.5	90		1500
		7. 22	22°C	2600	1.6	75		1600
		6.75	21°C	5400	1.6	95		1700
		6.90	21°C	4200	1.5	90		1800
		7.12	21°C	3800	1.6	80		1900
		7.05	20°C	3500	1.6	80		2000
		7.02	20°C	3400	1.6	90		2100
		6.62	20°C	3000	1.05	100		2200
		6.90	20°C	3200	1.1	75		2300
		6.74	20°C	2800	1.5	80		2400
		6.95	20°C	2900	1.2	80		0100
		7.01	20°C	3100	1.4	90		0200
		6.83	20°C	3000	1.6	75		0300
		7.00	20°C	2700	1.8	75		0400
		6.75	20°C	2900	1.7	80		0500
		6.87	20°C	3000	1.7	90		0600
		6.83	20°C	3100	1.8	90		0700
		6.90	20°C	3000	1.9	90		0800
		6.69	20°C	3100	1.45	90		0900
Average for 27 Apr '83		6.72	20°C	3020	1.5	80		
2-Day Average		6.66	20°C	2835	1.65	110		

JUNE, 1983

MONUMENT PLANT 48 HOUR PLANT WASTE WATER SAMPLE — SPECIAL FOR EAD — 10AM 6-21 thru 10AM 6-23. Samples secured, composite calculated, composite mixed, composite acidized by JOE TUTEN. 1 quart non-acidized retained for inorganic analysis. Sample filtered for analysis by Bailey.





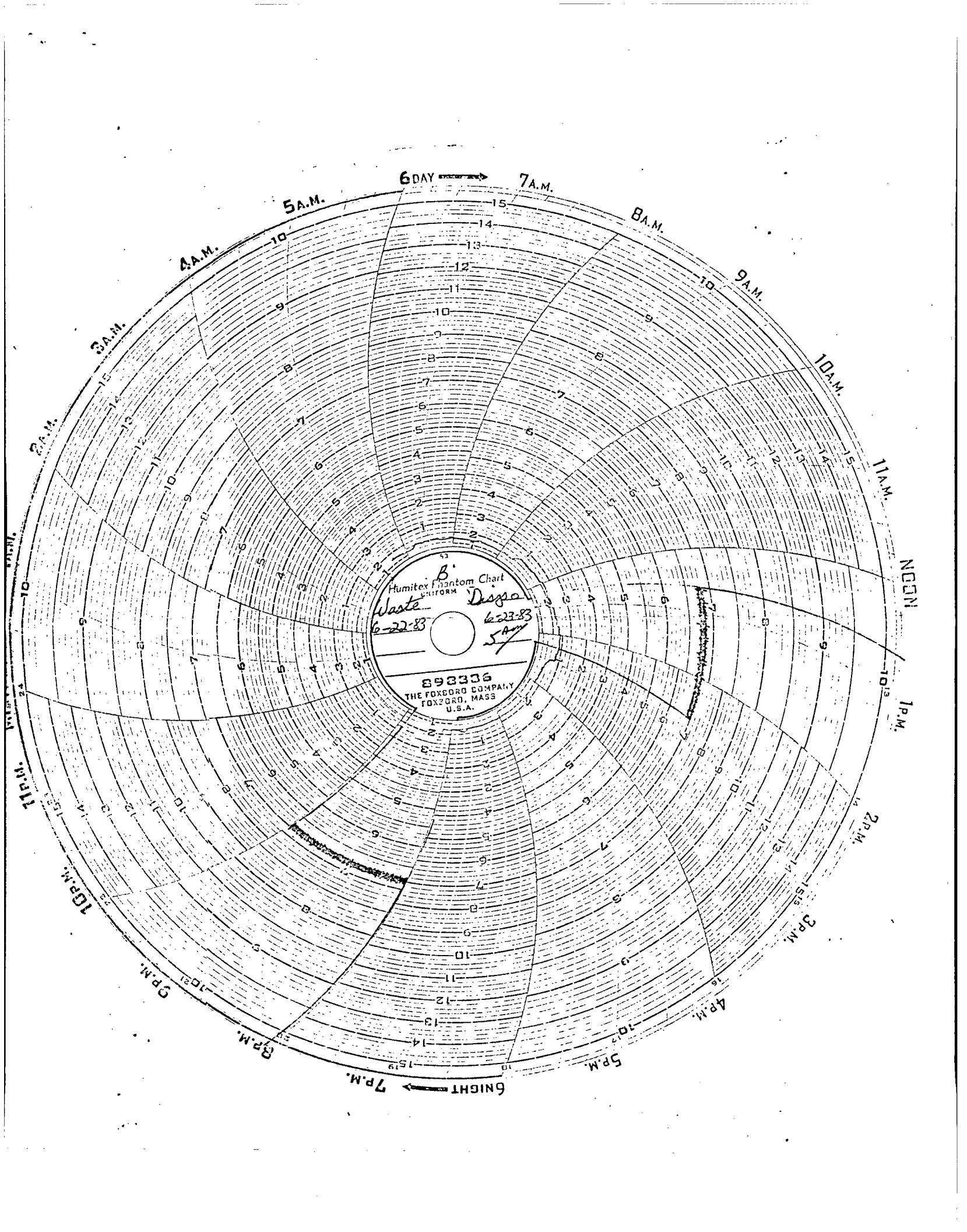
6-21

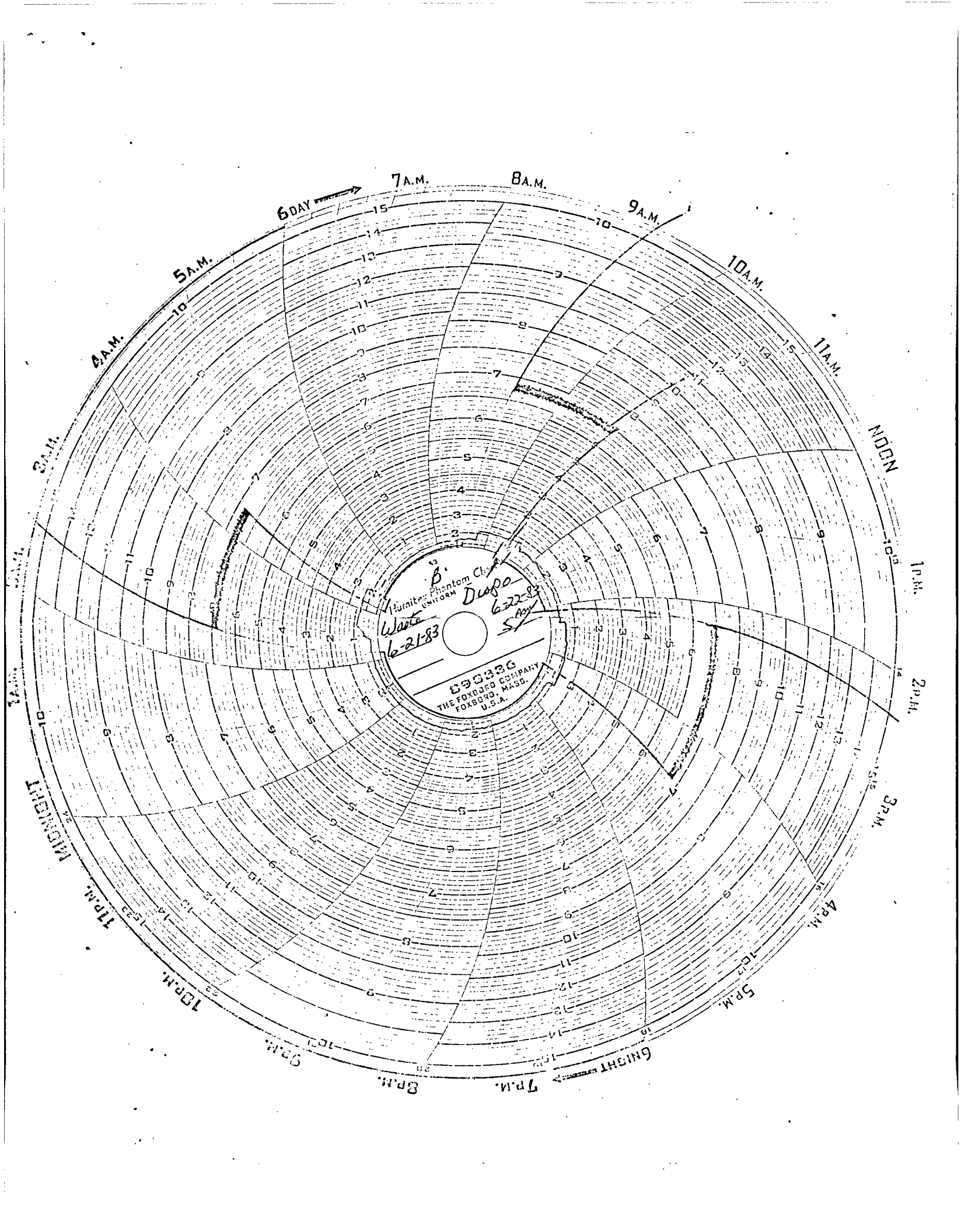
SAMPLE 1	164	ML
5	238	"
6	259	"
7	108	"
17	173	"
18	259	"
19	52	"

6-22

3	164	ML
4	259	
5	104	
10	52	
11	259	
12	207	

2298 ML TOTAL


6 DAY
7 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.
NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 NIGHT
7 P.M.
8 P.M.
9 P.M.
10 P.M.
11 P.M.
12 A.M.
1 A.M.
2 A.M.
3 A.M.
4 A.M.
5 A.M.
Humitek Phantom Chart
UNIFORM
B.
Waste
Dogpo
6-22-83
6-23-83
5 AM
893336
THE FOXBORO COMPANY
FOXBORO, MASS
U.S.A.


6 DAY
7 A.M.
8 A.M.
9 A.M.
10 A.M.
11 A.M.
NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 NIGHT
7 P.M.
8 P.M.
9 P.M.
10 P.M.
11 P.M.
MIDNIGHT
1 A.M.
2 A.M.
3 A.M.
4 A.M.
5 A.M.
B.
Humiter Phantom Ch
Duapo
6-22-83
Waste
6-21-83
239336
THE FOXBORO COMPANY
FOXBORO, MASS.
U.S.A.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/F. R. Sprester Checked by

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "A" at Monument Plant

Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter) A = 16.586 (Acres)

LENGTH: (Longest waterway) L = 1000 (Ft.)

ELEVATION DIFFERENCE: H = 3 (Ft.)

3578.5 ft. minus 3575.5 ft.

S = 0.30 %

RUNOFF CURVE NUMBER: Table 2-1[1/] CN = 85

TIME OF CONCENTRATION: Figure 2-2[1/] Tc = 0.19

	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	2	P =	2.45	
	5	P =	3.30	(In.)
	10	P =	3.90	(In.)
Direct Runoff: Figure 2-4[1/]	2	Q =	1.12	(In.)
	5	Q =	1.85	(In.)
	10	Q =	2.40	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3	
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.24	(CFS/AC In)
PEAK DISCHARGE: q = AxQxI	2	q =	23.03	(CFS)
	5	q =	38.05	(CFS)
	10	q =	49.36	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	2	V =	1.55	(Ac.Ft.)
	5	V =	2.56	(Ac.Ft.)
	10	V =	3.32	(Ac.Ft.)

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

J

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "A" at Monument Plant
Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter)		A =	16.586	(Acres)
LENGTH: (Longest waterway)		L =	1000	(Ft.)
ELEVATION DIFFERENCE:		H =	3	(Ft.)
3578.5 ft. minus 3575.5 ft.				
		S =	0.30 %	
RUNOFF CURVE NUMBER: Table 2-1[1/]		CN =	85	
TIME OF CONCENTRATION: Figure 2-2[1/]		Tc =	0.19	
	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	25	P =	4.75	
	50	P =	5.20	(In.)
	100	P =	6.10	(In.)
Direct Runoff: Figure 2-4[1/]	25	Q =	3.16	(In.)
	50	Q =	3.55	(In.)
	100	Q =	4.40	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3	
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.24	(CFS/AC In.)
PEAK DISCHARGE: q = AxQxI	25	q =	64.99	(CFS)
	50	q =	73.01	(CFS)
	100	q =	90.49	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	25	V =	4.37	(Ac.Ft.)
	50	V =	4.91	(Ac.Ft.)
	100	V =	6.08	(Ac.Ft.)

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "B" at Monument Plant
Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter) A = 7.494 (Acres)

LENGTH: (Longest waterway) L = 850 (Ft.)

ELEVATION DIFFERENCE: H = 1.5 (Ft.)

3576.5 ft. minus 3575.0 ft.

S = 0.18 %

RUNOFF CURVE NUMBER: Table 2-1[1/] CN = 85

TIME OF CONCENTRATION: Figure 2-2[1/] Tc = 0.15

	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	2	P =	2.45	
	5	P =	3.30	(In.)
	10	P =	3.90	(In.)
Direct Runoff: Figure 2-4[1/]	2	Q =	1.12	(In.)
	5	Q =	1.85	(In.)
	10	Q =	2.40	(In.)

DISTRIBUTION CURVE NO.: Exhibit 2-3[1/] DC = 65 SD-3

RATE OF RUNOFF: FIGURE 2-5[1/] I = 1.30 (CFS/AC In.)

PEAK DISCHARGE: q = AxQxI	2	q =	10.91	(CFS)
	5	q =	18.02	(CFS)
	10	q =	23.38	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	2	V =	0.70	(Ac.Ft.)
	5	V =	1.16	(Ac.Ft.)
	10	V =	1.50	(Ac.Ft.)

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "B" at Monument Plant
Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter)		A =	7.494	(Acres)
LENGTH: (Longest waterway)		L =	850	(Ft.)
ELEVATION DIFFERENCE:		H =	1.5	(Ft.)
3576.5 ft. minus 3575.0 ft.				
	S = 0.18 %			
RUNOFF CURVE NUMBER: Table 2-1[1/]		CN =	85	
TIME OF CONCENTRATION: Figure 2-2[1/]		Tc =	0.15	
	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	25	P =	4.75	
	50	P =	5.20	(In.)
	100	P =	6.10	(In.)
Direct Runoff: Figure 2-4[1/]	25	Q =	3.16	(In.)
	50	Q =	3.55	(In.)
	100	Q =	4.40	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3	
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.30	(CFS/AC In)
PEAK DISCHARGE: q = AxQxI	25	q =	30.78	(CFS)
	50	q =	34.58	(CFS)
	100	q =	42.86	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	25	V =	1.97	(Ac.Ft.)
	50	V =	2.22	(Ac.Ft.)
	100	V =	2.75	(Ac.Ft.)

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "C" at Monument Plant
Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter)		A =	8.360	(Acres)
LENGTH: (Longest waterway)		L =	650	(Ft.)
ELEVATION DIFFERENCE:		H =	1.0	(Ft.)
3575.7 ft. minus 3574.7 ft.				
	S = 0.15 %			
RUNOFF CURVE NUMBER: Table 2-1[1/]		CN =	80	
TIME OF CONCENTRATION: Figure 2-2[1/]		Tc =	0.11	
	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	2	P =	2.45	
	5	P =	3.30	(In.)
	10	P =	3.90	(In.)
Direct Runoff: Figure 2-4[1/]	2	Q =	1.15	(In.)
	5	Q =	1.50	(In.)
	10	Q =	1.98	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3	
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.30	(CFS/AC In.)
PEAK DISCHARGE: q = AxQxI	2	q =	12.50	(CFS)
	5	q =	16.30	(CFS)
	10	q =	21.52	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	2	V =	0.80	(Ac.Ft.
	5	V =	1.05	(Ac.Ft.
	10	V =	1.38	(Ac.Ft.

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "C" at Monument Plant
Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter)		A =	8.360	(Acres
LENGTH: (Longest waterway)		L =	650	(Ft.)
ELEVATION DIFFERENCE:		H =	1.0	(Ft.)
3575.7 ft. minus 3574.7 ft.				
	S = 0.15 %			
RUNOFF CURVE NUMBER: Table 2-1[1/]		CN =	80	
TIME OF CONCENTRATION: Figure 2-2[1/]		Tc =	0.11	
	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	25	P =	4.75	
	50	P =	5.20	(In.)
	100	P =	6.10	(In.)
Direct Runoff: Figure 2-4[1/]	25	Q =	2.70	(In.)
	50	Q =	3.08	(In.)
	100	Q =	3.88	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	.65 SD-3	
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.30	(CFS/A In.)
PEAK DISCHARGE: q = AxQxI	25	q =	29.34	(CFS)
	50	q =	33.47	(CFS)
	100	q =	42.17	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	25	V =	1.88	(Ac.Ft.
	50	V =	2.15	(Ac.Ft
	100	V =	2.70	(Ac.Ft.

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "D" at Monument Plant

Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter)		A =	1.793	(Acres
LENGTH: (Longest waterway)		L =	325	(Ft.)
ELEVATION DIFFERENCE:		H =	0.4	(Ft.)
3574.6 ft. minus 3574.2 ft.				
		S =	0.12 %	
RUNOFF CURVE NUMBER: Table 2-1[1/]		CN =	70	
TIME OF CONCENTRATION: Figure 2-2[1/]		Tc =	0.06	
	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	2	P =	2.45	
	5	P =	3.30	(In.)
	10	P =	3.90	(In.)
Direct Runoff: Figure 2-4[1/]	2	Q =	0.42	(In.)
	5	Q =	0.90	(In.)
	10	Q =	1.28	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3	
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.28	(CFS/AC In)
PEAK DISCHARGE: q = AxQxI	2	q =	0.96	(CFS)
	5	q =	2.06	(CFS)
	10	q =	2.94	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	2	V =	0.06	(Ac.Ft.
	5	V =	0.13	(Ac.Ft
	10	V =	0.19	(Ac.Ft.

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "D" at Monument Plant
Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter) A = 1.793 (Acres

LENGTH: (Longest waterway) L = 325 (Ft.)

ELEVATION DIFFERENCE: H = 0.4 (Ft.)

3574.6 ft. minus 3574.2 ft.

S = 0.12 %

RUNOFF CURVE NUMBER: Table 2-1[1/] CN = 70

TIME OF CONCENTRATION: Figure 2-2[1/] Tc = 0.06

	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	25	P =	4.75	
	50	P =	5.20	(In.)
	100	P =	6.10	(In.)
Direct Runoff: Figure 2-4[1/]	25	Q =	1.85	(In.)
	50	Q =	2.20	(In.)
	100	Q =	2.90	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3	
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.28	(CFS/Ac In)
PEAK DISCHARGE: q = AxQxI	25	q =	4.25	(CFS)
	50	q =	5.05	(CFS)
	100	q =	6.66	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	25	V =	0.28	(Ac.Ft.
	50	V =	0.33	(Ac.Ft
	100	V =	0.43	(Ac.Ft.

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "E" at Monument Plant
Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter) A = 13.9 (Acres)

LENGTH: (Longest waterway) L = 800 (Ft.)

ELEVATION DIFFERENCE: H = 1.6 (Ft.)

3575.8 ft. minus 3574.2 ft.

S = 0.2 %

RUNOFF CURVE NUMBER: Table 2-1[1/] CN = 65

TIME OF CONCENTRATION: Figure 2-2[1/] Tc = 0.14

	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	2	P =	2.45	
	5	P =	3.30	(In.)
	10	P =	3.90	(In.)
Direct Runoff: Figure 2-4[1/]	2	Q =	0.30	(In.)
	5	Q =	0.65	(In.)
	10	Q =	0.98	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3	
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.30	(CFS/AC In)
PEAK DISCHARGE: q = AxQxI	2	q =	5.42	(CFS)
	5	q =	11.75	(CFS)
	10	q =	17.71	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	2	V =	0.35	(Ac.Ft.
	5	V =	0.75	(Ac.Ft
	10	V =	1.14	(Ac.Ft.

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981 -

AREA DESCRIPTION:[2/] Drainage Area "E" at Monument Plant
Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter) A = 13.9 (Acre

LENGTH: (Longest waterway) L = 800 (Ft.)

ELEVATION DIFFERENCE: H = 1.6 (Ft.)

3575.8 ft. minus 3574.2 ft.

S = 0.2 %

RUNOFF CURVE NUMBER: Table 2-1[1/] CN = 65

TIME OF CONCENTRATION: Figure 2-2[1/] Tc = 0.14

	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	25	P =	4.75	
	50	P =	5.20	(In.)
	100	P =	6.10	(In.)
Direct Runoff: Figure 2-4[1/]	25	Q =	1.50	(In.)
	50	Q =	2.20	(In.)
	100	Q =	2.42	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3	
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.30	(CFS/ In)
PEAK DISCHARGE: q = AxQxI	25	q =	27.10	(CFS)
	50	q =	39.75	(CFS)
	100	q =	43.75	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	25	V =	1.74	(Ac.Ft
	50	V =	2.55	(Ac.Ft
	100	V =	2.80	(Ac.Ft.

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "F" at Monument Plant
Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter)		A =	13.842	(Acres
LENGTH: (Longest waterway)		L =	1500	(Ft.)
ELEVATION DIFFERENCE:		H =	8.5	(Ft.)
3580.5 ft. minus 3572.0 ft.				
	S = 0.57 %			
RUNOFF CURVE NUMBER: Table 2-1[1/]		CN =	60	
TIME OF CONCENTRATION: Figure 2-2[1/]		Tc =	0.25	
	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	2	P =	2.45	
	5	P =	3.30	(In.)
	10	P =	3.90	(In.)
Direct Runoff: Figure 2-4[1/]	2	Q =	0.18	(In.)
	5	Q =	0.45	(In.)
	10	Q =	0.70	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3	
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.30	(CFS/AC In.)
PEAK DISCHARGE: q = AxQxI	2	q =	3.24	(CFS)
	5	q =	8.10	(CFS)
	10	q =	12.60	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	2	V =	0.21	(Ac.Ft.
	5	V =	0.52	(Ac.Ft
	10	V =	0.81	(Ac.Ft.

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "F" at Monument Plant

Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter)		A =	13.842	(Acres
LENGTH: (Longest waterway)		L =	1500	(Ft.)
ELEVATION DIFFERENCE:		H =	8.5	(Ft.)
3580.5 ft. minus 3572.0 ft.				
	S = 0.57 %			
RUNOFF CURVE NUMBER: Table 2-1[1/]		CN =	60	
TIME OF CONCENTRATION: Figure 2-2[1/]		Tc =	0.25	
	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	25	P =	4.75	
	50	P =	5.20	(In.)
	100	P =	6.10	(In.)
Direct Runoff: Figure 2-4[1/]	25	Q =	1.18	(In.)
	50	Q =	1.40	(In.)
	100	Q =	2.00	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3	
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.30	(CFS/A(
				In.)
PEAK DISCHARGE: q = AxQxI	25	q =	21.23	(CFS)
	50	q =	25.19	(CFS)
	100	q =	35.99	(CFS)
VOLUME OF RUNOFF: Vol = (QxA)				
÷ 12 in/ft	25	V =	1.36	(Ac.Ft.
	50	V =	1.61	(Ac.Ft
	100	V =	2.31	(Ac.Ft.

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "G" at Monument Plant
Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter)		A =	26.277 (Acres
LENGTH: (Longest waterway)		L =	1850 (Ft.)
ELEVATION DIFFERENCE:		H =	10.7 (Ft.)
3580.5 ft. minus 3569.8 ft.			
		S =	0.58 %
RUNOFF CURVE NUMBER: Table 2-1[1/]		CN =	80
TIME OF CONCENTRATION: Figure 2-2[1/]		Tc =	0.30
	Yr. Freq.		
RAINFALL, 24 HR. Table 1 this Report	2	P =	2.45
	5	P =	3.30 (In.)
	10	P =	3.90 (In.)
Direct Runoff: Figure 2-4[1/]	2	Q =	1.15 (In.)
	5	Q =	1.50 (In.)
	10	Q =	1.98 (In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.11 (CFS/Ac In
PEAK DISCHARGE: q = AxQxI	2	q =	33.54 (CFS)
	5	q =	43.75 (CFS)
	10	q =	57.75 (CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	2	V =	2.52 (Ac.Ft
	5	V =	3.28 (Ac.Ft
	10	V =	4.34 (Ac.Ft

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "G" at Monument Plant
Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter) A = 26.277 (Acres

LENGTH: (Longest waterway) L = 1850 (Ft.)

ELEVATION DIFFERENCE: H = 10.7 (Ft.)

3580.5 ft. minus 3569.8 ft.

S = 0.58 %

RUNOFF CURVE NUMBER: Table 2-1[1/] CN = 80

TIME OF CONCENTRATION: Figure 2-2[1/] Tc = 0.30

	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	25	P =	4.75	
	50	P =	5.20	(In.)
	100	P =	6.10	(In.)
Direct Runoff: Figure 2-4[1/]	25	Q =	2.70	(In.)
	50	Q =	3.08	(In.)
	100	Q =	3.88	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3	
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.11	(CFS/Ac In.)
PEAK DISCHARGE: q = AxQxI	25	q =	78.75	(CFS)
	50	q =	89.84	(CFS)
	100	q =	113.17	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	25	V =	5.91	(Ac.Ft.
	50	V =	6.74	(Ac.Ft
	100	V =	8.50	(Ac.Ft

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "H" at Monument Plant

Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter)		A =	16.358 (Acres)
LENGTH: (Longest waterway)		L =	1750 (Ft.)
ELEVATION DIFFERENCE:		H =	9.5 (Ft.)
3578.5 ft. minus 3569.0 ft.			
		S =	0.54 %
RUNOFF CURVE NUMBER: Table 2-1[1/]		CN =	60
TIME OF CONCENTRATION: Figure 2-2[1/]		Tc =	0.29
	Yr. Freq.		
RAINFALL, 24 HR. Table 1 this Report	2	P =	2.45
	5	P =	3.30 (In.)
	10	P =	3.90 (In.)
Direct Runoff: Figure 2-4[1/]	2	Q =	0.18 (In.)
	5	Q =	0.45 (In.)
	10	Q =	0.70 (In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.10 (CFS/In)
PEAK DISCHARGE: q = AxQxI	2	q =	3.24 (CFS)
	5	q =	8.10 (CFS)
	10	q =	12.60 (CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	2	V =	0.25 (Ac.Ft)
	5	V =	0.61 (Ac.Ft)
	10	V =	0.95 (Ac.Ft)

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "H" at Monument Plant

Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter) A = 16.358 (Acres)

LENGTH: (Longest waterway) L = 1750 (Ft.)

ELEVATION DIFFERENCE: H = 9.5 (Ft.)

3578.5 ft. minus 3569.0 ft.

S = 0.54 %

RUNOFF CURVE NUMBER: Table 2-1[1/] CN = 60

TIME OF CONCENTRATION: Figure 2-2[1/] Tc = 0.29

	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	25	P =	4.75	
	50	P =	5.20	(In.)
	100	P =	6.10	(In.)
Direct Runoff: Figure 2-4[1/]	25	Q =	1.18	(In.)
	50	Q =	1.40	(In.)
	100	Q =	2.00	(In.)

DISTRIBUTION CURVE NO.: Exhibit 2-3[1/] DC = 65 SD-3

RATE OF RUNOFF: FIGURE 2-5[1/] I = 1.10 (CFS/AC In.)

PEAK DISCHARGE: q = AxQxI	25	q =	21.23	(CFS)
	50	q =	25.19	(CFS)
	100	q =	35.99	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	25	V =	1.61	(Ac.Ft.)
	50	V =	1.91	(Ac.Ft.)
	100	V =	2.73	(Ac.Ft.)

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/Checked by F. R. Sprester

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "I" at Monument Plant
Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter)		A =	2.849 (Acres
LENGTH: (Longest waterway)		L =	850 (Ft.)
ELEVATION DIFFERENCE:		H =	4.5 (Ft.)
3574.0 ft. minus 3569.5 ft.		S =	0.53 %
RUNOFF CURVE NUMBER: Table 2-1[1/]		CN =	60
TIME OF CONCENTRATION: Figure 2-2[1/]		Tc =	0.15
	Yr. Freq.		
RAINFALL, 24 HR. Table 1 this Report	2	P =	2.45
	5	P =	3.30 (In.)
	10	P =	3.90 (In.)
Direct Runoff: Figure 2-4[1/]	2	Q =	0.18 (In.)
	5	Q =	0.45 (In.)
	10	Q =	0.70 (In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.30 (CFS/AC In)
PEAK DISCHARGE: q = AxQxI	2	q =	0.67 (CFS)
	5	q =	1.67 (CFS)
	10	q =	2.59 (CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	2	V =	0.04 (Ac.Ft.
	5	V =	0.11 (Ac.Ft
	10	V =	0.17 (Ac.Ft.

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

EL PASO NATURAL GAS COMPANY

HYDROLOGY DATA SHEET[1/]

CALCULATED BY: O. Uribe/F. R. Sprester Checked by

DATE: September 1981

AREA DESCRIPTION:[2/] Drainage Area "I" at Monument Plant
Lea County, New Mexico

DRAINAGE AREA:[3/] (by planimeter)		A =	2.849	(Acres)
LENGTH: (Longest waterway)		L =	850	(Ft.)
ELEVATION DIFFERENCE:		H =	4.5	(Ft.)
3574.0 ft. minus 3569.5 ft.		S =	0.53 %	
RUNOFF CURVE NUMBER: Table 2-1[1/]		CN =	60	
TIME OF CONCENTRATION: Figure 2-2[1/]		Tc =	0.15	
	Yr. Freq.			
RAINFALL, 24 HR. Table 1 this Report	25	P =	4.75	
	50	P =	5.20	(In.)
	100	P =	6.10	(In.)
Direct Runoff: Figure 2-4[1/]	25	Q =	1.18	(In.)
	50	Q =	1.40	(In.)
	100	Q =	2.00	(In.)
DISTRIBUTION CURVE NO.: Exhibit 2-3[1/]		DC =	65 SD-3	
RATE OF RUNOFF: FIGURE 2-5[1/]		I =	1.30	(CFS/AC In.)
PEAK DISCHARGE: q = AxQxI	25	q =	4.37	(CFS)
	50	q =	5.18	(CFS)
	100	q =	7.41	(CFS)
VOLUME OF RUNOFF: Vol = (QxA) ÷ 12 in/ft	25	V =	0.28	(Ac.Ft.
	50	V =	0.33	(Ac.Ft.
	100	V =	0.47	(Ac.Ft.)

COMMENTS:

1/ McDougal, 1973.

2/ There are no structures used to retain storm runoff. Several of the existing ponds in and around the site were constructed with dikes to prevent inflow of storm runoff.

3/ See plant area and drainage pattern drawing in map pocket.

K

DRAIN LINE TESTING PROCEDURE
FOR
EL PASO NATURAL GAS COMPANY
MONUMENT PLANT
LEA COUNTY, NEW MEXICO

SUMMARY

This drain line testing plan sets forth the methods and procedures which El Paso Natural Gas Company proposes to use to verify the integrity of the underground drain system at the Monument Plant.

The purpose of this testing is to ensure that wastewater flowing through this piping system is contained and does not contribute to the degradation of groundwater quality in the general area of Monument Plant.

Recordkeeping and reporting have been addressed in the General Instruction section. All charts, worksheets and resulting reports will be retained for a minimum of five years.

Detailed instructions are given for testing each major section of drain line. As each section is tested, all laterals (smaller drains) which flow into the main header will be subjected to the same test procedure. This will assure that all underground drain piping is tested.

DRAIN LINE TESTING PROCEDURES FOR MONUMENT PLANT

Introduction

The following procedures are arranged to allow testing of various sections of the drain system with the plant in operation. Some sections will require a plant shutdown to permit testing.

Water used in testing will be raw water from the plant water system. Use of fire hydrants and hoses will be required in some locations to provide sufficient volume and pressure for filling and testing. In most cases, test pressures will be below normal line pressure in plant water mains making use of a hydrostatic test pump unnecessary. Higher test pressures will require such a pump.

The test pressures and duration used in this procedure exceed those specified for drainage and vent systems as set forth in the 1979 ICBO Code, Sections 1004 (A) 1 and 1005. The International Conference of Building Officials (ICBO) Plumbing Code of the Uniform Plumbing Code describe the procedures to be utilized in this testing procedure. The pressures and duration required in the ICBO Code are 4.3 psi and 15 minutes, respectively.

General Instructions

1. Before attempting to test any section of drain line, verify the sources of effluent and vapors entering the line. Any line which may contain significant amounts of Hydrogen Sulfide (H_2S) will be opened and tested observing all prescribed safety precautions and procedures.

2. All drain lines, containment aprons, scrubbers, classifier and contingency tank are shown on drawing no. 1MO-1P1, "Monument Compressor Station Plot Plan". This drawing shows both the 6" open gravity drain and the 4" closed drain systems.

3. All drain and block valves which are lubricated plug valves, should be lubricated in the closed position to minimize the possibility of leakage.

4. Before installing expandable plugs, clean the interior portion of the pipe where plug seal will contact the pipe wall to assure proper sealing.

5. Use new gaskets when installing blind plates in flange unions and tighten flange bolts evenly to prevent both tilting of flange faces and leakage.

6. Filling a test section should always be done from the lowest tap, venting at the higher taps to displace as much air or gas from the line as possible. Air or gas in the line, especially large amounts, may cause instability in pressure readings.

7. Test pressures given for each section to be tested are 10 p.s.i. above the maximum recorded pressure for that section of line. Test pressure should be applied only after system pressure is stabilized at some lower pressure. The test duration will be for one (1) hour.

8. After the test pressure has been applied and stabilized, the system will be isolated and testing will begin. This is to be a static pressure test. The introduction of additional pressure will void the previous time interval and will require restarting the test.

9. If a section will not maintain the static test pressure for the required time, provided there is no valve, fitting or flange leakage, this section of drain line will be considered faulty. At this point it may be necessary to further isolate smaller sections of the line or expose the entire line until the leaking portion can be located and replaced or repaired.

a. It should be noted that leakage can occur around the plug of a valve unless a sealing type grease is used to lubricate the valve in the closed position.

b. Leakage will occur around the seal of an expandable plug unless the inside pipe surfaces are thoroughly cleaned prior to inserting the plug.

c. Improper tightening of flange unions or faulty, used, or dirty gaskets will cause leakage at the blind plate installations.

d. Other points to check for system leakage are: loose screwed fittings and valve, stem packing (or bonnet) leakage on gate or globe valve, and faulty resilient seats in butterfly valves.

10. Test pressures will be recorded on a circular chart which will be retained as a permanent record. Recorders referred to in this procedure are Dickson Compact Battery Powered Recorders which use 4-1/2" diameter charts and, upon completion of section test, will be removed from the test tap and the tap plugged. The 100# chart is chart No. 10; the 60# chart is chart No. 29.

11. At the end of testing interval, remove the chart from the recorder before unscrewing the unit from the pressure tap to prevent irrelevant pen markings, ink spillage, or other chart damage.

12. Each chart will have the following information recorded on the back:

a. Date
b. Tap location

c. Line Description

d. Initials of person changing chart

e. Signature of person supervising testing

These charts will be retained at the plant office for referenced and inspection as required.

13. When the integrity of the drain system, or a section of the system, has been verified, the system, or section, will be returned to normal service.

14. All drains will be tested annually and a written report sent to the area superintendent with copies to Engineering and the file at the Plant.

15. Because the classifier tank is to be operated at atmospheric pressure any pressure or vacuum testing of this tank can cause damage to the tank and/or coating system. Therefore, the only possible method of testing the classifier tank will involve filling the tank with water and guaging any drop in level over an 8 hour period. This test will be performed annually.

16. For same reason specified for the classifier tank, pressure or vacuum testing of the oil tank is precluded. The tank will be filled with water and guaged to verify the maintenance of a constant level for a 4 hour period. This test will also be performed annually.

4" CLOSED SYSTEM DRAIN LINE FROM "A" COMPRESSOR INLET GAS SCRUBBERS TO THE CLASSIFIER TANK

1. Check the block valves on the drains from the two (2) vertical scrubbers on the "A" compressor station inlet; (close and lubricate as required).

2. Check the two (2) block valves on the drains from the horizontal scrubber on the "A" Compressor Station inlet; (close and lubricate as required).

3. Check the two (2) block valves on the drains on the Hobbs lines and the line from Warren Petroleum Co.; (close and lubricate as required).

4. Check the two (2) block valves on the drains from the vertical scrubber on the "B" compressor station second stage discharge; (close and lubricate as required).

5. Check the two (2) block valves on the drains from the 30" and 16" discharge headers on the south side of the cooling tower; (close and lubricate as required).

6. Check the block valves on the drains from the "B" compressor station inlet scrubber and the interstage scrubber; (close and lubricate as required).

7. Check five (5) block valves on drains on the suction and discharge headers at "B" Compressor Station; (close and lubricate as required).

8. Insert blind plate in 4" ANSI 150# flange union at the inlet to the 36" O.D. blowdown scrubber in the classifier area.

9. Open vent valve near "A" Compressor Station inlet scrubber.

10. Using the tap at the 36" O.D. blowdown scrubber near the classifier, fill the system with water until all air/gas has been displaced from the lines.

11. Close and plug all vent valves.

12. Install properly zeroed 60# recorder on either the tap at the "A" Compressor inlet scrubber or the tap at the blowdown scrubber, then stablize the system using the fill tap.

13. Raise the pressure to 16 psig on the system. Stabilize this test pressure then begin static pressure test as specified in General Instruction, Item 8.

14. If the test pressure cannot be maintained on the isolated system as specified, refer to General Instruction, Item 9.

15. At the end of the test period, the chart will be removed and retained for a permanent record and shall be identified as indicated in General Instruction, Item 12.

16. Upon completion of the test, release the pressure.

17. Remove the 4" blind plate from the flange union at the blowdown scrubber.

18. Close and plug all vent and fill taps.

6" GRAVITY DRAIN FROM AUXILIARY BUILDING TO THE THE CLASSIFIER TANK (INCLUDES OVERFLOW FROM CLASSIFIER TO CONTINGENCY TANK)

1. Insert expandable plugs in floor and pipe trench drains in the auxiliary building.

2. Open the vents on all of the expandable plugs.

3. Disconnect and plug the discharge piping from the sump pump in the southwest corner of "A" compressor building.

4. At the cooling tower acid tank apron drain, remove the screen from the drain line opening, clean the interior surfaces and install expandable plug.

5. Check the 3/4" block valve just downstream of the meter and the bypass valve on the cooling tower blowdown line; (close and lubricate as required).

6. Check the 2" valve on the drain from the air storage tank located at the north end of "B" compressor station; (close and lubricate as required).

7. Check the valves on the drain from the water treater; (close and lubricate as required).

8. Check the valve on the "B" compressor station open drain; (close and lubricate as required).

9. Insert a blind plate in the 6" flange union at the classifier tank inlet.

10. Check block valve on the bottom outlet of the chlorination contact tank; (close and lubricate as required).

11. Install a blind plate in the flange union at the top outlet of the chlorination contact tank.

12. Install an expandable plug in the vent on the outlet line from the chlorination contact tank.

13. Check the block valves on the outlet of the blowdown scrubber; (close if required).

14. Disconnect the screwed pipe union on the 1" drain between the vent line and the outlet line from the blowdown scrubber. Plug the 1" drain line.

15. Check clean out plugs to be sure they are secure.

16. Remove the blind plate from the orifice union in the 6" by-pass line from the gravity drain line to the classifier overflow line.

17. Install a blind plate in the flange union at the classifier overflow nozzle.

18. Disconnect and plug the 2" contingency tank return line at the classifier.

19. Check the 6" valve on the classifier overflow line at the contingency tank; (close and lubricate as required).

20. Disconnect and plug the 3" contingency tank pump discharge line.

21. Open the vent valves at auxiliary building and in expandable plugs at the 3 drain aprons; (one(1) at the auxiliary building and two(2) at the cooling tower).

22. Fill the open gravity drain system with water until all air/gas has been displaced from the lines.

23. Close and plug all vent valves.

24. Install a properly zeroed 60# recorder on either the tap at the blowdown scrubber or the tap located at the auxiliary building.

25. Raise the pressure to 16 psig on the system. Stabilize this test pressure then begin the static pressure test as specified in General Instruction, Item 8.

26. If the test pressure cannot be maintained on the isolated system as specified, refer to General Instruction, Item 9.

27. At the end of the test period, the chart will be removed and retained for a permanent record and shall be identified as indicated in a General Instruction, Item 12.

28. Upon completion of the test, release the pressure.

29. Open the valve in the overflow line at the contingency tank. This will allow the test water to drain into the contingency tank.

30. Remove all blind plates installed in the flange unions for this test.

31. Re-install the blind plate in the orifice union in the 6" by-pass line from the gravity drain line to the classifier overflow line.

32. Close and plug all vent and fill taps.

EL PASO NATURAL GAS COMPANY
EL PASO, TEXAS
DEPARTMENT
MONUMENT COMPR. STATION
PLOT PLAN
SE/4 OF NE/4 OF NW/4 SEC. 1, T-20-S, R-36E
LEA COUNTY, NEW MEXICO
SCALE: 1"=50'-0"
DATE: 1-22-53
DWG. No. IMO-1-P1
FIGURE 22
REV
PRINT RECORD
REVISION
NOTE: LOCATE PAVED ROAD STRIP INSIDE 60' R.O.W. TO SUIT FIELD CONDITIONS
PAVED ROAD
COMPRESSOR BLDG FL. ELEV. 105'-10"
COMPRESSOR BLDG FL. ELEV. 103'-10"
AUXILIARY BUILDING FL. ELEV. 104.
6" L.P. DRAIN (PVC)
4" H.P. DRAIN
FINISHED GRADE 100'-0"
SLOPE FIN. GR. FROM 102'-0" TO 100'-0"
PUMP HOUSE
OIL TANK
CLASSIFIER
CHLORINE STATION
WINDMILL AMERADA CO. WATER WELL
38'-0" x 15'-0" CONTINGENCY TANK
6' SAND FENCE REF. DWG. IMO-2-M49
WALK GATE (STD-1-M1043)
DISPOSAL POND BOTTOM ELEV. 95'-0"
EXISTING 3" LINES
6" OIL LINE (RELOCATED)
AMERADA STATE D3 OIL WELL
AMERADA STATE D3 OIL WELL
SOUTH AREA IMO-1-P4
SEE DWG IMO-1-P4
NOTE: 100' ASSUMED ELEVATION ON B.M. AT 0+00N - 0+00W
NOTE: EDGE OF ROAD 9'-0" FROM FENCE
SEE IMO-3-P3 FOR 'B' CAMP
EAST 660'
NO°12'-E 662'
5 STRAND BARB WIRE FENCE
NEW WARREN LOOP LINE 5/10/67
16" GAS FR. WARREN MONUMENT
RELOCATED PIG TRAP SEE DWG. PA1-LEE-3
SEE IMO-1-P9
W.O. 31488

FOR CONT. SEE DWG. IMO-2-P201

FOR CONT. SEE DWG. IMO-2-P214

FOR CONT. SEE DWG. IMO-1-P1

4" H.P. DRAIN SCD52 HDR. BLOWDOWN

STORAGE BLDG.

S-3+00

GRADE EL. 100'-0" (PLANT YARD)

PLANT SAND FENCE S-3+00

6" L.P. DRAIN (PVC) OIL/WATER INLET

B.M. 100-5" LOCATED TOP OF CONCRETE CURB @ CENTER OF SWING GATE

(DEAD) 2" STARTING AIR, 6" RAW WATER, 6" TREATED WATER, 2" INSTR. AIR

6" OIL LINE

1" CONDUIT, 1½" CONDUIT, 3" CONDUIT

SHEET PROOF FENCE

SWING GATE

12¾" O.D. x 35' Lg CASING (USED PIPE)

4" (PVC)

4" SEWER DRAIN

6" OIL LINE

AREA LIMIT S-3+15'-0"

8'-11" 2'-11" 37'-9" 20'-0"

6" O.D. BLOW-DOWN SCRUBBER SCD52

S-3+15'-0"

3" DRAIN TO CLASSIFIER

42'-0"

37'-0"

AREA LIMIT S-3+32'-0"

6" VENT STACK

DISPOSAL LINE (A.C. TO SITE) S-3+42'-0"

8" RISER

4" TO COMPR. DUCT

AMERADA CO. WATER WELL (ABANDON)

S-3+50'-0"

CHLORINE STATION

IMO-1-P20

S-3+68'-0"

14'-0" 12'-0" 9'-0" 4'-6" 4'-6" 44'-10" 65'-3" 73'-3" 34'-9"

LIGHT POLE

V-2102 OIL STORAGE S-3+65'-0"

4" OIL TO TRUCK LOADING

4" H.P. RET. FM. TRUCK LOADING

TRUCK LOADING

38'-0" DIA. x 15'-0" HIGH CONTINGENCY TANK

W-2+98'-0"

AREA LIMIT W-2+10'-0"

6" OVER FLOW TO CONTINGENCY TANK S-3+78'-0" 6"(PVC)

V-2101 CLASSIFIER S-3+75'-0"

IMO-1-P16

PRJ. GRADE EL. 100'-0"

MATCH LINE W-2+20'-0"

4" DRAIN TO CLASSIFIER

3'-0" 37'-0" 9'-0" 5'-4" 10'-11"

6" (PVC) S-3+98'-6"

¾" INSTR. AIR

6" RAW WATER TO B.W. PUMP (PVC)

TIE INTO EXISTING RAW WATER LINE TO TEX. PLT.

AREA LIMIT W-0+80'-0"

JCT. BOX PIPE GUARD

S-4+00

4" FM CLASSIFIER

IMO-1-P18

BACKWASH FILTER & PUMP BLDG. SEE DWG. IMO-1-P18

AREA LIMIT S-4+21'-0"

39'-0" 20'-0" 31'-0" 40'-0" 29'-6" 31'-3"

LIGHT POLE

EPNG PROPERTY LINE

6" TREATED WATER
6" RAW WATER (ABANDON)
2" STARTING AIR (DEAD)

1" CONDUIT
1½" CONDUIT
3" CONDUIT

W-2+00

W-1+00

W-0+00

LEGEND

REFERENCE DRAWINGS

DWG. NO.	TITLE
IMO-1-P16	BACKWASH FILTER & PUMP BLDG. - PLAN
IMO-1-P17	CLASSIFIER AREA - PLAN
IMO-1-P18	BLDG. PLAN

REVISIONS

NO.	DATE	BY	DESCRIPTION	K.E. APP.	ENG. APP.	MFR. APP.	DATE	TO	W.O.
A	9-8-82	LH	ADD CONTINGENCY TANK	K.E.					

PRINT RECORD

ENG. RECORD		DATE
DRAWN	GS	11-19-81
CHECKED		
CHECKED		
PROJ. APP.	DWM	9-2-82
DESIGN APP.		

El Paso NATURAL GAS COMPANY

MONUMENT PLANT DISPOSAL SYSTEM

DRAIN LINE CLASSIFIER AREA - LAYOUT — FIGURE 18

SCALE: 1/8" = 1'-0" W.O. No. 4276

DWG. NO. IMO-1-P15

IMO-1-P2

K&E

LEGEND

Contour Lines Have Been Adjusted To Match Rectified Photo Base

REFERENCE DRAWING NO. IMO-1-P15 Rev. A

ENGINEERING RECORD	
DRAWN BY	Aero-Graphics
TRACED BY	
CHECKED BY	J. T. C.
APPROVED	F. S.
DATE	
PHOTO DATE	2-12-81
CONTOUR INTERVAL	2'

El Paso NATURAL GAS COMPANY
PIPELINE SERVICES DIVISION
EL PASO, TEXAS

PLANT AREA AND DRAINAGE PATTERN

MONUMENT PLANT

SEC. 1, T.WS. 20-S, RANGE 36-E
LEA COUNTY, NEW MEXICO

FIGURE 5

0 100 200 400
SCALE IN FEET

DWG. NO. 50273-

Aero-Graphics

PROPERTY LINE

PROPERTY LINE

PROPERTY LINE

PROPERTY LINE

PROPERTY LINE

A

B

C

D

E

POND No.5
012Ac.±

POND No.4
0.30Ac.±

POND No.3
0.39Ac.±

POND No.2
0.34Ac.±

POND No.1
0.48Ac.±

PROPOSED CONCRETE SLAB

PROPOSED CONCRETE SLAB

OIL TANK

CLASSIFIER

CONTINGENCY TANK

WASTEWATER CLASSIFIER AREA

LEGEND

A — DRAINAGE AREA PREDICTION POINT

DRAINAGE DIVIDE FOR PLANT AREA

DIRECTION OF FLOW

PROPOSED CURBED CONCRETE SLABS WITH APRON DRAINS

MONITORING WELL (SEE SHEET 2 OF 2)

REFERENCE DRAWING NO. 1MO-1-P15 Rev. A

ENGINEERING RECORD	
DRAWN BY	Aero-Graphics
TRACED BY	
CHECKED BY	J. T. C.
APPROVED	F. S.
DATE	
PHOTO DATE	2-12-81
CONTOUR INTERVAL	2'

El Paso NATURAL GAS COMPANY
PIPELINE SERVICES DIVISION
EL PASO, TEXAS

PLANT AREA AND DRAINAGE PATTERN

MONUMENT PLANT

SEC. 1, TWS. 20-S, RANGE 36-E
LEA COUNTY, NEW MEXICO

FIGURE 5

0 100 200 400
SCALE IN FEET

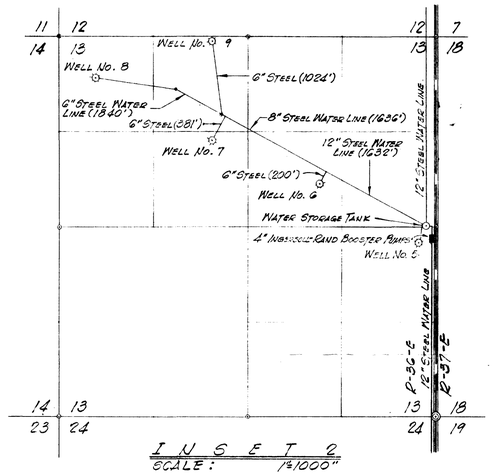
DWG. NO. 5007.19-1

SHEET 1 OF 2

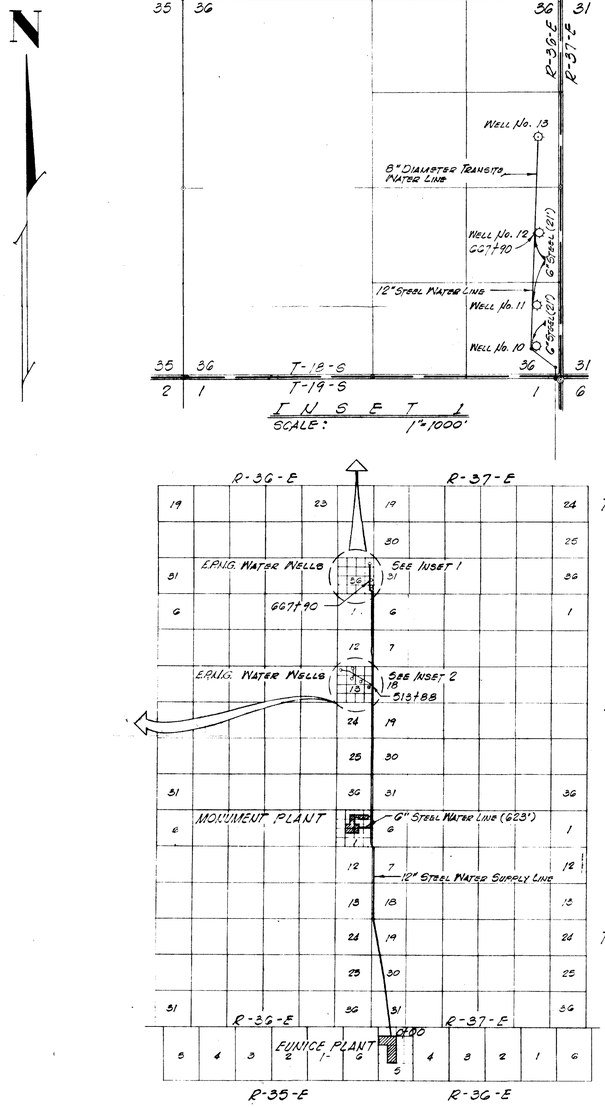
A REV.

REPRODUCTION BY aero-graphics

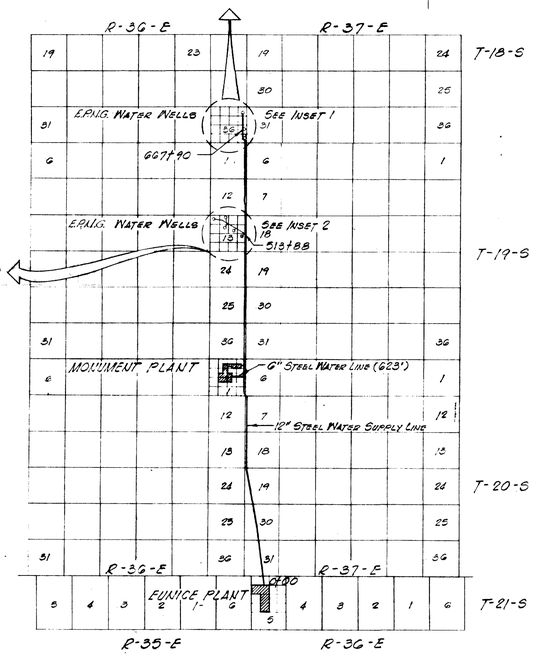
Contour Lines Have Been Adjusted To Match Rectified Photo Base



INSET 2
SCALE: 1"=1000'



INSET 1
SCALE: 1"=1000'



WATER WELL INFORMATION

E.P.N.G. WELL NUMBER	DEPTH	AQUIFER	NEW MEXICO STATE ENGINEER NUMBER	DATE DRILLED
5	123	OGALLALA	L-334	APRIL 1947
6	105	OGALLALA	195.36E.13.342	AUGUST 1947
7	110	OGALLALA	195.36E.13.231	AUGUST 1947
8	110	OGALLALA	195.36E.13.111	AUGUST 1947
9	125	OGALLALA	195.36E.13.221	AUGUST 1949
10	174	OGALLALA	185.36E.36.333	MARCH 1951
11	176	OGALLALA	185.36E.36.233	AUGUST 1952
12	175	OGALLALA	185.36E.36.323	AUGUST 1954
13	181	OGALLALA	185.36E.36.232	FEBRUARY 1965

NOTE: REFERENCE FIGURES 9 AND 10 OF THE REPORT ENTITLED "DISCHARGE PLAN FOR EL PASO NATURAL GAS COMPANY EUNICE AND MONUMENT PLANTS LEA COUNTY, NEW MEXICO" FOR INDUSTRIAL PROCESSES BEING SUPPLIED WATER FROM THE E.P.N.G. WATER WELL FIELDS.

FIGURE 4

REFERENCE DRAWINGS	REVISIONS			PRINT RECORD						ENGINEERING REC.	
5000.7-1, 5000.7-2, 5000.7-3, 5000.7-5 AND 5000.7-6	NO. DATE BY	DESCRIPTION	NO. DATE TO	NO. DATE TO		NO. DATE TO				DRAWN BY	JMC
										TRACED BY	
										CHECKED BY	J.F.C.
										APPROVED BY	E.E.S.
										PIPE SIZE	O. D.
										R/W NO.	
										R/W NO.	

El Paso Natural Gas Company
PIPELINE SERVICES - EL PASO, TEXAS

EUNICE MONUMENT WATER WELL SYSTEM
LEA COUNTY, NEW MEXICO

SCALE: 1" = 2 MILES
DATE DEC. 81
DWG. NO. 5000.7-11
REV.

FORM 7-219R (REV. 9-74)